Public Choice (2006) 128:91–107
DOI 10.1007/s11127-006-9046-8

ORIGINAL ARTICLE

Terrorism: The relevance of the rational choice model

Bryan Caplan

Received: 23 August 2005 / Accepted: 16 March 2006

Abstract Terrorism in general, and suicidal terrorism in particular, is popularly seen as "irrational," but many economists and political scientists argue otherwise. This paper distinguishes three different senses of irrationality: unresponsiveness to incentives, deviation from narrow self-interest, and failure of rational expectations. It concludes that an intermediate position on the rationality of terrorism is appropriate. The typical terrorist *sympathizer* deviates only slightly from homo economicus. But active terrorists arguably stray from narrow self-interest and rational expectations, and suicidal terrorists probably violate both. Deterrence remains a viable anti-terrorism strategy, but deviations from rational expectations increase the potential of persuasion and appeasement.

Keywords Terrorism · Irrationality · Paradox of revolution
JEL Classifications: D74, D72, D83

1. The believer who did not bomb

In one of his most famous investigations, Sherlock Holmes has an exchange with Colonel Ross about the dog that did not bark:

> "Is there any point to which you would wish to draw my attention?"
> "To the curious incident of the dog in the night-time."
> "The dog did nothing in the night-time."
> "That was the curious incident," remarked Sherlock Holmes (Doyle, 1930, p. 347).

Holmes infers that the suspect and the dog were well-acquainted, and proceeds to solve the crime.

B. Caplan
Department of Economics and Center for Study of Public Choice, George Mason University, Fairfax, VA 22030
e-mail: bcaplan@gmu.edu

The economic analysis of terrorism begins with a similar paradox. While millions believe that they earn vast rewards in the afterlife if they engage in terrorism or – better yet – suicidal terrorism, only a handful put their lives on the line. This is true today, and appears to have been true throughout recorded history. As Gaetano Mosca pregnantly observes (1939, p. 181–182) in *The Ruling Class:*

> Mohammed, for instance, promises paradise to all who fall in a holy war. Now if every believer were to guide his conduct by that assurance in the Koran, every time a Mohammedan army found itself faced by unbelievers it ought either to conquer or to fall to the last man. It cannot be denied that a certain number of individuals do live up to the letter of the Prophet's word, but as between defeat and death followed by eternal bliss, the majority of Mohammedans normally elect defeat.

Mosca's observation puts terrorism in perspective. The popular challenge "How do you deter someone who believes he will go to paradise with 72 virgins if he dies fighting the infidel?" overlooks the fact that almost everyone who believes this *has already been* successfully deterred. Suicide bombers are the outliers.

Gordon Tullock (1974) is well-known for his analysis of the economics of revolution. While historians emphasize revolutionaries' dedication and zeal, Tullock points to widespread apathy and free-riding. During the typical revolution, the vast majority refuses to make significant voluntary sacrifices for either side. In order to attract more than a handful of combatants, revolutionary movements have to offer "selective incentives." That means paying friends – food and shelter today, jobs and power after victory. It also means taxing neutrals, and punishing the enemy.

Tullock arguably underemphasizes the importance of hard-core revolutionaries who act out of a sense of moral duty. In its early stages, any revolutionary movement is a losing bet: Members pay for a tiny chance of radical change with a large chance of privation and even death. But some join anyway, and this occasionally snowballs into a successful revolution. A few people become revolutionaries when the probability of success is low, which raises the chance of success, which makes it easier to attract more supporters with selective incentives, which raises the chance of success further.

Does Tullock have a "rational choice account" of revolution? If this requires that 100% of people act rationally, then no. But he tells a plausible story in which *almost everyone* is *close* to the usual homo economicus assumptions. The rational choice model is highly relevant to revolution, but we must slightly relax its assumptions to explain why revolutions exist in the first place.

In a similar vein, this paper contends that the rational choice model is highly relevant to terrorism – including suicidal terrorism. As Mosca implicitly points out, if standard rational choice models did not roughly apply to the typical devout Muslim, suicide attacks would be orders of magnitude more common. The facts are most consistent with a world where *almost everyone* is *close* to the usual homo economicus assumptions.

Nevertheless, rational choice scholars (Berman & Laitin, 2005; Hoffman & McCormick, 2004; Iannaccone, 2003; Pape, 2003; Wintrobe, 2003; Berman, 2003; Sprinzak, 2000) should be more willing to question terrorists' rationality. Suicidal terrorism in particular would be even rarer or non-existent if *everyone* satisfied the assumptions of homo economicus. An important corollary is that anti-terrorism tactics that would fail against homo economicus have overlooked potential.

Table 1 Rational choice and terrorism

	Responsive to incentives	Narrow self-interest	Rational expectations
Sympathizers	Yes	Close	Close
Active terrorists	Yes	Probably close	Probably close
Suicidal terrorists	Yes	Probably not close	Probably not close

2. Varieties of terrorist irrationality

When observers question the rationality of terrorists, there are two crucial ambiguities. First, who are we talking about? There are three different classes of "terrorists" one could have in mind: Sympathizers, who favor terrorism without doing much about it; active terrorists, who actually belong to a terrorist organization; and suicidal terrorists, who kill themselves for their cause.[1]

Second, what kind of rationality? Economics have worked hard to formalize the common sense concept, but still assign it several different meanings. High-level theorists often use "rationality" in a very weak – or "thin" – sense. For Mises (1966, p. 19 – 22), all action is rational by definition. If you use means to achieve ends, you are rational. The slightly stronger take on thin rationality equates it with maximizing a "well behaved ordinal utility function" (Wintrobe, 2003, p. 18). This ensures that preferences are transitive: If you prefer a to b and b to c, then you prefer a to c. Even suicidal terrorism is perfectly rational in these weak senses of the term.

Applied economics, in contrast, has stronger – or "thick" – standards of "rationality." Three stand out.[2] The least demanding is "having a negatively-sloped demand curve," or, to put it more generally, *responsiveness to incentives*. Another recurring – and much "thicker" – hallmark of rationality is *narrow selfishness*. Probably the most common standard of rationality in modern economics, however, requires that agents' beliefs be correct on average – in technical terms, that they have *rational expectations* (Sheffrin, 1996; Pesaran, 1987). A person who repeatedly makes the same mistake is irrational in this sense.

More demanding standards of rationality imply more definite predictions about how the world works, opