# Terrorism and Game Theory

## *Coalitions, negotiations and audience costs*

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# Preface

The decision to study Peace & Development and conducting my research into terrorism was primarily motivated by my experiences whilst carrying out research in Peru during the hostage situation of the Japanese Embassy in 1996 (initiated by the Moviemento Revolutionario de Tupac Amaru (MRTA)). Peruvians condemned the action, but sure, their manifesto was sound and true and the director (who was a hostage) of the research centre where I was working, spoke relatively highly of the hostage takers as being reasonable and moral people. I left pondering my stance if violence (n)ever could be legitimate and what I would do if I would be in their position.

My research into 'terrorism' revealed that their struggle against unjust foreign domination through globalisation is only one of the myriad of possible causes. Despite taking a rational approach towards the topic by applying game theory to terrorism, which unmasked and clarified several aspects, many questions surrounding terrorism provide ample material for further research.

I would like to take the opportunity to thank my supervisor Professor Edward Moxon-Browne for the lively discussions and his encouraging enthusiasm.

Although the experimental game did not reveal answers I was looking for, they were great fun and opened up another intriguing complex issue of psychological game theory, therefore I thank the players Fraser Gray, Paddy McHugh, Astrid Mueller, John Power and Bernadette Sexton.



*"Maybe it's not a wrong answer—
maybe it's just a different answer."*

# Summary

The aim of the research was to investigate theories of terrorism and its changes over time and apply this to game theory, in particular the concept of audience costs and coalition formation within the game theoretical framework.

Causes and goals of terrorism were identified and modifications of ideas of terrorism in time observed, accompanied with an analysis of involved actors.

Based on a premise of justification derived from the Just War theory, negotiations with aggrieved groups (terrorists) can be a rational approach to such type of protracted conflicts and uncovered dynamics based on the composition and character of organised actors. This includes averting the joint bargaining paradox when asymmetric actors cooperate to achieve a joint goal, governments who may fare better from their point of view when dividing up refugees into geographically separate areas to decrease the possibility of cooperation between aggrieved groups and recognising two-speed negotiations, which can have a (detrimental) effect on (deadline) negotiations. Secondly, an adaptation of the audience cost model explained the "war of nerves" of the terrorist theatre involving the generation of fear amongst its targets and the updating of information on moderate actors by action of extremists. Several mutations of the Prisoner's Dilemma were discussed as options to prevent mutual harm.

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# Abbreviations

| | |
|---|---|
| **DA** | Deprived Actor |
| **EI-PC** | Economic Inequality – Political Conflict nexus |
| **EU** | European Union |
| **ICC** | International Criminal Court |
| **PD** | Prisoner's Dilemma |
| **RA** | Rational Actor |
| **UN** | United Nations |
| **USA** | United States of America |
| **WWII** | World War II |

# 1. Introduction

## *1.1 Introduction and overview report*

To most people, the word 'terrorism' instantly generates images of horrific, apparently senseless acts of violence. However, if one would probe a little further, what does terrorism constitute exactly? Who engages in such activities, why, what are its causes, and, especially at the time of writing, what makes the idea and threats of terrorism so prevalent in our lives? After all, the actual deaths as a direct result of terrorist violence do not justify the amount of attention given to the topic, compared with, say, deaths resulting from malaria.

Whilst carrying out preliminary research on terrorism, it intrigued me that available literature was dated, to 1970s and 1980s, and new publications were either referring to theories of terrorism proposed over 15-20 years ago or remained superficial (Keet, 2002a). (Inter)National relations as well as public opinion towards what constitutes terrorism have changed over the years, so it may very well be that certain developments in the theory/theories of terrorism have taken place. Moreover, and maybe part of a problem, terrorism appears to have an ill-defined definition which is subject to change (Guelke, 1995:48-51; Gibbs, 1989). Therefore, in the light of recent developments, it will be very interesting to investigate more thoroughly if a shift in theories of terrorism has taken place, and if so, which (part[s] of) theories are superseded by more recent models to include and describe current prevalent notions of terrorism. To be able to address problems in conflict areas suffering from terrorist actions one will need to have an understanding of the background, hence possible motivations, of involved actors. This is explored in chapter 2 of this report.

The insight I expect to gain in the theory of terrorism will be required to investigate the second tier of my research, which is the modelling of options for understanding and possibly the resolution of situations involving terrorism.

A widely accepted method in modelling in the area of political science and economics is game theory. There are, roughly, two strands in a game theoretical approach. A *zero-sum* approach (for example Brams (1985); Tay Kok Siong *et al.* (2001)) is used in a sense of government / hostages as winners and the zero set to executed terrorists. Adaptations of the mathematics behind the zero-sum game theory, initiated by Nobel Prize winner John Nash (1950; 1953), allows for modelling of *win-win* scenarios (or losing equally), which is known as a Nash equilibrium: all involved parties will obtain the best possible results for all parties and a change in strategy of one of the involved factions would lead that faction to gain (earn) less than if they remained with their current strategy. This can be further divided into cooperative and non-cooperative strategies. In most published research, this is applied on a qualitative

basis with limited predictions using actual values, for example 'if parameter *a* in the formula of the model increases then the overall utility decreases, which finds its real life example in conflict area *b*', or 'model x illustrates best strategy choice *y*', and probabilities. Examples where equilibrium approaches are used are:

- Joint bargaining paradox and coalition forming (Chae and Heidhues, 2001; Manzini and Mariotti, 2001). Under a pure-bargaining situation, coalition-forming results in a sub-optimal outcome from the perspective of the factions deciding to form 'one front' than when they negotiate individually. An adaptation of the mathematical model incorporates non-pure-bargaining, which could give an insight into why in real life situations coalition-forming may be beneficial to the factions involved, partly depending on the composition and structure of the coalition. One can think of the Palestine/Israel (Middle East) conflict and the internal coalition Palestinians have formed that may, or may not, strengthen their negotiation position; likewise the negotiation position of the Israelis.

- Government negotiations with terrorist and subsequent inclusion in a solution (joint government or governing responsibilities) may divide terrorist organisation(s) into moderates who are willing to negotiate, and extremists, who want to subvert the negotiation process, leading to a temporary increase in violence (Bueno de Mesquita, 2002). Examples might be the Northern Ireland Peace Process and ETA / Batasuna party in Spain.

- Audience costs (Fearon, 1994). This means a build-up of public opinion supporting government action to wage a  war, where the government pays the cost when it subsequently backs down (or a resisting nation giving in to pressure). Fearon suggests that the side with a stronger domestic audience (e.g. a democracy) is always less likely to back down in negotiations than the side less able to generate the audience cost (i.e. a 'non-democracy'). The relevance of this aspect is for example USA's 'war on terrorism'.

Chapter 3 addresses basic concepts of game theory and possibilities for applying these ideas to a terrorism context are explored in chapter 4. Chapter 5 provides conclusions and recommendations for further research.

Summarizing the above, I will conduct my research looking at strategies to deal with terrorists in the most constructive way, hence the modelling aspects of 'roads towards positive peace' based on theories of terrorism.

## 1.2 Research Questions

In this research, I intend to investigate and try to find answers to the following set of research questions:

- What theories of terrorism do exist and are they still of relevance today and/or have they changed over the past 25 to reflect changes in the global society?
- If the answer is yes to the previous research question, can be devised why theory / theories did change and can be identified what and when changes occurred?
- Determine which aspects of game theory may be useful as an aid in modelling activities surrounding dealing with actors involved in terrorism.
- Using the model(s) of a theory of terrorism, test the validity of, and adjust where appropriate, different game theoretical models of the involved actors in terrorism. Specific for the models:

  *- Joint bargaining paradox and coalition forming*: is there an optimum in the amount of factions and type of coalition-forming? Can they expected to be stable and fruitful, and if so, when?

  *- Government negotiations with terrorists*: the model discussed by Bueno de Mesquita (2002) is a limited (game) theoretical model because there can be more actors identified than included in the formulas (Kahn, 1989) and successful negotiations might be interpreted as a 'bad bargain' from the terrorist's side, therefore potentially amendable to achieve a different equilibrium. Furthermore, the assumptions on which his game theoretical model is founded might not hold.

  *- Audience costs*: to what extend would it be possible to adapt the concept of audience costs to a terrorism framework, with regard to the 'terrorist theatre' and democratic states desiring to 'combat terrorism'.

- Does the application of game theory on terrorism model(s) provide new insights, which might aid towards not only an understanding, but also provide ideas towards a possible resolution of such type of conflicts?


## *1.3 Methodology*

In order to answer the first three research questions as outlined in the previous paragraph, an extensive literature research of proposed theories of terrorism will be carried out, including changes in the meaning of 'terrorism'. These will be compared and contrasted with one another to determine prevailing ideas on terrorism in the different time periods, starting with the literature on the 'start' of the so-called Age of Terrorism (1970s), throughout the last 25 years up to and including current trends (i.e. post 9/11).

Following the results of the literature analysis, game theory basics are covered briefly, with more in-depth details on relevant sections of game theory. The latter focuses on the mathematics involved in the joint bargaining paradox and coalition forming, [government] negotiations [with terrorist] and the effects of audience costs.

In the third section of my approach, I will combine the devised theory of terrorism with the characteristics of the related game theory, and try to capture the possible dynamics of aspects related to terrorism within the formulae. Depending on the applicability of present game theoretical models, this may require adjustment of the mathematics and/or graphically visualizing indicative trends held within the formulae. If the latter is required, this will be carried out by using excel sheets or I will code a simple software program (coded in the C++ programming language) where one can set relevant variables.

# 2. Theories of terrorism

The title of this chapter might seem a bit surprising when one is familiar with the media reports, using the word 'terrorism' in abundance, the reader left to assume its meaning or infer what it conveys from the context. It certainly does not indicate that academics have written extensively about the topic or that these scholars hardly agree on conceptualising, defining and describing what terrorism is and are far from a unified theory on which they can agree. Therefore, I will discuss in this chapter what may be defined as terrorism, its myriad causes and goals, involved actors and changes in these ideas in recent history. This, in order to be able to provide the necessary background required for subsequent chapters, chapter 4 in particular, where models for resolving conflicts where terrorists are involved are discussed.

## *2.1 What is terrorism?*

A simple question without a straightforward answer. Academics and politicians do try to formulate one, but do not provide the *same* answer. Schmid, referenced in Piper (2002), carried out an inventory of definitions in 1984 and found 101 descriptions definitions of terrorism, containing 22 different factors that are characteristic for terrorism, but none of the 22 characteristics appeared in all definitions.

### 2.1.1 Definitions and word usage

Although the definition of what constitutes terrorism exactly is rather unclear, the word certainly has a negative connotation, considered a pejorative (Fisk, 2001:436) and an insult. Why? What makes terrorism different from other atrocities?

If one looks up statistics of deaths that are considered as caused by a terrorist act, "it has caused fewer American deaths than, say, highway traffic accidents" (Bakhash, 1987) or world wide deaths caused by tuberculosis (2 million per year[1]) and, at least before 11 September 2001, *directly* affects less people than problems like Third World hunger or environmental damage[2], but receives at least equal, if not more, attention and funding[3].

Terrorists acts are described in terms like "sheer bloody murder" when e.g. a Palestinian carried out a *self-sacrificing operation*, versus "operational blunder" (George, 1991) when

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[1] Refer to www.who.int for latest figures.
[2] Note here that with varying definitions, counting the death toll results in divergent statistics. Compare the RUC data (Wilkinson, 1977:88) with that of the Northern Ireland Office of the British Government (Bueno de Mesquita, 2002:29), the former registering roughly twice as much deaths per year.
[3] The latter include terrorist and 'counter-terrorist' measures.

Israelis *bulldozer* houses of *innocent civilians* in Palestinian refugee camps. Further, and maybe even more important, there's the famous quote "one man's terrorist is another man's freedom fighter"; the section "terrorist or freedom fighter?" below elaborates further on this dichotomy. This negative branding does not only occur in the media but, more dangerously, appears in academic research literature as well, mainly in the form of dehumanising 'terrorists':

> illiterate, simpleminded … Of course, not all terrorists are sufficiently stupid. Many are coerced … mentally unstable individuals … ignorant, religiously indoctrinated fanatics (Rathbone and Rowley, 2002)

Other, non-university, research bodies using similar vocabulary is for example RAND Corporation[4]. Condemning terrorism and the people carrying out terrorist acts before considering its meaning is not a constructive approach for independent and neutral research. Gibbs (1989) tried to take a neutral stance in conceptualising terrorism, it being a sociological phenomenon in terms of control, but his concept is an extensive inclusion definition in that he states that "Terrorism is illegal violence or threatened violence directed against human or nonhuman objects, provided that…." five conditions are met, which in return effectively excludes a whole range of acts. On the other hand, terrorism can be defined to be all-inclusive, hence render it meaningless. Chomsky (1991:12) defines two options to approach terrorism: a literal and a propagandistic one, respectively "taking the topic seriously" or "construing the concept of terrorism as a weapon to be exploited in the service of some system of power". Terrorism always has a political context and is used as a political label, where he comes to the conclusion that one has to "abandon the literal approach and recognize that terrorist acts fall within the canon only when conducted by official enemies" (Chomsky, 1991:12). If this were the situation, than *any* possible definition conveys, to a more or lesser extend, the subjective point of view of the author[5]. Is it possible to construct a working definition that is the least subjective? Lowe (2002:4) indicates

> To start with a definition like 'the intentional, indiscriminate killing of the innocent' is to *assume* the immorality of terrorism, and would end any discussion of its morality or immorality before we start.

which is in a similar vein as the "illegal violence" Gibbs (1989:330) is referring to. What qualifies as *legal* violence as opposed to *illegal* violence, legitimate versus illegitimate violence, or George W. Bush's 'self-legitimating'? What about the word violence itself?

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[4] For example Jenkins (2002). Azar (1990:2) talks about "dysfunctional cognitive and behavioural patterns", as if a terrorist has some kind of mental disease; or "terrorists and other malicious individuals" (Homer-Dixon, 2002).
[5] Due to space limitations a detailed account on the topic of definitions of terrorism is not possible. Extensive coverage on this aspect can be found in Guelke's book *The Age of Terrorism* (1995), *The Alchemists of Revolution*, by Rubenstein (1987) and *Terrorism* by Laqueur (1977).

One notion that the reader may want to keep in mind is that the author of this report grew up in 'The Age of Terrorism' (the 'age' starting, roughly, in the late 1960s) and started following current affairs since the early 1980s, unlike the vast majority of scholars of terrorism. Being educated in different uses of the word 'violence' in recent history is alike trying to teach a toddler to understand the word 'table': most tables have four legs, some three, some five and sometimes none at all, most tables are made from wood, but some contain glass or are made of iron; all are called a table. When is violence 'war' and when should one call it 'terrorism', or are they all mere *variations on a theme*? Not only in the popular use of the word terrorism, but also in contemporary literature (e.g. Charney, 2001:838; Pavlischek, 2001), distinctions are made, implicit or explicit, between those expressions of violence. Generally, in the Western literature terrorism is considered not war 'as we know it'. This poses the question: what is war? Is it different from activities referred to as terrorism, hence requiring a different definition, and another kind of response? This is the topic of the next section.

**Just War Theory**

National law, international law (enacted by e.g. ICC) and international organisations have laid down specific situations where a nation is legally entitled to go to war, and what actions are legally accepted as permitted to carry out during a war. These definitions, widely accepted and predominantly laid down by Western states, have a basis in Christian teachings on war and the use of force and are known under the terms *jus ad bellum*, providing guidance on the resort to force, and *jus in bello*, which places restraints on fighting a justified war, based on works by Augustine and refined mainly by Aquinas[6] (Pavlischek, 2001; McGurn, 1987; Lowe, 2001). The Just War Theory takes for granted that it is philosophically and theologically, hence morally, right in certain circumstances to go to war and kill people. It, however, does make a distinction between soldiers and non-combatants, especially when comparing war with terrorism:

> Unlike trained and disciplined soldiers on the traditional battlefield, terrorists deliberately and intentionally attack innocent and defenseless civilians. (Pavlischek, 2001)

> These acts of terrorism target the safety of innocent citizens, of non-combatants, and it is an analysis of the status of noncombatants that shows that terrorism, as we commonly understand it, is not compatible with just war theory. (Lowe, 2002:2)

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[6] Aquinas, *Summa Theologica*, Second Part, Part II, question 40 - " Of War", referenced in Lowe (2002).

But is it possible to demarcate 'innocent citizens'[7], and are, as Lowe indicates, innocent citizens and non-combatants synonyms? Is an off-duty soldier an innocent non-combatant, and adults in general? No adult is completely void of any responsibility, which leads Lowe (2002:4) to touch upon the sliding scale of "different degrees of culpability". Though there is a widespread idea that children are innocent, not everybody agrees[8]. Secondly, from the above distinctions, one can infer that during a 'real' war, perpetrators do not target civilians deliberately. One example, for indicative purpose, illustrates this is not true, or one may need to dismiss WWII as a 'just war': Operation Gomorrah in 1943 killed 30000 German citizens in Hamburg overnight (Drewermann, 2001). The city was a deliberate target, not accidental 'collateral damage'.

On the other hand, Fromkin (1977), and others in later publications, distinguishes terrorism as a weapon of the weak and terrorists, as opposed to states waging a war, do not achieve their goals by their actions, but through the reactions on their actions[9]. Thus terrorism is an indirect strategy to achieve one's goals, whereas people waging a 'real' (just) war, chose targets with the aim to destroy a specific target. An important notion is that its effectiveness depends on the reaction of the opponent. This is also its Achilles heel: the opponent may act in another way than anticipated, thus having the option to break a vicious circle or downward spiral. Terrorists themselves tend to judge the success of an action based on the amount of media coverage and propaganda and the resulting psychological 'warfare'; i.e. the instilled fear and sense of insecurity, the idea of 'invisible enemies', not knowing where they are or with how many, etc. From a political philosophy perspective, terrorism is an indirect strategy (Fromkin, 1977). However, this only suggests that the connection between action and goal in a war is closer linked to on another, more obvious, than the indirect strategy of terrorists, where the link between action and goal requires additional clarification because the two lay further apart, hence there is a gradation with a grey area to decide if action and goal are linked 'close enough' to fit 'war'. Who decides?

Another point of debate on war versus terrorism is the just war characteristic *proper authority*[10], meaning a "lawful government or supragovernment authority" (Anon, 2001), i.e. a state or international organization. This implies that a non-state actor fighting for independence or some level of sovereignty never ever can do their (terrorist/war/violent) acts justly and would always be immoral. Clearly, historically this is not considered to be the case, as a vast majority of states established themselves by violent means, or they were terrorists. On the other hand, if one allows for non-state actors, provided they meet aforementioned

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[7] Intriguing is the use of a new term in the media, widely used after the May 2003 bombing in Morocco: *soft targets*, as opposed to 'innocent civilians', where killed by explosions.
[8] A Phalangist soldier involved in the 1982 Sabra and Shatila massacre in Beirut justified killing children and pregnant women, because "Pregnant women will give birth to terrorists; the children when they grow up will be terrorists." (quoted in Fisk, 2001:359).
[9] For example Friedman (2001): "Unable to actually imprison us, these terrorists want us to imprison ourselves".
[10] The other characteristics: just cause, just intention, last resort, limited ends, proportionality and reasonable chance of success (Anon, 2001).

characteristics of waging a just war, 'especially the demands for justice and discrimination, *then some acts of what has traditionally been called terrorism are permissible and just*." (Lowe, 2002:4).

Making the discussion  full circle, is that when "a legitimate authority uses force justly, *it is acting in a way consonant with God's governance in a fallen world*." (emphasis added) (Pavlischek, 2001).  The whole notion of *jus ad bellum* and *jus in bello*, according to international standards, has been defined by Western Christian thought, which is very much based on, and emphasizing

> both the autonomy of abstract reasoning and a dualistic conception of reality that privileged the "this" as compared to the "that", producing a series of devastating either/or distinctions: mind/body, male/female, reason/emotion, citizen/stranger, self/other, white/black. (Falk, 1991:102)

Whereas other religions, like Daoism or Buddhism, contain a complexity far beyond Western dualism and may have other notions about peace and war, which has not been taken up in the current international sphere of organisations or law.

Summarizing, while the idea of 'just war' and its validity of use as an international standard may not live up to scrutiny, as people in other regions may not agree with the 'international standard', it is used as a standard to compare terrorism with. Even when using these standards, one can come to the conclusion that terrorism in certain situations with regards to non-state actors may actually fit the description of a just war and can be legitimate, not some 'alien evil' to be destroyed, more so when one takes into account the notion of degrees of culpability and the grey area of the distance between means and ends. This leads to the conclusion that terrorism and war could indeed be interpreted as variations on a theme.

**Terrorist or freedom fighter?**

From the 'Just War' section, on may infer that terrorism could be considered legitimate in certain cases. This finding may seem a *contradictio in terminis* to some academics, as they consider exactly the illegitimacy of the actions as a defining property of terrorism.  On could argue that when 'terrorism' is legitimate, it is not terrorism, but the perpetrators are freedom fighters instead. Following this line of reasoning, 'terrorism' based on ideological grounds can never be legal and legitimate, but 'ethnic groups' may have the possibility of receiving the label 'freedom fighter' – hence may be legal and legitimate in their actions. However, I do not agree with this line of reasoning on two grounds. First, irrespective if one would refer to an aggrieved group as 'terrorists' or 'freedom fighters', they both use the *same method of working* of indirect means, which includes the use of violence, to achieve their goal(s) and exploiting the features of a terrorist theatre by instilling fear as important strategy, therefore

one should refer to the same process with one name – terrorism. Secondly, it is the *motivations* (causes/goals) for resorting to terrorism as a tool on which people (states, organisations etc. [§2.2.2]) decide – classify the aggrieved group – if a struggle is legitimate or not, which lies in the eyes of the beholder as well as international agreements, like Just War Theory and the Universal Declaration of Human Rights. This allows for a discussion based on reasoning and arguments where one can compare the terrorist's motivations with these international agreements on its legitimacy of the use of violence, as opposed to measuring 'terrorist or freedom fighter' by two standards and use a label when it suits some political stance at some time.

This distinction between method of working and motivations better represents the subjectivity surrounding terrorism. It does not only capture the differences in interpretation and labelling concerning ethnic groups or refugees (see also §2.2.1), but also covers ideological terrorism. For example an aggrieved group desiring a standard of living at least on, though preferably above, the poverty line, is enshrined in the Universal Declaration of Human Rights as their rightful right: from their perspective, and from compassionate governments in the world, fighting for survival can be considered as legitimate even though they are not fighting for freedom from occupation. Yet, at the same time other organisations and governments may have a different view on this. If one would characterise terrorism by its very reason of illegitimacy, the problem of different perceptions on motivations is not fully addressed, even though that is exactly the decisive factor in classification, whereas when one defines terrorism by its method of working, it allows for further clarifications on (protracted) conflicts. This, in turn, brings forth the notion of legitimate terrorism (freedom fighter is a subset) as indicated in the previous section, and is in the light of the explanation in this section, not an oxymoron.

**Working definition of terrorism**

Despite reservations, it is necessary for this research to place it in context as to what I consider terrorism, therefore my working definition on what I mean when referring to 'terrorism' is

*The use of physical and psychological violence as a means to achieve a political goal.*

Terrorism is a means to achieve a goal, and not a goal in itself, as the fear and destruction inflicted on somebody or something is not the 'end station' of what a terrorist wants to achieve. I am aware this begs for discussion on how distant the relation between means and end should be to 'qualify' for terrorism (see the Just War Theory section), on which I do not have a definite and conclusive answer. Terrorist acts can involve definite indirect means, as in A attacking B to influence C that subsequently affects D, which does not occur in a straightforward 'just war'. Secondly, I include 'political goal' as a way to distinguish it from

'criminals' or 'violence for violence sake' to which some literature, in my opinion, it unjustly degrades. I include physical and psychological violence (= instilling fear), but not structural violence, because structural violence is too prevalent in the world, which, when included, would make the definition too all encompassing. Further, by omitting referencing to labels like 'non-state groups', both non-state and state terrorism fall under this definition. One could argue to categorise state terrorism under 'supportive terrorism', 'counter-terrorism' or 'counter-insurgency measures'[11], but the track record and list of policy measures shows that state terrorism and its all variations are closer to a situation of combating fire with fire, than an enlightened approach towards a peaceful resolution. Last, for reasons elaborated on in the previous section, there is sufficient doubt, a grey area or sliding scale, between combatants in war and civilians or non-combatants, that a well-defined distinction cannot be upheld and therefore not included in the definition.

## 2.1.2 Causes and goals of terrorism

Partly due to definitional problems outlined in the previous paragraph, research literature on causational factors and diverse goals that drives people to resort to carry out terrorist acts is inconclusive. How these two are connected can be a matter of debate: are researched causes derived from terrorists' manifestos, implicitly or explicitly worded goals, or are living conditions perceived as unjust and not decent and therefore its goals may be inferred, or a mere conjecture?
The first section of this paragraph provides an overview of the wide range of aspects that are attributed as being a contributing factor and the second section looks into its (un)related goals.

**Causes of terrorism**

Probably the most contested cause of terrorism is an aggrieved group resorting to violence for nationalist or separatist reasons; depending on one's point of view, this can be considered as *resistance* against an (external) oppressor. Thus far, only Mahatma Ghandi and his followers of the freedom movement have managed to liberate themselves from foreign occupation by peaceful means (Drewermann, 2001), whereas in most other (previously) colonised states "nationalism movements commonly turned to terrorism", it being "the resort of an extremist faction of this broader movement" within an ethnic minority (Crenshaw, 1981:383). Williams

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[11] Wardlaw (1989:179) categorises 'state terrorism' as "sub-species" of terrorism, and primarily as an activity of what I discuss as 'principal supportive states' in §2.2.2, supporting terrorism in some way *in another country*. George (1991) considers 'state terrorism' as including acts of terrorism carried out directly by the state *in the same country* of the conflict zone itself.

(1994) provides an overview on the relation between ethnic minorities and the likelihood of conflict, for example to establish or assert language rights, religious beliefs and symbols (1994:59), but he also includes factors like

> civil and political rights and privileges, …, regional-ethnic parity in the economy… What then generates perceptions of unfairness is competition/rivalry when an ethny is subordinated or disadvantaged in economic opportunity, social status, political voice and rights, or cultural expressions. (Williams, 1994:59)

However, these factors are not unique for ethnic minorities. To generalize it further, ethnic conflict arises from a "complex combination" of class, inequality, political opportunity, mobilization resources and "ethnic strength" (Williams, 1994: 49). How can 'ethnic strength' be measured, and to what extend is ethnicity (and related nationalist separatist movements) a constructed concept?[12] One note of caution on the importance of ethnic conflict is appropriate. Fearon and Laitin (1996) assessed the ratio of actual versus potential communal violence in Africa from independence through 1979, ranging from 0.0005 for actual ethnic violence to 0.0028 (or 0.28%) for ethnic civil war, thereby claiming that incidence of ethnic conflict is hugely overestimated due to research bias. Worded more positively: most ethnic groups live in peace with each other[13].

A more important factor may be the social stratification Williams is referring to and inequalities in the distribution of scarce resources. Extensive contemporary media and literature simplify this to the poverty argument[14]: when a group is absolutely or relatively deprived, they rebel. A comprehensive evaluation of the extant literature on the validity of this argument, the Economic Inequality – Political Conflict (EI-PC) hypothesis, has been carried out by Lichbach (1989), who came to the conclusion that "EI-PC studies have produced an equivocal answer about the EI-PC nexus" (p440) regardless the research angle (statistics, rational actor and deprived actor paradigms). Problems Lichbach identified were notions on the lack of exactly defined economic factors influencing the decision to resort to political conflict and the "tolerance for inequality" (p452), according to the Rational Actor (RA) approach shifting to behavioural dissent only when absolute poverty is present, the Deprived Actor (DA)[15] scientific research program's undefined additional "intermediate psychological processes" (p459), and another not fully explored factor of the ([in]significant) influence of collective action (p465). Say, one dismisses the inconclusive research results and assumes that it is a (major) cause fuelling terrorism – proof by contradiction: roughly 15% of the population

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[12] Nevertheless, the idea works for mobilizing people.
[13] Their findings will be further elaborated on in chapter 4, cooperative structures in game theory.
[14] Examples are Murphy (2001), Kristof (2002) and the Internationale Vereinigung für Moraltheologie und Sozialethik [international organisation for moral theology and social ethics] (2001).
[15] Refer to T.R. Gurr's *Minorities at Risk* for a comprehensive explanation and discussion on relative deprivation (in this work referred to as consisting of Deprived Actors).

consumes 85% of the resources, UN statistics show that citizens in the Third World are worse off now than 30 years ago, while a small faction in those countries enriched themselves, i.e. RA and DA are both present as well as the statistics. If either one of them is true, the West ought to be continuously subject to terrorist acts by (a small group representing) people from these Third World countries. But there is no huge mass uprising of the vast majority of the world population against the few in Western states, nor continuous terrorist attacks carried out by Third World citizens against the West. In fact, the amount of terrorist incidents declined in the 1990s[16].

Broadening the perspective to globalisation, Galtung (2002) blames the Third World – First World dichotomy as a new version of class conflict based on structural violence. This assertion in itself *may* provide an explanation as to why widespread social upheaval has not occurred. Proving injustice being done by structural violence is considerably more difficult than an overt assault on a country or discrimination of a target group, and even if one succeeds in convincing their own group, they will likely stumble upon resorting to terrorist methods, not possessing sufficient assets to purchase and develop so-called 'weapons of mass destruction'. This is an example of aforementioned (§2.1.1) wider gap between means and ends.

Guelke (1995) explores globalisation, inequality and the Third World from another direction and explores the possible links between economic affluence and a *stable* liberal democracy, thereby assuming that it would reduce incidence of terrorism. However, at the same time he asserts that a liberal democracy "has proved little more successful than other forms of political systems in overcoming the relative weakness of the state in many Third World societies" (p135) and that economic development is a more important factor to maintain law and order. Guelke is more concerned with intra-Third World conflicts than world wide international terrorism[17] and in addition to economic development, the possible effects a "debilitated" liberal democracy in Third World countries may induce and facilitate, but without formulating a sound conclusion on the matter either. The factor of democracy as an instigator or facilitator for terrorism deserves further exploration. A democratic government is supposed to represent the people and provide political means to voice grievances, hence essentially providing a sphere where terrorism has no place. For this reason, in theory, there *'cannot'* be an aggrieved group that is not adequately represented; otherwise, it is a 'violation of the doctrines of democracy and constitutionalism" (Wilkinson, 1977:232). In reality, this may not be the case: for example the 'second-class citizens' in the democratic Jewish state Israel (excluding non-Jewish

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[16] Refer to e.g. 'Patterns of Global Terrorism' publications, downloadable from the US State Department website at http://www.usemb.se/terror/.

[17] Additionally noting "there has been relatively little spill-over from political violence within Third World states into the international arena" (Guelke, 1995:142).

citizens certain rights (Dworkin, 1997:222)). Such a situation would fit Wilkinson's assertion that political violence is morally justifiable in a democracy in two occasions[18]:

> Firstly, there is the case of the minority whose basic rights and liberties are denied or taken away by arbitrary action of the government or its agencies. … [Second] when one minority is attacked by another minority and does not receive adequate protection from the state and its forces of law and order. (Wilkinson, 1977:40)

and

> Those who are the subjects of a liberal state, but who are not admitted to its rights of citizenship cannot be morally bound to obedience to the state. They are not bound by political obligation for they have not been accorded any rights by the state. (Wilkinson, 1977:39)

Arguably, based on these claims, one can say it is exactly absence of a 'correct' implementation of democratic ideals and not democracy *sic*.

However, a characteristic of democracies is their openness. Some, like Meyer (2002) and Khan (2003), consider this openness a major weakness of the system, and therefore a 'cause'. Openness in itself cannot be a cause, only maybe *easing* terrorists in their preparations and facilitating publicity in the relative absence of censorship, but not the 'change of mindset' to resort to terrorism as a tool. Likewise the non-cause of the claims of the increase in ease of mobility and technology, put forward by for example Homer-Dixon (2002).

It is conceivable to contend that Western states are as close to the democratic ideology as possible, but it is generally assumed the case, thereby invalidating Wilkinson's two occasions. Why then, have Western states not been free from internal terrorism? What might be a cause, is the so-called 'terror of the majority': the minority is represented and allowed to voice their grievances, but this is consistently not translated into desired policies because there are not sufficient votes to pass desired legislation.

Rubenstein elaborates another interesting aspect occurring in Western liberal democratic states in his book *Alchemists of the Revolution* (1987), though not necessarily because of a hiatus in democratic governance. There are two points I would like to bring under attention. First, Rubenstein's thesis that the main cause of terrorism are disgruntled, disaffected, intelligentsia who are in a social and moral crisis unable to mobilize the masses. This is "a primary internal cause of terrorism, dictating to a degree its philosophy, tactics and consequences" (Rubenstein, 1987:xvii). Intellectuals, of the type of ambitious idealist, do not have a rebellious lower class to lead due to shifts from primary and manual work to the services sector, nor do they receive guidance from a creative upper class that they can follow.

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[18] This is in contradiction with the classical just war theory (disallowing non-state actors the right to violently resist), even though both just war and democracy have their roots in Christianity.

When rigid social stratification shatter hopes for social transformation, then the ingredients are present for a start or rise in terrorist activities in an attempt to reconnect with the masses who they claim to represent and aspire to lead[19]. But now, 15 years after the book's publication, access to third level education (the 'democratisation of education') has increased to such an extend that it devalues degrees to a minimum standard for procuring a job. Is the degree graduate now the new (white collar) working class stuck in his/her cubicle? If true, then the 'gap' between the masses and intelligentsia is smaller[20] at present, hence more likely to be bridge-able, and therefore less prone to induce ideas to resort to terrorism, thus at least weakening Rubenstein's view. The second aspect of Rubenstein's book is a broad discussion on the myriad of, predominantly leftist, political ideologies – indirectly the perceived cause being the undemocratic government, unfair capitalist system *et al* – but may simply be a failed revolution (see also next section 'goals').

Opposite the concept of disaffected intelligentsia is the assertion that it is not intelligentsia, but simpleminded people who are easy to indoctrinate that are perceived to be 'the cause' (Rathbone and Rowley, 2002; see footnote 4), essentially trying to dehumanise terrorists[21], prevalent in more recent popular literature. In this context, Midgley (2002) has put forward an interesting explanation for the increased levels of dehumanisation:

> a continuation of the frozen, abstract hatreds made possible by the cold war…
> this suspending of normal human relations is supposed to be just a temporary
> expedient … The corrupt thing about the Cold War idea was that it legitimised
> acceptance of this evil as a normal, permanent condition of life. It domesticated
> tribal hatred.

Thus obfuscating the distinction between literal and metaphorical wars, where the negative mindset of people caused by the Cold War continues to live on, and feed, terrorism and the violent responses on terrorism, made possible by disregarding the idea that an opponent is a human being too. However, a closer examination of this argument reveals that the implied cause of the violence is within us, having internalised dehumanisation, not the 'illiterate stupid other'.

In line with either dehumanisation, or with previously outlined ethnicity and democracy or both, is religion as a cause for terrorism put forward, 'Muslim fanatics in the Middle East' in particular. Michael Radu[22] (2001) provides a simplification: *democracy* is declared un-Islamic by all ideologues of Islamic terrorism, Islamists hate *capitalism*, believe in

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[19] "…ever since the Russian intellectuals "invented" modern terrorism…" (Radu, 2001), referring to Narodnaya Volya. For similar claims, see e.g. Wieviorka's "Disappointed, frustrated or unrealisable upward mobility" (1988:29); "middle-class alienation" (Kristof, 2002); "spoilt children of affluence" (Wilkinson, 1977:93); Crenshaw (1981); Williams (1994:65).
[20] Smaller than the gap between primary / secondary school level and postgraduate Masters / PhD degrees.
[21] Confirming terrorist's core reasons they are fighting for: being heard, recognised and treated as equal human beings.
[22] Michael Radu, Ph.D., is a senior fellow at the Foreign Policy Research Institute (FPRI), where he directs its Center on Terrorism and Political Violence.

a new Caliphate (who will lead the community of Muslims worldwide) and oppose *individualism*. Statistics reveal two relevant intriguing facets. One is religious revival in general, with the US at the top (Doyle, 2003), the other is statistics on killings (including from one murder to world wars) gathered and analysed by Lewis Fry Richardson, mentions, among other factors, on the causality of violence and religion:

> *The one social factor that does have some detectable correlation with war is religion*. … nations that differ in religion are more likely to fight than those that share the same religion. Moreover, some sects seem generally to be more bellicose (*Christian nations participated in a disproportionate number of conflicts*). But these effects are not large. (emphasis added) (Hayes, 2002:15)

Bear in mind though, that there is also a 'disproportionate' amount of Christians. In turn, it can be argued that there are many Christians exactly because they 'seem generally to be more bellicose'. Notwithstanding the above, all religions emphasise that one should treat others as we wish to be treated, and that one should not kill another human being (the latter with a few exceptions – see e.g. §2.1.1, Just War Theory).

From an Islamic perspective, there are scholars who consider Western society, which is based on Christian theology, as the main cause of terrorism, and social Darwinism and materialism in particular (Yahya, (1)). Last, New Age – as a religion – considers the perceived cause of terrorism the "modern society", being "too stressful and uncreative" (Ridgley, 1999), i.e. a problem within oneself.

Summarizing, among the multitude of causes that may lead a person to resort to terrorism, none conclusively links a sole cause to the act. Ethnicity, nationalism/separatism, poverty and economic disadvantage, globalisation, (non)democracy, Western society, disaffected intelligentsia, dehumanisation, and religion all have arguments confirming a possible existing link, as well reservations against a causal relation.

**The myriad of goals**

Outlining the goals terrorists strive for faces a similar problem as trying to identify the causes, and is in turn connected to the definition of terrorism.

First, terrorists / freedom fighters may want to liberate their country from foreign occupation, or strive for partial or complete self-determination to form a new state, or regaining the region the group calls their homeland. Second, reforming government in accordance with the various political ideologies, ranging from anarchism to socialism and communism and its variations (Crenshaw, 1981; Rubenstein, 1987; Weinberg, 1991). Essentially, these goals are all quests for influence, power (see e.g. Radu, 2001; Crenshaw, 1981), ranging from being heard, taken seriously as a human being, demanding equal rights, recognising and attempting to secure fundamental human rights, including sufficient living conditions, to creating and controlling a

state. Some try to secure this by aspiring a revolution, which, when there is no sufficient base to mobilise the masses, may never exceed the stage of (germinal) terrorism; thereby implying that successful terrorism is or can be upgraded to the level of a victorious revolution, hence realising his/her goals.

However, procuring power is not always the (main) goal. Trying to prove the government of a country is fundamentally flawed; exposing its injustice (e.g. the structural violence perpetrated by organisations) in the hope the scales before the public's eyes will fall and will see the 'true' nature of the unfair government is another target. In short: the failed state (Coates, 2003; Khan, 2003; Piper, 2002; Crenshaw, 1981), which is expected to respond with curtailing civil liberties (as happened in the US after 9/11 (Hayden, 2002; Brinkley, 2003)) and to disrupt the delicate balance (in democracies) between security and freedom (Meyer, 2002).

Finally, a goal that *might* become specific for this time (however, see also §2.1.3), is the religious revival, some may call it fundamentalism, as a goal to avert 'the societal problems of modern times' (see e.g. Yahya (2); Anon, (1); Doyle, 2003). This stance assumes that more devotion leads to a fair distribution of resources, an end to killing humans, more cohesion in societies, more respect for others and so forth. A full theological debate on the matter falls outside the scope of this report.

### 2.1.3 Changes in definitions over time

Before being able to discuss changes in concepts of terrorism over time, there are a few general difficulties with such an approach to bear in mind.

*The subjectivity inherent in social research.* This is always a problem when engaging in social research (Keet (2002b)), but more so when attempting to investigate an ill-defined concept like terrorism. Where does an 'informed guesstimate' end and conjecture, mere speculation, start? Moreover, previous periods are easier to summarize than recent or even current affairs, due to the lack, and impossibility, of overview of the long-term implications of current events.

*Whose glasses are you looking through?* It may be clear from previous paragraphs, no matter what exact definition and description one attaches to terrorism, everyday use easily slips into the pejorative sense instead of the literal and different (research) institutes and 'think tanks' having their own measure as to what comprises terrorism. Even being aware of these differences, this still poses a problem when one looks trough the glasses from other cultures or languages. A simple example may suffice. *Grosso modo*, 'the Western countries' are lumped together as a homogenous group, where the prevailing language is English, and this research is carried out by predominantly referring to English literature. Partly fuelled by my discontent of the (lack of) depth of most of this English contemporary literature on terrorism as

well as the fact that I found two non-English language scholarly books highly informative[23], I carried out a limited investigation on differences between English and non-English (popular) literature to put my suspicions on language and preferred-viewpoint-bias to the test. A restricted comparative book search between five major Internet book resellers in the US, UK, the Netherlands, Germany and Spain was conducted; *Appendix A* outlines the methodology and raw data and *Table 1* on the following page summarizes the data analysis. Important in this context, is to observe the difference in percentage of books with a "9/11" (related) topic in both UK and US, 45% of their total, compared with only 12.5% of the most popular non-English language books that are related to the events in the US of 11 September 2001. Secondly, of the 20 most popular "terrorism" books at Barnes and Nobles in the US, 6 are fiction novels (30%). Though one should not tar the US and UK with the same brush by the mere observation of the overlap of five books that were listed in both their top 20, there is a difference in accent: aforementioned fiction novels (USA) compared to Northern Ireland-related books in the UK list. There were only two English language books translated into another language and on English and non-English language lists. One could argue the Germans and Spanish scholars have ample material of recent history and current affairs in their own country to write about, but so does the UK.

A consequence of this relative lack of variation in sources is, besides being aware of differences in topical emphasis between languages, that certain aspects may not receive the attention in English language literature, hence in this report, it otherwise may have deserved. A compare and contrast is beyond the scope of this dissertation, but is an interesting avenue for further research.

*Wider historical perspective.* The next section starts with late 1960s as 'the age of terrorism', yet this does not mean terrorism is a new phenomenon, merely that the author demarcated the time frame. For example the Assassins, Robespierre's *régime de la terreur* in France during 1793-94, Narodnaya Volya in Russia, and Latin American 'freedom fighters' in the 20th century; respectively introducing the words assassination, terrorism, intelligentsia and guerrilla[24] warfare into the English language. An explanation why contemporary English scholars consider an 'age of terrorism' is the relative peace argument Guelke (1995) has put forward: there are no large amount of casualties in Western states post WWII, which softens the Western psyche in that a few deaths will have a relatively larger impact. It is difficult to verify if the actual incidence of terrorist acts have increased over the past 30 years, due to the various opinions on what to include in the statistics; for the time being, all still fits neatly within a Poisson distribution (Hayes, 2002), i.e. pure randomness of violent events of any kind.

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[23] The books are written in German (Funke (1977)) and translated from French (Wieviorka (1988)). This does not imply I fully agree with its contents.
[24] Guerrilla is the diminutive of the Spanish (Castellano) word guerra, which means war.

*Table 2.1. Data analysis popular book search*

| Analysis | Count | Percentage of total | Comments |
|---|---|---|---|
| Total amount of books* | 88 | | |
| Total amount of unique books** | 83 | N/A | 5 overlap Amazon and Barnes & Noble |
| Books on offer, including translations, in all countries | 0 | 0 | |
| Translated books*** | 5 | 6% | "9/11: The big lie" by Thierry Meyssan (UK-English and German), "The New Jackals: Osama Bin Laden and Future of Terrorism" by Simon Reeve (UK-English and Dutch), and three books from English into Spanish |
| 9/11 related books of all books (in title or summary) | 24 | 27.3% | |
| Percentage "9/11" of all English language books | 18 | 45% | 18 out of 40 books |
| Percentage "9/11" of all non-English language books | 6 | 12.5% | 6 out of 48 |
| Listed books with a publication date < 9 September 2001 (or unknown) | 24 | 27.3% | (3 Amazon, 3 Barnes & Noble, 5 BOL, 6 Buch, 7 Casa del Libro) |
| Prevailing category of categorised books | 23 | 69.7% | Amount of not NULL: 33<br>1st: Society and Politics & Philosophy. Noteworthy: 6 Barnes & Noble books were fiction novels; 6 history; 4 biography. |
| Authors with multiple books and not in category 'fiction' | 5 | 13.6% | Caleb Carr, 9 (2), Bruce Hoffman (2), Thierry Meyssan (3), Simon Reeve (2), Peter Taylor (3), |

\* Amazon, 20 books: UK; Barnes & Noble, 20 books: USA; Buch, 20 books: Germany; BOL (Books OnLine), 8 books: the Netherlands; Casa del Libro, 20 books: Spain.
\*\* Translations are considered as 'unique book'.
\*\*\* Includes books where English is the original language, and the listed book in any of the other languages, and vice versa.

*International and domestic politics.* In addition to the relative peace argument, politicians tend to favour having an opponent to unite citizens and prove leadership in 'difficult times', or to create, or at least emphasise, external conflicts to divert public attention from internal problems[25]. Terrorism does well in that respect, because it is difficult, if not impossible, to entirely resolve/end/root out, and provides for an ideal mix in the media: "a highly compelling performance that combines the elements of bloodshed and mystery, human interest and politics, heroes and villains" (Wieviorka, 1988:42). Alike the 'bread and games' the Romans provided for their citizens to keep them occupied with relatively harmless pastimes.

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[25] The 1998-99 bombing raids in former Yugoslavia and Iraq are considered such an action, in an attempt to downplay Bill Clinton's Monica Lewinsky scandal.

**The start of the Age of terrorism**

Bearing in mind aforementioned reservations, there are roughly four distinct changes in the concepts of terrorism found in discussions on terrorism literature over the last 30 years.

Late 1960s – 1970s

Terrorism is considered as a 'new' phenomenon in the post-colonial era. This is 'illustrated' by the internationalisation of terrorist acts, like several plane hijackings and the 1972 Munich Olympics, appearing on the EU and USA radar. In Latin America, a shift form rural guerrilla to urban terrorism took place (see e.g. Allerman, 1977:173-197), with the landmark publication of the *Mini-Manual of the Urban Guerrilla* written by Carlos Marighella (1969).

Terrorists are considered to be driven by political ideology and secular motives (Jenkins, 2002), though this may be because of 'the intelligentsia' (see §2.1.2) and the time of *détente* in the sixties (Rubenstein, 1987; Guelke, 1995; Wieviorka, 1988). On an international scale, the 'start' of the age might also be linked to (relatively) eased East-West tensions and relative peace after the Cuban missile crisis (Guelke, 1995:184), thus maybe more a result of 'international and domestic politics' as mentioned in the previous section.

Terrorism in the 1980s

Predominantly a result of the Cold war politics, with an accent on groups with leftist political ideologies, Marxism, communism etc., referencing the 'Red Network', alleging that Russia is behind all terrorism, with the high/low point Claire Sterling's *The Terror Network*[26].

Late 1980s – early 1990s

The fall of the Berlin wall and Glasnost "represented a change in the nature of the international political system, with important implications for the concept of terrorism" (Guelke, 1995:183): some voices raise (Western) state terrorism and the existence of 'Black terrorism', committed by far right movements. The West is seen as the main perpetrator, which is the same trap of thinking as the 'Red Network' advocates, but then the other way around. There still exists a strong research bias in picking examples of 'terrorism' to suit the scholar's own interpretation to make his/her point.

Jenkins (2002) considers terrorists to be driven more and more by "ideologies that exploited religion". This might appear so, but the changes in international politics, analogous to what Guelke provided for the onset of the age (see above), may be closer to the truth: as Piper points out, "that with the end of the Cold War, ideological motives are partially relieved by economic interests"[27], with a marginal note on the vague term 'economic interests' (see also

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[26] Sterling, Claire, (1981), *The Terror Network: the secret war of international terrorism*. London: Macmillan. This book is widely criticised and proven incorrect, in that claims and assertions made in the book were not founded upon true data (see e.g. Herman and O'Sullivan (1991:39-75) for a critique).

[27] Translation by author.

§2.1.2 – causes of terrorism). The (near) 'death' of leftist ideologies resulting from the end of the Cold War may have induced a relative increase, and a resurfacing of attention, of plain economic, 'ethnic' and religious motives.

**Late 1990s – present and a (the?) future**

<u>Late '90s – present</u>

Categorising the recent years confronts us with the problem of not having an historical overview. Notwithstanding this, one can observe a rigorous blank condemnation with an abundance of platitudes, especially after 9/11. A contributing factor to this characteristic is the Internet, where it is fairly easy to spread opinions by seemingly trustworthy 'research' organisations like the American Enterprise Institute, Family Research Council, RAND Corporation and certain university publications that are not always peer reviewed. They are beaming an air of credibility wanting to 'join the cause' against terrorism to make a few bucks and receive attention. These simplifications feed the 'terrorist problem' because these types of publications hardly contribute to a constructive debate.

Besides this, an additional change compared to the previous time periods can be identified: improved and increased levels of technology used by terrorists, e.g. 'dial-a-bomb' and cyber wars, all further detached from the actual deed, hence more anonymous and easier to commit when one is not physically confronted with the 'human face' of the people who are killed[28]. A logical consequence is that terrorists will need more education to make use of technological possibilities. Modernization surfaces in several writings, since the late 1970s, making these current claims less convincing. Idem ditto the interdependence of countries and fragility of communications systems, the electricity grid and the food production and supply system – or all things technical (e.g. Thomson, 2002). Homer-Dixon (2002) is an illustrative example of a social researcher who probably attended a course 'introduction in technology' and instantly identified a wide range of dangers that come with use of (advanced) technology[29]. This has, in my opinion, more to do with the fear of the unknown and unfamiliarity of the intricacies of the technology of everyday products than with a potentially devastating threat. However, 'more technology' in the sense of increased internationalisation does occur in the terrorist scene as well, in two tiers by exchanging knowledge between various terrorist groups and the wider geographical area a terrorist organisation may encompass.

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[28] With the exception of self-sacrificing operations.
[29] In the same vein, I mentioned during a class discussion that I have the theoretical knowledge to make a microbiological 'weapon', to much horror of my fellow students – but any student who completed a few courses in microbiology possesses sufficient knowledge to do so. Actually going ahead with it is something entirely different.

More interesting is the notion of the *'Freizeit-Terrorist'*[30] (Meyer, 2002). Although Marighella introduced the concept of the 'undercover terrorist' for urban terrorism in 1969: living a life as normal as possible during daytime and in your leisure time preparing terrorist acts; the refinement of this idea at the moment surely are the 9/11 hijackers.

Last, another aspect that may, or may not, pass the test of time when future scholars of terrorism look back on this era, is the absence of the ethics and philosophy of killing (except for Drewermann, 2001). It may seem as if that is a finished station with the conclusion that one may kill other human beings (whilst making up your own criteria), ignoring what makes a member of a political party or antimovement (see §2.2) to make the switch and take the path of violence.

<u>Future</u>

Academically, there may be a point in avoiding the word 'terrorism' and include its type of activities as part of a new form of 'war ethics', or try to define diversifications into e.g. resistance organisation, state-supported terrorism etc. Regardless of the outcome, if one would want to undertake this, researchers can reinterpret history (again) with 'new' views on terrorism.

The practice of terrorism might change over time; more often "feature disruption rather than destruction" (Lesser, 1999:4), like cyber wars carried out by 'hacktivists' (see Denning (2001) for an overview on the subject), an example is Hizbollah versus Israel[31], as, according to Wardlaw (1989), terrorists seem to have a rationale for not using nuclear weapons as being too all encompassing. The assertion that advances in technology will increase and worsen the prevalence of terrorist acts may not hold, though the actual actions may be different than the targets have themselves prepared for.

None of the aforementioned causes are easy to resolve, even highly improbable; therefore terrorism likely will be part of life in the foreseeable future.

## *2.2 Actors involved in terrorism*

In the previous two paragraphs, I have gone into some detail about definition, causes and goals and changes over time, but have not touched upon terrorist groups themselves. What is the nature of a terrorist organisation? How do they emerge? Do they receive 'outside' support? What positions are possible for other states involved in the conflict? These questions are explored in this paragraph. First, I consider general sociological characteristics, then the aggrieved groups and finally state actors involved in terrorist conflicts.

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[30] 'Freizeit' is translated into English as leisure time, but literally means '*free* time' – your time when you're not constrained with the chores of work and social obligations.
[31] The cyber war in 2000, which involved mainly site defacing, email bombs and ping-to-death (= web servers flooded and inaccessible), required mediation to end the net attacks, are covered by e.g. Gambill (2000) and Arabia Staff (2000).

**Sociology of movements and factions**

Michel Wieviorka (1988) has carried out research into terrorism from the perspective of sociology, particularly into what makes groups change from social movement, like labour organisations, to social antimovement that subsequently may give way to a terrorist organisation, which is "the most extreme and distorted form an antimovement can take" (1988:5). The reasoning, alluded to by Crenshaw (1981:396) in a slightly more watered down version, is as follows:

1. The dimensions of a social movement are based on principles of identity, opposition and totality, articulated on a theoretical level.

2. The social antimovement, which may surface / 'grow out' of / separate from the labour movement when labour conditions deteriorate, starts with inverting these three characteristics and synthesises them together into a single whole. The main characteristic of a social antimovement is that "it transfers its actors from a prior relationship of social domination into a situation of estrangement or disengagement" (Wieviorka, 1988:19).

3. The switch to terrorist organisation is initiated by an "exogenous factor, set in motion by the intervention of specific actors who are foreign to the labor movement" (Wieviorka, 1988:17) and fuelled by an unresponsive institutional system that has closed in on itself and incapable or unwilling to deal with social demands. Further, it is those terrorists who have lost their sense of reality by being too disengaged and cut off from the rest of society, which "lies at the very heart of terrorist activity: the processes of *inversion* through which a collective action loses touch with its original guiding principles" (p57).

Especially interesting is Wieviorka's distinction that the change from social movement to antimovement occurs from within the organisation, but that to become a terrorist organisation requires external influence. Secondly, drawing the fine line between 'social violence' and 'terrorist violence' is difficult, if not "impossible" (Heumann and Vogel, 2001). Is incidental violence social violence, but re-emerging violence terrorist violence? Or could the first maybe failed terrorists, and the second 'too successful' social violence? Third, are terrorist really cut off from society? Not necessarily: a) the *Freizeit-Terrorist* must be familiar with 'normal life' to create the best cover and b) there are all-encompassing organisations like Hizbollah[32], who, besides engaging in protracted conflict in south Lebanon, provide education, various religious and community services and agricultural support. Fourth, Wieviorka claims that violence erupts from universities, students working on the assembly line and unemployed ex-students, who "cut and paste ideologies" (p41) – resulting in an ongoing process of division and recombination within the terrorist arena. Sandole (2002) then argues that once the conflict has erupted, it may become self-stimulating and self-perpetuating once the violence passed a certain threshold, as if there is no way back like the one-way ticket of Wieviorka's three

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[32] The USA and Canada list Hizbollah as a terrorist organisation, the EU does not.

stages. There are ample examples confirming and contradicting this hypothesis. Chomsky (2001) voices a more nuanced version, considering small interchanging affinity groups who do business[33], a principle developed by the Christian right in the USA.

Besides social movements, there are political movements, though this distinction does not exclude social movements from being involved in politics. But where there may be social and communal groups sprouting to address a single issue, political parties cover more topics and are seen as "the product of important changes in the structure of the state and society" (Weinberg, 1991:426). Then Weinberg advocates that in the relationship between political failure and recourse of terrorism "some dramatic *external* event(s) that provides a sufficient shock to cause a group of individuals to embark on the terrorist path" (emphasis added) (p427) in contrast with political parties, who are "more likely to be the products of longer periods of gestation" (p427). Following this line of thought, one actually may consider terrorists groups a result of even longer gestation: first they try the political route and upon repeated failure some members separate from the political faction and carry out political terrorism[34]. Another possibility that may occur in parallel is the co-existence of both, in some way interdependent or in competition with each other for support by the masses. A curious result of Weinberg's analysis of links between political parties and terrorist movements is, that terrorist groups with connections to a political party seem to survive longer; he has no idea why. However, one can think of changing circumstances in society, where, depending on the fluctuations, sometimes violence might appear more effective and in other times the political approach. I will elaborate on this aspect in chapter 4.

Topics transcending the two discussed are the logic of collective action and the influence of peer pressure. It is outside the scope of this research, but these aspects of internal group dynamics with regards to terrorist organisations (covering localised 'cells'), the psychology of terrorists, would be highly interesting to investigate[35].

### 2.2.1 Aggrieved groups

In the previous paragraphs I used words like 'terrorist organisation', 'terrorist group' and 'terrorist cell' for convenience, because this is how they are normally referred to, even though,

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[33] Original wording "Man hat kleine Gruppe die Sachen tun", where 'Sachen' not only translates into doing business, but its meaning also includes more shady activities, alike the Irish 'brown envelope culture'.

[34] Crenshaw (1981:390) suggests that "many terrorist" have prior political experience in non-violent opposition, without data backing up this claim. From personal experience in DWARS, the youth organisation of the Dutch Greens (GroenLinks), there always was a division between the 'politicos' and people who did not prefer the political negotiation route. I would not consider the latter as having 'political experience', even though they were member of a political youth organisation.

[35] A 'landmark' publication to start with is: *'The group as polarizer of attitudes'* by Serge Moscovici and Marisa Zavalloni, published in the Journal of Personality and Social Psychology, 1969 12(2), 125-135.

or precisely because, this implies subjectivism and bias, as one may call these organized groups terrorists, others would say freedom fighters, or resistance for a just cause. To avoid this negative branding, I will use the more neutral term "aggrieved group" to refer to these groups, and it is up to the reader to judge and categorise which label is applicable to whom.

Aggrieved groups have specific political objectives and believe that violence is an inevitable means to achieve their political ends. Objectives vary widely, from defending/aspiring land, religions, nationalities or ideologies. Roughly, this can be divided as having a basis in ideological or refugee-based disorders (Khan, 1987):

- Ideological disorders: comprising right-wing (e.g. racist) and left-wing (e.g. Marxist) ideologies (see also §2.1.2) that may be focussed within the state and/or on the international stage;

- Refugee-based disorders, incorporating Diaspora and people in exile, including liberation struggles: the aim is to get 'their own' country or region back, most often being fought from a refugee area outside the borders of the country they are targeting, i.e. they are per definition supranational oriented and part of the "triangle refugee-group, supportive state(s) and suppressive state(s)" (Khan, 1987) (see also §2.2.2).

It is important to make this distinction here, because the responses on the two types of aggrieved groups are distinct:

> Although the international community often recognizes the plight of aggrieved groups under colonial and racist regimes and other forms of alien domination, and upholds the legitimacy of their struggle, no such recognition is generally accorded to groups promoting a specific economic ideology. (Khan, 1987)

According to the UN[36], struggle by peoples under above cited regimes is legitimate, as these peoples have the right to self-determination and independence. One note of caution here is, that the Resolution is, as always, a compromise with ambiguous wording, and a signatory state does not necessarily follow the guidelines of a UN resolution. Furthermore, in line with the terrorist versus freedom fighter section in §2.1.1, if one defines terrorism by its method of operation and measures legitimacy in accordance with UN Resolutions like the Universal Declaration of Human Rights, an ideological disorder may have legitimacy as well, but may be harder to prove than 'self determination and independence'.

In line with Weinberg's terrorist - political party delicate relation, the aggrieved group, from either type, consists of 'moderates' and 'hardliners' – assuming there is a division between reluctant terrorists and terrorists who whole-heartedly stand behind the violent acts. This suggests, that the aggrieved group is *not* homogenous nor that terrorists have "a similar background" as Crenshaw (1981:389) advocated. However, this aspect may have changed over the past 20-30 years. The move from rural to urban-based struggle (§2.1.3) via cells

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[36] G.A. Resolution 3103, 28 U.N. GAOR Supp. (No 30) at 512, U.N. Doc A/9102 (1973), cited in Khan (1987).

necessarily has had an effect on the composition of an aggrieved group, and the increased level of technology and internationalisation doesn't require a farmer fighting for a piece of land, but an moderately to highly educated (middle-class[37]) person. With the increase in technology and mobility comes a higher price tag to finance the activities. One possibility in procurement of finances is to ask or accept an offer from supporters (§2.2.2), but this creates dependency; another, developed in the 1980s and 1990s, is setting up 'Terrorist Inc.'[38].

The aspect of differences among and within aggrieved groups will be further discussed in chapter 4 in the context of game theory.

### 2.2.2 Other involved actors

The media and politicians liken to treat aggrieved groups as insular entities, but in principle, this is not possible: even if it were a 'purely' domestic conflict, an aggrieved group is campaigning against a / the state. Additionally, because of the increased interdependence and internationalisation of societies and higher levels of funding required, it is possible to identify at least five other actors involved in a conflict. These are supportive states and groups, suppressive states and groups and international organisations. A further sub-division can be made into both principle and accessory supportive/suppressive states.

Supportive states

Accessory supportive states provide moral support to the aggrieved group, which might sound little distinct from being neutral, but effective moral support from states that promote the political objectives, officially positioned as being outside of the problem, does provide extended legitimacy of the actions of the aggrieved group (Khan, 1987). A principal supportive state not only provides moral support, but also resources (finance, military, active training etc.), though sometimes support may not be voiced loud and clear for international political reasons.

Supportive groups

For example the Diaspora, other aggrieved groups involved in a similar conflict in another geographical region to exchange strategies and moral support and aggrieved groups involved in another type of conflict, but who can provide technical assistance in deploying new methods of violent acts. Bearing the financing of terrorism in mind, in this context multinational corporations owned by people who are also member of an aggrieved group as well as the wider financial sector, 'regular' companies may do business with Terrorist Inc.,

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[37] Wilkinson (1977:93); Kristof (2002);
[38] Examples are provided by James Adams' book *The Financing of Terror* (discussed by Bakhash (1987)) and, more recently, by Heumann and Vogel (2001).

which can be interpreted as either directly or indirectly providing funds to an aggrieved group, thereby perpetuating the conflict.

Suppressive states and groups

The distinction between principal or accessory suppressive state largely depends on perception of the aggrieved group of the particular state and the consistency in opposing the aggrieved group (Khan, 1987), as well as the policies applied by the suppressive state.

There may be principal or accessory suppressive groups who either compete for the same base or have a distinct ideology. The line between suppressive states and groups may be unclear in certain circumstances, as a suppressive group might be, directly or indirectly, supported by the same or another suppressive state.

International organisations

Undoubtedly, these organisations are players in the terrorist theatre, and due to previously discussed problems of definitions and interpretations, can be any stance varying from active support to active suppression, including gradations of accessory, moral, supportive or suppressive attitude – or 'passively' ignoring a protracted conflict, although inaction is to some extend taking sides as well.

Real life is more complicated than these clear distinctions, as it is common practice for a state to be categorized as more than one type of state not only over time, but especially *at the same time* with regards to different conflicts. This conflicting characterization is part of the wider problem, as "the dual approach of measuring with two standards towards violence and terrorism impairs the orderly functioning of the international system" (Khan, 1987): labels become weapons to influence, and even to manipulate, domestic and international public opinion. Thus, the interplay does not quite resemble a triangle (§2.2.1) as much as a polygon, where all supportive and suppressive actors could be involved, or dragged into a conflict that, because of external influences, may lead to at least continuation of a protracted low intensity conflict, fuel a proxy war or become the source of a full fledged 'world war', or provide a stimulus in resolving the conflict.

## *2.3 Summary*

Results of scholarly research over the decades is inconclusive about the concept of terrorism and its causes and goals, probably partly due to changes of the subjective idea of the (academically) unclear meaning of the word 'terrorism' and the modifications of actions (not tactics) carried out. Similarly, the emergence and composition of aggrieved groups (terrorist organisations) and the interplay with other actors (state, group and international organisation) are still fields that allows for plenty of further research.

# 3. Game Theory

To be able to discuss the application of game theory to terrorism, certain abstract features, characteristics and definitions need to be addressed before the modelling can take place. The intention of this chapter is to keep the mathematics to a minimum, though the reader is strongly advised to refer to *Appendix B* (p92) for further details where indicated. I will provide an overview of the extant game theoretical models which are – hypothetically – potentially relevant when modelling protracted conflicts characterised by political violence (terrorism); which ones may, can, and have been used is a topic for chapter 4. Important definitions are included in the glossary for reference.

There are many goals of game theory, ranging from teaching, learning, operational gaming, entertainment to experimental gaming[39], but what they have in common is that all attempt to abstract certain 'situations': predominantly economic markets and to some extend bureaucracies, organisational behaviour and international politics. The latter faces more difficulties, as human behaviour is more complex to model than a 'rational' *homo calculus*.

*Table 3-1* lists characteristics, types, of a game a game modeller can combine in virtually any manner to define a model of the system under investigation. For example a zero-sum, non-cooperative game with a dominant equilibrium that is finite and players use a pure strategy; some of these combinations will be discussed in this chapter.  On the type of game itself, there are parameters concerning the information available to the players, as presented in *Table 3-2*, and 'pre-game' behaviour.

*Table 3-1. Overview game features.*

| | | | Comments |
|---|---|---|---|
| Zero-sum | ? | Non-constant sum | Zero-sum = 'exactly what I win, you will lose' Non-constant sum = other payoffs (might be better for a 'loser' than in a zero-sum game) |
| Non-cooperative | ? | Cooperative | Cooperative means that players make "binding agreements"; non-cooperative is competitive |
| Dominant equilibrium | ? | Nash equilibrium | Can be both with or without focal point; games with a dominant equilibrium can have Nash equilibria |
| Pure strategy | ? | Mixed strategy | Pure = move $a$ is best (thus chosen), otherwise $b$ Mixed = there's a probability $?$ that the player chooses $a$, and probability $1 – ?$ that $b$ is chosen |
| Finite | | Infinite | A single game can be repeated (in)finitely (with subgames making a 'supergame'), or can learn during the 'repetition' (evolutionary games). Can be used to determine the probability of a mixed strategy and Bayesian updating |
| Extensive form | ? | Normal (strategic) form | Extensive = with full game trees Normal = a 'simplified' extensive form game depicted in a table with payoffs |

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[39] See Shubik (1972) for a structured overview.

*Table 3-2. Information categories.*

| Information category | Meaning |
|---|---|
| Perfect | Each information set is a singleton (an information set containing one node) |
| Certain | Nature* does not move after any player moves |
| Symmetric | No player has information different from other players when he moves, or at the end of the nodes |
| Complete | Nature does not move first, or her initial move is observed by every player |

*Source: Rasmusen (2001:48), Table 2.4.*
*\*Nature is some external event not controlled by any of the players*

## 3.1 Zero-sum and non-constant sum games

I will explain the difference between a zero-sum and a non-constant sum[40] game by two examples, the Battle of the Bismarck Sea and Student Strategy[41], and discuss the concept of a weak / strong dominant equilibrium and Nash equilibrium.

**Battle of the Bismarck Sea**

Please refer to e.g. Rasmusen (2001) for a full description of the game and *Appendix B-1* for related formulae; *Table 3-3* presents the payoffs (units they win / lose) of the choices players Kenney and Imamura have to their disposal in the Battle of the Bismarck Sea. If Kenney chooses *North* and Imamura *North*, then Kenney gains a payoff of 2 and Imamura loses 2 ("gains -2"); the double arrow in the *North* row of Kenney indicates that it does not matter what Imamura chooses when Kenney chose *North*, he will lose the same regardless: the choices are interchangeable. Strategically from the point of view of Imamura, the situation would be more interesting if he would *suspect* Kenney to choose *South*: he best picks *North* to limit his damage to –1. On the other hand, if Kenney decides *South*, then either he has the largest gain, 3, or the least gain (and least damage to Imamura), so Kenney can be risky and choose *South* or be sure of a relatively good payoff when choosing *North*. However, these mutual suspicions about what one thinks the other will chose, results in (*North*, *North*), which is not the best solution for either of the players. This is called a weak dominant strategy equilibrium, or iterated dominance equilibrium (found by mentally repeating the game or by elimination of weaker payoffs ["following the arrows pointing to 'better' outcomes"]).

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[40] Non-constant sum games are sometimes referred to as non-zero sum or variable-sum games.
[41] I slightly modified this game, which is based on Boxed Pigs.

*Table 3-3. Battle of the Bismarck Sea*

|  |  | **Imamura** |  |
|---|---|---|---|
|  |  | *North* | *South* |
|  | *North* | **2, -2** $\leftrightarrow$ | 2, -2 |
| **Kenney** |  | $\uparrow$ | $\downarrow$ |
|  | *South* | 1, -1 $\leftarrow$ | 3, -3 |

*Payoff to: (Kenney, Imamura)*
*Weakly dominant strategy in bold*

Other matrices with values for the 'gain' and 'loss' of the player can be constructed, as is the case with the traditional Prisoner's Dilemma[42], which is *not* a zero-sum game and has a dominant equilibrium. It is important to realise that in the application of game theory to the social and political sciences, zero-sum modelling is outdated and deemed inadequate to capture even the most basic behavioural aspects of gaming. Modifications and extensions of the Prisoner's Dilemma and other typical games[43] are more widely used, combined with e.g. mixed strategies (§3.2), cooperative structures (§3.3) of part, or all, players and repeated (in)finite games of negotiations / bargaining (§3.4). In these games there may still be a sense of 'winning' and 'losing', but not in equal amounts and some of them allow for the concept of 'not gaining', which is strictly different from losing.

**Student Strategy**

Besides the weak and dominant strategies that may not be present in a game, games can have a Nash Equilibrium, which is a combination of actions when none of the players can improve its payoff by deviating form that particular combination.
There are two students, an Organised Student (dominant) and a Lazy Student (smart). When a student writes an essay (*Work*), it is at a utility cost of 2 in total and the lecturer awards 10 grade points as a result (i.e. the overall payoff of both students has a maximum of 8 points). If both students do the same work, the Organised Student is rewarded for the extra work, whereas the Lazy Student receives only one point, and both together receive less than the maximum because of their inefficiency of doing the work twice. However, when the Lazy Student actually does decide to carry out some good *Work*, the slacking Organised Student walks away with credit. On the other hand, if the Organised Student decides to *Work*, the Lazy Student slacks and takes a free ride with the Organised Student. When both students show their slacktitude, they do not meet the deadline and no one receives any point. The payoff matrix is shown in *Table 3-4*. There is no dominant strategy, but one can devise a

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[42] Most game theory study books cover this game to great extend, in its basic form and modifications on the game itself. See e.g Brams (1985), Myerson (1991) and Rasmusen (2001). The Prisoner's Dilemma, with a strong dominant strategy, is included in *Appendix B-2.*
[43] For example Boxed Pigs, Splitting the Pie, the Dollar Auction and Grab the Dollar.

Nash equilibrium by starting to propose one strategy combination and to test whether each player's strategy is a best response to the other player's strategies. *Appendix B-1* contains related mathematical formulae.

*Table 3-4. Student Strategy*

|  |  | **Lazy Student** | | |
|---|---|---|---|---|
|  |  | *Work* | | *Slack* |
| **Organised** | *Work* | 5, 1 | $\rightarrow$ | **4, 4** |
| **Student** |  | $\downarrow$ | | $\uparrow$ |
|  | *Slack* | 9, -1 | $\rightarrow$ | 0, 0 |

*Payoff to: (Organised Student, Lazy Student)*
*Nash equilibrium in bold*

Note that every dominant strategy is a Nash equilibrium, but not every Nash equilibrium is a dominant strategy equilibrium.

Another aspect of choosing strategies is that in real life a player may not act in accordance with a dominant or Nash equilibrium for psychological or cultural reasons. For example, if (*Work, Work*) would have a payoff of (5, 2), which is overall 1 point less than (*Work, Slack*) and (*Slack, Work*) in the Student Strategy game, thus not an equilibrium, but it is 'socially required' that both students work, then the students naturally opt for the (5,2) option. This is a *focal point*, which should be borne in mind especially in modelling behavioural situations, and "probably more useful for understanding real bargaining situations than the Nash bargaining solution" (Myerson in Raptis, 2001).

## *3.2 Pure and mixed strategies*

Whereas the previous paragraph outlined two straightforward games, it becomes gradually more interesting by expanding the basic models. In reality, it is often not the case that a player's strategy set maps neatly to one 'best action' (a pure strategy), but that a player selects a particular strategy with a certain *probability* over another strategy. The latter is a game with a mixed strategy. Rasmusen (2001:67) provides an analogy illustrating the difference:

> A pure strategy constitutes a rule that tells the player what action to choose,
> while a mixed strategy constitutes a rule that tells him what dice to throw in
> order to choose an action.

This should not be interpreted as if a player just picks one of the actions randomly without any preference, but one can imagine a *repeated* game where all members of a set of players

played the game. Say, 25% of these players chose $a$ and 75% chose $b$, which can be interpreted as if one of these, randomly picked, players would play, he would choose action $a$ with a probability $?$ of 0.25 and choose $b$ with a probability $(1 - ?) = 0.75$. One such game is the War of Attrition (see *Appendix B-2* for details) that will return in next chapter in relation to audience costs.

## *3.3 Cooperative and non-cooperative games*

By far the most appealing facet in light of chapter 4 is the feature of cooperative versus non-cooperative games and the next paragraph on bargaining. §3.1 and §3.2 presented examples of non-cooperative games where the players were competing for the best result, but what happens if some, or all, players cooperate to achieve a common goal, via effective negotiation? Or, even more intriguing, some players cooperating to compete against a third player – which can be extended virtually *ad infinitum* to cooperating or competing groups and players who are themselves coalitions (alliances) who are internally cooperating and / or competing for a common stance against another player for inter(non-)coalition bargaining etc.

Von Neumann and Morgenstern introduced the concept of a *characteristic function* (with transferable utility). Harsanyi (1963) adjusted this when describing a game in cooperative form; Shapley and Gillies added the *core* as a solution concept (a criterion for stability), which was further enhanced with the *value* as a one-point solution within the core[44], all focussing on the (area of) equilibrium and the idea of 'threats', which has its relevance in audience costs as well.

Intertwined is the theory on the 'type' of players: what is *the coalition*? There are two main differences in coalitions: one can have, say, three players and two of them decide to cooperate against the third in the hope to yield a better payoff, and the set of $N$ players can form a *grand coalition*, who in turn may well be non-cooperative in a meta-level game.

**The grand coalition**

A fascinating paper by Manzini and Mariotti (2001) outlines and analyses the effect of 'a group of people', an alliance, in a negotiation process, based on the internal dynamics of the alliance. They discuss how the group members do and have come to their joint position (see *Figure 3.1* for an overview of the possibilities; a further distinction can be made in the internal bargaining process of a coalition: simultaneous moves, or alternate offers [see §3.4]). They

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[44] See *Appendix B-1* for summarised details, and refer to e.g. Myerson (1991) for the characteristic function and Shubik and Shapley (1971) for further explorations of the core.

conclude that, based on their mathematical models, unanimity agreement leads to more aggressive negotiation tactics with third parties than majority procedures and if alliance members have a fallback position, this will also lead to worse agreements[45].
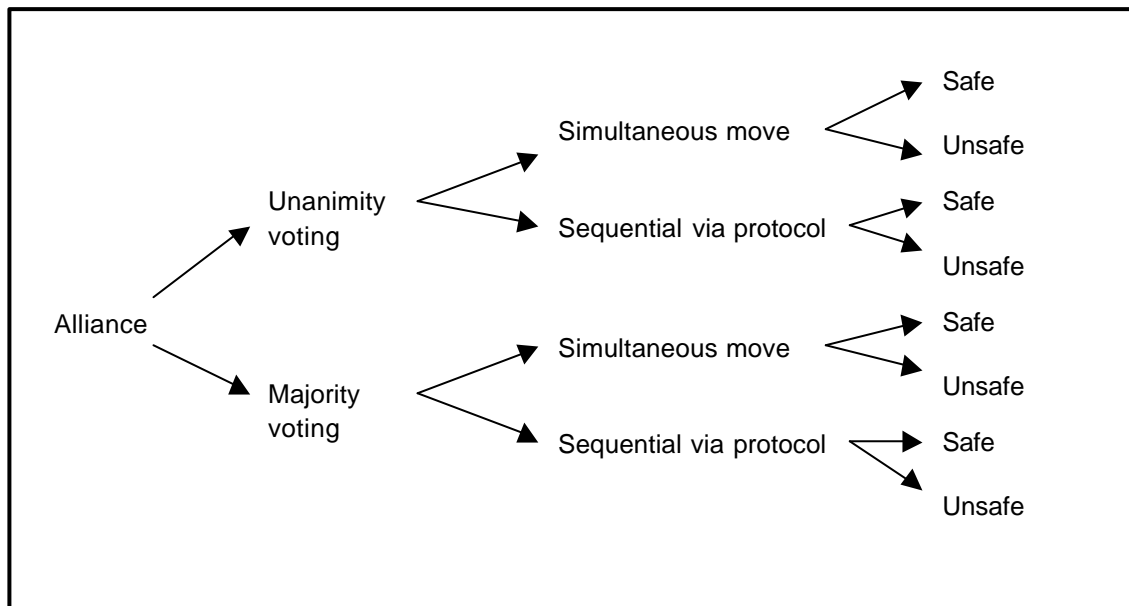


*Figure 3.1. Intracoalition bargaining options within an alliance. Safe/Unsafe indicates if there is a 'fallback' option for a member of the alliance.*

Another aspect of the internal dynamics of coalitions is further explored in *Appendix B-3* (p100) where I provide a derivation for coalition members of unequal strength (like size of the member or a higher level of influence for cultural reasons, see *Figure 3.2*), hence one of the coalition members may request a larger share of the pie than a 50-50 split in a two-person coalition (regardless if there is a third player). Based on this generalised formula of unequal members,

$$(? \ r \ + (1- r)/4, \ ? \ r + (1- r)/4, \ (1- r)/2),$$

a stronger alliance member may be persuaded into joining (not defecting) a coalition, as her payoff is larger than if she would go it alone.
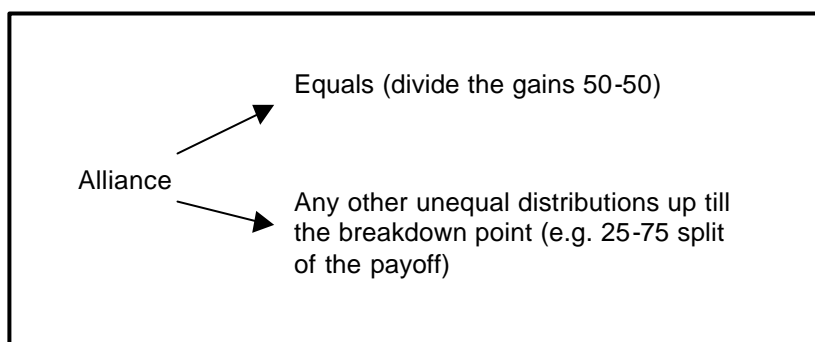


*Figure 3.2. Power distribution within an alliance.*

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[45] See *Appendix B-1* for key (mathematical) game theory aspects.

**$n$-Person game with partial coalitions**

The '$n$-Person' is predominantly worked out for only 3 players, where two of the three may form a coalition in order to improve their payoff. Horn and Wolinsky (1988) use a union versus company setting with 'centralized' (coalition) and 'decentralized' bargaining (decentralized is more profitable for the company – divide and rule), Berninghaus *et al.* (1999) apply this to company mergers[46] and Chae and Heidhues (2001) provide a more abstract mathematical model (included in *Appendix B-1*). Their model shows, that under pure-bargaining situations, a player joining a coalition is always worse off, which is counter-intuitive and called the 'joint bargaining paradox' (see bargaining §3.4), but when a fallback position is included there is a certain range where it is advantageous to form or join a coalition. Ironically, in the light of aforementioned work by Manzini and Mariotti, this fallback position actually has a negative influence on the bargaining strength of the coalition as a whole. However, they need not be in contradiction *per sé*, as Manzini and Mariotti used *repeated* games with (joint stable) sub-game perfect equilibria, whereas Chae and Heidhues do not.

## *3.4 Bargaining*

Having outlined the basic idea of a game, types of strategies, equilibria and discussed possible compositions of players, it is now appropriate to discuss the interaction between these players: bargaining[47]. As with the other topics, this is one of increasing complexity and only the basic principles will be addressed here[48].

The fourth axiom[49] of Nash's bargaining solution (1953) requires symmetry, in the sense of

> With *people who are sufficiently intelligent and rational* there should not be any question of "bargaining ability", a term which suggests something like skill in duping the other fellow. The usual haggling process is based on imperfect information. (emphasis added) (Nash, 1953:138)

Note here, that the concept of internal coalition structures as discussed in §3.3 does not necessarily affect symmetry of the overall game. In a single symmetric game *à la* Chae and Heidhues it does not, but if one repeats a game, alike Manzini and Mariotti (2001), Bueno de Mesquita (2001) or Horn and Wolinsky (1988), it is considered an *asymmetric* Nash solution (Chae and Heidhues, 2001), thus where "the information sets of players differ in ways relevant to their behaviour, or differ at the end of the game" (Rasmusen, 2001:49) and

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[46] Where players $x$, $y$, and $z$ can form either $xy$ against $z$, $xz$ versus $y$ or $yz$ against $x$.

[47] Interchangeably used with negotiations, though negotiations tend to be used more in cooperative games and bargaining in non-cooperative games.

[48] The reader may like to consult Myerson (1991), Rasmusen (2001) or Gale (2000) for further explorations of the topic.

[49] "The solution does not depend on which player is called player 1. In other words, it is a symmetrical function of the game." (p137). Please refer to *Appendix B-1* for the other axioms.

'bargaining ability' diverges (stronger/weaker coalitions on long-term basis). The latter is highly relevant in modelling sociological and political situations and often a model consists of a 'supergame' comprising subgames with pure strategies modelled on the Nash bargaining solution.

Aside from the varying information sets of the players, there are two main bargaining procedures: one where players make simultaneous offers and either have to accept or reject the offer simultaneously, or alternating offers (offer by $a - b$ accepts or rejects – if reject, $b$ makes a new offer – etc.). The latter, first introduced by Rubinstein, 'suffers' form a first mover's advantage. Each subgame in the alternating offers bargaining has a unique subgame perfect equilibrium (s.p.e.) with an immediate agreement amongst the players. If one models this game with three players, the number of s.p.e.'s is infinite (or at least multiple when the set of possible distributions is discrete). (Gale, 2000)

Other factors involved in the bargaining process that affect the procedure are [making credible] threats, side-payments or cheap talk, lying and trust[50].

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[50] Please refer to Ouardighi (2002) for a fascinating analysis of the concept 'trust' in relation to game theory.

# 4. Towards a resolution of terrorism using Game Theory

*A little bit of simple rational analysis – say as a consultant to the terrorists and food poisoners – could quickly suggest how much worse matters could be. Fortunately terrorist groups do not appear to employ management science and operations research departments.*

<div align="right">Martin Shubik (1987:1519)</div>

*Remarkably, we have just improved our position by taking steps to undermine our own military strength. Those who think that unilateral disarmament is invariably nonsensical do not know their elementary game theory very well.*

<div align="right">Yanis Varoufakis (1991:61)</div>

This chapter integrates previously discussed theories of terrorism with different game theoretical models, aimed to be a contribution to untying the knot by offering a rational approach to the emotion-laden concept of terrorism. There are no games that provide *the* strategy to *the* solution, but they aid in understanding the problems, which in turn supply tools for addressing (some of) the issues.

The first paragraph considers audience costs, not only its effect but also exploitation of the model by aggrieved groups. Subsequently, I look into bargaining and coalition dynamics, assuming that at some stage a certain level of dialogue between the actors is a prerequisite for building positive peace[51]. Both paragraphs rely heavily on adaptations of general game theoretical and political science models, as the resources on the combination of terrorism and game theory are sparse. Third, some of the theories are assessed via an experimental game. The last paragraph touches upon the sense of using game theory in the context of a terrorist theatre, based on the findings of the preceding investigation.

## *4.1 Audience costs*

The term audience cost, first introduced by Fearon (1994), describes a situation on the international political stage when a leader of one country backs down in an international crisis with another country. Costs increase the longer the duration of the crisis, but it depends on behaviour and decisions if the leader actually 'pays' the costs. Payment should not be interpreted in monetary terms, but a measurable extension of loss of reputation in the form of not being re-elected by the public as the most serious incurred cost (that is, assuming the

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[51] Be it as all actors involved are just tired of violence, or for acknowledgement of the plight of an aggrieved group. Regarding the latter: refer back to §2.1.1 on Just War and legitimate terrorism, where when a protracted conflict meets the requirements, negotiations are (legally and/or morally) justified. This is by American researchers and policy advisors considered the 'soft approach' (see e.g. Dershowitz (2002) and RAND corporation publications, among others).

leader wants to be re-elected). This definition begs the question how audience costs can be measured in 'non-democracies', and for non-state terrorists, to which I will return after addressing general audience cost related factors.

The game is modelled as a War of Attrition, having a continuum of Nash equilibria (*Appendix B-2*), though with three options in the set of strategies instead of two: attack the other country, back down or continue the crisis, where the cost of continuing is mapped onto the discounted value for each round, hence imagine this as the increase of the build-up of the audience cost. Paying the cost counts for both challenging states backing down and for a challenged state that first resists and subsequently backs down. This model predicts that democracies, being able to generate more audience costs than a non-democracy and therefore more capable of signalling their intention more accurately, are less likely to back down in a crisis situation.

However, it does not address *how* audience costs may be generated. Smith (1998) argues that, when in equilibrium, only the least competent leaders will back down during a crisis and will pay audience costs and that "The possibility of war is necessary to keep leaders honest" (p633) (when signals do not threaten they are worthless). Brito and Intriligator (1985) attribute this positive probability of war to a separating equilibrium induced by one country and has its basis in asymmetric information in order to prevent bluffing by the informed state. However, Smith's model[52] ignores the possibility that a leader may back down because of new information that would make a war unjustified, hence not legal and/or foolish to continue the crisis or attack; conversely, "non-intervention signals lower competence" (Smith 1998:633) of the leader. Inherent in the War of Attrition is the tendency towards "belligerent equilibria" (Myerson, 1991:330) and exacerbated by the two-tier bargaining[53], it results in a bias towards hawkish strategies. A striking example of the limitations on audience cost build-up and the strong bellicose leader bias is the Iraqi crisis in 2002/2003: 'dove' US Secretary of State Colin Powell made a U-turn towards supporting an invasion of Iraq; though strictly according to the audience cost definition, he would not have suffered credibility, but he did.

An extension of the domestic politics factor of audience cost generation is the influence of an opposition party on the stance of the leader (/government), in addition to the voting public. An opposition party can lend additional credibility to threats signalled by the government when 'even the opposition supports the government's stance', but also makes the government more selective in signalling, in the form of the opposition as 'watchdog' because the opposition has no incentive to support a bluffing government. Guisinger and Smith (2002:197) consider this wider combination as "domestic accountability". The credibility an opposition party lends to the government makes the leader more selective, but stronger, in the international crises. Because non-democracies do not have one or more opposition parties, nor voting citizens,

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[52] The values and importance he attaches to the different strategic options. In itself, the extensive form game of the International Crisis Game (included in *Appendix C-1*) can be a useful modelling tool.
[53] Which is the dynamics between international and domestic politics, see Putnam (1988) for an explanation of the concept.

they cannot build up audience costs like their democratic counterparts, in turn affecting the credibility of a threat, or any signalling for that matter[54].

Prins (2003) adds that institutional stability in general allows for more precise signalling (conversely, instability hampers successful signalling of true intentions) and regimes "with non-institutionalized political participation engage in more escalatory behavior" (p82)[55].

Schultz (2001) tried to put the concept of audience costs to the test, but noted problems on partial observability and strategic selection of cases, claiming one can only detect audience costs when it actually incurred. Based on a Monte Carlo simulation, "only states with relatively low audience costs ever incur them" (Schultz, 2001:48), which makes intuitive sense because when the audience costs are too high, the cost of backing down for a belligerent leader is too much. For example Roddy (2003) observed George W. Bush's build up to the Iraqi invasion that "the steering wheel long ago exited the driver's side window", implicitly suggesting that the 'strong and powerful leader' who does not back down according to the model, has actually lost control over his own power[56].

With outlined variations and extensions of the audience costs model, it indicates that strong leaders never back down (weak leaders do) and when the leader has a stable democratic apparatus behind him, the threats he's signalling are more credible and better reveal his true intentions than his non-democratic counterpart. Despite the fact that there is still plenty of further research possible on the audience costs in international politics, I endeavour to apply the concept of audience costs to the terrorist theatre, and assess factors that need to be addressed in order to make it a possible useful tool.

First, would it be possible for terrorist groups to generate audience costs according to aforementioned definition within their own supporters group, and in the 'electorate'? (The latter envisaged as citizens of the affected area, including supporters and non-supporters.) Aside from a few exceptions, aggrieved group leaders do not get voted into government nor

---

[54] This, however, does not preclude that any type of signalling or even cheap talk, has no effect when it comes from a dictator or autocrat (see e.g. Croson *et al.* (2003)). It is alluring to provide Saddam Hussein in the build-up to the US/UK-led invasion of Iraq as an example: despite his repeated claims of not possessing weapons of mass destruction, primarily the US and UK governments preferred not to believe him, nor his 'signalling' to invite the UN weapons inspectors in, whereas other countries and coalitions gave him the benefit of the doubt. At the time of writing, it is too early to tell if this could serve as an example of a lower capability to build up audience costs and lack of credibility of non-democratic states, or if the US and UK governments will have to pay large audience costs (even though it would not support Schultz' (2001) simulation).

[55] I disagree with his model; on the artificially introduced dualism of democracy versus non-democracy, where curtailing executive power is more important than multiparty systems, but subsequently Prins contradicts himself in that it is this aspect of competitive participation as an important factor. Moreover, he restricts "formal alliance ties" only to defence pacts, as if bi- and multilateral trade agreements would not have an effect on crisis bargaining, escalation and resulting from that the audience costs.

[56] However, continuing the metaphor: what about using the brakes? There are arguments claiming the EU is the brake on US's unilateralism, but here is not the place to discuss this in detail.

can be voted out of office or Politburo every four or five years, which would make the situation analogous to a non-democracy, and less capable of generating audience costs in the first place. Restricting the possibility of generating audience cost to the inner working of an organised aggrieved group, for example the leader promising a new and better world or more equal pay to his followers which does not materialize, is an interesting avenue for investigation. Crenshaw (1991) asserts that one of the reasons terrorism declines is through organisational disintegration, which thus could be an effect of a bluffing leader, though data is hard to find and inconclusive.

Second, even though I cannot assess the internal audience cost build-up, and the organisation of an aggrieved group is not as democratic as a democratic state, common sense points towards a likelihood of audience cost generation with the wider public, as it is exactly the threats made by these organisations that contribute for a large part to their importance. However, from the game theoretical framework outlined by Fearon, Smith and Schultz among others, this cannot be possible. It is easy to assume that either there is something lacking in the model, or the people rationally should not believe the threats because they originate from unreliable sources (according to the definition). There is another option: an aggrieved group *exploiting* the audience cost model, as opposed to being 'trapped' in it like a state leader. The reasoning is as follows: the aggrieved group commits a terrorist act, succeeded by several threats that are not carried out, leading the people to believe the aggrieved group is not trustworthy in its threats. The people are lulled into a sense of security, relax imposed restrictions and foster the idea that the terrorist act was an isolated event (Freedman, 2002:2), and then the aggrieved group actually implements a threatened action. Thereby the aggrieved group is taking advantage of the less credible signalling, messing up the neat Bayesian updating of the public's belief system about the terrorist organisation in that the probabilities cannot be realistically updated. Worded differently: one can update the probability of the type of player after each threat, but this does not provide more information on the aggrieved group and/or 'terrorist' leader, *defeating the main point that Bayesian updating is supposed to deliver in a game*; alike a 'War of Nerves' instead of a War of Attrition. This is formulated in the following proposition:

> PROPOSITION 1.
>
> *The effectiveness of threats signalled by an aggrieved group has a basis in the unreliability of the signalling compared to international politics, whereby identification of the type of player based on Bayesian updating is corrupted and cannot provide the same increase in the level of information as in the standard audience cost model, thereby exploiting the model.*

A more positive aspect on the potential for generating audience cost is when the aggrieved group is part of a peace solution, or at least taking part in negotiations to achieve a peace agreement. Kydd and Walter's (2002) extensive game with Bayesian updating and

separating or pooling equilibria, analyses terrorist violence as a problem of trust. The lack of trust was a problem with the credibility of signalling in the section above, but a peace negotiation is a distinct setting and signalling can be effective in determining the type of player, i.e. if the opponents are moderate or violent terrorists, weak or strong and trustworthy or not. Intriguingly, their observation goes against the audience cost model as well, in that *weak* moderates "may be forgiven for failing to prevent terrorist attacks, but strong moderates will not" (Kydd and Walter, 2002:289). The moderates, bargaining with the government (see also §4.2), may promise peace, thus signalling their intentions in the same manner as a state leader may do, but if they're weak, they won't have to pay audience costs (in full), because it is not expected that they could curtail extremists. Therefore, the incurred terrorist acts by extremists to avert a peace deal provide useful information not about the extremists themselves, but about the strength of the moderates on the moderates' capabilities to curtail the extremists. This leads to a paradox that weak moderates are better off in peace negotiations when there is an active violent faction, yet a weak negotiator achieves less in a bargaining process. Alternatively, is it like before exploitation of the model, in that an aggrieved group has an incentive to be perceived as weak, yet strong at the negotiation table? For why is it, that the combination violent terrorist and affiliated political party lasts longer then either one separately?[57] If they were to be more effective when working in tandem or complementing one another's strategy, should they not only be capable of persisting longer, but also come to a resolve faster as they are 'battling on two fronts'? I have no answer to this based on empirical data, but bargaining strength does shed some light on this (see "broadening the models" further below). However, what it does imply according to Kydd and Walter (2002), is an indicator for due audience costs when the negotiations involve a *strong* moderate aggrieved group: if violence does occur, the other player infers that the moderates have been bluffing and not capable of keeping their commitments.

Third, when agreeing that aggrieved groups can build-up audience costs, albeit not in the same manner as in the standard international political scene, is this quantitatively measurable? This faces the same problems as Schultz (2001) discussed. An option to overcome this would be to rely on opinion polls; with all its imperfections not ideal either. Besides, establishing baseline credibility poses a problem, as well as (subjectively?) deciding if with every statement, bluff and lie the terrorist group should always be deducted equally[58] as the government. Intuitively, catching a bluffing democratic government seems more serious than a lying terrorist organisation, but this lies in the eye of the beholder as well as the parameters of the situation/game. Take for example a hostage situation: one subjectively may assume that a dishonest government lying to release hostages *might* be deducted less, i.e. incur lower audience costs, than unreliable hostage takers. Although according to Lapan and Sandler (1988:16), governments will lose reputation "when governmental declarations are not completely credible and uncertainty characterizes the government's costs of not negotiating".

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[57] See also §2.2 and Weinberg (1991).
[58] Calculated via the discount rate and factor of the war of attrition game.

Thus a policy stance to never negotiate with terrorists is 'likely to be time inconsistent" (p16) and implausible, a factor affecting audience costs related to the terrorist theatre, but which *could* have less impact than unclear positions in the more regulated international political arena.

Concluding, in terrorist frameworks like peace negotiations, audience costs can be generated and identified, in the non-negotiation phase, aggrieved groups exploit the audience cost model to their own benefit, and audience cost modelling parameters, especially the rate of deduction in crisis prolongation, depends on the problem being modelled and the preference of the modeller.

## *4.2 Bargaining and coalitions*

The previ ous paragraph sidelined the actual bargaining and negotiation processes, important but its intricacies were not of primary concern. This paragraph will take a closer look at this facet. Coalitions can be part of a bargaining process, transforming the non-cooperative nature of bargaining to partial cooperation between a subset of the players, or all players into a 'grand coalition'[59], which may very well be brought forward via internal bargaining within the grand coalition until a unanimous vote is achieved.

Reiterating §2.2, two or more of the following list are involved actors, or players in the game: the aggrieved group (at least one, but may be more), primary state targeted, principal and accessory states and groups and (inter)national organisations. *Figure 4.1* shows their primary interrelations. However, I would not argue that e.g. there is no competition within an international organisation, but its *aim* is to work together and foster cooperation towards a grand coalition (like resolutions and common policy statements), more profoundly than bi- and multilateral interstate bargaining. Coalition governments are not applicable in a majority of cases, but do have an effect on the overall stage, e.g. in determining the strength and position of the EU as an international actor.

However, the first step is to deconstruct the interplay to its simplest form, to be extended later if and where appropriate.

### 4.2.1 The Leviathan trap: ideologies, zero-sum and other ways out

Hobbes' pessimism on peace and the unavoidability of conflict is aptly illustrated by the Prisoner's Dilemma (PD), which invariably results in the rational outcome that harms both players, escaping conflict only by installing a "sovereign, titanic Leviathan, to keep us all in

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[59] The basics are outlined in §3.3 (coalitions) and §3.4 (bargaining).

awe". I will refer to this combination of logic as the Leviathan trap, which lies at the heart to figure out "how individually rational agents can avoid collectively irrational outcomes" and "whether it is the character of the agents or their logic that holds the key to a theory of conflict". (Varoufakis, 1991:37-41). One possible 'escape' is denial of choice between the two alternatives in the game[60]. Indeterminate sustained force across the globe, required for the denial of choice, is not realistic at this point in time or in the foreseeable future; therefore I will discuss changes to the game model as potential or possible workable alternatives that can avoid mutual damage.
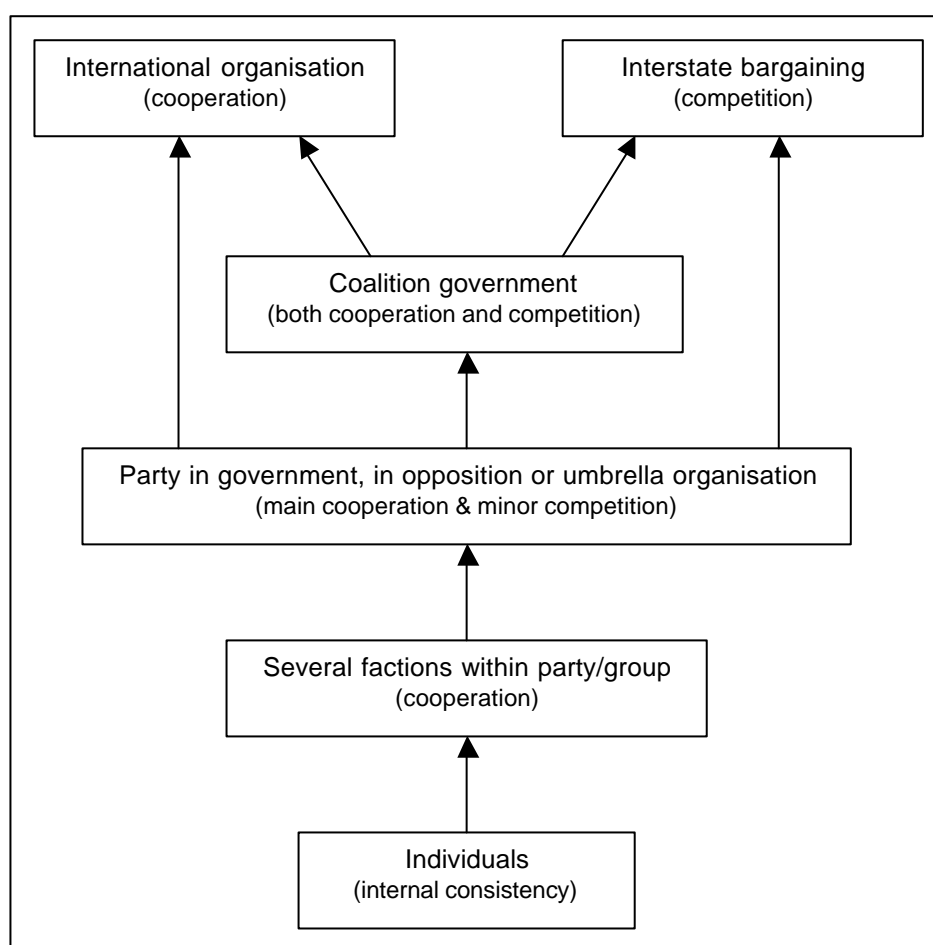


*Figure 4.1. Prevalent types of interrelations between actors*

Imagine a normal form game, one-off or finitely repeated, with two players, the government and a terrorist, or a representative of the aggrieved group. Both may choose between a peace deal (or policy) that would contribute to either positive peace or negative peace (the latter as 'absence of violence', or, according to Just War theory, as the 'presence of law and order').

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[60] Which reduces the PD game to "choose between *I agree* and *I agree*", thus eliminating the bargaining.

*Table 4-1* presents the payoff matrix and will have as outcome (*Negative peace, Negative peace*) with payoff of (3, 3), for the standard PD reasons, if there is not an unlimited level of trust between the government and terrorists. On can think of argumentations like "if I open up our organization and provide intelligence information, but all the other wants is finishing us, I will lose out, which is not going to happen" and "we don't get everything we want, but we make sure neither do you".

*Table 4-1. Two types of peace deals*

|  |  | **Terrorist** | | |
|---|---|---|---|---|
|  |  | *Positive peace* |  | *Negative peace* |
|  | *Positive peace* |  |  |  |
|  |  | 8, 8 | $\rightarrow$ | 1, 10 |
|  |  | $\downarrow$ |  | $\downarrow$ |
| **Government** | *Negative peace* |  |  |  |
|  |  | 10, 1 | $\rightarrow$ | **3, 3** |

*The values are numerical representations of a strategy, where the ratios of the values are important, not the actual numbers[61].*

*Table 4-2* presents an 'improvement' on the PD, which is either a reality or maybe a mediator can convince the players they are not doomed playing out *Table 4-1*, but in a better position than inflicting mutual harm:

*Table 4-2. A slightly modified "Prisoner's Dilemma".*

|  |  | **Terrorist** | | |
|---|---|---|---|---|
|  |  | *Positive peace* |  | *Negative peace* |
|  | *Positive peace* |  |  |  |
|  |  | **8, 8** | $\leftarrow$ | 1, *7* |
|  |  | $\uparrow$ |  | $\uparrow$ |
| **Government** | *Negative peace* |  |  |  |
|  |  | *7*, 1 | $\leftarrow$ | 3, 3 |

*Numbers in italics are in violation of the standard PD payoffs*

The dominant strategy towards (*Positive, Positive*) in the payoff matrix in *Table 4-2* is rather obvious, though even a weak dominant strategy as in *Table 4-3* may be 'sold' to the negotiators via the power of persuasion as a preferable solution: a *win – win* scenario as opposed to a *win – win-much-less-than-your-opponent* situation, provided that the players can convince themselves they both have relatively good intentions (or a mediator may do so), taking advantage of "cultural … perceptions and attitudes toward … symmetry, fairness and power" (Shubik, 1986:75). Note that this game demands a lower threshold for mutual trust to achieve (*Positive, Positive*) than the official Prisoner's Dilemma of *Table 4-1*.

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[61] The ratios that are characteristic of a PD: temptation [for *Negative peace*] > cooperate [here *Positive peace*] > relative punishment [both *Negative*] > sucker [one *Positive* the other *Negative*]. See *Appendix B-2* for details.

*Table 4-3. Payoff matrix with focal point and/or a basic level of trust.*[62]

|  |  | **Terrorist** | | |
|  |  | *Positive peace* | | *Negative peace* |
|  | *Positive peace* |  | | |
|  |  | **8, 8** | ↔ | 1, *8* |
|  |  | ⇕ | | ↑ |
| **Government** | *Negative peace* |  | | |
|  |  | *8*, 1 | ← | 3, 3 |

*Numbers in italics are in violation of the standard PD payoffs*

Another method of leaving the stage of a PD is to create it as in infinite game, where the players "take into account the possibility that they will have to live with each other on the morrow" (Shubik, 1962:219), which fosters cooperation automatically (Axelrod and Hamilton, 1981)[63]. Fearon and Laitin (1996) use a similar model to explain interethnic cooperation, but add a few crucial aspects that the normal form game model cannot capture: important factors are individual reputation, 'in-group policing' (group leaders punish their own people when they defect) and is linked to decentralised institutional arrangements. However, these institutions imply a level of self-governance, power sought after by aggrieved groups resorting to terrorist acts, and a (semi-) legal apparatus is a requirement to form enforceable 'binding agreements', which in turn is a prerequisite to make cooperative games workable. Reputation of each individual adds to a wider level of trust of the whole (ethnic) group, and according to Ouardighi (2002) this social network is an even more important factor than enforceability or third party monitoring of agreements[64]. To summarize his game theoretical model (which uses a nonlinear differential system), where each of the players "dynamically contributes within a joint production activity" and encompasses responses to deviation, I include *Figure 4.2* and *Table 4-4* from his article as it neatly captures the gist of Fearon and Laitin as well.

*Table 4-4. Strategic configurations of a partnership*

|  |  | **Historical context** | |
|  |  | *Low familiarity* | *High familiarity* |
| **Social** | *Mutual vigilance* | Crisis | Doubt |
| **context** | *Mutual trust* | Sympathy | Merger |

---

[62] Note that the mentioned model outcome in bold text is not correct, as *Negative peace* is weakly dominant over *Positive peace*, due to the difference between payoff 1 for the government if (*Positive, Negative*) and 3 when (*Negative, Negative*). However, that difference is relatively small compared to the gains of (8, 8), the 'temptation'-factor for defection is absent, and it requires a lower level of trust between the players than a standard Prisoner's Dilemma.

[63] It is in this context Varoufakis came to the conclusion as quoted at the start of this chapter.

[64] Third party, external, monitoring of commitment is detrimental to trying to build mutual trust: if you trust the other faction(s) sufficiently, there is no need for a 'nanny' to verify actions Ouardighi (2002). This is in stark contrast with e.g. Kydd and Walter (2002) and Walter (1997) who essentially preach the moral value of the use of an outside enforcer or monitor.
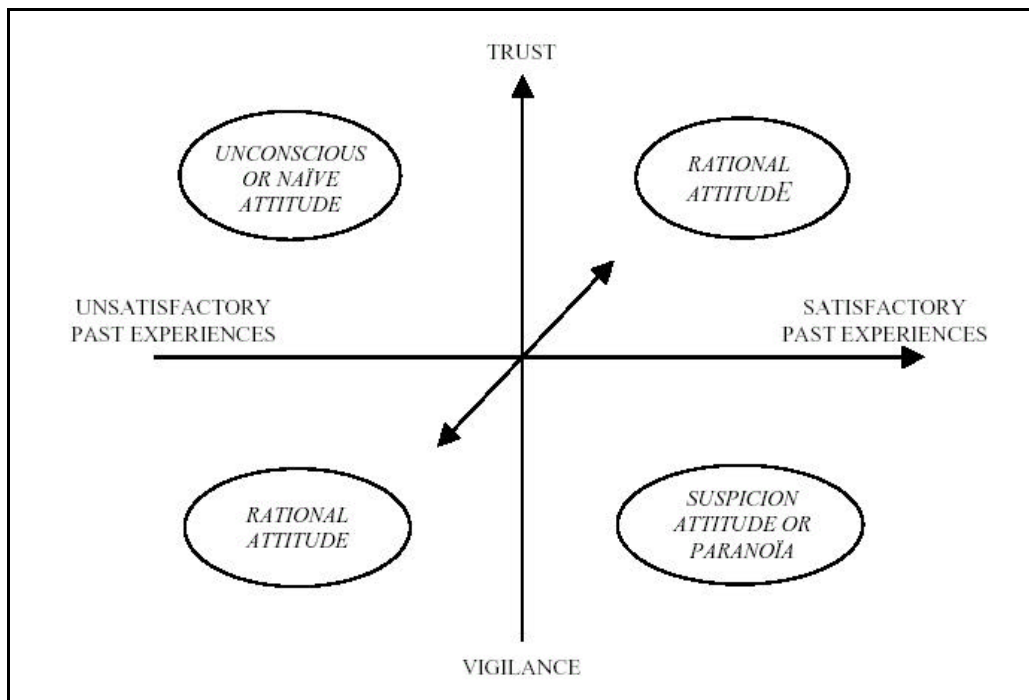
*Figure 4.2. Trust as a reactive attitude*

It is tempting to hold both the figure and table against the various 'terrorist situations' and make predictions where on the axis and table cell the relationships lie, but within the limitations of this research, this would not exceed the level of an (informed) guesstimate, and therefore an interesting avenue for further research.

Aside from delving in externalities not covered in a standard normal form game and tinkering with payoffs, one can investigate the dualistic nature of the game, positive versus negative peace, modelling negotiations on the contents of peace agreements instead. In reality, horse-trading among the representatives (players) at the negotiation table does not reflect, as e.g. Putnam (1988) and Hosli (1999) indicate, equal gains and losses (zero-sum, see *Figure 4.3*) to achieve a peace deal, but scope for diversions. The crucial point is, peace bargaining does not occur on single items but on combinations of points[65] and for one player to give in on some item, i.e. lose a little from his overall payoff to what he perceives as a minor issue, may be of greater value to her (e.g. an intangible 'moral victory'), giving her a higher extra payoff than he loses. *Figure 4.3* represents this higher level of flexibility. Although *Figure 4.4* is limited to the 2-dimensional space, the room for agreement (blue) can be extended to partially overlapping spheres, cubes, pyramids and so forth.

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[65] For example, the Joint Declaration of the British and Irish governments as published in *The Irish Times*, 2-5-2003, p10-11 (online at www.ireland.com), included sections on paramilitarism, policing and justice, rights, equality, identity and community, proposals for 'on the runs' and on monitoring and compliance.
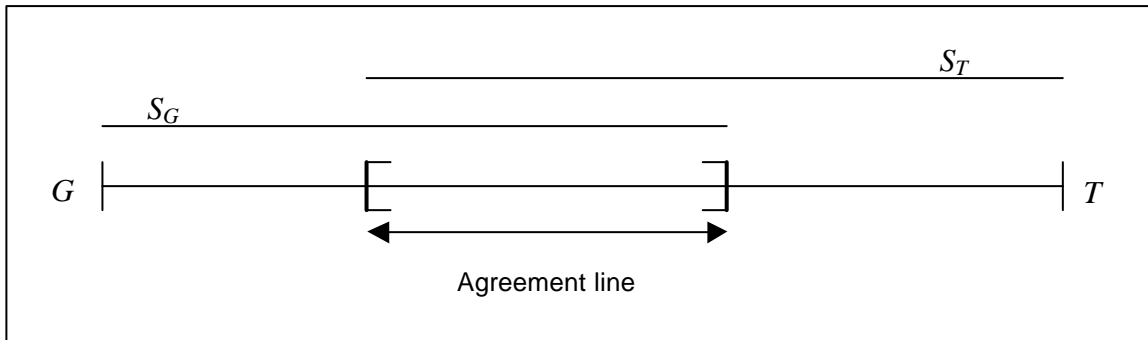
*Figure 4.3. One dimensional negotiation line, a zero-sum approach. $S_G$ is the set of demands (flexibility in negotiations) for the government and $S_T$ for the aggrieved group. (Figure based on Putnam, 1988)*
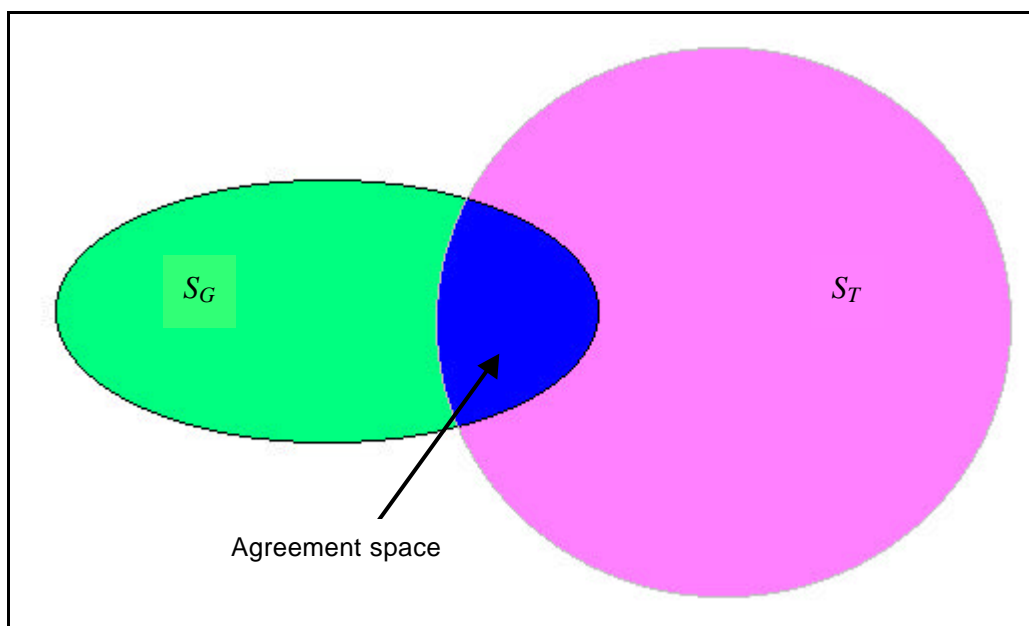


*Figure 4.4. Negotiation spaces, variable-sum: the amount one player can gain does not imply the equal loss in the payoff of the other player. Green + blue is $S_G$ and purple + blue is $S_T$.*

A rather curious game that escaped the Leviathan trap by using a dualistic approach is *Rationalizing Revolutionary Ideology* by Roemer (1985)[66]. He modelled the transformation from PD into a zero-sum game purely because of the charisma and persuasion by one of the players, Lenin: by supporting him, people can avert the loss expected in a PD and turn it into the "sum" part of zero-sum. Bawn (1999:307) succinctly words it as strategic elites creating focal points around specific issues. With increasing levels of complexity of the mathematics of Roemer's game, it is possible to calculate how poor the peasants and how fierce the Tsar's penalties have to be in order to be able to be motivated to support the revolutionaries: *it is not ideology but just good strategy to incite a revolution*.

---

[66] The article takes Russia with entrepreneurs Lenin and the Tsar as example; revolution has the broad definition as an allocation or redistribution problem.

Bawn (1999) thinks ideologies[67] can arise out of self-interest and political bargaining and that an enduring ideology *must* be Nash equilibrium (p305); her game of ideology predicts that *inefficient* ideologies[68] will never be proposed because that implies that a player deviates from equilibrium strategy. These deviations are deemed irrational in the realms of game theory's analytical and instrumental reason[69].

Alternatively, the disagreeing actors all could choose for a joint outside option to call in an international organization like the UN, EU or Transcend. This does have an effect on bargaining due to the fact that joint outside options are taken, in equilibrium, at out-of-equilibrium decision nodes, acting as a fallback for one of the parties. Thereby a new (extensive form) game is generated with *new* strategy sets, a highly interesting concept when bargaining peace agreements – to look for a third way. (Manzini and Mariotti, 1999). After all, in addition to play a game wisely, one can change it.

## 4.2.2 Broadening the models

The previous section looked primarily at elementary two-actor scenarios, which will be unravelled further (the bottom half of *Figure 4.1*) with sequential bargaining in an extensive form game and then extended to a multi-player stage.

*Core game with two players, the government $G$ and terrorists $T$.* See *Figure 4.5*; either $G$ can start with the game or $T$, which does not affect the essentials of the game. Here, $T$ starts: the terrorists decide to continue using violence, or offer the government to negotiate over a peace agreement, the government can either accept or reject this peace offer. If the government accepts, then the terrorist can decide to go ahead with negotiations, or defect. Think of defection as the terrorists having deceived the government, to test if it is 'soft' or not. The gamble of defection can mean either that the terrorists truly do not want to negotiate, or hoping that with more violence, the government may be even more willing to negotiate at a later stage, hence then the terrorist's intend is to create a better position for negotiations with the government at some time in the future[70].

---

[67] Bawn's definition of ideology: "an enduring system of beliefs, prescribing what action to take in a variety of political circumstances" (1999:305).

[68] Inefficiency includes "wasting time" on "symbolic activities" and advocating "clear lost causes" (Bawn, 1999:324-325). Aggrieved groups resorting to 'instrumental reason', using any means to achieve your goal, rely considerably on symbolism and if a certain goal is a lost cause is highly debatable: that an aggrieved group does not have the military might to fight an overt war but resorts to terrorist acts does not mean that they're fighting needlessly for a lost cause.

[69] But see also *Appendix C-1* (heading "the rational and irrational") and §4.4.

[70] Conversely, substituting $G$ for $T$ and vice versa, a defecting government may decide that deceiving will help them gather intelligence to catch more terrorists, or e.g. end a hostage situation.

Else, terrorists do not offer to initiate peace talks, but subsequently the government can take the first step to indicate it is willing to initiate negotiations, which the terrorist can either accept or reject. Last, the government can respond to terrorist attack with counter-terrorism, here and in following figures considered as a policy of violence carried out by the government.
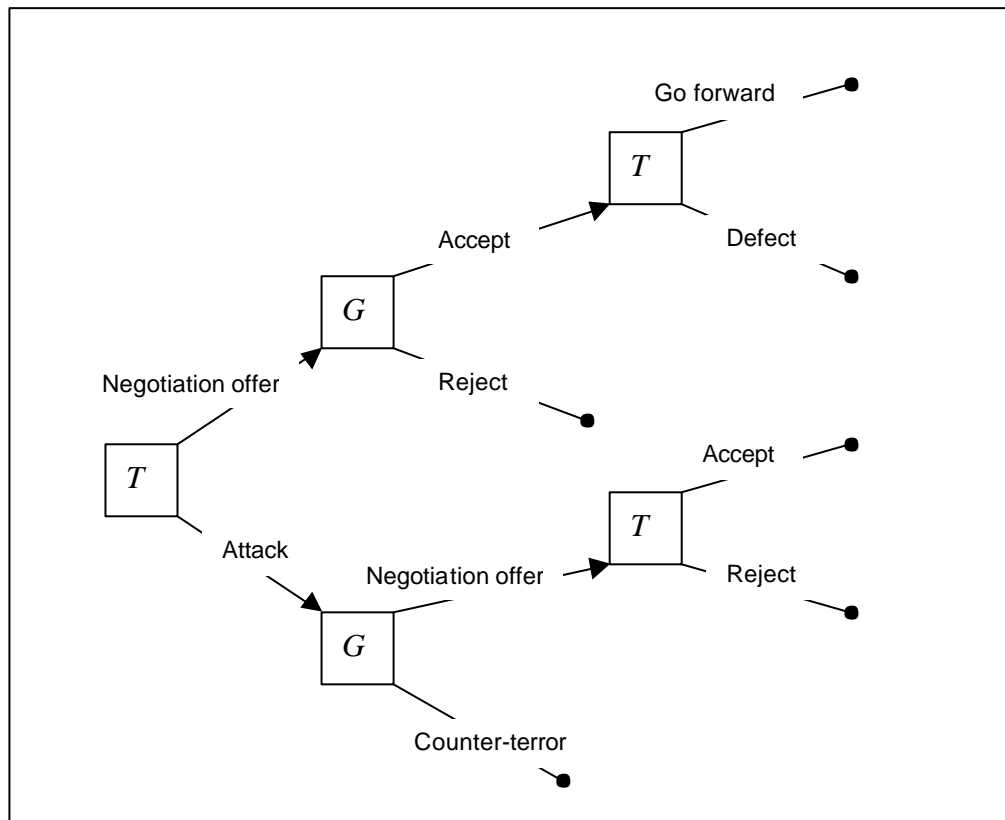


*Figure 4.5. Core game with two players, the government $G$ and terrorists $T$.*[71]

However, neither the terrorists nor governments are homogeneous groups, thus one can divide the two players in *Figure 4.5* into four groups. This is represented in the next two diagrams. Of course, this does not mean that there are always two subgroups per group (player), but the primary point is that there is more than one actor involved in establishing the government's and aggrieved group's stance on policies that affect terrorists.

*Core game where terrorists are divided between moderates, $T1$, and terrorists who want to continue using violence, $T2$.* The assumption is made, that when moderate terrorists do not make a peace offer (to the government), the violent ones certainly will not do so and when $T2$ joins the negotiation all will continue as outlined in *Figure 4.5*. If $T2$ decides to disrupt an attempt by $T1$ to initiate negotiation, $T1$ decides either to continue its initiative to negotiate

---

[71] The allocations of probabilities follow standard procedure, *Negotiation offer* with probability $p$, *Attack* $(1 - p)$ and so forth.

with the government or abandon its initiative. In this game, the government is an externality that does not affect the strategy of aggrieved groups. Bueno de Mesquita (2002), Kydd and Walter (2002) use a similar idea, respectively by assumption and additional Bayesian updating.
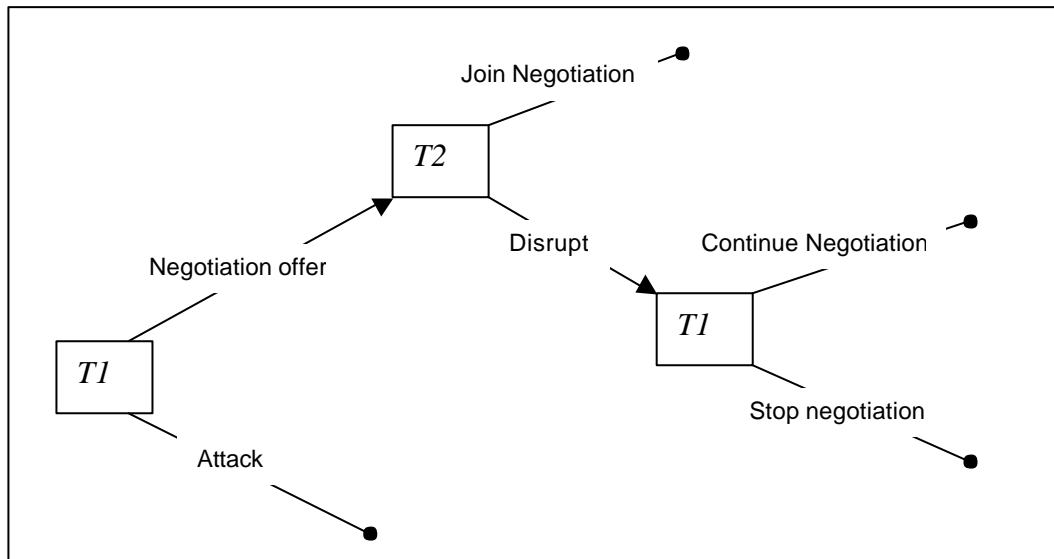


*Figure 4.6. Terrorists are divided between moderates, $T1$, and violent terrorists, $T2$*

*The 'government' is divided into the party in government, $Gg$, and the opposition, $Go$.* This can also be interpreted as a coalition government consisting of two parties who debate internally on their position regarding intended policy measures on terrorism (the upper half of *Figure 4-.1*). The *Wants negotiation* and *Wants counter-terrorism* are signals voiced by $Go$, as is *Support $Gg$* in the policy chosen by $Go$ (*Figure 4.7*).

This game in *Figure 4.7* structures the audience cost model as an extensive form game, where, according to Fearon's definition, *Negotiation* is 'backing down' and *Counter-terrorism* equal to 'standing firm', the latter building up audience costs. If $Gg$ decides to go for *Negotiation* in the third round (indicated with an asterisk in the figure), it incurs audience costs. Likewise, if the audience costs would count 'in reverse', the policy change by $Gg$ in round three to *Counter-terrorism* (indicated with "**") would equally incur audience costs.

It is possible to substitute *Figure 4.6* and *4.7* fully into the first diagram, but this would obfuscate the essence of the game. Alternatively, there are options for the extensive form game to partially integrate *Figure 4.5* in a series of successive moves or to imagine the games happening in parallel. However, the former would make the model unnecessary complicated[72] and for the latter "it is not possible to rely on standard solution concepts such as Nash's" (Horn and Wolinsky, 1988:485) because Nash's does not define compound bargaining.

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[72] For the interested reader, an example is included in *Appendix C-2*.
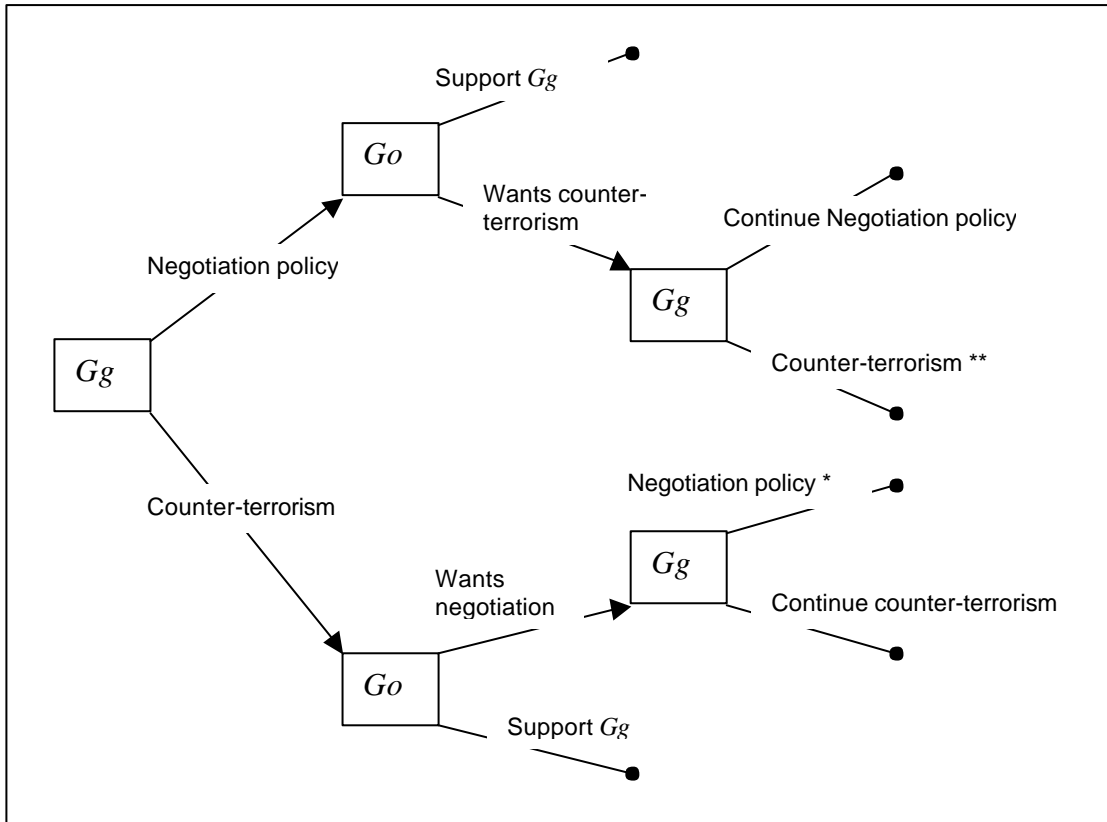
*Figure 4.7. Divided government, with a party in government, $Gg$, and an opposition, $Go$*

A step towards integration of the above models is to condense the matter to pure strategies in subgames with three players at each node: either a moderate, a hardliner and the government, or one generic terrorist and a non-unified government with an extra opposition party or a coalition government who do not share the exact same strategy set. This model is as Chae and Heidhues (2001) outlined and to which I applied a generalization in chapter 3 (see *Appendix B-3* for derivations), {$T2$, $T1$, $G$} as:

$$(?\ r\ + (1-r)/4,\ ?\ r + (1-r)/4,\ (1-r)/2),$$

where $T2$ denotes the payoff for the violent terrorist group, $T1$ a stronger negotiating moderate and $G$ the government. ? is the fraction players $T2$ and $T1$ have agreed upon that $T2$ is worth in the coalition {$T2$, $T1$} (i.e. her share of the pie), if it is deemed viable to form one, and ? represents $T1$'s worth in the coalition. The breakdown point of the coalition, $r$, depends on the relative strength of $T2$ and $T1$: in a non-cooperative situation with equal strength players $r = ?$ , which is not a realistic assumption. In variable strength situations, this leads to the following proposition:

PROPOSITION 2.

*In a 3-player game, {T1, T2, G}, where two players consider forming a coalition, this can be favourable in situations where the fallback position, r, is strictly lower than in a non-cooperative game, provided that the two coalition players divide the bargaining gains asymmetrically and both agree on the subdivision ratio.*

Proof is included in *Appendix B-3* (p100). For example, a coalition between $T2$ and $T1$ as unequal partners dividing the bargained piece of the pie with a ¼:¾ ratio, it computes as a payoff of for {$T2$, $T1$, $G$} as (0.25, 0.375, 0.375), *thus a strong moderate terrorist can fare well by cooperating with a weak (smaller) hardliner*. Of course, the same is true in the case of one terrorist (representative) and two government players. Although at first impression the difference in payoff between $T2$ and $T1$ may seem unfair, due to a sense of inequity aversion (Fehr and Schmidt, 1999), but suffering this temporary loss to achieve a better result in the long run is rational (Brams, 2001), which Konishi and Debraj model "by simply changing the discount factor of agents" (2002:3) and allowing for constant renegotiation of agreements[73].

Horn and Wolinsky (1988) investigated *when* factions should ideally form a coalition against a third player and when they should not, which they summarize in proposition 2 (p493) for labour unions, but can easily be adapted for {$T2$, $T1$, $G$}:

PROPOSITION 3.
*If the two sets of means and goals of the two aggrieved groups are sufficiently close substitutes, the equilibrium form of organisation is an encompassing group. If they are sufficiently complementary, the equilibrium form of organisation is separate groups.*

In case of sufficiently complimentarity and acting separately, they can virtually paralyse the government (the firm in Horn and Wolinsky's setting) because their bargaining position is stronger under separate organisations. The encompassing group follows aforementioned model of Chae and Heidhues. The bargaining power of the government is not generally applicable for adaptation based on Horn and Wolinsky's applied model: the firm should divide and rule by geographically separating the workforce within and across countries. This has its analogue only in establishing smaller refugee camps in different locations with relatively difficult means of transport between them, making aggregation to form literally and figuratively 'one front' among the dispersed refugees more challenging, or even impossible. Illustrative examples of the potential of applicability are the Palestinian and Afghan refugees. Palestinians reside in smaller refugee camps[74] spread over different countries in the Middle

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[73] They test deterministic and stochastic schemes, slightly different from game models discussed in this and previous chapter.
[74] E.g. Shatila and Ain-El-Helwe in Lebanon with roughly 200,000-400,000 people.

East and have a far from united front. Afghan refugee camps in Pakistan with over 2 million refugees per camp is said to have been fertile ground for Taliban and, later, Al-Qa'ida recruitment [75].

Aggrieved groups may not only form a coalition as, but consist themselves of coalitions as well, either as umbrella organization or as a group of individuals, i.e. an alliance above (graphically represented in *Figure 3.2*). Game models predict different degrees of effectiveness of such alliances. Hosli (1999) and Putnam (1988) focus on the "capacity to act", which is supposedly lowest when the alliance uses unanimity procedures and improves with qualified majority; even more so with simple majority voting. However, strength of negotiation tactics with other players has a correlation in the opposite direction: alliances based on unanimity fare best (Manzini and Mariotti (2001) and *Appendix B-1*), presumably because a representative of the alliance at the negotiation table feels 'stronger' as he is assured that what he bargains for is what all members want most. Combining the two ideas, one can infer 'slower, but more robust' and 'quicker response, but less social basis in the grass roots support'. The former may take longer than the patience of the players (representatives and alliance members) or not demand enough when the strategy set (negotiation space) is a lowest common denominator consensus, the latter has a higher probability of breaking down after some time because of less than full support. The crux is, which one is prevailing in what situation, aside from defining fluid concepts as slow and quick. The latter depends on the perception of the involved actors, but when there are negotiations and the actors cannot agree within a given deadline, though see options and are unanimity-based, it is reasonable to categorise the negotiation process as too quick. It is widely accepted within peace research that working with deadlines has a negative outcome on peace negotiations and processes; these discussed models provide a game theoretical explanation why this is observed in the field[76].

Another problem may arise during negotiations when we take a situation with two players, government and aggrieved group, where each is subdivided in parties/factions and individuals, when one is of the slower qualified majority or unanimity type and the other would like to hammer out a peace deal in a relatively short time span. Being able to identify such a situation, based on the organisational or institutional arrangements involved, may alleviate some of the frictions and aid mutual understanding for their respective inner workings of the faction, hence aid towards a positive outcome of negotiations.

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[75] Presentation, d.d. 11-4-2003, by Rifat Iqbal, Pakistani Ambassador to Ireland, on invitation by the Irish Peace Society, Limerick, Ireland.
[76] In addition to the previously discussed finite/infinite Prisoner's Dilemma.  A deadline can be interpreted as a finite PD, hence subject to end of game pathologies; no deadline as pretending it is an infinite game.

## *4.3 Experimental gaming*

### 4.3.1 Introduction

One of the aims of experimental gaming is to put game theoretical models to the test. This particular experimental game will investigate the assumptions and model as outlined by Bueno de Mesquita (2002) on his premise that when an aggrieved group embarks on the path of peace settlement negotiations with the government, a terrorist organisation divides between 'moderates' – willing to negotiate – and 'hardliners' – those who prefer the route of violence. Based on his game theoretical model of extensive form sub-game perfect Nash equilibrium with backward induction, one can expect an *increase* in violence during the negotiation process as hardliners supposedly try to avert a possible agreement[77]. However, the assumption that aggrieved groups split up into moderates and hardliners is by no means a 'proven' process that a modeller should build into a game model, although Kydd and Walter (2002) make a similar observation from the game theoretical perspective of trust (see also §4.1). Wieviorka (1988:22) thinks this division magnifies because the moderates do not provide counterweight to extremists in the same level as before negotiations with the government started.

Weinberg (1991) discusses the delicate balance, dependence and cooperation between terrorist faction(s) and its (ideologically) related political faction as viable and relatively lasting longer that non-cooperation, whereas Crenshaw (1991:70) claims that a decline (end) of terrorism does occur, either because of physical defeat, the group's decision to abandon the violent strategy and/or organisational disintegration, ignoring persistence or settlement by negotiation altogether. There are no overwhelming data either way.

Instead of investigating the assumptions via a case study, which is per definition subject to research bias, especially in the field of terrorology, this is put to the test in a simulated setting with three players per game: one government and two terrorists, a moderate and a hardliner, who negotiate their respective objectives and possibilities for a peace agreement.

Secondly, this three-person game explores the gaming experiment carried out by Berninghaus *et al.* (1999), similar to Horn and Wolinsky (1988), who tested a three-person game in joint venture asymmetric bargaining, as a terrorist bargaining session, where I map the 'smaller group in the merger' to the violent terrorists ($T2$ [X in their model]), the larger group as the moderate terrorists ($T1$) and the third party the government ($G$). The 'divide and rule' advantage of $G$ as well as collective bargaining of $T1T2$ (*Einigkeit macht stark*) was observed in their economics setting. Furthermore, $T1T2$ coalitions resulted twice as often in

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[77] The violence is expected to decline after a peace agreement due to a 'clamp down' of the (small) violent faction.

conflict than when there was no coalition (22.66 versus 11.63 % (1999:9)). It will be interesting to see if the outcomes in the terrorist negotiation game are similar.

Last, two factors influencing coalition-forming in a positive way are introduced. First, the externality positive-framing is used as if the players were negotiating towards a common good, some peaceful settlement, which should result in behaviour that is more cooperative than the negative frame of the private good of individually achieving one's objectives (see e.g. Andreoni, 1994), modelled in the prize award system of the game. Though the award allows for optimalisation of one's own goals (one free drink), a combined agreement of the players will award an additional free drink for each participant. Second, the players are in face-to-face negotiations instead of anonymous bargaining behind a computer, which, according to Croson *et al.* (2003) and Valley *et al.* (1998), increases the probability of reaching agreements even when there was an equilibrium prediction of no agreement, and the agreements were more beneficial to the players. Thus instead of 'deceptive cheap talk', improved communication led to additional gains compared to no communication before the official bargaining started.

However, it must be noted that outlined experimental game is a pilot experiment, which, depending on the results, might need to be adjusted in order to be able to cater for a statistically sound amount of games.

### 4.3.2 Aspects to investigate

Precise aspects that are investigated during this experiment are:

A.  The level of cooperation / coalition forming between moderate and hard-line terrorists in one group (country) and if they will cooperate between countries.
B.  Does a division between moderates and hardliners occur?
C.  Do hardliners instigate violence during the bargaining process to avert its outcome?
D.  If the answer to C is yes, is this in cooperation with the moderate terrorist, alone or in cooperation with other violent terrorist factions?
E.  The amount of peaceful settlements versus walkout and conflict.
F.  Do the results of the Coalition Calculator[78] provide a relation / indicative estimate on the influence of the others and are in line with the outcome of the particular game?

*Appendix D-0* (p112) contains the game procedure and an explanation of the rules; *Appendix D-1* the rules as communicated to the players and *D-2* the specific descriptions per player per

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[78] *Appendix C-3* describes the functionality of the Coalition Calculator and contains a few screenshots of the software.

country. *Appendix D-3* the expected maximum overall payoff per group (country), *Appendix D-4* the independent media briefings and *D-5* the evaluation questionnaire.

### 4.3.3 Results

Due to space limitations, results on the Coalition Calculator, questionnaire, media events and comments on individual games are included in *Appendix D-6*.

First, a comparison of the results is given and thereafter the specific points, as outlined in §4.3.2, are addressed briefly, followed by a discussion on the set-up of the game.

*Importance and influence -* Comparing the provided importance/influence levels, questionnaire responses and media events, Game 1 in particular reveals the different perceptions of realities:

1.  The interpretations of importance, where both $G$ and $T2$ are diametrically opposite from each other, each thinking to be the most important at the end of the game and hardly allocate any relevance to the other players. $T1$ consistently allocating higher importance and influence to $G$;

2.  In both Game 1 and Game 2, the same player (allocated role $T2$ and $T1$ respectively) had consistently higher esteem of her own importance and influence than the other players, which could be due to her dominant personality surfacing during both games[79], but see point 6;

3.  The confusion around certain events: other people died, but never any of the players;

4.  The players' own inconsistencies in answering the questionnaire, numbers of importance/influence and post-game comments (e.g. who started the violence).

Although Game 3 was by far the most effective and constructive game of the three, there are still considerable differences between each player's own perceived importance and influence and that what the other players think:

5.  Influence of each player at the end of the game: $G$ granted himself 60, whereas $T1$ allocated a mere 5 to $G$ and $T2$ a fraction of 40 to $G$ out of a total of 100;

6.  At the same time, each player consistently granted relatively the most influence to him/herself; which was not always observed during the first two games.

In hindsight, it would have been useful if the coordinator had recorded the relative influence and importance from an 'outsider' perspective as well. The coalition calculator was not tested in full due to lack of sufficient participants.

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[79] The peaceful attitude of $T1$ (Game1) / $G$ (Game 2) was shifted to more vocal and strategic behaviour in Game 3 (where she played $T1$).

*Threats -* Threats were absent during all three games. Instead, the players considered the 'threat' carried out with immediate effect, despite occasional intervention (in relation to the nuclear arsenal of $G$ in Game 1) by the coordinator to verify if this was a threat or an actual 'instigated event'. Noteworthy is that one player accused another to have carried out an event (media event 1 and 6 in Game 3), either as a way of propaganda, or to masque a shift of $T1$ to more violent tactics.

*Violence -* Discussing the deployment of nuclear arms during the first game after finishing the experiment, the coordinator mentioned the 'worst case scenario' she prepared for was what to do if a player instigated the event to assassinate [eliminate] of one of the players, but that was perceived by the participants as really devious. Combined with the confusion around who actually was killed during the deployment of the nuclear arsenal in Game 1 and all the other bombs, this points towards the idea that they apparently thought it was unfair, but not evil, to kill other, unknown, people (see also 'media events'), but *not* the players they were actually negotiation with, even though the negotiation was of a rather unconstructive nature.

*Learning aspect -* Due to the set time constraints, there was a feeling of "not finished with the matter yet" and all players would have preferred to continue with the game. Furthermore, all players indicated the desire to participate in another round of games at a later point in time to have 'another chance'. The difference in behaviour of the participants between the games and the request for a repeat indicates the learning aspect of the strategic approach in a game, therefore provided background information on the foundations of the experiment, should, if repeated, be taken into account as an 'unfair' advantage over other inexperienced players. However, Shubik *et al.* (1974) and Kirchkamp and Nagel (2000) found that learning occurred trough reinforcement in their experimental, with only a weak correlation with imitation of neighbours when in a spatial structure and hardly as a result of the payoff and reward system. This is in contradiction with Fehr and Schmidt (1999), who do claim repeated-game and repeated interaction do have a positive effect towards more stable behavioural patterns, at least partly resulting from the psychological evidence on social comparison and loss aversion.

*The level of cooperation / coalition forming between moderate and hard-line terrorists in one group (country) and if they will cooperate between countries*. Cooperation was observed between $T1$ and $T2$ during Game 3, but not during Game 1 and 2. Observation and analysis of the coalition-forming should have been observed more closely, or in more detail, by gathering data on the motivations for doing so. There was no experimental gaming session with more than one country at a time.

*Does a division between moderates and hardliners occur?* In both Game 1 and Game 3, the players did not appreciate $T1$, either for lack of conviction for the cause, or the seesawing

between the other players. A division did occur between $T1$ and $T2$ in Game 2, in line with Bueno de Mesquita's prediction.

*Do hardliners instigate violence during the bargaining process to avert its outcome?* This was observed in Game 2.

*If the answer to C is yes, is this in cooperation with the moderate terrorist, alone or in cooperation with other violent terrorist factions?* $T2$ initiated the events himself, as a last attempt to prevent a $T1$ and $G$ to write a peace agreement.

*The amount of peaceful settlements versus walkout and conflict.* Only Game 1 ended in serious conflict. Game 2 was a little closer to an agreement, whereas Game 3 had invented a more encompassing agreement than strictly required on the basis of given objectives, with the final percentages in power-sharing the main point of bargaining (either 30, 40 or 45% for the royal family). Whereas the players in Game 2 were discussing if they would want an agreement, the players in Game 3 agreed to achieve an agreement, and were 'merely' filling in the details.

*Do the results of the Coalition Calculator provide a relation / indicative estimate on the influence of the others and are in line with the outcome of the particular game?* The importance/influence perceptions of the participants are a valuable tool in assessing the outcome. The high discrepancies noted in Game 1 are indicative for the violent end state of the game (both $G$ and $T2$ were considering themselves to be the most important by a large margin). In contrast, Game 2 represents a 'more equal' division (except by $T1$), which reflects the closeness of an intention for a peace deal. Allocations for Game 3 vary widely, though consistently each player grants him/herself a somewhat higher fraction of influence and importance than other players do. Although $T1$ achieved most of her goals, $G$ and $T2$ did not credit her for it.

### 4.3.4 Discussion of the experiment

The majority of published experimental games reward a monetary payoff, but the 'free drinks' is an appropriate incentive in these types of political science scenarios, as it allows the players plenty of further evaluation of the games afterwards, as well as realising the concept of using a strategic approach as opposed to purely behavioural / emotional interpretations of a conflict. Further, when carrying out small-scale experiments like the one conducted, the after-the-game provides considerable insight in belief systems of the participants, which players do not necessarily write in full on a questionnaire form.

At the start of the first experiment, players were informed that there was a 'moderate and a violent terrorist', which the players stayed with. This could be a lack of their imagination in inventing a change in their tactics, or perceived as a boundary the participants felt compelled to adhere to. For the second experiment (Game 3), the descriptions were unchanged in that $T1$ is moderate and $T2$ violent, but referred to with the more neutral labels 'terrorist 1 and terrorist 2'. During Game 3, both $T1$ and $T2$ changed their tactics, in that $T2$ was not violent and $T1$ instigated an occasional violent event (though asserting it was $T2$ who did it). This may be accidental, but certainly worthwhile to include in further experiments.

Although the intention of the initial experiment was to play it with 5 to 6 groups of three people, to allow for more flexibility and inventiveness of the players (e.g. to form a UN-type of cooperation or world-wide terrorist network), the major advantage of a one-group analysis is that the interactions between and motivations of the players could be monitored more closely. Ideally, the game should be repeated with multiple groups and an observer for each group.

Concerning choosing the protracted conflict modelled, less well-known problems could be an advantage and prohibiting deploying nuclear arsenal or assassinations of other players may improve clarity of the game. Analysing the instigated events, a deterrence mechanism could be built in (the so-called discount factor), in that when instigating an event whereby people are killed, the achieved personal payoff at the end of the game will be deducted by one point for each deadly event. However, the latter is a moral consideration.

Another, more detached, approach taken in experimental games in economics, is playing the game behind a computer over the network, but this does not suit the political / behavioural setting of peace negotiations. The bargaining in politics is highly dependent on personal behaviour, even more so in emotional protracted conflicts, and factoring out this parameter will not result in an increase in understanding of bargaining dynamics. One can argue the current set-up is 'endless cheap talk' before players reach a situation where peace agreements are proposed, or as an infinite bargaining game of alternate offers between three players. If the former, then one may want to introduce penalties (as a function of time and/or media events) and deduct the overall points, i.e. introduce a clearly identified discount factor and rate as in the war of attrition. If the latter, one may prefer to impose a more strict bargaining process where only one player may talk at a time and would need to phrase his/her intentions in a determined format as in the alternate offer bargaining procedure. For example, $T2$ not indicating, "…let's do 35%…" but "I reject $G$'s offer of 45%. I propose 35%" and both $G$ and $T1$ must respond before a next step is taken. However, stricter rules in accordance with the more narrowly defined game theoretical models will reduce the likelihood of achieving a peace settlement.

Last, the time aspect may have influenced the not so positive outcome, and when applying stricter game rules, one may need to increase the time the game is played to at least one or two hours.

### 4.3.5 Conclusions

Overall, the intentions of the experimental game may have been too ambitious, and has not been carried out a sufficient amount of times to infer a single regularity in either coalition-forming or bargaining behaviour in government – terrorist negotiations.

Despite having facilitated a setting where cooperative behaviour is most likely to flourish, including the background of the players and a simplified environment, the outcome of the three games, none achieved a peace deal, was disappointing.

However, the perceived relative importance and influence measurements are a very promising approach. In addition, it has revealed useful improvements for future experiments, in that taking into account suggested improvements, it provides for an adequate experimental game in a larger setting.

## *4.4 Discussion*

In the preceding paragraphs several game models passed the revue: none is capable of describing a general model for terrorist situation, but this is certainly at least partially due to the plethora of situations, causes and involved actors described as terrorism. However, it does provide insight into aspects of the terrorist theatre, ranging from exploitation of the audience cost model, the increase of violence during peace negotiations (including providing new information to the actors), options to escape the mutual harm of the Prisoner's Dilemma, potential for coalition-forming and offers an explanation for unconstructive deadlines and actors in two-speed negotiation processes.

Referencing to the multitude of causes in §2.1.2 and discussed game theory:
- Ethnicity, nationalism/separatism: success of cooperation is linked to in-group policing a level of self-governance. It does not answer the minimum required levels of these two parameters to achieve peaceful co-existence. The trust factor provided an explanation form another angle.
- Poverty and economic disadvantage, globalisation: violent struggle can be a rational, 'good' strategy if the individuals are sufficiently poor, have a charismatic leader to lead the people and the government's punishment system is sufficiently harsh; the 'critical mass' for revolt can be calculated.

- (Non-)democracy: no conclusive answer. There are factors like poverty and ethnicity to be taken into account (see previous points). Democratic leaders ought to be better capable of signaling their intentions, hence alleviating the information asymmetry and thereby lowering the chance of conflict.
- Western society: not addressed. See also religion further below[80].
- Disaffected intelligentsia: not sufficiently addressed. One could consider the stance to negotiate with aggrieved groups as an outlet for intelligentsia. There are conflicting results on the effects of ideology (either narrowed down to economic motives, or considered as inefficient).
- Dehumanisation: not addressed. Modelling dehumanisation opens the complex issue of 'psychological game theory', an undeveloped area in game theory.
- Religion: may be considered as a component of an ethnic group, but did not receive attention separately. Religion, and its norm and belief system, does have an effect on usefulness of the focal point concept, which could be exploited to avert the mutual harm of the Prisoner's Dilemma game.

Testing the possible goals of the aggrieved groups mentioned in §2.1.2 for potential with game theory, especially in the sense of goal as possible strategy set, the following observations can be made:

- Power: a quest for power, being it absolute winning or equilibria where both win, i.e. gain a share in power, is exceedingly suitable for game modelling.
- Implementing ideology: there are conflicting views on modelling ideology, which allows for further exploration of the topic.
- Territory: this can be interpreted as a strategy for power, but also parameterised as indivisible or public good bargaining analogous to economics games.
- Evangelisation of religion: converting people, in the abstract sense a process of enlarging one's grass roots, does not lend itself for game theory because it is a *process* and not an outcome (see next alinea).

A less positive note is the outcome of the experimental gaming session, where even players who were merely 'role playing' were not capable of finalizing an agreement, which is, in addition to documented protracted conflicts, an indication that the reality is much more complicated than any of the models could capture.

The Nash equilibrium is an appealing concept to use, because the definition states that it is, as Voltaire centuries before (1758) wrote, "the best of all possible worlds" for all players. However, this overlooks that the equilibrium is an existence result, but does not provide

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[80] Whereby 'Western society' is considered to be based predominantly on Christianity (variations on Protestantism and Catholicism), as religion as well as the prevalent norms and beliefs system.

directions on how to define payoffs that accurately reflects the situation being modelled. Further, over-focussing on equilibria culminates in notions of e.g. 'inefficient ideologies' that will not be chosen as strategy because they are not in equilibrium, something that the game designer has designed herself, which is circular reasoning and does not provide an explanation. How to explain a player's conjectures for the decision to chose a strategy off the equilibrium path? Is he a 'rational fool' or irrational? Maybe the analytical and instrumental reason of positivism that lies at the heart of game theory cannot live up to the intricacies of social relations? Varoufakis (1991) provides an illuminating discussion on this and related factors if off-equilibrium choices are rational, hence suitable for (game) modelling, or irrational, and I provided an example in *Appendix C-1* where an apparently irrational move starting violent conflict could be rational in retrospect. These points could suggest that the route (process) to the destination (solution) is more important than the payoff/utility (Shubik (1987:1520) and Varoufakis (1991:27)), although, shown in this chapter,

> As with any mathematical theory of human behavior, utility theory does not always successfully predict the decisions that people make, but it is a compelling and general theory that can account for much observed behavior. (Myerson in Raptis, 2002)

As Varoufakis (1991:278) concludes, by which I agree, *"conflict is not only compatible with Reason; it is the only rational response to primitive social relations"*, which means that game theory can be a useful tool to contribute to the research and resolve of terrorism.

# 5. Conclusion and recommendations

## *5.1 Conclusions*

The conclusions are categorised in accordance with the research questions as outlined in chapter 1. The investigation uncovered the following answers:

*What theories of terrorism do exist and are they still of relevance today and/or have they changed over the past 25 to reflect changes in the global society?*
Results of scholarly research over the decades are inconclusive about the concept of terrorism and its causes and goals; there exist a plethora of theories of terrorism, partly due to changes of the subjective idea of the (academically) unclear meaning of terrorism, the modifications of actions, but not tactics, carried out and because of difficulties investigating aggrieved groups. Theories have changed over time, and likely will change in the future, reflecting changes in the global society.
Causes range widely from ethnicity and nationalism/separatism to poverty, economic disadvantage and globalisation. In addition, (non)democracy, Western society, disaffected intelligentsia, dehumanisation and religion may be connected to instigating terrorist activities as well, but none of the aforementioned 10 potential causes has a *single* conclusive causal relation: it is possible to devise arguments both confirming and refuting the connections. Likewise, goals vary, and include demands for varying levels of power and/or territory, implementing a certain ideology and advocating religion. As a result, the emergence and composition of aggrieved groups (terrorist organisations) and the interplay with other actors (states, groups and international organisations) do not follow one specific model either.

*If the answer is yes to the previous research question, can be devised why theory / theories did change and can be identified what and when changes occurred?*
Whereas in the 1960s and 1970s ideology-based terrorism was more prevalent, it was narrowed down to the Red Network as main instigator by the mid 1980s with a counter-reflex of research into state-sponsored terrorism, i.e. the West as main perpetrator, in the late 1980s and early 1990s. From the late 1990s to present, religion as cause for resorting to terrorism, and to some extend the First-Third World dichotomy, receives disproportionate attention and dehumanisation of perpetrators does take place in the popular literature. In addition, a shift towards *Freizeit*-terrorism and cell-based organisation structures on a supra-national level can be identified. Near-future devastating 'superterrorism' has been predicted for, roughly, the last 15 years, but has not materialised even though the technology to do so is available. However, new tools do not imply a more violent mindset of members of an aggrieved group.

Theories, and varying emphasises on their causes, tend to shift as a result from changes in the international political arena, and to some extend receive disproportionate attention when domestic conditions of the countries fighting 'terrorism' are worsening to divert attention.

*Determine which aspects of Game Theory may be useful as an aid in modelling activities surrounding dealing with actors involved in terrorism.*
Variable-sum normal form games, like mutations of the Prisoner's Dilemma can capture basic elements of negotiations between aggrieved groups and the government and an adjusted War of Attrition is suitable for modelling audience costs. Extensive form games disclose interactions between actors in a structured format. Cooperative games reveal interesting features of coalition-formation and strengths and weaknesses in negotiation processes.

*Using the model(s) of a theory of terrorism, test the validity of, and adjust where appropriate, different game theoretical models of the involved actors in terrorism.*

- *Joint bargaining paradox and coalition forming: is there an optimum in the amount of factions and type of coalition-forming? Can they be expected to be stable and fruitful, and if so, when?*
  In a 3-player game, where two players consider forming a coalition, this can be favourable in situations where the fallback position is lower than in a non-cooperative game, provided that the two coalition players divide the bargaining gains asymmetrically and both agree on this asymmetric subdivision ratio. I have proved that a strong moderate terrorist can fare well by cooperating with a weak (smaller) extremist faction (the same holds for the case of one terrorist (representative) and two government players of unequal strength). Further, if the sets of means and goals of the two aggrieved groups are sufficiently close substitutes, the equilibrium form of organisation is an encompassing group; if they are sufficiently complementary, the equilibrium form of organisation is in separate groups. When the former is applicable, a government would benefit from the 'divide and rule' tactics by distributing refugees into smaller groups in geographically distinct areas to avoid cooperation against an oppressor.
  Deadlines have a negative outcome on peace negotiations and processes; the discussed models provide a game theoretical explanation why this is observed in the field based on the internal dynamics of the actors (organisations/government). This also indicates that when one can identify a situation with 'two-speed' actors, based on the organisational or institutional arrangements involved, it may alleviate some of the frictions and aid mutual understanding for their respective inner workings, hence aid towards a positive outcome of negotiations.
- *Government negotiations with terrorists.* This is partly addressed and explained in the previous point. The experimental game did not provide sufficient statistical evidence

to support the claim of a division between moderates and violent extremists, but was observed during one game out of three.

- *Audience costs: to what extend would it be possible to adapt the concept of audience costs to a terrorism framework, with regard to the 'terrorist theatre' and democratic states desiring to 'combat terrorism*?

  In terrorist frameworks like peace negotiations, audience costs can be generated and identified, in the non-negotiation phase aggrieved groups exploit the audience cost model to their own benefit, alike a War of Nerves. Modelling audience cost parameters, especially the rate of deduction in crisis prolongation, depends on the problem being modelled and the (subjective) preference, or moral bias, of the modeller.

*Does the application of Game Theory on terrorism model(s) provide new insights, which might aid towards not only an understanding, but also provide ideas towards a possible resolution of such type of conflicts?*

Game theory is a useful tool in rationalising the emotion-laden field of terrorism, and has provided insight in the intricacies of the audience cost model, the increase of violence during peace negotiations, options to escape the mutual harm of the Prisoner's Dilemma, potential for coalition-forming and offers an explanation for unconstructive deadlines and actors in two-speed negotiation processes. Although several of the uncovered aspects will need to be verified with empirical data, at the present stage it already aids understanding, which is a first step towards resolution of conflicts, but one can never include all terrorism-related aspects into one model because of the controversies surrounding the concept 'terrorism'.

## *5.2 Suggestions for further research*

Although the conducted research did clarify aspects of the terrorist theatre, it also opened new areas one can explore for further research.

English-language based sources are relatively one-sided on terrorism and do not capture all angles. Even within the Western views, probed continental European material emphasised other aspects of terrorism not, or hardly, touched upon by the English scholarly literature, therefore a comparative investigation in differences of point of view and reporting between countries and across languages could reveal additional perspectives.

I addressed the game theory of cooperative structures with regard to internal group dynamics related to unanimity and majority positions on a theoretical level, which would benefit from a closer analysis of terrorist organisations and cells to put the ideas to the test on how they reach a policy stance and if it indeed affects negotiations in the way as predicted by the theory. Possibly related are aspects involving the logic of collective action, peer pressure and internal motivation of the terrorist. Overall, this could shed light on deadline- and two-

speed negotiations and sustainability of a peace agreement by their grass roots, whether from the aggrieved group, government or the wider public.

The audience cost model could not be used to assess build-up of audience costs within aggrieved groups due to a lack of sufficient information, though it would be highly informative if Crenshaw's (1991) idea of organisational disintegration were related to a leader who incurred audience cost due to making false promises to his group members could be tested and how these audience cost are 'paid' when there are no elections, or if there are other more important reasons.

The dynamics of inter-group and state relations is underexposed. Although several examples of negotiations exist, at present most notably Northern Ireland and Israel/Palestine, there is a strong US voice to be 'tough on terrorism' (despite existing 'quiet diplomacy' of negotiations with aggrieved groups, e.g. USA with Hizbollah), which does not aid in 'openly' researching the matter. However, a better understanding of these dynamics could help actors involved in other protracted conflicts to set out their respective policies. These envisaged case studies could provide information in order to determine probabilities of the extensive form games to update either the mixed strategy or typing of players via Bayesian updating, which in turn serves (more accurate) prediction of behaviour in these conflict situations.

Ouardighi's (2003) model of trust should be put to the test, i.e. one can asses the various conflicts on this dimension, which could reveal if requests by one faction to "just trust us" and another choosing vigilance is rational or purely emotion-based. Additionally, it might reveal if external monitoring fosters trust, or if it is indeed harmful as Ouardighi devised.

The idea of a Coalition Calculator is promising proof of concept based on results obtained from the experimental game, and deserves further attention in looking into its possibilities to predict potential for coalition-forming / defection. This includes further development of the software and, ideally, being put to the test in real negotiations, which can be various low-intensity conflicts as well as other settings like GATT negotiations.

Several improvements on the experimental set-up can be made. These include informing the players on "terrorist 1 and terrorist 2" as opposed to "a moderate and an extremist", using several groups in parallel with each an observer and/or the game is tape recorded in order to capture the bargaining dynamics. Other improvements may be a more restrictive setting with alternate bargaining and introduction of a 'punishment' factor (deduction in payoff) for instigating violent events, although the latter is an entirely moral consideration. Last, a note of caution on modelling a conflict, is that due to the sensitive area, one may not expect that all participants can detach themselves from the real-life conflict the game is modelled on and this prejudice can affect their negotiation behaviour. Therefore, it may be more effective to model less well-known problems.

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# Glossary

| | |
|---|---|
| **Alliance** | A group of similarly but not identically motivated members; consisting of individual decision makers who share a common interest, yet also have heterogeneous preferences, and must take a common stance in negotiations. |
| **Asymmetric information** | The opposite of symmetric information. |
| **Backward induction** | A player is described by strategy and conjecture. Take the end state you desire and trace back through the (extensive form game) tree to determine your moves required to reach the desired end state, taking into account the expected moves of the other player. |
| **Bargaining** | The game involves at least two players who have the opportunity to collaborate for mutual benefit in more than one way. A solution means "a determination of the amount of satisfaction each individual should expect to get from the situation, or, rather, a determination of how much it should be worth to each of these individuals to have this opportunity to bargain" (Nash, 1950:155). |
| **Bayes-Nash equilibrium** | This is a Nash equilibrium "at the interim stage where each player selects a best response against the average best responses of the competing players" (Vleugels, 1997). |
| **Bayesian updating** | Probabilistic update of player B's perception on the type of player A after player A chose an action. This impact of new information on the revision of probability estimates is used with extensive form games. |
| **Cheap talk** | Costless and unverifiable lies about private information and incredible threats about future action. |
| **Coalition** | Any nonempty subset of the set of players. See also alliance. |
| **Core** | If the payoff allocation vector is feasible and no coalition can improve on the outcome. |

**Dominant strategy**       Where it is a player's strictly best response to *any* strategies the other
                            player might pick.

**Extensive form**          A rooted tree together with functions that assign labels to every node
**game**                    at each branch. This description of a game meets five conditions: the
                            nodes and branched do not form any closed loop, contains an
                            indication of which node belongs to which player, the probability that
                            Nature uses to choose different branches at its nodes, information
                            sets are divided and consists of the payoffs for each player at each
                            end node (Rasmusen, 2001:41).

**Focal point**             A strategy combination of two players that is not the most favourable
                            equilibrium, nor a dominant strategy, but chosen due to a social
                            predisposition towards the strategy.

***Jus ad bellum***         Provides guidance on the resort to force.

***Jus in bello***          Places restraints on fighting a justified war.

**Just War**                Rules the international community has agreed upon for permitted
                            reasons to go to war, and defines restrictions on how to fight the war:
                            just cause, just intention, last resort, limited ends, proper authority,
                            proportionality and reasonable chance of success.

**Mixed strategy**          A 'random strategy': each of the player's possible information sets
                            maps to a probability distribution over actions that are pure strategies.
                            E.g.: War of Attrition.

**Nash equilibrium**        The strategy combination where no player has an incentive to deviate
                            from his strategy given that the other players do not deviate.

**Nature**                  In game theory, an external event not caused by either of the players
                            of the game (e.g. a flood, economic recession).

**Nonzero sum game**        The payoffs of the players do not sum to zero. Also referred to as
                            variable-sum game or non-constant sum game.

**Normal form game**    See strategic form game.

**Payoff**    The actual received, or expected, utility in a game.

**Pure strategy**    Each of the player's possible information sets maps to one action.

**Strategic form game**    The outcome matrix (table with payoffs) show what outcome results from each possible action combination. With $n$ players, $k$ variables in the outcome vector, $p$ as the number of strategy combinations and $q$ the number of action combinations, the following holds:

It consists of strategy combinations $s^1$, $s^2$,..., $s^p$; payoff functions mapping $s^i$ onto the payoff $n$-vector $p^i$, ($i$ = 1, 2, ...,$p$). The outcome matrix presents action combinations $a^1$, $a^2$,..., $a^q$; and functions mapping $a^i$ onto the outcome $k$-vector $z^i$, ($z$ = 1, 2, ..., $q$).

**Subgame perfect equilibrium**    In extensive form game with complete information, the profile of strategies is subgame perfect when no player wants to change her strategy whatever decision node can be reached during the game.

**Symmetric information**    A player's information set at any node where he chooses an action or an end node, contains at least the same elements as the information sets of every other player.

**Terrorism**    The use of physical and psychological violence as a means to achieve a political goal.

**Transferable utility**    A commodity that players can freely transfer among themselves.

**Value**    A unique expected payoff allocation for the players, which lies within the core.

**Zero-sum game**    A zero-sum game is a game in which the sum of the payoffs of all the players is zero whatever the strategies they choose. Example: Battle of the Bismarck Sea.

# Appendix

## *Appendix A: Popular books search*

## Methodology

1. Take the most popular Internet-based bookseller
2. Do a search on "terrorism" narrowed sown the selection to "books"
3. Register, per Internet-based bookseller, the first 20 hits. Note title, author, publisher, year of publication, ISBN, category of the book, comments. Create an SQLAnywhere or a MS Access database for convenience of analysis, with model:

## Model
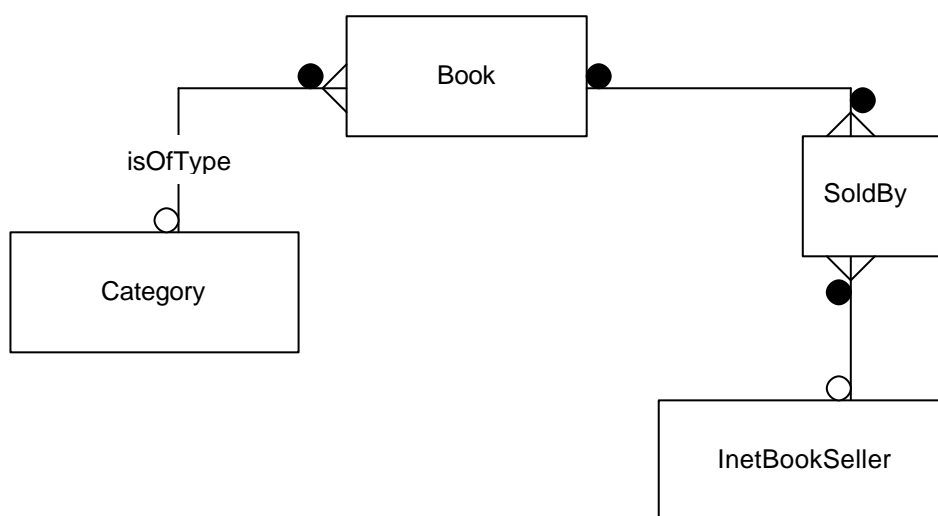


## Tables

Book(<u>ISBN</u>, Title, Author, Publisher, YearOfPublication, Category, OriginalTitle, Comments)
Category(<u>Category</u>)
InetBookSeller(<u>SellerName</u>, URL, Country)
SoldBy(<u>ISBN</u>, <u>SellerName</u>, Rank)

## Assumptions

1. The database will be based on the English language, but actual values of the attributes are in the Internet bookseller's language.
2. Languages covered for the search are: English, German, Spanish and Dutch.
3. Countries covered are: UK, USA, the Netherlands, Germany, Spain and France.

**Data Types**

| | | |
|---|---|---|
| ISBN | string | 20 characters |
| Title | string | 50 characters |
| Author | string | 50 characters |
| Publisher | string | 50 characters |
| YearOfPublication | integer | 4 digits |
| Category | string | 50 characters |
| OriginalTitle | string | 50 characters |
| Rank | integer | 2 digits |
| Comments | string | 300 characters |
| SellerName | string | 20 characters |
| URL | string | 25 characters |
| Country | string | 2 characters |

4. Data to analyse: ranking of the same books including translated books, translated books, year of publication, prevailing category (e.g. 'psychology' etc.)

## Results

Raw data grouped by country.
Data based on a search conducted on 12 March 2003.

**Results UK**

| | |
|---|---|
| Internet bookseller: | Amazon |
| URL: | www.amazon.co.uk |
| Search: | "terrorism" – in "books" |
| Total hits: | 3512 |
| Sort on: | "bestselling" |

See Table A-1

**Results USA**

| | |
|---|---|
| Internet bookseller: | Barnes and Noble |
| URL: | www.barnesandnoble.com |
| Search: | "terrorism" – in "books" |
| Total hits: | 3919 |
| Sort on: | "bestselling" |

See Table A-2

**Results the Netherlands**

| | |
|---|---|
| Internet bookseller: | Bertelsman online |
| URL: | www.nl.bol.com |
| Search: | "terrorisme" in "boeken" |
| Total hits: | 4, additional 'non-deliverable' of 4 |
| Sort on: | no sort options |
| See Table A-3 | |

**Results Germany**

| | |
|---|---|
| Internet bookseller: | Buch |
| URL: | www.buch.de |
| Search: | "Terrorismus" |
| Total hits: | 88 |
| Sort options: | no sort options [looks like on 'best selling'] |
| See Table A-4 | |

**Results Spain**

| | |
|---|---|
| Internet bookseller: | Casa del Libro |
| URL: | http://www.casadellibro.com/ |
| Search: | "terrorismo" in "libros" |
| Total hits: | 25 |
| Sort on: | not sorted (options available: Año de publicación, Autor, Título) |
| See Table A-5 | |

*Table A-1. Results Amazon, UK*

| ISBN | Title | Author | Publisher | Year of publ. | Category | Rank | Comments |
|---|---|---|---|---|---|---|---|
| 15832 24890 | 9-11 | Chomsky, Noam | Seven Stories Press | 2001 | Society, Politics & Philosophy, History | 1 | Presents a series of interviews conducted during the first month following the terrorist attacks of September 11, 2001, that discuss reactions to the attacks in the U.S. and abroad, U.S. foreign policy, and the new war on terrorism. |
| 07432 04735 | Bush at War: Inside the Bush White House | Woodward, Bob | Simon & Schuster | 2002 | Society, Politics & Philosophy, History, Biography. | 2 | presidency of George W. Bush. Before the acts of terrorism on 9-11 W. Bush's presidency numerous problems...one they felt they could trust to lead them through these difficult times. And the world saw a man who was decisive and resolute, |
| 09538 81024 | Alice in Wonderland and the WTC Disaster | Icke, David | Bridge of Love | 2002 | Society, Politics & Philosophy | 3 | N/A |
| 15658 47725 | Theatre of War: The Innocent American Empire | Lapham, Lewis | The New Press | 2002 | Society, Politics & Philosophy | 4 | But in this book, Lewis Lapham shows that the imperial behaviour of the US government is perfectly consistent with the practice of past administrations… |
| 02330 50485 | The New Jackals: Osama Bin Laden and Future of Terrorism | Reeve, Simon | Carlton Books | 2001 | Society, Politics & Philosophy, Biography | 5 | 'Reeve points out how little [Yousef and bin Laden] actually have to do with Islamic teachings...terrorism is not based on any Islamic ideology' |
| 29123 62733 | 9/11: The big lie | Meyssan, Thierry | Carnot | 2002 | Society, Politics & Philosophy | 6 | In "The Big Lie", Thierry Meyssan sheds new light on the 9/11 Pentagon and World Trade Center crashes. As a keen observer of international affairs, he had been intrigued by anomalies revealed in the first photographs of the attack … |
| 03741 90666 | Longitudes and Attitudes: America in the Age of Terrorism | Friedman, Thomas L. | Farrar Straus Giroux | 2002 | Society, Politics & Philosophy | 7 | N/A |
| 07475 45197 | Loyalists | Taylor, Peter | Bloomsbury | 2000 | Society, Politics & Philosophy | 8 | It catalogues the struggle in Northern Ireland from its beginnings in the early 17th century, through … The book centres around some breathtakingly frank interviews with Loyalist paramilitaries. |
| 07528 52620 | Last Man Down: The Fireman's Story | Picciotto, Richard | Orion Fiction | 2002 | Society, Politics & Philosophy, Biography | 9 | The Sunday Times Bestselling story of Battalion Commander Richard Picciotto who, on 11 September, survived the collapse of Tower 1 of the World Trade Center. A royalty is being paid to the New York Fireman's fund. |
| 07528 49417 | Last Man Down: The Fireman's Story: the Heroic Account … | Picciotto, Richard "Pitch" | Orion paperback fiction | 2003 | Society, Politics & Philosophy, Biography | 10 | The No. 1 bestselling true story of Battalion Commander Richard Picciotto who, on 11 September, survived the collapse of the North Tower of the World Trade Center |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 08478 25043 | The Rage and the Pride | Fallaci, Oriana | Universe Publishing | 2002 | Society, Politics & Philosophy, History, Biography | 11 | The Italian-born journalist offers her reactions to the events of September 11, 2001, and her views on America, Italy, Europe, Islam and Western civilization, and related topics, interspersed with personal memories. |
| 07475 38182 | Provos: The IRA and Sinn Fein | Taylor, Peter | Bloomsbury | 1998 | Society, Politics & Philosophy, History | 12 | Based on the author's television series on the IRA, this book traces the group's history and relationship with Sinn Fein. |
| 08952 61359 | Hatred's Kingdom: How Saudi Arabia Supports New Global Terrorism | Gold, Dore | Regnery Publishing | 2003 | Religion & Spirituality | 13 | N/A |
| 08707 03579 | Gerhard Richter: Forty Years of Painting | Storr,Robert | Museum of Modern Art | 2002 | | 14 | Society, Politics & Philosophy , Art, Architecture & Photography. |
| 03407 17378 | Bandit Country | Harnden, Toby | Coronet Australia | 2000 | Society, Politics & Philosophy, History | 15 | To the army, South Armagh is "Bandit Country"...Northern Ireland which has claimed the lives of 115 soldiers since 1969. interviewed members of the army, MI5, RUC and IRA |
| 18598 46793 | The Clash of Fundamentalisms: Crusades, Jihads and Modernity | Ali, Tariq | Verso Books | 2002 | Religion & Spirituality, Society, Politics & Philosophy | 16 | In this work that provides an explanation for both the rise of Islamic fundamentalism and new forms of Western colonialism, Tariq Ali argues that what we have experienced since September 11 is the return of history in an horrific form. |
| 18598 44219 | Welcome to the Desert of the Real! | Zizek, Slavoj | Verso Books | 2002 | Science & Nature, Society, Politics & Philosophy | 17 | after 9-11, titles like "The End of the Age of Irony" abounded in the media, ... postmodern ambiguities was over. global capitalism is fundamentalist and that America was complicit in the rise of Muslim fundamentalism. |
| 07432 41908 | What We Saw: The Events of September 11, 2001 in Words, Pictures and Video | Rather, Dan | Simon & Schuster | 2002 | Reference & Languages, Society, Politics & Philosophy | 18 | To coincide with the first anniversary of the atrocities of September 11 comes a one of a kind record of the events as they unfolded on that fateful day |
| 29123 62768 | Pentagate | Meyssan, Thierry | Carnot | 2002 | Society, Politics & Philosophy, History | 19 | Designed to complement "9/11 The Big Lie",  It appears that the press erased witness statements that did not match the official version of events |
| 07475 5806 X | Brits: The War Against the IRA | Taylor, Peter | Bloomsbury | 2002 | Society, Politics & Philosophy, History | 20 | A huge amount has been written about Northern Ireland and its troubles, but Brits is a valuable addition to the field, |

*Table A-2. Results Barnes & Nobles, USA.*

| ISBN | Title | Author | Publisher | Year of publ. | Category | Rank | Comments |
|---|---|---|---|---|---|---|---|
| 089526 1359-B&N | Hatred's Kingdom: How Saudi Arabia Supports the New Global Terrorism | Gold, Dore | Regnery | 2002 | N/A | 5 | N/A |
| 074320 4735-B&N | Bush at War | Woodward,Bob | Simon & Schuster | 2002 | N/A | 6 | authoritative account of the first 18 months of the Bush White House |
| 037550 8562 | The Demon in the Freezer | Preston, Richard | Random House | 2002 | fiction | 7 | N/A |
| 031225 3486 | The Janson Directive | Ludlum, Robert | St. Martin's Press | 2002 | fiction | 8 | N/A |
| 069111 367X | Rethinking Europe's Future | Calleo, David P. | Princeton University | 2003 | N/A | 9 | he explains why Europe was for a long time the world's greatest problem and how the Cold War's bipolar partition brought stability of a sort...Europe's deeper past |
| 080411 952X | The Unsung Hero | Brockmann, Suzanne | Ballantine Books | 2000 | fiction | 10 | N/A |
| 156025 5021 | Dreaming War: Blood for Oil and the Cheney-Bush Junta | Vidal, Gore | Thunder's Mouth Press | 2002 | N/A | 11 | Vidal is fearless in his assertions that the bombing of Afghanistan was more symbolic than militarily necessary and was simply, he asserts, a pre-emptive claim on foreign oil. |
| 084237 3195 | Let's Roll!: Ordinary People, Extraordinary Courage | Beamer, Lis a, Ken Abraham | Tyndale House | 2002 | N/A | 12 | Lisa Beamer's recounting of her heroic husband's life, and how his sacrifice on September 11th has turned into a source of strength for her |
| 076530 7154 | The Last Jihad | Rosenberg, Joel C. | Tor Books | 2002 | N/A | 13 | Saddam Hussein dispatches his top assassins to the United States. Iraqi hitmen spread carnage throughout London, Paris, and Riyadh. And the Butcher of Baghdad is just getting started. |
| 189322 4740 | When You Ride Alone You Ride with Bin Laden: | Maher, Bill | New Mill. Entertainmen | 2002 | N/A | 14 | This hard-hitting book takes issue with the way the war against terror is being run and questions why George W. Bush has not asked all Americans to pitch in and help achieve success |
| 078686 9003 | The Cell: Inside the 9/11 Plot, And Why the FBI and CIA Failed to Stop It | Miller, John J. With Chris Mitchell, Michael Stone | Hyperion Press | 2000 | N/A | 15 | uncovers the covert forces that triggered the horrific events of September 11th |
| 047123 | The Art of Deception: | Mitnick, Kevin D. | Wiley, John & | 2002 | N/A | 16 | Mitnick redeems his former life of crime by providing specific guidelines |

| 7124 | Controlling the Human Element of Security | William L. Simon | Sons | | | | | for developing protocols, training programs, and manuals to ensure that a company's sophisticated technical security investment will not be for naught |
| 0804119724 | Into the Night | Brockmann, Suzanne | Ballantine Books | 2002 | fiction | 17 | N/A |
| 0847825043-B&N | Rage and Pride | Fallaci, Oriana | Rizzoli International | 2002 | N/A | 19 | themes unchained by the Islamic terrorism: the contrast and, in her opinion, incompatibility between the Islamic world and the Western world; the global reality of the Jihad and the lack of response, the lenience of the West. |
| 0743241908-B&N | What We Saw: The Events of September 11, 2001, in Words, Pictures, and Video | CBS News, Dan Rather | Simon & Schuster | 2002 | N/A | 18 | What We Saw is a unique historical record of the events of September 11th. |
| 0895261499 | Fighting Back: The War on Terrorism from Inside the Bush White House | Sammon, Bill | Regnery | 2002 | N/A | 20 | Sammon discusses the inner workings of the White House from the first news of the September 11th attacks through the first 100 days of the war on terrorism. unabashedly sympathetic to the administration |
| 0375508619 | The Hunt for Bin Laden | Moore, Robin | Random House | 2003 | N/A | 1 | Action-packed and controversial, The Hunt for bin Laden….the failure of the "conventional" generals; the courage of the Northern Alliance; the wounding and murder of journalists |
| 0060934417 | Bel Canto | Patchett, Ann | HarperCollins | 2002 | fiction | 2 | Somewhere in South America.. Fiction story. |
| 0374190666-B&N | Longitudes and Attitudes: Exploring the World After September 11 | Friedman, Thomas L. | Farrar,Straus,Giroux | 2002 | N/A | 3 | made up of the columns Friedman has published about September 11… |
| 0425170349 | Rainbow Six | Clancy, Tom | Berkley | 1999 | fiction | 4 | N/A |

*Table A-3. Results Bol, the Netherlands.*

| ISBN | Title | Author | Publisher | Year of publ. | Category | Rank | Comments |
|---|---|---|---|---|---|---|---|
| 9026515901 | Vrijheidsstrijd, verzet, terrorisme | Ree, F. van | Swets & Zeitlinger | N/A | Leren & Studeren / Mens & Maatschappij | 1 | Een interessante bijdrage aan de verdieping van het inzicht in de achtergronden en in de uitwerking van het 'oorlogsdenken' in het terrorisme dat werd bedreven door de Rote Armee Fraktion in de Bondsrepubliek. |
| 9035124030 | Vuur | Junger, Sebastian | Prometheus Groep | 2001 | Literatuur / Vertaalde Romans & Verhalen | 2 | bosbranden, terrorisme, oorlog: een verkenning van gevaar |

| ISBN | Title | Author | Publisher | Year of publ. | Category | Rank | Comments |
|---|---|---|---|---|---|---|---|
| 9060129709 | De jacht op de jakhals | Yallop, David | Van Gennep | N/A | Mens & Maatschappij Geschiedenis | 3 | Carlos en het internationale terrorisme |
| 903512412X | De nieuwe jakhalzen | Reeve, S. | Prometheus Groep | 2002 | Mens & Maatschappij Geschiedenis | 4 | Osama bin Laden, Ramzi Yousef en de toekomst van het terrorisme. In 1993 deed Ramzi Yousef met zijn aanslag op het WTC ook al een poging. |
| 9038702701 | Terrorisme en politieke verantwoordelijkheid | Muller, E.R. | Kluwer Juridisch | N/A | Leren & Studeren / Recht | 5 | Uitgevers |
| 9058261735 | Schokgolven | Pattyn, Pattyn, B. & J. Wouters | Uitgeverij Allmedia | 2002 | Leren & Studeren / Sociale Wetenschappen | 6 | terrorisme, fundamentalisme en 11 september |
| 9038910819 | De Ring + CD-ROM | M. Kallenborn | Uitgeverij Elmar | 2000 | Reizen & Vakantie / Reisbeschrijvingen | 7 | terrorisme, woestijnpiraten en de Sahara-zee : gebaseerd op een waar gebeurd verhaal |
| 9033625318 | In naam van Allah | Vermaat, J.A.E. | Uitgeverij De Banier | N/A | Leren & Studeren / Sociale Wetenschappen | 8 | islamitisch fundamentalisme en terrorisme. In dit boekje door een televisiejournalist (Tros en EO) wordt een reeks terroristische (mis)daden beschreven, die in naam van Allah of het islamitische fundamentalisme gedurende de laatste jaren zijn begaan. |

*Table A-4 Results Buch, Germany.*

| ISBN | Title | Author | Publisher | Year of publ. | Category | Rank | Comments |
|---|---|---|---|---|---|---|---|
| 3486566962 | Terrorismus und Freiheitskampf | Braun, Nikolaus | Oldenbourg | 2003 | N/A | 1 | Gewalt, Propaganda und politische Strategie im Irischen Bürgerkrieg 1922/23 |
| 3934730671 | Fundamentalismus, Terrorismus, Krieg | none | Velbrück | 2003 | N/A | 2 | N/A |
| 3789082961 | Terrorismus - Rechtsfragen der äußeren und inneren Sicherheit | compilation | Nomos | 2000 | N/A | 3 | Symposium für Hans P. Bull und Helmut Rittstieg am 31. Mai 2002 |
| 3434461817 | Terrorismus | Hirschmann, Kai | Europ. Verlagsanstalt | 2003 | N/A | 4 | N/A |
| 3980856100 | 11. September 2001, Der inszenierte Terrorismus - Auftakt zum Weltenbrand? | Meyssan, Thierry | editio defacto | 2002 | N/A | 5 | 'Kein Flugzeug traf das Pentagon!' |
| 3801104575 | Terrorismus | Thamm, Berndt | Deutsche | 2000 | N/A | 6 | behandeln ein breites Spektrum der aktuellen Erscheinungsformen |

| | | G. | Polizeiliteratur | | | | des Terrorismus. fließenden Grenzen zwischen Krminalität, Verbrechen und Krieg, die nachrichtendienstlichen sowie militärischen Aspekte. |
|---|---|---|---|---|---|---|---|
| 3825859231 | Medien und Terrorismus | none | Lit | 2002 | N/A | 7 | Reaktionen auf den 11. September 2001 |
| 3933470676 | Spirituelle Achtsamkeit im Angesicht des Terrorismus. | Stone, Joshua David  LeSar, Sally | N/A | | N/A | 8 | |
| 3932293894 | Von der Respektlosigkeit über den Terrorismus zu Liebe und Frieden | Mürmann, Hermann J. | Principal | 2002 | N/A | 9 | Zukunft hat nur eine Welt, die allen Menschen ein würdiges Leben in Frieden<br><br>und Freiheit ermöglicht. In diesem Buch werden dafür Perspektiven aufgezeichnet. |
| 3453867246 | Terrorismus - die sinnlose Gewalt | Carr, Caleb | Heyne | 2003 | N/A | 14 | Historische Wurzeln und Möglichkeiten der Bekämpfung. liefert konkrete Ansätze zur Überwindung terroristischer Bedrohungen. Translated? |
| 3596156149 | Terrorismus, der unerklärte Krieg | Hoffman, Bruce | Fischer | 2001 | N/A | 15 | Neue Gefahren politischer Gewalt. historischen Wurzeln und aktuellen Erscheinungsformen des Terrorismus. Seine Prognose, dass Terroristen im High-Tech-Zeitalter über ein Potenzial verfügen… |
| 3531138197 | Weltmacht USA im Schatten des Terrorismus | none | Westdeutscher | 2002 | N/A | 16 | Hintergründe, Konsequenzen, Prognosen. Analysen zum 11. September aus internationaler Perspektive<br><br>Ein Jahr nach den verheerenden Terroranschlägen |
| 3830500785 | Terrorismus als weltweites Phänomen | none | BWV | 2000 | N/A | 17 | aus der Reihe Bundesakademie für Sicherheitspolitik |
| 3472052082 | Islamistischer Terrorismus | none | Luchterhand | 2002 | N/A | 18 | Eine Herausforderung für die internationale Staatengemeinschaft. Vortr. anlässl. d. Herbsttagung d. Bundeskriminalamts vom 13. bis 15. November 2001. Hrsg. v. Bundeskriminalamt |
| 3548363466 | Osama bin Laden und der internationale Terrorismus | Pohly, Michael Duran, Khalid | Ullstein TB | 2001 | N/A | 19 | ein sachliches und fundiertes Porträt Osama bin Ladens. die religiösen, psychologischen und geopolitischen Hintergründe des islamistischen Terrorismus |
| 3763759395 | Linksterrorismus und Rechtsterrorismus in der Bundesrepublik Deutschland von 1970 bis heute | Rabert, Bernhard | Bernard & Graefe | 1995 | N/A | 20 | title covers it |
| 3879758506 | Zukunft des Terrorismus und des Friedens | none | VSA | 2002 | N/A | 10 | Menschenrechte - Gewalt - Offene Gesellschaft |

| ISBN | Title | Author | Publisher | Year | Category | Rank | Comments |
|------|-------|--------|-----------|------|----------|------|----------|
| 3934920160 | Die Zukunft des Terrorismus | Scheerer, Sebastian | Klampen | 2002 | N/A | 11 | Menschen zu terroristischen Handlungen motiviert. erfolgreiche Strategie der symbolischen Nutzung physischer Gewalt. |
| 385165546X | Der Geist des Terrorismus | Baudrillard, Jean | Passagen | 2002 | N/A | 12 | is translated from french |
| 393242509X | Terrorismus Terrorismus | Waldmann, Peter | Gerling Akademie | 2000 | N/A | 13 | Provokation der Macht. Is translated |

*Table A-5 Results Casa del Libro, Spain.*

| ISBN | Title | Author | Publisher | Year of publ. | Category | Rank | Comments |
|------|-------|--------|-----------|---------------|----------|------|----------|
| 84493 13732 | UNA HISTORIA DEL TERRORISMO | LAQUEUR, WALTER | PAIDOS IBERICA | 2003 | N/A | 1 | Siempre habrá grupos de personas, pequeños o no tan pequeños, que esgriman agravios contra otros grupos y que sientan inclinación por la violencia. |
| 84493 13864 | SOBRE EL TERRORISMO Y LA GUERRA | BECK, ULRICH | PAIDOS IBERICA | 2003 | N/A | 2 | Traductor: R.S. CARBO |
| 84974 20292 | POLITICAS DEL MIEDO: UN BALANCE DEL TERRORISMO EN EUROPA | VV AA | BIBLIOTECA NUEVA | 2002 | N/A | 3 | N/A |
| 84493 12663 | ¿POR QUE SUCEDIO?: EL TERRORISMO Y LA NUEVA GUERRA | HOGE, JAMES F.GIDEON, ROSE | PAIDOS IBERICA | 2002 | N/A | 4 | Traductor: FRANCISCO BELTRAN ADELL. los motivos y las acciones de los terroristas, el estatus del ejército estadounidense, la situación en Oriente Medio, el bioterrorismo, la seguridad aeroportuaria, las presiones diplomáticas |
| 84666 08664 | LAS LECCIONES DEL TERROR: ORIGENES HISTORICOS DEL TERRORISMO INTE RNACIONAL | Carr, Caleb | EDICIONES B | 2002 | N/A | 5 | Traductor. Una introducción a los orígenes históricos del terrorismo internacional moderno encuadrando este fenómeno en la disciplina de la historia militar en vez de hacerlo en el de la ciencia política o la sociología. |
| 84763 54991 | EL TERRORISMO EN EUROPA | GONZALEZ CALLEJA, EDUARDO | ARCO LIBROS S.A. | 2002 | N/A | 6 | La obra analiza los rasgos esenciales del terrorismo como estrategia particular de acción política, da cuenta de los antecedentes históricos del problema desde fines del siglo |
| 84816 45184 | TERREMOTO, TERRORISMO, BARBARIE Y UTOPIA: EL SALVADOR, NUEVA YORK , AFGANISTAN | SOBRINO, JON | EDITORIAL TROTTA | 2002 | N/A | 7 | la miseria, la injusticia, pero también los testimonios de misericordia, solidaridad y santidad propios de una civilización de la pobreza como es la de los pueblos de América Latina. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 84791 45269 | LA CONCIENCIA CRISTIANA ANTE EL TERRORISMO DE ETA: EPILOGO DE LA OBRA… | SEBASTIAN AGUILAR, FERNANDO | AUTORES CRISTIANOS | 2002 | N/A | 8 | BIBLIOTECA DE AUTORES CRISTIANOS. |
| 84080 42769 | EN EL NOMBRE DE ALA: LA RED SECRETA DEL TERRORISMO ISLAMICO EN ES PAÑA | CANALES, PEDRO y MONTANCHEZ, ENRIQUE | PLANETA | 2002 | N/A | 9 | Este libro pretende demostrar que España puede ser un objetivo para estos grupos islamis tas, ya que, el mito de al-Andalus sigue estando vivo. |
| 84791 4520X | LA IGLESIA FRENTE AL TERRORISMO DE ETA | VV.AA. | AUTORES CRISTIANOS | 2000 | N/A | 10 | N/A |
| 84954 58381 | RESPONSABILIDAD CIVIL DERIVADA DE ACTOS DE TERRORISMO | FUSTER-FABRA TORRELLAS, JOSE MARIA | ATELIER | 2001 | N/A | 11 | N/A |
| 00000 00 | ETA CONTRA EL ESTADO: LAS ESTRATEGIAS DEL TERRORISMO | SANCHEZ-CUENCA, IGNACIO | TUSQUETS | 2000 | N/A | 12 | Colección: KRITERIOS TUSQUETS. «guerra de desgaste» |
| 84080 41622 | OSAMA BIN LADEN EL TERRORISMO DEL SIGLO XXI | LANDAU, ELAINE | PLANETA | 2001 | N/A | 13 | Qué fuerzas impulsan a Osama Bin Laden y a su organización terrorista internacional, que ha sacudido los cimientos del mundo occidental |
| 84607 17747 | TERRORISMO, ARTEFACTOS EXPLOSIVOS Y AUTO-PROTECCION: CORPORACION EURO-AMERICANA DE SEGURIDAD | de VV.AA. | AUTOR EDITOR | 2001 | N/A | 14 | N/A |
| 84729 01408 | EL TERRORISMO: UNA LECTURA ANALITICA | BORDES SOLANAS, MONTSERRAT | BELLATERRA SA | 2001 | N/A | 15 | N/A |
| 84239 77838 | A MANO ARMADA HISTORIA DEL TERRORISMO | HOFFMANN, BRUCE | ESPASA-CALPE SA | 1998 | N/A | 16 | Bruce Hoffman analiza en este libro la naturaleza, la evolución y el futuro del terrorismo. |
| 84813 61062 | HABLEMOS DE TERRORISMO | DIETERICH, HEINZ y CHOMSKY, NOAM | TXALAPARTA S.L. | 1998 | N/A | 17 | |
| 84493 06329 | TERRORISMO Y ANTITERRORISMO | REINARES, FERNANDO | PAIDOS IBERICA | 1998 | N/A | 18 | ¿Qué es el terrorismo? ¿Dónde, cuándo y cómo surgen las organizaciones terroristas? ¿Quiénes han militado en ellas y por qué? ¿Cuáles son las medidas antiterroristas que deben adoptar los gobiernos democráticos? |
| 84767 64928 | DELITOS CONTRA EL ORDEN PUBLICO, TERRORISMO, CONTRA EL ESTADO O L A COMUNIDAD INTERNACIONAL | VV.AA. | BOSCH CASA | 1998 | N/A | 19 | N/A |
| 84605 72579 | ESE CAMINO DE SANGRE: NOTAS PARA UNA RESPUESTA AL TERRORISMO VASC O | MORALES MOYA, PEDRO | AUTOR-EDITOR | 1998 | N/A | 20 | N/A |

## *Appendix B-1: Game Theory Formulae*

### Strategic form game

$$G = (N, (C_i)_{i \in N}, (u_i)_{i \in N}),$$

where $N$ is a non-empty set of players, $C_i$ refers to the non-empty set of all strategies available to player $i$ and $u_i$ is the utility (payoff).

### Dominant strategy

Strategy $s^*_i$ is a dominant strategy if it is a player's strictly best response to *any* strategies the other player might pick, in the sense that whatever strategies they pick, his payoff is highest with $s^*_i$, such that

$$\pi_i(s^*_i, s_{-i}) = \pi_i(s'_i, s_{-i}) \qquad \forall s_{-i}, \forall s'_i \ ^1 s^*_i .$$

### Weakly dominated strategy

Strategy $s'_i$ is weakly dominated if there exists some other strategy $s''_i$ for player $i$ which is possibly better and never worse. $s'_i$ is weakly dominated if there exists $s''_i$ such that

$$\pi_i(s''_i, s_{-i}) = \pi_i(s'_i, s_{-i}) \qquad \forall s_{-i} \qquad , \text{ and}$$

$$\pi_i(s''_i, s_{-i}) > \pi_i(s'_i, s_{-i}) \qquad \text{for some } s_{-i}.$$

### Nash equilibrium

The strategy combination $s^*$ is a Nash Equilibrium if no player has incentive to deviate from his strategy given that the other players do not deviate

$$\forall i, \qquad \pi_i(s^*_i, s^*_{-i}) = \pi_i(s'_i, s^*_{-i}), \qquad \forall s'_i .$$

### Pure strategy

Each of the player's possible information sets maps to one action

$$s_i \colon w_i \circledR a_i.$$

### Mixed strategy

A 'random strategy': each of the player's possible information sets maps to a probability distribution over actions

$$s_i \colon w_i \circledR m(a_i), \text{ where } m \ ^3 0 \text{ and } \int_{A_i} m(a_i)da_i = 1.$$

**Characteristic function**

With transferable utility, the cooperative possibilities of a game can be described by the characteristic function $v$, with $v(S)$ (the 'worth') assigned to every coalition. A game in strategic form with transferable utility, $v(S)$ is defined as

$$v(S) = \min_{s_{N \backslash S} \in \,?(C_{N \backslash S})} \quad \max_{s_S \in \,?(C_S)} \quad ? \, u_i(s_S, s_{N \backslash S}),$$
$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad i \in S$$

where $N \backslash S$ is the set of all players in $N$ who are not in the coalition $S$, $C$ refers to the non-empty set of all strategies available, $u_i$ is the utility (payoff) and $s_S$ and $s_{N \backslash S}$ denote correlated strategies.

Harsanyi (1963) derived a characteristic function via a generalisation of Nash's rational threats criterion, where $v$ becomes the *rational threats representation* in coalitional form of the strategic form game.

$$v(S) = ? \, u_i(s_S, s_{N \backslash S}) \quad and \quad v(N \backslash S) = ? \, u_j(s_S, s_{N \backslash S}).$$
$$\quad\;\; i \in S \qquad\qquad\qquad\qquad\qquad\quad j \in N \backslash S$$

This can be interpreted "in terms of alternative assumptions about the ability of coalitions to commit themselves to offensive and defensive threats" (Myerson, 1991:424).

**The core**

Any game in coalitional form

$$v = (v(S))_{S \, \mathit{Ï} \, N},$$

having a payoff allocation vector

$$x = (x_i)_{i \, \mathit{Î} \, N} \text{ in } \mathbf{R}^N,$$

where $x_i$ is the utility payoff to player $i$.

An allocation $y$ is feasible for a coalition $S$ if and only if

$$? \, y_i = v(S)$$
$$i \in S$$

One can define the core of $v$ if and only if $x$ is feasible and no coalition can improve on $x$

$$? \, x_i = v(N) \quad and \quad ? \, x_i \geq v(S), \quad \forall S \subseteq N.$$

Shubik (1986) visualized this concept as follows, where the actual location of the core may differ depending on the game played and the related allocated payoffs (idem ditto location of the value). The black dot is the value (see next section), and S the symmetry point between the three players.
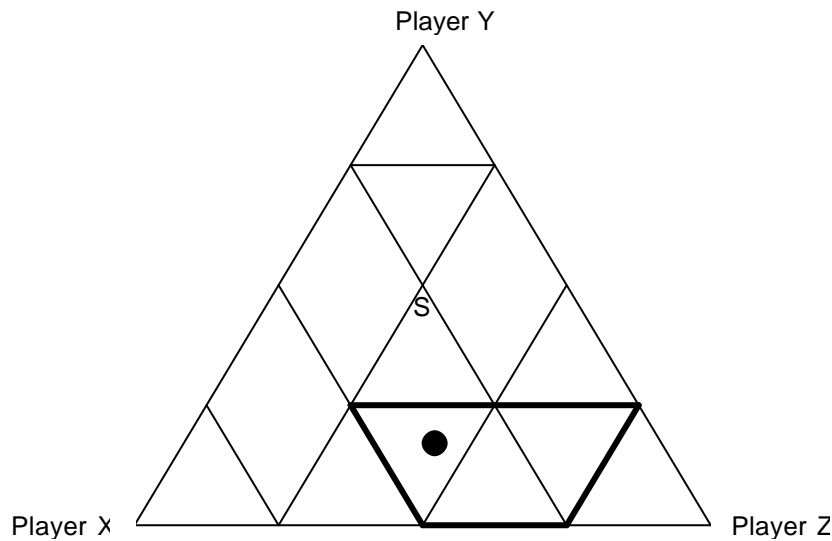
*Figure B-1. Visualisation of the core (lies within the area demarcated with the bold lines) and the value (the black dot within the core).* Based on Shubik (1986), Figure 1.

One must realise this is merely a model, and there are situations where there is no core, or some stable outcome falls outside the core. Gale (2000) is rather critical, "It appears that the core concept requires agents to behave myopically, rushing to join improving coalitions so that they can cut their own throats" (p9). See subsection 'Partial coalitions' below for an example on the disadvantage of joining a coalition. That cooperative games do not provide each player with a well-defined maximisation problem could be considered as an obstacle to a consistent theory, or, more positively, it allows for plenty of further research. An avenue for solutions to this problem is to model the 'pre-play' behaviour, like communications and (binding) commitments together with game theory.

**The value**

A unique expected payoff allocation for the players, which lies within the core. Please refer to e.g. Myerson (1991:436-451) for the full explanation, which does not lend itself well to reproduce here in summarised form.

**Unanimity and majority coalitions**

A brief summary follows; refer to the original paper (Manzini and Mariotti, 2001) for a full explanation of the theorems and lemmas, including the graphical results.

Agents $i = 2, \ldots, N + 1$, breakdown point $b$, $N + 1$ agents negotiating over alternatives $s \in S$. Given $s$,

$$s' \in S, \ u_i(s) = u_i(s') \text{ for some } i \in A \text{ implies } u_j(\text{s}) = u_i(s') \text{ for all } j \in A,$$

where $A$ is the set of agents. Agent 1 has opposite preferences from alliance $A$, thus given $s$,

$$s' \in S, \ u_i(s) = u_i(s') \text{ for some } i \in A \text{ implies } u_j(\text{s}) = u_i(s').$$

Further, as the alternatives are better than the breakdown point payoff

$i \in \{1\} \cup A$ there exist $s \in A$. such that $u_i(\text{s}) = u_i(b)$.

Introducing probabilities (mixed strategy)

$u_i(s') = pu_i(s) + (1 - p)\, u_i(b)$

Internal bargaining procedure, $P$, via alternating offers game, $\Gamma(P)$, and $A$ or 1 rejects the

offer with a probability $1 - p \in (0,1)$.

The internal negotiation must be stable not only with respect to the individual deviations of

each $i \in A$ but also with respect to joint deviations by groups of agents in $A$. That is, an "s.p.e.

in which at no information set can a subset of agents $A' \subset A$ improve the payoff of each

agent $A'$ by jointly changing their actions, given the equilibrium continuation": a joint stable

subgame perfect equilibrium (j.s.s.p.e).

For $i \in A$, for all $s \in [0, 1]$ let the certainty equivalent (the 'present value') functions

$d_i : [0, 1] \times \{0, 1,\ldots, \infty\} \rightarrow [0, 1]$

be defined by

$d_i(s, r) = s' \in S$ such that $u_i(s') = p^r u_i(s) + (1 - p^r)\, u_i(b)$ if such an $s'$ exists, and 0

otherwise

$d_1(s, r) = s' \in S$ such that $u_1(s') = p^r u_1(s) + (1 - p^r)\, u_1(b)$ if such an $s'$ exists, and

1 otherwise

If a safeguard is present, then for a subgame $G$, the certainty equivalent

$d_G : [0, 1] \times \{0, 1,\ldots, \infty\} \rightarrow [0, 1]$

is defined by

$d_G(s) = \max_{i \in A} d_i(s)$ if $\min_{i \in A} d_i(s) > 0$ and 0 if $\min_{i \in A} d_i(s) = 0$

Then, negotiations between the alliance and the other player, 1, have the following unique

equilibrium payoffs

$u_i(s^1_i) = \max \{pu_i(s^i_1) + (1 - p)\, u_i(b), \underline{u}_i\}$

$u_1(s^i_1) = \max \{pu_1(s^1_i) + (1 - p)\, u_1(b), \underline{u}_i\}$

where $\underline{u}_i$ is the minimum feasible utility for player $i$, having strategy profiles

- Agent 1 proposes alternative $s^1_{N+1}$, accepts any alternative $s = s^{N+1}_1$ and rejects
  otherwise;

- Agent $i \in A$ proposes alternative $s^{N+1}_1$, accepts any alternative $s = s^{N+1}_1$ and rejects
  otherwise.

$s^1_{N+1}$ and $s^{N+1}_1$ are equilibrium proposals by agent $N$ and $N+1$ in a pair-wise bargaining and

in a bargain between them alone.

**Partial coalitions**

In a pure bargaining situation where $N = \{1, 2, 3\}$, $S = \{(x, y, z) \in \mathbf{R}^3_+; x + y + z = 1\}$ and the breakdown point $b$ is $0$, with two alternative coalition structures on $N$:

$$C(N) = \{\{1\}, \{2\}, \{3\}\} \text{ and } C*(N) = \{\{1, 2\}, \{3\}\},$$

one has

$$F(C(N), S, b) \;\; = \;\; (? , ? , ? ),$$
$$F(C*(N), S, b) = (¼, ¼, ½).$$

This shows that the coalition members will be worse of: the joint bargaining paradox. Harsanyi (referenced in Chae and Heidhues, 2001:15) provides two interpretations for this paradox: a more cautious representative of the coalition (but note majority / unanimity procedures of previous section) and the representative's incentive is affected because she has to hand over part of the gains to other coalition members. I would interpret the latter as a possibility for the representative to achieve a *higher* overall payoff exactly because she has to hand over part of the spoils. Another, more subjective, interpretation is that before the coalition existed each member was joining the 'negotiation table', whereas a coalition cuts it down to a single right, i.e. for player $z$ the psychological threat of having $x$ and $y$ sitting in front of him may be larger than just one $xy$ to deal with.

A second aspect is if an 'important' separate player should join a coalition against the fifth player. Take

$$C(N) = \{\{1\}, \{2, 3, 4\}, \{5\}\} \text{ and } C*(N) = \{\{1, 2, 3, 4\}, \{5\}\},$$

one has

$$F(C(N), S, b) \;\; = \;\; (? , {}^1\!/_9, {}^1\!/_9, {}^1\!/_9, ? ),$$
$$F(C*(N), S, b) = (? , ? , ? , ? , ½).$$

However, both presented examples of the joint bargaining paradox assume that the outcome of the bargaining is *always* 'the coalition' against 'the opponent' with each a fifty-fifty share in payoff. This is not necessarily the case, most certainly not in political science scenarios. *Appendix B-3* explores this further and provides a solution where there is not a fifty-fifty share between the coalition and opponent and that in certain cases it does pay off to form a coalition.

**Nash bargaining solution**

A summarised version of the Nash bargaining solution (Nash, 1950) and its related axioms with coalitions (Nash, 1953) is presented here, based on Rasmusen (2001:297) and Chae and Heidhues

    1. <u>Invariance</u>

$$U*[F(U), F(X)] = F[U*(U,X)].$$

$X$ is the set of feasible payoffs and $U$ the disagreement point; $U^*$ is a function of $U$ and $X$. This means that the solution is independent of the units in which utility is measured.

2. <u>Pareto Efficiency</u>

   No player can make a better offer

   $$(U_i, U_j) > U^* \Rightarrow (U_i, U_j) \notin X.$$

   Written in another format

   *There exists no $x \in S$ with $x > F(C(N), S, b)$,*

   Where $F$ is the solution function, $N$ is the set of players, $C(N)$ the coalition structure on $N$, $S \subset \mathbf{R}^N$ is the feasible set and $b \in \mathbf{R}^N$ the breakdown point.

3. <u>Independence of Irrelevant Alternatives</u>

   If one drops some possible utility combinations from $X$, thus there is a smaller set $?$, then if $U^*$ is in $?$, $U^*$ does not change

   $$U^*(U, X) \in \; ? \subseteq X \Rightarrow U^*(U, \; ?) = U^*(U, X).$$

4. <u>Anonymity</u> (or Symmetry)

   The solution does not depend on which player is called player 1.

   *If $\phi$ is a permutation of players in $N$, then $F(\phi(C(N), S, b)) = \phi(F(C(N), S, b))$.*

The first four properties result in a solution for the maximisation problem, the Nash solution:

$$\text{Max}_{u \in S, \, u \geq b} \prod_{i \in N} (u_i - b_i).$$

5. <u>Representation of Homogeneous Coalitions</u> (RHC)

   The above is insufficient for producing a unique solution for a general bargaining problem with a coalition. Chae and Heidhues add the RHC axiom, that is:

   *If a coalition $C_j$ is homogeneous in bargaining problem $(C(N), S, b)$, then*

   $$F_i(C(N^{\,j}), S^{\,j}, b^{\,j}) = F_i(C(N), S, b) \text{ for any } i \in N^{\,j}.$$

Including axiom 5, a solution $F$ satisfies all if and only if $F$ solves the maximisation problem

$$\text{Max}_{u \in S, \, u \geq b} \prod_{j=1}^{m} \left( \prod_{i \in C_j} (u_i - b_i)^{1/c_j} \right),$$

*where $c_j$ is the size (or the number of members) of $C_j$ for $j = 1, \ldots, m$.*

## *Appendix B-2: Games*

**Prisoner's Dilemma**
The game models a situation with two criminals who may face several years in prison depending on their strategy during the interrogations by the police: each prisoner can *Deny* or *Confess*; see *Table B-2.1* for its payoff matrix. Again, the arrows represent the prisoner's preference between actions. In contrast with the Bismarck Sea game, there is no result equally likely, but most arrows point towards (-8, -8). At first impression, if both prisoners deny they are both better off than when both confess ("both one year in prison" versus "both eight year in prison"), so why is (*Deny, Deny*) not the preferred solution? Both prisoners know their payoffs, hence they also know, that if one denies the crime and the other confesses, the one who denies will go free – better than spending a year in prison. Regardless if one prisoner knows what the other has chosen, they both end up in prison for 8 years.

An example: they both can communicate beforehand, and agree amongst themselves to both deny the crime. It pays off to break the promise you made to your companion in crime: if you break the promise and your friend keeps his promise, then you will go free, while the other has to spend 10 years in prison, so it is more favourable to confess. The other player likely thinks exactly the same (because the gamble to deny may result in 10 years instead of 1 year in prison), so he will choose *Confess* as well, resulting in a situation where both confess.

*Table B-2.1. Payoff matrix of the Prisoner's Dilemma*

|  |  | **prisoner2** | | |
|---|---|---|---|---|
|  |  | *Deny* | | *Confess* |
|  | *Deny* | -1, -1 | $\rightarrow$ | -10, 0 |
| **prisoner1** |  | $\downarrow$ | | $\downarrow$ |
|  | *Confess* | 0, -10 | $\rightarrow$ | **-8, -8** |

*Payoff to (prisoner1, prisoner2)*
*Dominant strategy in bold*

Or, more general: temptation [to confess] > revolt [both deny] > punishment [both confess] > sucker [you deny the other confesses] (Rasmusen, 2001:34).

There are many variations on this game, especially of interest is a repeated Prisoner's Dilemma, the resulting observed tit-for-tat behaviour (Brams, 1985), and its possibilities to 'start' cooperative behaviour among the players from their initial asocial stance (Axelrod and Hamilton, 1981), based on differences in the information set of the players (Kreps *et al.*, 1982). The dilemma can be adjusted to become zero-sum by adding a third player, e.g. the government who has an incentive when the prisoners confess (Tucker, 1950).

**War of Attrition**

Imagine there are two states in a build up to war, a 'crisis', and the states are threatening each other by investing more in military, an arms race, with increasing costs – hence both earn a negative amount per period, say, -1. The state that backs off earns zero at the end and the other state earns a reward, e.g. 3, for outlasting the other. The choices available are *Continue* or *Exit*, and, as there is already a crisis, are in a state where both choose *Continue*. One straightforward equilibrium is for State1 to *Continue* regardless what State2 chooses and State2 to *Exit* immediately to avoid losses (or vice versa), i.e. the pure strategy solution, but the whole point of the attrition is that neither state backs off during the first round. In a repeated game with a mixed strategy, the following occurs: State1 chooses *Exit* with a constant probability *?*, given that the other player does not end the game. Now, devise *?*. First, denote the expected discounted value as $D_{Continue}$ if State1 stays and $D_{exit}$ if State1 exits directly after State2 indicated to continue the crisis. If State1 exits (*Exit, x*) with a probability *?*, he receives 0, but when he stays (*Continue, x*) his payoff depends on the behaviour of State2. If State2 continues too, (*Continue, Continue*), with a probability of 1 - *?*, State1 receives −1 because of the continuation and his expected value for the following period, which is discounted using *r*, is unchanged. On the other hand, if State2 exits immediately (probability *?*), then State1 receives 3 (see *Table 3-5*). To calculate the expected discounted value for State1:

$$D_{Continue} = \text{?} \cdot 3 + (1 - \text{?}) \, (-1 + [D_{Continue} / (1 + r)]),$$

$$D_{Continue} = 4 \, \text{?} - 1 + (1 - \text{?}) \, D_{Continue} / (1 - r)$$

$$D_{Continue} = (4 \, \text{?} - 1) \, ((1 + r) / (r + \text{?})). \qquad \text{(intermediate steps omitted)}$$

Equate $D_{Continue}$ to $D_{exit}$, the latter being zero, and resolve the last equation, then *?* = 0.25 in equilibrium, which is independent of the discount rate *r*. Both states are likely to continue the game until the loss is equal to their gain if they were the survivor, in this example 3 rounds, that is, if State1 and State2 are rational players. One can think of a situation where a state does not want to give up for other reasons, and is willing to make a loss on the short term, outlasting the other who will exit, if he expects to gain, rather intangible, 'credibility' that is expected to be of use when a similar crisis would reoccur.

Brams (1985) elaborates further on the arms race.

*Table B-2.2. Payoff matrix for the War of Attrition*

|  |  | **State2** | |
| --- | --- | --- | --- |
|  |  | *Continue* | *Exit* |
| **State1** | *Continue* | -1, -1 for each subgame | 3, 0 |
|  | *Exit* | 0, 3 | N/A* |

* Both players do not exit at the same time

### *Appendix B-3: Derivation CH formula*

### *Derivation of the generalisation of Chae and Heidhues' formula* [1]

**Notations**

$x$, $y$ and $z$ are individual bargainers under equal strength: each gets 1/3

$x$ = violent terrorist group, smaller faction

$y$ = stronger negotiating moderates

$z$ = government

$XY$ is a 'fair' coalition, where both $X$ and Y receive half of the bargain result each

$XY'$ is an unequal coalition where $X'$ gets ¼ of the bargain and $Y$ ¾

$XY^*$ is an unequal coalition where $X^*$ gets ? of the bargain and $Y^*$ ? .

$Z$, $Z'$ or $Z^*$ is the remainder when $x$ and $y$ have formed a coalition into respectively $XY$, $XY'$ or $XY^*$

**Derivation**

First, Chae and Heidhues' formula with pure-bargaining and $x$ and $y$ forming an equal-power coalition

$$(r/2 + (1- r)/4, \; r/2 + (1- r)/4, \; (1- r)/2)$$

Using a division of $(x, y, z)$ as (? ,? ,? ), into $XY$ and $Z$, results in a cut-off point at $r$ = ? , i.e. if $r$ is larger, then $XY$ is more profitable than $x$ and $y$ and rationally makes sense for the terrorists to form $XY$; this is where the lines cross in *Figure B-3.1*.

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[1] The non-mathematically oriented reader may want to skip over the derivation, but note the text in italics, and move on to the discussion section.
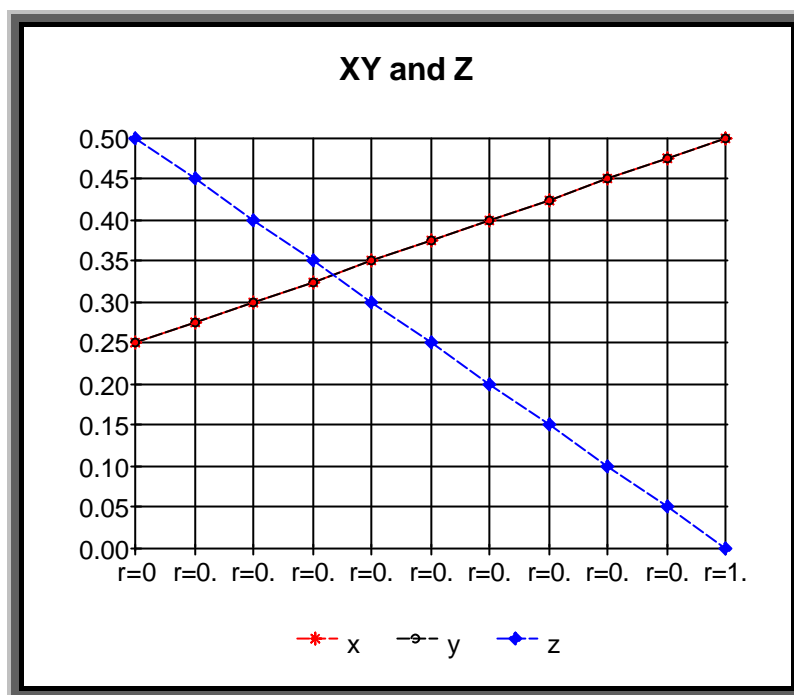
*Figure B-3.1. Equal coalition of XY against Z.*

If you have a weak $x$ and a strong $y$ who form a coalition $XY'$, the cut-off point for the 'piece of the pie' is at $r = 0.25$: $X'$ will get 0.25 and $Y'$ and $Z'$ receive each 0.375 (see *Figure B-3.2*), using

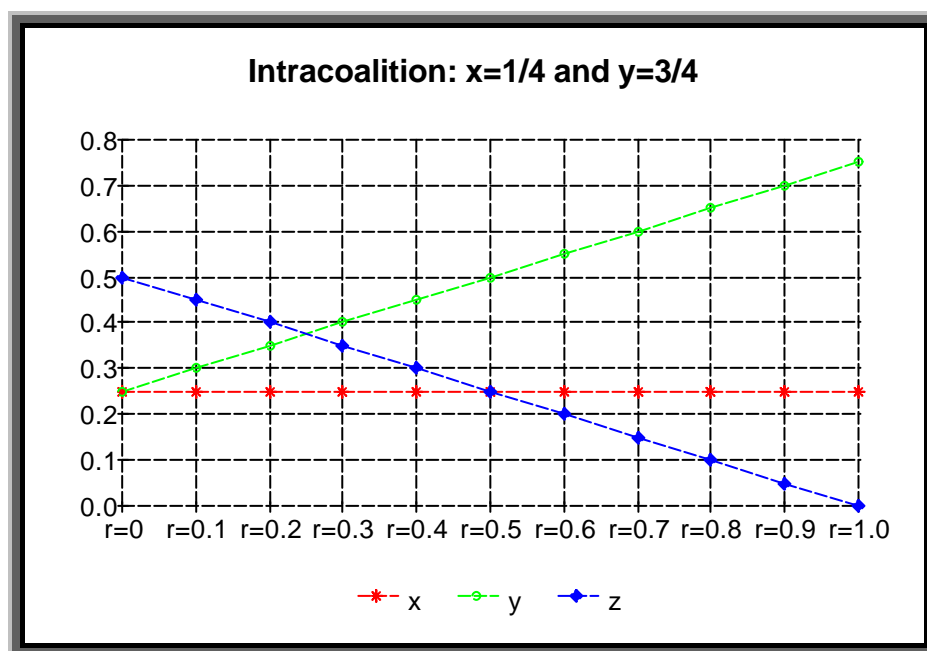$$(r/4 + (1- r)/4,\ 3\,r/4 + (1- r)/4,\ (1- r)/2)$$



*Figure B-3.2. Coalition of unequal players.*

So, instead of (? ,? ,? ) separate bargaining and all factions are equal, or an equal strength coalition $XY$ with cut-off point at $r$ = ? , you have payoff (0.25, 0.375, 0.375) and $r$ = ¼ as the cut-off point when $Y'$ is stronger than $X'$ in dividing the bargain between the two respectively into ¾ and ¼ of their total.

However, under equal strength of $XY$ and $Z$ and $r$ = ¼, the division is (0.3125, 0.3125, 0.375). That is, $X'$ would want to form a coalition with $Y'$ when $X'$ his share of the pie is ¼ of the total of 1 and is no worse off it he would offer more than 50% of the bargained total to $Y'$ when $r$ > ¼. However, if he can convince $Y'$ to share the bargaining result equally with himself, $X'$, under $r$ = ¼ conditions, then $X'$ gains at least 0.3125 − 0.25 = 0.0625 under $r$ ≥ ¼.

> *Could Y' be talked into such a coalition?*

Rationally, player $y$ should not team up with $x$ when ¼ < $r$ < ? when $XY'$ divides up the result equally pretending to be $XY$, which they are not, as with $r$ = ¼ with equal strength within the coalition $Y'$ would receive 0.3125 and under no cooperation (y) ? , but only with unequal strength in intracoalition bargaining, $Y'$, in this example ¾, receives 0.375. Thus for $y$, it only pays off to form a coalition with $x$ when ¼ < $r$ < ? *and* he receives ¾ of the bargaining result of $XY'$.


Below the same principle as the previous graph, but $XY^*$ has an intracoalition inequality of $X^*$=? and $Y^*$=?; using

> $(r$ /3 + (1- $r$)/4, 2 $r$ /3 + (1- $r$)/4, (1- $r$)/2)

The cut-off point (i.e. where $Y^*$ and $Z^*$ cross) is at $r$ = 0.2728, giving 0.3636 to both $Y^*$ and $Z^*$, which is each more than a ? share with no coalition, i.e. the overall is (0.2728, 0.3636, 0.3636). So, if $x$ and $y$ formed a coalition and have decided that an unequal coalition is ok, meaning $XY^*$, then this will payoff well for $Y^*$ when $r$ ≥ 0.2728. In that case, $X^*$ receives 0.2727, which is more than $X'$, but less than under fifty-fifty division when having $XY^*$ (which would be (1-0.3636)/2 = 0.3182).

> *Would, in this case where $r$ = 0.2728 and $Y^*$ receiving 0.3636, $y$ be willing to enter*
> *coalition $XY^*$?*

After all, the moderate terrorist faction gains more with $Y^*$ than the $y$ or $Y$ situation when $r$ = 0.2728, than it loses from accepting $Y^*$ above $Y'$ ($Y'$ = 0.3864 when $r$ = 0.2728).
In other words:

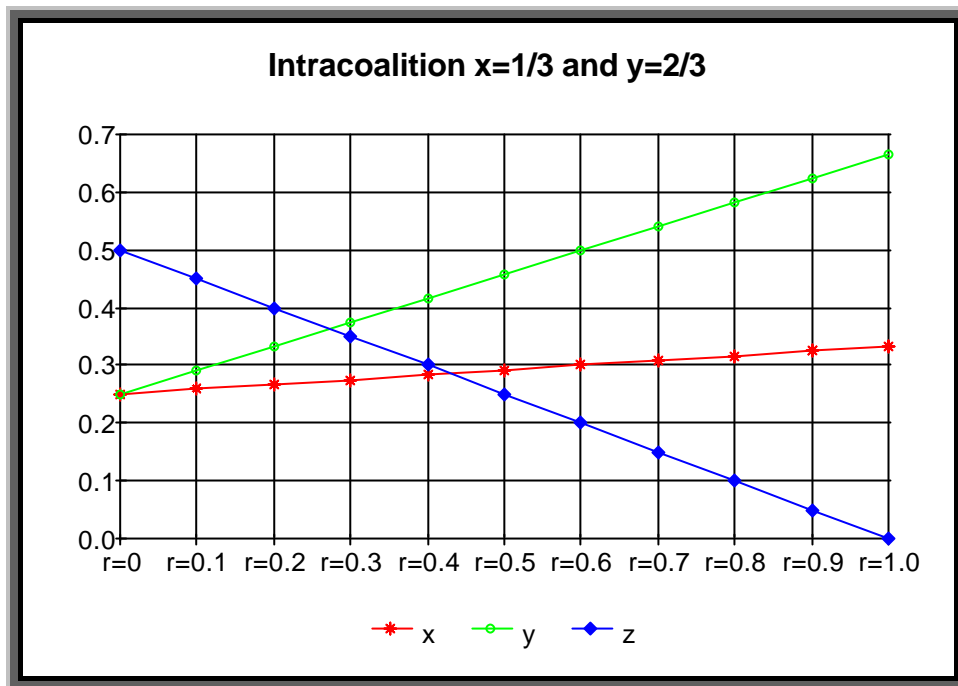> *Is maximalisation more important or 'shared achieved goals'?*

*Figure B-3.3. Coalition of unequal players*

But then, if (members of) $x$ think high of themselves, and demanding half of the bargained results, then $r$ will need to be on or above ? .

Cut-off point $r$ can be determined with an adaptation of Chae and Heidhues' formula and using the fractions as devised by the Coalition Calculator. A generalization of Chae and Heidhues' formula will then be of the form:

$$(?\ r\ + (1- r)/4,\ ?\ r + (1- r)/4,\ (1- r)/2)$$

where ? is the fraction players $x$ and $y$ have agreed upon that $x$'s worth is in the coalition and ? represents $y$'s worth in the coalition, or as guessed/estimated by $z$ (who then can do his own calculations to devise his own best strategy – in order to either stimulate or prevent the terrorists of teaming up). Or ? can be what $x$ thinks of himself compared to $y$ and $z$ but then to take that value as a relative part to ? (what $y$ thinks of himself compared to $x$ and $z$) of a total of 1.

**Discussion**
For example $x$ gave the 'importance values' for $(x, y, z)$ as (20, 40, 40)[2] and $y$ gave (10, 40, 50), then ? is 20/60 and ? is 40/60 ($x: y = ?\ :?\ = XY^*$). In this example, one should not expect that in any coalition, $y$ will settle for less than the maximum they can achieve in a coalition, i.e.

---

[2] For convenience to the players, in order to avoid fractions, they can enter a number {0, …, 100}, with a total sum of 100.

$y$'s part of the result of the bargain should be divided up into at least $?$ – ?, and not that $x$ will succeed in convincing $y$ to do a 'fair coalition' of splitting the spoils fifty-fifty.

> *The wider the gap between one's own perception and the other's perception, the more unstable the coalition.*

Last, finally knowing $?$ and $?$, and as a result of that $r$, hence the values of $x$, $y$ and $z$ when $x$ and $y$ do or do not form a coalition, one can determine if their behaviour is 'rational' (= maximising their individual outcome) or 'irrational' (other behavioural aspects are more important in the negotiations). In the same manner, this can be calculated for a coalition of $y$ and $z$ against $x$.

Admitted, in line with chapter 4 the reader may think, "the above is all nice and well, but how does this translate to the terrorist – government simulation game?" What is 100%, or 1 in aforementioned formulas, and what is achieving a fraction $r$ of, say, $?$ that would make up the pie in the negotiations? Clearly, one cannot. However, it is tempting to devise the pieces of the pie in line with the payoff per goal, but these are somewhat arbitrarily allocated in the first place. Or worded differently: it's up to the designer of the game who can build in any bias he or she wishes; more positively: it offers virtually limitless opportunities to test various hypotheses on coalition-forming between violent and moderate terrorists, or, if extended, between moderate terrorists and the government.

## *Appendix C-1: The International Crisis Game*
(source: Smith, 1998:624)

C announces a foreign policy

A decides whether to attack

do not attack                  attack

Status Quo

B decides whether to retaliate

do not retaliate          retaliate

Acquiescence

C decides whether to intervene

do not intervene          intervene

Bilateral war                  Multilateral war
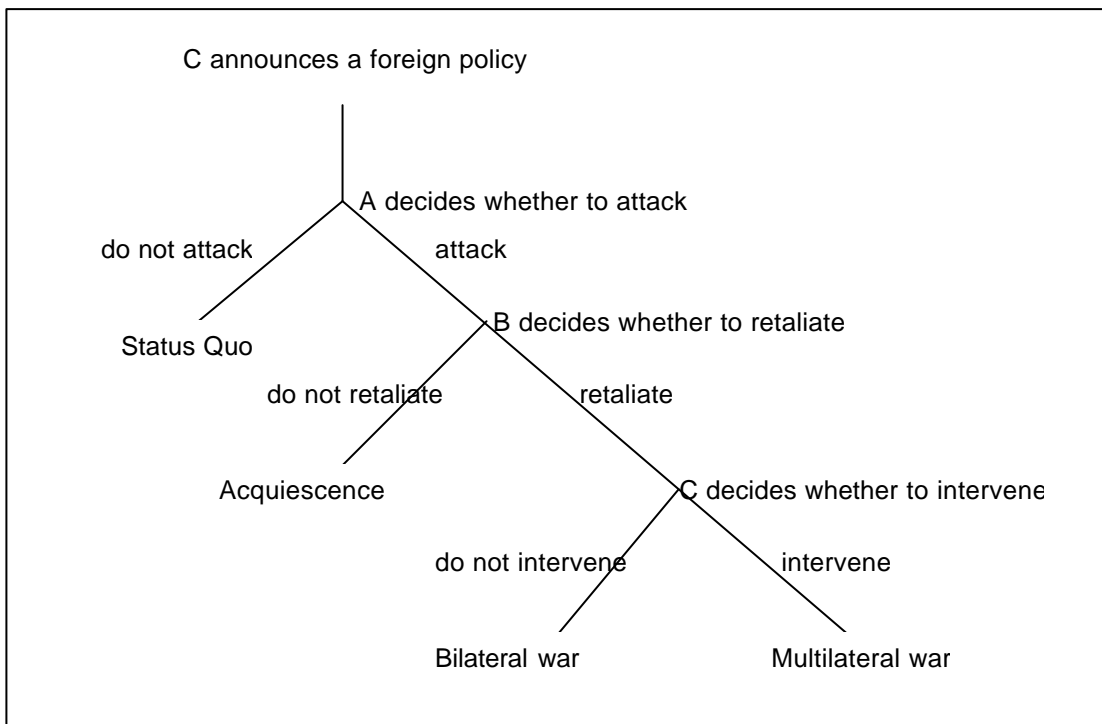
### Explanation of the diagram
There are three nations, A, B and C. A has a dispute with B and C, where B and C agree over the status quo. A has the sole options to either attack B or stay disgruntled. B can decide to give in to A and A achieves its desired policy, or B can retaliate and will be successful with some probability. Once the war between A and B is ongoing, C decides to intervene or let A and B continue with their bilateral war. Form B's perspective, a multilateral war involving C is more favourable as it would provide them with moral and physical support to try to maintain their status quo. This knowledge has an effect on B's behaviour: if it expects C to intervene, it may be more inclined to resist. Idem ditto for state A: if A thinks C will intervene, it may be less inclined to initiate the fight with C due to a smaller probability of success. (Smith, 1998)

An extension of this idea is for example imagining C as a (former) superpower and B fighting the (one-sided proxy) war on behalf of C against A. Alternatively, for example acquiescence by Lebanon regarding Syria's presence in the country.

### The rational and irrational
Say, B is militarily superior to A and both know this, but A feels it is unfairly treated by B, or desires land and/or statehood, and does not approve B receives support from C. From a rational game theoretical equilibrium perspective, A should not attack B but seemingly 'irrationally' does so anyway. This is an off-equilibrium strategic move, and with A having insufficient military strength, its people resort to terrorist acts. Subsequently B retaliates by a show-off of its military strength, with either accessory or principal support by C. However,

remind yourself it is exactly the unfair treatment A disapproved of and the lopsided response by B and C is actually proving their case, thus their initial (subgame) off-equilibrium attack against B becomes rational in the nonmyopic (farsighted) multi-stage extensive form game. One can easily think of A = Palestine or Lebanon, B = Israel, C = USA or A = Euskadia (Basque region), B = Spain and C = USA/EU.

Despite this realistic scenario, game theory does not lend itself well to accurately represent this type of switching from irrational to rational strategies: in principle, a set of feasible strategies does not contain irrational moves and one cannot update the strategy set 'in hindsight'.

### Appendix C-2: Extensive form game
*Example of a more (too) complicated game, with players government, G, moderate terrorists who are willing to negotiate (initially), T1, and more violent-minded terrorists, T2.*
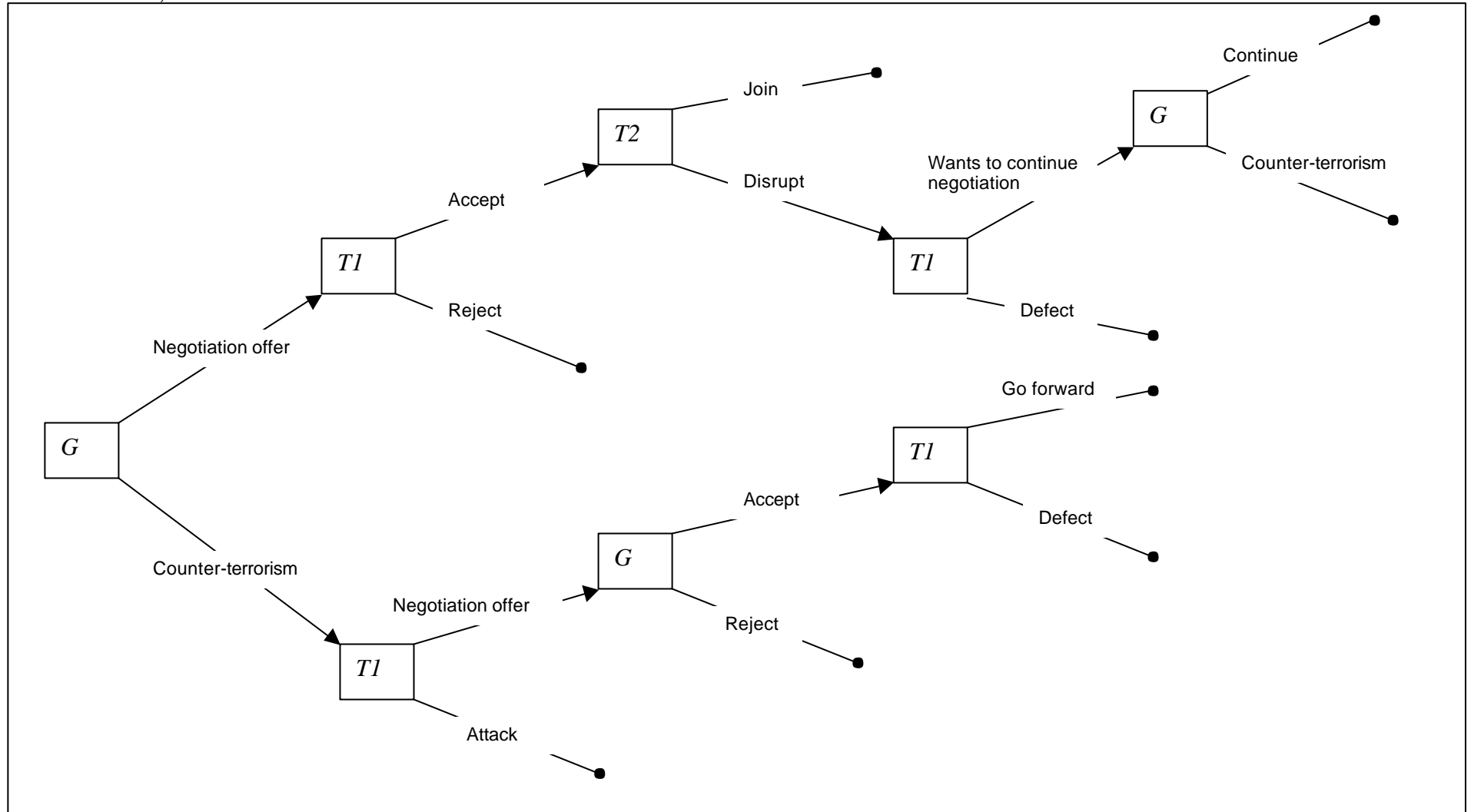
## *Appendix C-3: Coalition Calculator*

**Aim of the software**

- To provide a user-friendly interface for the player to enter 1) their expectation of *importance* of one's own and the other players for joining the negotiations and 2) the estimated actual *influence* of the other faction compared to one's own influence in the negotiation process.
- The relative importance and influence must be provided as a fraction between 0 and 100, totalling to 100.
- Show results graphically.

This may reveal possible discrepancies: e.g. a faction thinks high of itself, but others do not, or maybe a faction is given a high importance for being 'on board' in the negotiations, but subsequently does not influence the discussions accordingly. Conversely, a faction with 'low' importance and a 'big mouth' trying to dominate the negotiations, which in turn, may lead to resentment in the other players, or fuel the idea of 'giving in too much'. The discrepancies, or sameness, provide an indication of the stability of a coalition. Higher discrepancies indicate a lower chance of success in cooperation because diverging perceptions of one's importance and influence gives the player the idea he may achieve more of his goals than other players are willing to grant to him.

The values can be fed into the generalised Chae and Heidhues formula as indicated in *Appendix B-3.*

**Calculations**

There are three different ways of comparing the data:
1. One player's results compared to the values the other players entered for that player.
2. Average results of the values of each player
3. Compare average result (point 2) with the player's own result.

*Example*

There are four players, denoted with A, B, C, D.

A enters values (50, 10, 10, 30)

B enters values (10, 65, 5, 20)

C enters values (5, 40, 15, 40)

D enters values (15, 15, 10, 60)

1. Compare A with what B, C and D think of A:

A of himself as 50 ≡ 50% importance

B values A as 10 ≡ 10%;

C values A as 5% and

D values A with 15%

In general, A thinks higher of himself than the other players do, respectively 50% and a combined (B, C, D) average of 10%, which may lead to defecting behaviour by A because A likely will not get out of the negotiations of what he expects. The other players are not willing to give as much as A demands because they think A is much less important. It is also possible to interpret this as an incentive for A to spend more on marketing to influence the other's perceptions of A.

2. Averaging

Average for A: (50 + 10 + 5 + 15)/4 = 20 ≡ 20%

Average for B: (10 + 65 + 40 + 15)/4 = 32.5 ≡ 32.5%

Average for C: (10 + 5 + 15 + 10)/4 = 10 ≡ 10%

Average for D: (30 + 20 + 40 + 60)/4 = 37.5 ≡ 37.5%

3. The average for C is 10% and C allocated herself 15%, which means that C has a realistic idea of her own importance in the negotiations; or worded differently, she knows her place.

**Prototype**

The interface was programmed in C++, using Borland C++ Builder, version 5.

Print screen of the prototype program, with explanations provided per stage.



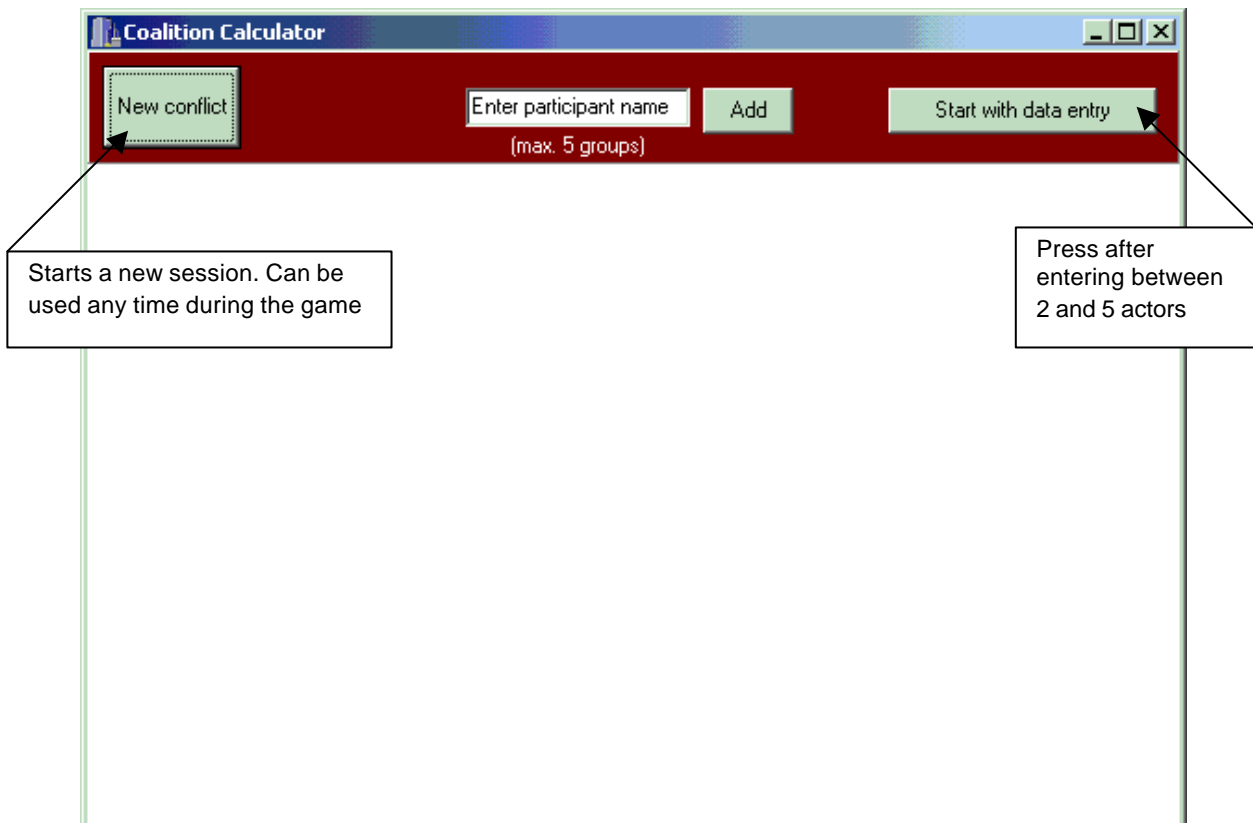*Figure C-3.1. Start of the game.*
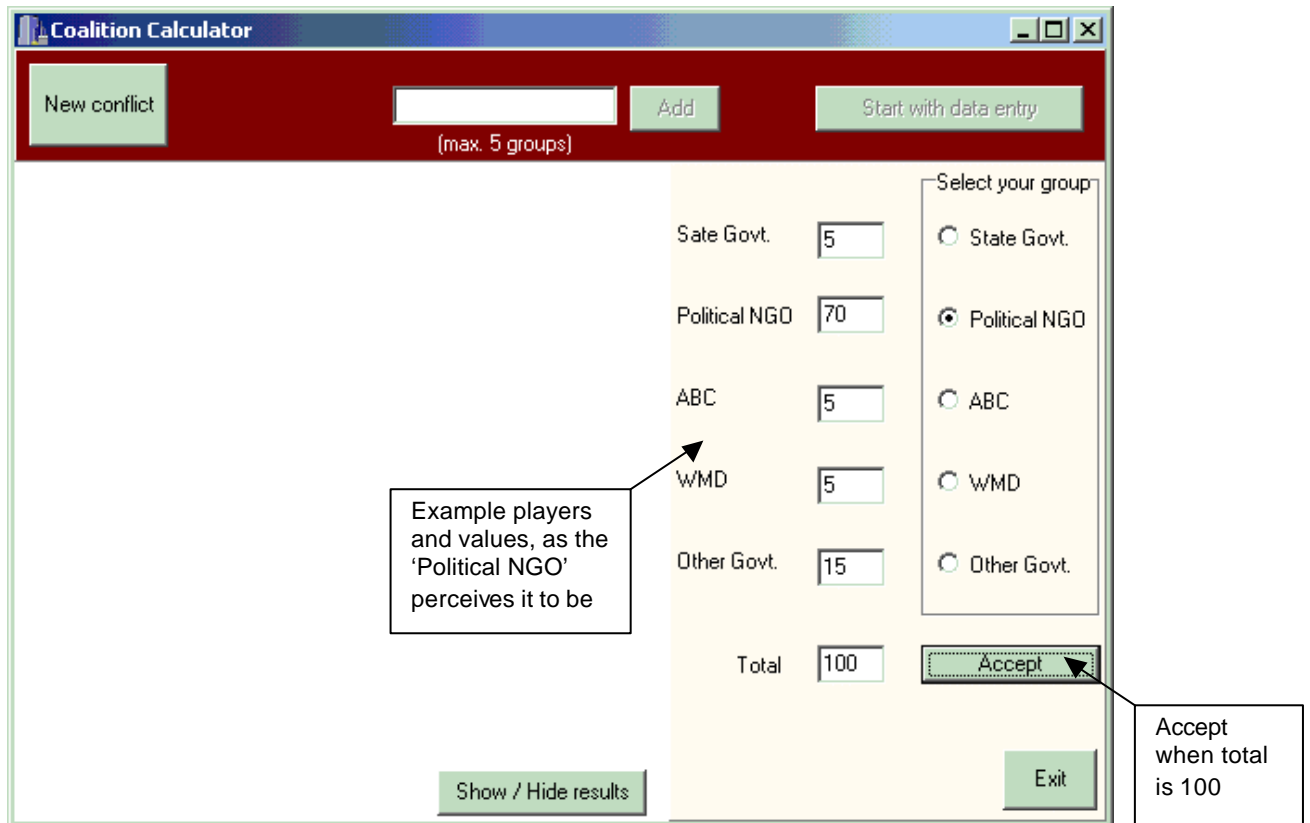
*Figure C-3.2.The actor "Political NGO" enters her values for relative importance for herself and compared to the other actors, totalling to 100. All other actors will do the same in turns.*
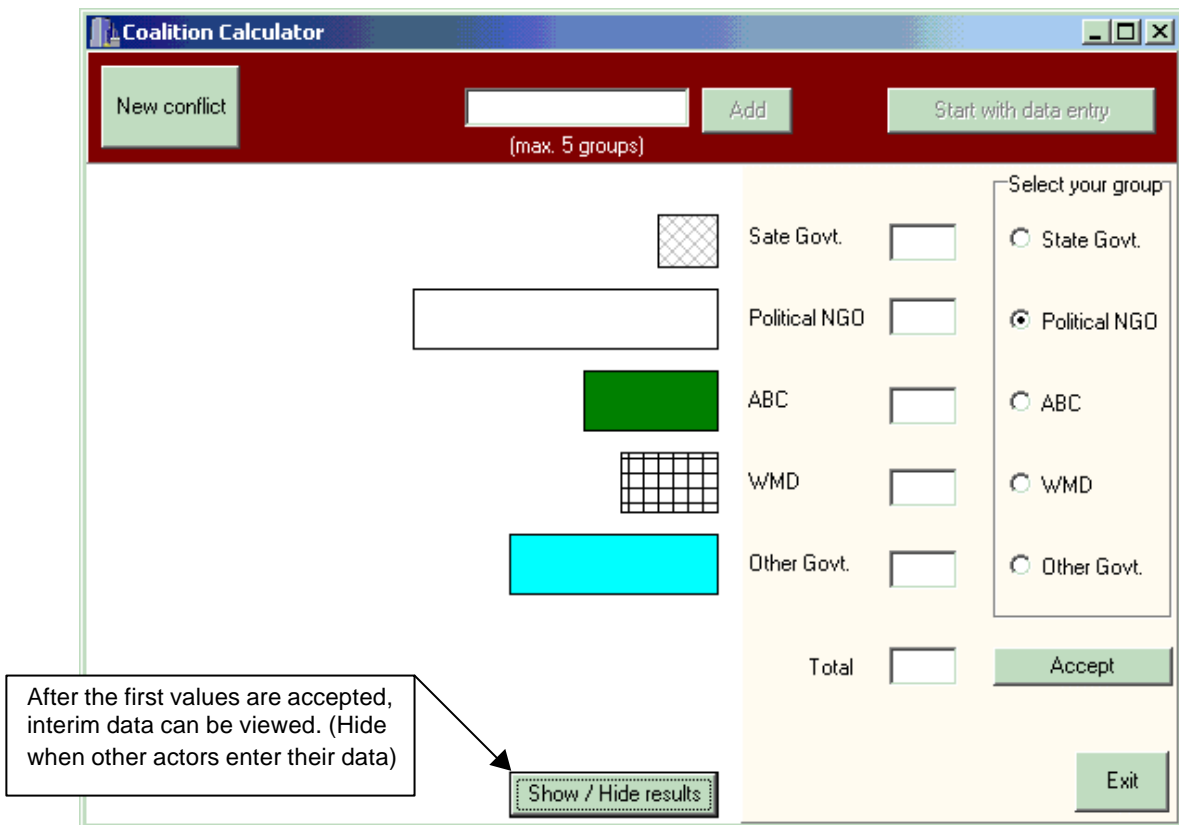


*Figure C-3.3. Interim results for the Political NGO; white bar = her own importance according to herself; other bars = how important the other actors think the Political NGO is.*

**Additional functionality**

The features outlined in the previous sections is an indication of the working program. When it is put to use, the following features should be added:

- Two entry columns, one for relative importance and one for relative influence;
- A selection for data gathering at the start, mid and end of the game (or any other desired amount of sample taking);
- Option to save and open a data file;
- Indicate if it is a 'grand coalition', and, in case of three players and a 2-person coalition against the third player, include the generalised Chae and Heidhues formula;
- A selection which data analysis is to be shown;
- Other options for (graphical) data analysis, e.g. plotting the data in a line graph with a line where $x = y$ and the provided values scattered points (a smaller Euclidean distance between a point and the line indicates the player has a more accurate perception of himself compared to the others).

Optionally:

- Instead of presenting bar and line graphs and numbers, one might opt for a classification, e.g. by using fuzzy loginc, of 'stable coalition', 'very stable', 'fragile' and 'unstable', with an optional indication in the fragile and unstable range with actor contributes most to the instability (i.e. where the discrepancies in perceptions are largest).
- Add an external independent observer, who will provide values, but are not included in the calculations.

## *Appendix D-0: Methods*

**Rules of the game**

Because the set-up of the experimental game is behavioural oriented, where the valid model of a social process is one where the players are ignorant of the rules of the game (Shubik, 1962)[1]: the rules are intentionally obfuscated to cater for the ignorance factors (in game theoretical sense)[2]. Game information is uncertain, asymmetric and incomplete (see chapter 3, *Table 3-2*).

The game will be played in one room and each group is placed separately with three chairs (no table), but each player can walk to another group, or walk to another area with one of the group members. The rules communicated (written here in italics, see *Appendix D-1* for the sheet that will be distributed among the players) to the players are as follows.

- *There are 6 groups of three people, one representing the government, one moderate and one violent terrorist, where each group is a country with a (fictitious) conflict.* Each group bargains in subgames of strategic moves, where the 'country' is the supergame. In turn, the 'world' should be interpreted as the supergame of the six separate supergames.

- *The simulation is based on a past or present protracted conflict where 'terrorism' was/is mentioned. The moderate terrorist is 'stronger' in the bargaining process than the violent terrorist. Not all conflicts are the same: they may, or may not, differ in causes, goals and government structure.* That the groups are in the same room should be interpreted as in 'all countries are in the world'. Stronger/weaker group is in line with the game model of Berninghaus *et al.* (1999).

- *Each person will receive a list of objectives, with a value attached to it, which is known only to oneself. Another faction may have the same, or similar objectives, but not necessarily the same 'net effect' (payoff) attached to it.* Players with imperfect information, but are assumed to have equal bargaining skills.

- *The one group and person in each group with the most points, i.e. most achieved goals, will get (a) free drink(s) after the gaming session.* Imperfect information about the rules: what is 'winning' for one is not necessarily winning for another; a player only knows one's own payoff. Thus, even if a 'revolution' may be likely, this does not mean a player cannon earn his/her prize. Secondly, by both rewarding the individual as well as the group, the negotiations can go either way.

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[1] See also Varian (1999) for an excellent outline on game design.
[2] The difference being a *lack of knowledge of the rules of the game* and a lack of knowledge of a player in a game with known rules but who *does not have perfect information.* An analogy with Poker is respectively having the cards in your hand but not knowing what defines a winning hand, and knowing what to do but not knowing the cards other player have. (Shubik, 1962:218)

- *You may: negotiate, form a coalition with anybody you want, walk out, start a conflict / (civil) war: the outcome is up to you.* Imperfect information and imperfect knowledge of the rules: the player is unaware of the probabilities of certain events. The coalition may be between $XY$, $XZ$, $YZ$ or with other governments or terrorists from other countries. In this scenario, it is conceivable governments forming a 'United Nations'-like cooperation, and terrorists could likewise set-up an 'international terrorist network'. However, it is up to the players to do so, no suggestion in that direction will be provided, but can be inferred from the rule '*form a coalition with anybody you want*".

- *You neither do have a deadline, nor a fixed set of negotiation rounds*. The players do not know how the last play is to be determined, in order to avoid 'last ditch effort' inconsistent behaviour, or backward induction. Essentially, this defines it as an infinite game, where players have to account for the possibility that after a failed or successful negotiation procedure they still will have to live with each other on the same planet. In practice, the game will last no longer than 1 hour. A second set of games will be played with a deadline of 20 minutes (see further below).

- *The organiser is the 'independent media service': it is up to you to check the overhead projector regularly for events. Further, you are allowed to instigate an event, but only on your behalf and communicated via the organiser either to your country, or to the world, i.e. other groups, as well*. The 'independent media service' is analogous to what Rasmusen (2001) calls 'Nature'. This opens the opportunity for a player to step-up his/her violent actions, though another possibility one can think of is that a country may want to communicate to the world that they achieved a peace settlement. This may be a motivator for other groups to achieve one as well in order to gain most points in the game (hence free drinks). Further, the 'independent media service' will issue statements in its behalf, like "Amnesty International reports human rights violations in country x, involving torture and executions, allegedly carried out by the government's special forces" and "Japan was target of a chemical attack – as of yet no organisation has claimed the act of violence" (see *Appendix D-4* for a list of prepared briefings).

- *The organiser may call time-outs for gathering interim data. If so, you will be asked to provide your expectation of importance compared to the other players and, second, the estimated actual influence of the other faction compared to one's own influence in the negotiation process, both as a fraction between 0 and 100*. See further below for details.

**Information of the game**

There are six countries, which are existing countries in the world, but do not mention a country with a current protracted conflict, in order to avoid subjectiveness of the players being influenced by present proceedings in the area (like the recent Supreme Court decision to prohibit Batasuna in Spain[3] or the peace process in Northern Ireland). Though note that it is not possible to 'clear memory' of players due to the subject field of the experiment. Countries are from each continent, with main 'terrorist cause' mentioned in between brackets – loosely modelled on past and present protracted conflict where 'terrorist' name-calling has occurred/occurs (text in italics will be communicated to all players):

- *Bangladesh* (poverty/globalisation and non-democracy: Colombia/FARC) [Italy];
- *Belgium* (minority power/imperialism: South Africa/ANC) [Japan];
- *Zambia* (ethnic/language etc., democracy: Spain/ETA-Batasuna) [Venezuela];
- *Yemen* (intelligentsia: Russia/Narodnaya Volya) [Jamaica];
- *Canada* (refugees/nationalism, democracy: Israel (government)/Palestine (Palestinian Authority and Al Aqsa)) [Qatar];
- *Paraguay* (sectarianism/ethnic and non-democracy: Lebanon-Syria/USA, from Lebanese perspective) [Central Africa].

*Appendix D-2* contains the sheets players receive at the start of a game and *Appendix D-3* the possible payoff outcomes for each player and country.

**Proceedings of the game**

The game ends NOT when the players think they're done, NOT when they walk out, and NOT when there is a conflict situation, but will when the organiser decides the time is up, which is randomly chosen. This means that a group (country) has the option to re-enter negotiation after 'letting off steam' or become irritable after they think they have agreed upon a peace settlement.

**During the game**

Aside from the media newsflashes initiated by the organiser and, possibly, by a player, the organiser will call time outs for 3 out of the 6 groups to test the Coalition Calculator (See *Appendix C-3* for a description and screenshots of the software):

- At the start (within 5 minutes), when each player has introduced him/herself with "I am [name] and I am [a terrorist / the government]", to fill in 1) their expectation of *importance* of one's own and the other players and 2) the estimated actual *influence* of the other faction compared to one's own influence in the negotiation process, both

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[3] Or the more recent decision by the USA to add Batasuna to their list of terrorist organisations (Egurbide, 2003a, 2003b) and the claim that ETA is currently Europe's most active group, having killed 839 people since 1968 (Sharrock, 2003).

as a fraction {0, …, 100}. This may reveal possible discrepancies: e.g. a faction thinks high of itself, but others do not, or maybe a faction is given a high importance for being 'on board' in the negotiations, but subsequently does not influence the discussions accordingly (and vice versa: a faction with 'low' importance and a 'big mouth' trying to dominate the negotiations, which in turn, may lead to resentment in the other players, or fuel the idea of 'giving in too much').

- Halfway during the negotiations this exercise will be repeated.
- Idem ditto at the end of the game.

**At the end of the game**

Each player will fill in an evaluation form (see *Appendix D5*). After filling in the form, the players will be informed about the reasoning behind the game set-up and the result, i.e. who 'wins'. Then the game will be played again, but with a pre-set and communicated deadline of 20 minutes. The same conflict and objectives profiles will be used, but each group will be allocated another country. To avoid interference from the first game, the players will be informed that this is a new set, with similar scenarios, but not the same objectives and payoff allocations. See above for alternate countries, which are mentioned between square brackets. A repeat of the game tests what the players learned from the first round and therefore may be capable to come to 'solutions' sooner, which might be stimulated by the imposed deadline, though peace research literature has noted on several occasions that setting deadlines for negotiations can have a detrimental effect on the negotiation process (see also §4.2.2).

Within one week after the game, the participants will be informed on the overall results regarding the aspects that are investigated in this experimental game.

## *Appendix D-1: Rules*

## **Rules of the game**

- There are 6 groups of three people, one representing the **government**, one **moderate terrorist** and one relatively **violent terrorist**, where each group is a country with a (fictitious) conflict.

- The simulation is based on a past or present protracted conflict where 'terrorism' was/is mentioned. Not all conflicts are the same: they may, or may not, differ in causes, goals and government structure.

- Each person will receive a list of **objectives**, with a value attached to it, which is known only to oneself. Another faction may have the same, or similar objectives, but not necessarily the same 'net effect' (points) attached to it.

- The one group and person in each group with the most points, i.e. most achieved goals, will get (a) **free drink(s)** after the gaming session.

- You may: **negotiate**, form a **coalition** with anybody you want, **walk out**, start a conflict / (civil) **war**: the outcome is up to you.

- You neither do have a deadline, nor a fixed set of negotiation rounds.

- The organiser is the **independent media service**: it is up to you to check the overhead projector regularly for events. Further, you are allowed to **instigate an event**, but only on your behalf and communicated via the organiser either to your country, or to the world, i.e. other groups, as well.

- The organiser may call **time-outs** for gathering interim data. If so, you will be asked to provide your expectation of **importance** compared to the other players and, second, the estimated **actual influence** of the other faction compared to one's own influence in the negotiation process, both as fractions between 0 and 100.

## *Appendix D-2: Countries*

**Country:**       Yemen

**Player:**        Government

------------------------ ?*Not to be communicated verbatim to other players* ?---------------------------

**Background information of the conflict**

Yemen has a parliament and a government, but in reality, the major decisions are taken by the royal family, which is not ideal, but you are relatively well off under the current system and do not want to see it changed dramatically.

Recent terrorist actions did not affect you or your family members personally, but is potentially a serious threat to your *status quo*. Non-violent actions that have ridiculed the government made you irritable.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

- A. End the violent attacks (4 points)
- B. Maintain government structures (5 points)
- C. The royal family should stay on, but less influence is desirable (1 point)

**Country:**       Yemen

**Player:**        Terrorist

------------------------ ?*Not to be communicated verbatim to other players* ?---------------------------

**Background information of the conflict**

Having studied political science, up to PhD-level for many years, you see the inequalities and unfairness of the present system, which should be changed by political means.

Especially unfair is the hard work academics like you, as well as the ordinary peasant and factory workers, are subject to, but receive little pay or reward for it.

Some of your academic peers are not as patient as you in trying to realize your ideals of a socialist society, but you prefer dialogue, demonstrations and strikes above violent actions.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

  A. Power-sharing solution, where the voice of the people is not only taken seriously, but make up the lion's share of the decision-making. (5 points)
  B. The royal family must *not* have decision-power. (1 point)
  C. Redistribution of wealth to a more equal sharing of resources. (4 points)

**Country:**       Yemen

**Player:**        Terrorist

------------------------ ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

Having studied political science, up to PhD-level for many years, you see the inequalities and unfairness of the present system, which should be changed sooner rather than later.

Especially unfair is the hard work academics like you, as well as the ordinary peasant and factory workers, are subject to, but receive little pay or reward for it.

Some of your academic peers think they are more patient in trying to realize your ideals of a socialist society, but they just don't see the urgency of the need for change. Endless dialogue with the corrupt government likely will not result in the desired changes, therefore violent actions are a necessary tool to emphasise the importance, and may speed up the process, of the required modifications in governance of your country.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

  A.  Overthrow of the government and make an end to the ruling by the incompetent royal family. (4 points)

  B.  New governance must be based on socialist principles, hence with a more equal sharing of resources. (6 points)

**Country:**         Bangladesh

**Player:**          Government

------------------------- ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

You belong to a ruling elite, with financial back-up of the major superpower of the world, especially in the area of support for a crack-down of the drugs cartels  and industrial investments. This 'streamlining' of operations is unfavourable for your citizens but you are relatively well off and in a stable position. The fact that there's a conflict going on for well over 30 years, terrorists are ruling a not insignificant proportion of the sovereign state Bangladesh (though they stay in 'their' region most of the times) and foreign (economic and policy) influence is hindering realisation of your own ideals as a politician, makes you wishing to change the current situation. You are fairly sure that the terrorists are involved in the narcotics trade.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

   A. End terrorist-led occupation of affected counties (6 points)
   B. Develop a liberal economy market (3 points)
   C. Replacing the narcotics business with other profitable agriculture / industry (1 point)

**Country:** Bangladesh

**Player:** Terrorist

------------------------- ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

You are a member of the 'oldies' in the organisation and in a high managerial position within the organisation, involved for over 25 years in the socialist struggle that is, overall, already taking over 30 years (and counting). The years have made you a bit milder towards preferences in ways of achieving your goals and you enjoy the spoils of ruling part of the country, which is run as a state within a state.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

A.  Extend your own governance to the whole country (6 points)
B.  The state system should be based on socialist principles (3 points)
C.  In time, it may be better to replace the revenue gained from drugs trade to other forms of primary/secondary/services sector (1 point)

**Country:**        Bangladesh

**Player:**         Terrorist

------------------------ ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

You are a young student and low in the rankings within the well-established terrorist organisation structure, but determined to work your way up in the system. You realise that the requirements by the older members of the organisation, i.e. a socialist system, is of utmost importance, especially because of the foreign economic influence that is detrimental for all fellow Bangladeshi. The struggle is continuing for over 30 years without achieving its goals and your patience is running out: more serious measures are necessary if the organisation, and implementation of your ideals, is ever to be realised.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

    A.  Replace the existing government with one based on socialist principles (5 points)
    B.  Cut down on foreign investment and their domination in policymaking (5 points)

**Country:**      Belgium

**Player:**       Government

------------------------- ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

You are a descendant of the Congolese imperialists and belong to the ruling elite. The ethnic Congolese make up only about 20% of all Belgians, who are predominantly ethnic Arians comprising of, at a long gone time important, different monarchies. It is your view that the Arians are not capable of ruling themselves anyway, so it is a good thing that the Congolese are in power, in order to achieve at least reasonable economic progress. You have captured the main leader of the 'resistance' organisation, but this did not result in a significant reduction of violent activities. Foreign moral support for the terrorists is irritating you.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

A. Stay in power and continue the current governance (5 points)
B. Further crack-down on terrorist activities to achieve more secure living conditions (4 points)
C. Propaganda to convince others it is a fair system (1 point)

**Country:**        Belgium

**Player:**         Terrorist

------------------------ ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

You belong to the Arian majority that together make up about 80% of the Belgian population, but the Congolese minority hold all the positions of power, and money (a remnant of the imperialist era). All ethnic Arians are descendants / belonged to, previously important, different monarchies (like the Habsburgs, Oranges, etc). You are proud of your heritage and consider it highly unfair being discriminated against. However much the disadvantaged position, you still have hope to resolve the inequalities by peaceful means, if possible, despite the fact that the leader of your organisation is detained by the government. Some other states in the world support your ideals.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

A.  Introduce democracy that reflects the composition of the Belgian populations (7 points)

B.  New policy regulations to allow for affirmative action, as 'fast track' measure to make up arrears (3 points)

**Country:**       Belgium

**Player:**        Terrorist

------------------------- ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

You belong to the Arian majority that together make up about 80% of the Belgian population, but the Congolese minority hold all the positions of power, and money (a remnant of the imperialist era). All ethnic Arians are descendants / belonged to, previously important, different monarchies (like the Habsburgs, Oranges, etc). You are proud of your heritage and consider it highly unfair being discriminated against.

Although Belgium is officially a sovereign state, you consider it is still very much an imperialist system, hence entitled to fight for your right of self-determination. Some other states in the world support your ideals.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

A.  Introduce democracy that not reflects the composition of the Belgian populations, but is ruled by the majority, Arians (6 points)
B.  New policy regulations to allow for affirmative action, as 'fast track' measure to make up arrears (3 points)
C.  Arians should hold the main position of power, regardless if they have the skills: they will learn them soon enough (1 point)

**Country:**       Zambia

**Player:**        Government

------------------------ ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

The country recovered from a civil war and 'non-democracy' of the previous century, and the present democracy is relatively new, but working according to the vast majority of the Zambian people, which is also the impression of other states about your government. However, there is an ethnic minority claiming descent from an ancient culture and insist on having their own state, despite recent trends among neighbouring countries to cooperate tighter. You have tried to be compassionate with their plight, released prisoners (conditionally), allowed, at least for a while, the political wing of the ethnic minority to be included in the country politics (but had to ban them because they were not condemning the terrorist violence), granted self-governance to some extend to the region, but to no avail: the violence did not cease and you're at the end of your patience with them.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

 A. End the violent attacks and killings (6 points)
 B. Allow some decentralised self-governance in the region of the minority, but certainly not separation of the region (4 points)

**Country:**      Zambia

**Player:**      Terrorist

------------------------ ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

The country recovered from a civil war and 'non-democracy' of the previous century, and the present democracy is relatively new (since the mid 1970s), but you feel 'left out' after establishment of the democratic system in the country, because you wanted a country for the ethnic minority you belong to – its culture dating back for centuries, including having an own distinct language and heritage. You were a member of the, now banned, political wing representing your people in regional as well as national governance, but still think dialogue with the country's government is the preferred way forward.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

     A.   An increased level of self-governance compared to the present decentralisation, close to a 'state within a state' (7 points)

     B.   Administratively reunited with the other part of your ethnic group, currently residing in a neighbouring country (2 points)

     C.   International recognition of your struggle and your heritage/culture (1 point)

**Country:**        Zambia

**Player:**        Terrorist

------------------------- ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

The country recovered from a civil war and 'non-democracy' of the previous century, and the present democracy is relatively new (since the mid 1970s), but you feel 'left out' after establishment of the democratic system in the country, because you wanted a country for the ethnic minority you belong to – its culture dating back for centuries, including having an own distinct language and heritage.

The, recently banned, political wing of the resistance organisation did not (yet) achieve the organisation's goals, and you consider the current government of the country 'terror of the majority in a democracy'. You consider using violence, both targeted and indiscriminate, as a legitimate way to achieve independence.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

  A. An own, separate, country for your ethnic group (6 points)
  B. Reunited with the other part of your ethnic group, currently residing in a neighbouring country (3 points)
  C. Full expression of your cultural heritage (1 point)

**Country:**     Canada

**Player:**      Government

------------------------- ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

You belong to the democratic government of a Canada, a sovereign country in a region that has utmost significance for historical and religious reasons, but are threatened by another ethnic group who want to claim the same region, though their links are less historical than yours. You managed to chase most of the terrorists out of the country, but they don't let you live in peace and security. As this problem is going on for about half a century, and some family members and friends died because of it all, you do not trust the terrorists for a bit, but are 'persuaded' via additional political and economic support to pretend to negotiate for a peace settlement, but really you want to finish the problem once and for all.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

   A.  Eliminate the terrorists, or make sure none will cross the border (7 points)
   B.  A concession for lasting peace is to offer the terrorists a small piece of (arid) land (2 points)
   C.  Convince the wider community of your rightful cause (1 point)

**Country:**       Canada

**Player:**        Terrorist

------------------------ ? *Not to be communicated verbatim to other players* ?-------------------------

**Background information of the conflict**

Decades ago invaders chased most of your fellow group members from your land, covering Canada (roughly), and the vast majority is now forced to live in refugee camps across the borders in neighbouring states. Both your ethnic group and the invaders claim historical, cultural and ethnic rights on the region and you realise that eventually you have to find a way to leave in peace together. Therefore you want to let diplomacy prevail in achieving a solution, even though you are aware that the Canadian government engages in state terrorism every now and then. International support for your cause is divided, but there are several United Nations resolutions in favour of your goals.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

   A.  Reach a peace agreement, including a piece of the territory of Canada (7 points)
   B.  Members of your ethnic group who are currently living in Canada must receive full citizen status with equal rights (2 points)
   C.  Economic support by the present Canadian government as a form of 'payback' to make up for the losses over the decades (1 point)

**Country:** Canada

**Player:** Terrorist

------------------------- ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

Decades ago invaders chased most of your fellow group members from your land, covering Canada (roughly), and the vast majority is now forced to live in appalling refugee camps across the borders in neighbouring states, who do not treat you fair either. Both your ethnic group and the invaders claim historical, cultural and ethnic rights on the region. This problem has been going for too long, and despite international assistance for a 'peace agreement', nothing improves, more precisely, it worsens: more people are being laid off, insufficient money to fund education and health services. If this continues, there is no viable future for you, your family and ethnic group as a whole, therefore direct action may be all that is left to change the course of history. And why not? After all, the Canadian government uses illegitimate force to protect themselves.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

A. A piece of land that you can call your own (6 point)
B. A return of refugees to their homeland (3 points)
C. Economic support by the present Canadian government as a form of 'payback' to make up for the losses over the decades (1 point)

**Country:**      Paraguay

**Player:**       Government

------------------------- ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

You are from the government of the United States of Europe and *opposing* the Paraguayan government, who is harbouring and supporting terrorists and its ties are too close to its large neighbouring country Brazil, a terrorist state as well. Terrorism cannot be condoned for any reason. You are aware that Uruguay occupies a little part of Paraguayan territory, but according to the United Nations, it belongs to Brazil, not Paraguay, and besides, Uruguay has the right to establish a buffer zone against terrorists for their own right for security.

Pretend you prefer diplomacy, but you know, and they know, that you have the, proven, military might to back-up your demands.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

    A.  Cease terrorist activities (6 points)

    B.  Economic liberalisation (2 points)

    C.  Paraguay must implement a parliamentary democracy (2 points)

**Country:**        Paraguay

**Player:**        Terrorist

------------------------ ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

Your government represents a delicate balance of feudalist leaders representing the main sects in the country, though in reality, a large neighbouring country, Brazil, is pulling the strings. All involved know this, but this situation is preferable over yet another civil war. One party in government is also taking part in armed struggle against the capitalist imperialists, Uruguay backed by the United States of Europe, who occupy a small area of your sovereign territory, which is condoned and/or supported by your own government and that of Brazil, to dissatisfaction of Uruguay, and more importantly, superpower capitalists USE. However, being in politics, you prefer a resolution of the conflict by peaceful means.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

      A.   An end to the foreign occupation (5 points)
      B.   Maintain the composition of the present government (3 points)
      C.   Economic liberalisation (2 points)

**Country:**        Paraguay

**Player:**         Terrorist

------------------------- ? *Not to be communicated verbatim to other players* ?--------------------------

**Background information of the conflict**

The terrorist group you are a member of receives widespread support within the region, largely as a result of the armed struggle against the invader Uruguay (who is heavily backed by capitalist superpower United States of Europe), because you liberated (using violence) the south of the country from this occupation, though the USE still occupy a small fraction of the sovereign territory of Paraguay. You know that officially the government of Paraguay is supposed not to support your cause, but you know they do. Furthermore, you are aware that the government is not quite wholly democratic, but largely influenced by the large neighbouring state Brazil.

Because of previous successes achieved through violence, you intend to continue to use this as a means to achieve your goals.

-------? Goals to be negotiated about and to achieve ? ----- ***Do not mention your payoff*** -------

**Your objectives**

A. An end to the foreign occupation (7 points)
B. Larger representation of your sect within the government (2 points)
C. Less influence of Brazil (1 point)

## *Appendix D-3: Payoffs*

**Yemen**

Possible outcomes regarding the objectives of the payers representing Yemen, where g is the government, t1 the moderate terrorist and t2 the violent terrorist. Each player's maximum is a payoff of 10, thus the theoretical upper limit of a game is 30 and minimum 0 if none of the objectives are met. Realistically, the objectives allow for a best outcome with an agreement between g and t1 or t1 and t2, i.e. a maximum payoff of 20.

**Bangladesh**

Maximum 30, minus 3 of socialist versus liberal, can achieve an agreement between t1 and g

**Belgium**

T1 and t2 are likely to cooperate, thus a practicable maximum of 20.

**Zambia**

Cooperation between t1 and g most likely, plus possibly an extra 2 for 'cultural heritage'.

**Canada**

T1 and t2 are likely to cooperate, plus 2 by the government if they agree on a peace deal involving all players, thus a practicable maximum of 22.

**Paraguay**

The author does devise a clear strategy for this game, and would have been played either in a second round, or at a later date as it requires medium to experienced players.

### *Appendix D-4: Media*

## Independent Media Briefings

### *Briefing 1*
Amnesty International reports human rights violations in Canada, perpetrated by the government. Violations include various methods of torture, incarceration without trial and killings.

### *Briefing 2*
The United Nations agree on a resolution announcing the 'war on drugs', as a first step to cooperate between governments of all nations to counter the narcotics 'enterprises'.

### *Briefing 3*
The United Nations re-iterate the right of self-determination and independence for peoples, as well as the validity of the Declaration of Human Rights and democratic values.

### *Briefing 4*
A major biological disaster occurred in Washington DC, United States of America. It is believed that the infection of the water supply system with deadly *E coli* bacteria is the work of a terrorist organisation, but as of yet the attack has not been claimed. Hospitals are flooded with infected people; it is believed that at least 2000 people will die within this week. Americans in other major cities fear the worst, bottled water ran out of supply and many people have to resort to medieval practice: drinking beer instead of water.

### *Briefing 5*
Rumours point to Belgium, because of the US support for the Congolese minority, or Bangladesh, as the poor Bangladeshi are apparently highly dissatisfied with their government's 'sell out' of the country's assets to US multinationals.

### *Briefing 6*
Central Africa and the European Union announce their bi-lateral agreement in trade and development.

### *Briefing 7*
MERCOSUR advocates closer cooperation between all South American countries, working towards a political union on the continent.

### *Briefing 8*
A depot with a large amount of pipe bombs, traditionally developed and used by Japanese terrorists, is found in Italy.

**Briefing 9**
Network congestion and server failure of major European Internet websites caused severe disruption. The first political finger pointing is towards blaming the Japanese or the highly educated Jamaicans, but the investigators "keep an open mind" about it all.


**Briefing 10**
The United Nations Security Council is in disarray about the Hungarian crisis, who are supposedly not only harbouring terrorists, but also actively supporting them. Though only when apparently these terrorists are against the USA, USE or USME.

### *Appendix D-5: Questionnaire*

## Evaluation questionnaire


Name (optional): ……………………………………………………………………………………….

Study/Occupation (optional): ………………………………………………………………………..
Role: government / [moderate / non-moderate] terrorist



1. What is your opinion on the negotiation process?

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2. Which faction did annoy you the most? Why?

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3. Did you make use of the media service to launch an event?

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4. If you answered with "yes" to question 3, how often, and why?

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5. Was there a media event that made you change your strategy? If "yes", which event(s)?

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6. Did you form a coalition at one stage during the game? If yes, with whom?

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7. What options of the game did you miss, if any?

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8. Is there anything you would have done differently if you could do this game again?

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## *Appendix D-6: Results*

### *Gaming experiment results (8 and 15 May 2003)*

$G$ = government; $T1$ = moderate terrorist; $T2$ = violent terrorist

**Basic data participants**

| | |
|---|---|
| First game: | Canada, based on Palestine/Israel conflict |
| Participants: | 3 |
| Background participants: | Postgraduates in politics, Department of Government & Society University of Limerick, Ireland, and members of the Irish Peace Society. |
| Time game: | 45 minutes |

| | |
|---|---|
| Second game: | Zambia, based on Spain/ETA/Batasuna |
| Participants: | 3 |
| Background participants: | Postgraduates in politics, Department of Government & Society University of Limerick, Ireland, and members of the Irish Peace Society. |
| Additional note: | $G$ was $T1$ in game 1, $T1$ was $T2$ in game 1 and $T2$ was $G$ in game 1. |
| Time game: | 15 minutes |

| | |
|---|---|
| Third game: | Jamaica, based on Narodnaya Volya/Russian revolution |
| Participants: | 3 |
| Background participants: | Postgraduate in politics, undergraduates in Material & Engineering and Music & Dance. All are students at the University of Limerick, Ireland. |
| Additional note: | $T1$ was a player in game 1 and game 2, $T2$ and $G$ were new players. |
| Time game: | 38 minutes |

**Relative importance and influence of the players**

The tables below present the relative importance and influence in the negotiation process of other players compared with oneself.

What $G$ thinks of itself, relative to $T1$ and $T2$

Idem $T1$ relative to $G$ and $T2$

| g | start | mid | end | start | mid | end |
|---|---|---|---|---|---|---|
| | *importance* | | | *influence during negotiations* | | |
| g | 90 | 90 | 90 | 90 | 90 | 90 |
| t1 | 0 | 0 | 0 | 5 | 0 | 0 |
| t2 | 10 | 10 | 10 | 5 | 10 | 10 |
| | | | | | | |
| t1 | start | mid | end | start | mid | end |
| | *importance* | | | *influence* | | |
| g | 50 | 50 | 70 | 50 | 50 | 70 |
| t1 | 30 | 0 | 0 | 10 | 0 | 0 |
| t2 | 20 | 50 | 30 | 40 | 50 | 30 |
| | | | | | | |
| t2 | start | mid | end | start | mid | end |
| | *importance* | | | *influence* | | |
| g | 50 | 50 | 0 | 45 | 50 | 0 |
| t1 | 0 | 0 | 0 | 10 | 0 | 0 |
| t2 | 50 | 50 | 100 | 45 | 50 | 100 |

*Table D-6.1. Canada, 8-5-2003.*
*Note: $T2$ allocated 0 to the $T1$ and $G$ because she was convinced that the nukes deployed by $G$ killed both $G$ and $T1$ – not herself (but see note at questionnaire); likewise, $G$ considered to have 'won' the game because of the elimination of the terrorists, especially $T1$, because of the bombs and nukes he deployed, though $T1$ and $T2$ contested being killed by either the bombs or the nukes.*

| g | start | mid | end | start | mid | end |
|---|---|---|---|---|---|---|
| | *importance* | | | *influence during negotiations* | | |
| g | 30 | 20 | 20 | 30 | 10 | 30 |
| t1 | 30 | 40 | 60 | 40 | 50 | 60 |
| t2 | 40 | 40 | 20 | 30 | 40 | 10 |
| | | | | | | |
| t1 | start | mid | end | start | mid | end |
| | *importance* | | | *influence* | | |
| g | 50 | 0 | 0 | 50 | 10 | 0 |
| t1 | 50 | 80 | 100 | 50 | 80 | 100 |
| t2 | 0 | 20 | 0 | 0 | 10 | 0 |
| | | | | | | |
| t2 | start | mid | end | start | mid | end |
| | *importance* | | | *influence* | | |
| g | 50 | 33 | 50 | 50 | 33 | 50 |
| t1 | 25 | 33 | 50 | 25 | 33 | 25 |
| t2 | 25 | 33 | 0 | 25 | 33 | 25 |

*Table D-6.2. Zambia, 8-5-2003.*
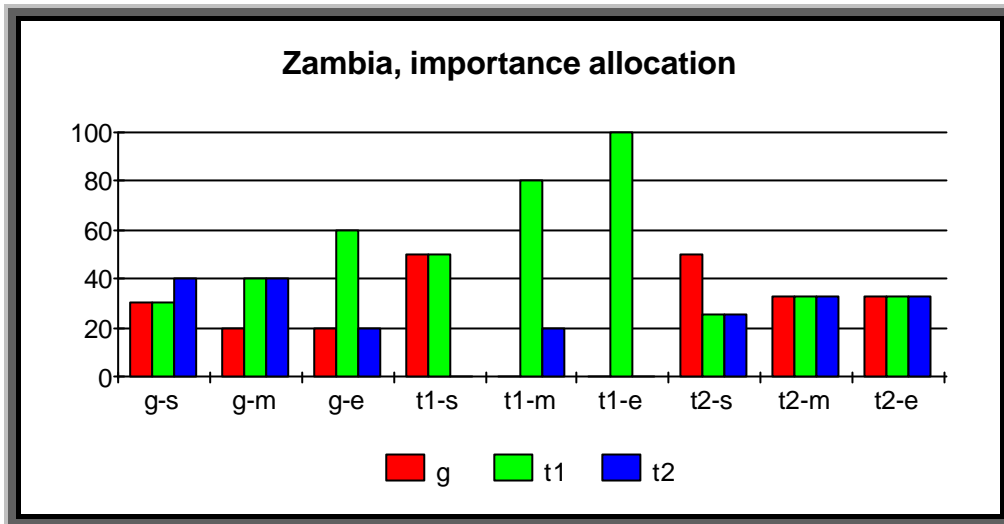*Note: $G$ and $T1$ verbally agreed on a peace agreement near the end of the game.*

*Figure D-6.1. $G$ = governments; $T1$ = moderate terrorist; $T2$ = violent terrorist; g-s = allocations given by g to the different players at the start of the game; g-m = idem, but during half-time; g-e = idem, at the end of the game. Example: the first bar at the left-hand side represents the importance $G$ allocated to herself at the start of the game.*
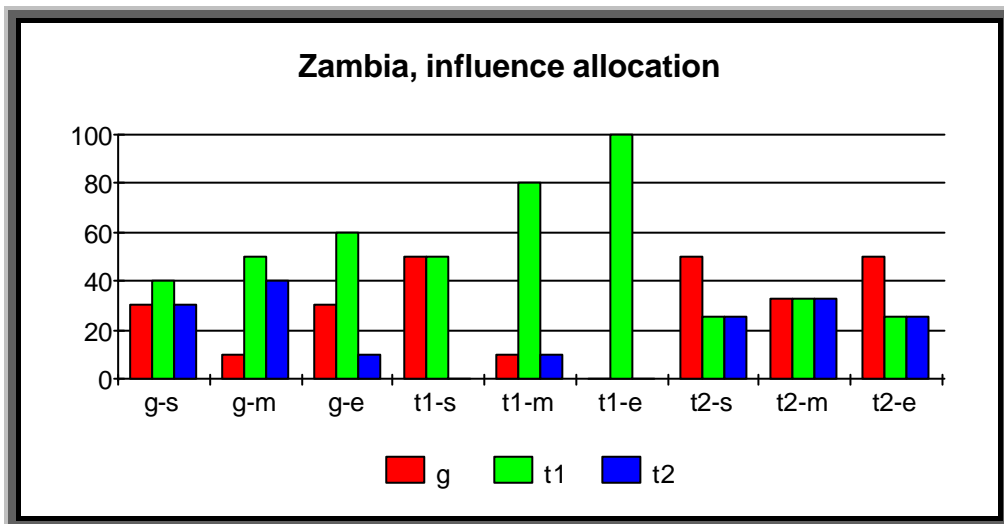


*Figure D-6.2. $G$ = governments; $T1$ = moderate terrorist; $T2$ = violent terrorist; g-s = allocations given by g to the different players at the start of the game; g-m = idem, but during half-time; g-e = idem, at the end of the game. Example: the last bar at the right-hand side represents the influence on the negotiation process $T2$ allocated to himself at the end of the game.*

| g | start | mid | end | start | mid | end |
|---|---|---|---|---|---|---|
| | *importance* | | | *influence during negotiations* | | |
| g | 70 | 50 | 80 | 90 | 60 | 60 |
| t1 | 20 | 20 | 10 | 5 | 20 | 30 |
| t2 | 10 | 30 | 10 | 5 | 20 | 10 |
| | | | | | | |
| t1 | start | mid | end | start | mid | end |
| | *importance* | | | *influence* | | |
| g | 30 | 33 | 20 | 40 | 10 | 5 |
| t1 | 40 | 33 | 50 | 30 | 60 | 60 |
| t2 | 30 | 33 | 30 | 30 | 30 | 35 |
| | | | | | | |
| t2 | start | mid | end | start | mid | end |
| | *importance* | | | *influence* | | |
| g | 0 | 0 | 30 | 33 | 15 | 40 |
| t1 | 25 | 40 | 10 | 33 | 70 | 10 |
| t2 | 75 | 60 | 60 | 33 | 15 | 50 |

*Table D-6.3. Jamaica, 15-5-2003.*


**Questionnaire responses after Game 1 and Game 3**


Game 1

*1. What is your opinion on the negotiation process?*

$G$: primitive – men in suits or men in lion cloths…. Same game

$T1$: useless – no winner, violence was the only "negotiating"- language

$T2$: when dealing with such a TERRORIST (the government) no negotiation is possible.
Perhaps with a change of government progress could be made. Our day will come.


*2. Which faction did annoy you the most? Why?*

$G$: moderate terrorists – not whining enough

$T1$: government – there was no negotiation at all, government was clear before game started

$T2$: Moderate terrorists – no conviction for the cause. ? of the '?' as far as I'm concerned.


*3. Did you make use of the media service to launch an event?*

$G$: yes

$T1$: yes

$T2$: yes, on several occasions


*4. If you answered with "yes" to question 3, how often, and why?*

$G$: positioning for negotiations. Several times

*T1*: once – public is sick of violence, big peace movement. Wasn't taken into consideration, neither from government nor from terrorists

*T2*: To launch attacks – car bombings, suicide bombings etc. to condemn the annexation of our territories.

*5. Was there a media event that made you change your strategy? If "yes", which event(s)?*

*G*: no strategy. Remained consistent throughout – zero-sum! ☺

*T1*: -

*T2*: Yes, when the government annexed our territory + then used neutron bombs, I (1) realised no negotiation was possible with such a TERRORIST, (2) that the international community do not care about my plight + B) that I was dead once the bomb hit, + there was therefore no need for a strategy.[1]

*6. Did you form a coalition at one stage during the game? If yes, with whom?*

*G*: No

*T1*: -

*T2*: No – I ?med with the moderate terrorists but realised that I wanted to kill them more than the government

*7. What options of the game did you miss, if any?*

*G*: time-outs, coalition, walk-out. But I managed to annex a country!

*T1*: -

*T2*:

*8. Is there anything you would have done differently if you could do this game again?*

*G*: would have instigated more terrorist attacks via non-violent methods – i.e. water privilege withdrawal – in order to justify neutron bombing of the refugee areas.

*T1*: no connection to Middle East…positions were not negotiable (biased by actual conflict in Middle East)

*T2*: launched more suicide attacks, particularly aiming at the Prime Minister. I will not rest until everyone of them are dead.

---

[1] This is in contradiction with "relative importance and influence of the players", where *T2* allocated 0 to the *G* and *T1*, noting that she assumed *they* were dead.

Game 3

*1. What is your opinion on the negotiation process?*

$G$: very hard when there is a coalition and you are not part of it

$T1$: very productive – violence was barely used as a "means" of negotiation. King was very weak therefore.

$T2$: frustrating


*2. Which faction did annoy you the most? Why?*

$G$: where people did not listen, or when it got complicated, I like things simple

$T1$: -

$T2$: The moderate terrorists as they had very frail persona, changed mind easily.


*3. Did you make use of the media service to launch an event?*

$G$: no

$T1$: yes

$T2$: the election


*4. If you answered with "yes" to question 3, how often, and why?*

$G$: -

$T1$: elections, bombs, redistribution of wealth

$T2$: not enough


*5. Was there a media event that made you change your strategy? If "yes", which event(s)?*

$G$: -

$T1$: -

$T2$: the attempted blame of the real terrorists by the moderate terrorists


*6. Did you form a coalition at one stage during the game? If yes, with whom?*

$G$: No

$T1$: yes, with both sometimes

$T2$: the moderate terrorists


*7. What options of the game did you miss, if any?*

$G$: coalition, elections

$T1$: -

T2: the function of the media adequately

*8. Is there anything you would have done differently if you could do this game again?*

G: I would establish control immediately and know exactly every thing.

*T1*: -

*T2*: more time, with clearer structure.


**Initiated events in chronological order**


*Game I – Canada*

Events in chronological order:

1. $G$ action: bomb refugee's headquarters, targeting $T1$

2. $T2$: killed Canadian education minister and his two bodyguards

3. $T2$: suicide bomber in a busy shopping centre, but security prevented multiple deaths

4. $G$: invasion of refugee camps + implementing buffer zone

5. Independent media briefing 1

6. $G$: annexation/incursions of all 'occupied land' and refugees sent to neighbouring states

7. Independent media briefing 2

8. $T2$: more killings

9. $T2$: is planning… and then blew up a vessel, killing 241 passengers

10. $G$: deploys localised nukes targeted at the refugee camps [2]

11. $T2$: appointed democratic 'government' of their supporters

12. $T1$: claims to have the largest supporters base of the refugees


*Game 2 – Zambia*

Events in chronological order:

1. $T1$: request for international recognition via UN

2. $T2$: bombing downtown police station, killing >20 people

3. Briefing 7

4. $T2$: bombs supermarket

Note: event 4 was initiated 1 minute before the (announced) deadline, when $G$ and $T1$ had a verbal agreement, to dissatisfaction of $T2$.

---

[2] Note coordinator: there was major confusion among the players if this is allowed during the game, and a discussion followed if it would mean all were killed, including Canadian citizens, because the refugee camps are basically next door. The players were inconsistent themselves on its outcome (compare importance/influence data with the questionnaire results)

*Game 3 – Jamaica*

Events in chronological order:

1. $T1$: $T2$ did a bomb to kill the foreign minister, which is the brother of the king

2. $T2$: refutes this allegation

3. $T2$: claims g bombed 4 hospitals as retaliation for the first bomb

4. They all agreed on elections

5. Extension of the gaming time requested by $T2$ and $G$

6. $T1$: claims $T2$ bombed something

**Additional comments on Game 1, 2 and 3 by coordinator**

*Game 1:*

The initial setting was given with a positive framework, in that "all were together at the negotiation table to see if the problem could be solved by negotiations".

The modelled conflict was obvious from the start of the game. Despite stressing that it was a model and "not necessarily exactly reflecting" the background description, objectives and allocated payoffs of the Palestine/Israeli conflict, not all participants, especially the government, negotiated on the basis of the given objectives. Opinion of the actual conflict had an effect on the proceedings of the game in a negative sense.

After 15 minutes, the coordinator pointed again towards one of the rules, that players are allowed to / should negotiate and permitted to form coalitions, walk out etc.

After 'half time' (i.e. answering their opinion on relative importance), independent media briefing 1 and 3 were made public: 1 was discussed and agreed upon by all three factions as not to be taken seriously and 3 had an insignificant influence ($T2$ commented as insufficient response from the UN). $T1$ was relatively quiet during the game, compared to $T2$ and $G$.

The 'moderates', $T1$, could have taken up $T2$'s public event announcing to have set-up democratic governance amongst the violent terrorists, to form a coalition to form a credible counterweight against the government (e.g. to drive out the government from their refugee area). Intriguingly, $T1$ did not.

The 'mini-nukes' launched by $G$ caused initial disbelief, consternation and confusion on who was actually affected and killed by it: did it kill 'Canadians' as well, or 'only the refugees', and if only the refugees, did it kill the negotiators [players]? In this, and other violent events instigated, it was always *other* people being killed, but no participant actually said to another player "you were killed too" or "I assassinated you".

Overall, the game followed a tit-for-tat attitude of increasing levels of violence, with an interesting note after the game that $G$ considered using the Transcend approach[3] at the start of the game, "but when the others started with the bombings, I thought to hell with it, I'm going to use the violence as well". However, the sequence of instigated events initiated by the players started with bombs carried out by the *government*, not the terrorists. Nevertheless, the level of hostilities during the game was disappointing, especially in the light of the type of participants.

If there were a 'winner', i.e. closest to achieving any of the objectives, $G$, with its executed mass murders of the refugees/terrorists, throwing them out of the country and annexing their land, would come closest with a mere 5 points out of the theoretical 30 and practicable 20+.

*Game 2*

No evaluation of Game 1 occurred, except for personal reflection when answering the questionnaire, and the players were given the choice: either to have an explanation of the underlying theory or play another game with an ultimatum of 15 minutes. All wanted to play another game for 10 minutes.

The initial setting was given with the same positive framework as Game 1, in that "all were together at the negotiation table to see if the problem could be solved by negotiations".

Undoubtedly, the experience of the first game played part in the behaviour during the second, which was much more 'civilised': $T2$ was relatively quiet/ignored (at least initially, as event 2 was ignored by both $T1$ and $G$) and $G + T1$ made, verbally, an agreement, as in cooperation with each other.

At one minute before the end of the game, they were pressed to write down the points of agreement, $T2$ launched an attack, $G$ backed off somewhat and more cautious in writing down anything[4]. This is exactly in line with the assumption made by Bueno de Mesquita. At the end, there was some sort of agreement, but again, no stage of a 'written peace agreement' (single items they both could agree upon).

Winners: $G$ achieved 4 points, $T1$ 8 point and $T2$ 0, resulting in a total of 12 points.

Notes afterwards were that "I had no chance… I was excluded" (*T2*) and "if only we had a little more time, we would have had it in written format" (*T1*), the latter in accordance with Galtung, and generally accepted within peace research, that it's best not to set a deadline if one really wants to achieve a peace agreement.

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[3] See www.transcend.org for more information, or www.peace.ie and *Searching for Peace* for examples of its application.
[4] The request by the coordinator was that the players should write down, in list form, the items they agreed upon.

*Game 3*

Rules were communicated to the players as before, with the minor change from 'moderate and violent terrorist', to the more neutral 'terrorist 1 and terrorist 2'. Like the previous two games, the initial setting was given with a positive framework, in that "all were together at the negotiation table to see if the problem could be solved by negotiations". Though the three players were all sitting in half a circle at one side of the table and the coordinator on the other, $T2$ moved to the side of the coordinator, as not to have to sit next to $G$. $T1$ initiated possible coalition-formation with $G$ after 16 minutes from the start of the game by taking $G$ to another area in the room, two minutes later $T2$ interrupted and they discussed together. At 20 minutes, $T2$ and $G$ discussed separately to see if they could strike a deal, and again within two minutes, $T1$ interrupts and $T1 + T2$ negotiate, leaving out $G$ for one minute; then $G$ was included again and all three walk back to the table to continue negotiations in the more 'official' setting. They all agree on elections to be held to achieve a fair power-sharing. Upon announcing there is five minutes left to reach a peace deal, $G$ makes an offer for a peace settlement (conditional to $T2$ ends attacks, royal family stays on and keeps 45% of the power, the people 55%), and the horse-trading over the details of the agreement fills the remainder of the negotiation time. One minute before the end, an extension of 5 minutes was requested by both $T2$ and $G$. $T1$ intervenes on percentages of power. $T1$ and $T2$ negotiate separately and $G$ respects this. Right before the end, the discussion is about (partially) achieved improvements on economics, health, education, infrastructure, taxation, elections, but not the percentages of power (35, 40 or 45% for the royal family).

Winners: $G$ achieved 5 points, $T1$ 9 points and $T2$ 6 points, thus an overall of 20 points in cooperation, compared to revolution in Russia, on which the game was modelled on.

Notes after the game, consisting of a continuation of the discussion and evaluation of the each player's gaming tactics, were equally as lively as the game itself. The main topics were the internal coalition-forming, hence exclusion of the third player, the "devious propaganda" by $T1$ trying to put $T2$ in a negative light, that $T1$ "could switch sides whenever she wanted" and $T2$ stressing not wanting to resort to violence because "they were together to resolve it, not to wage war", i.e. the effect of positive framing.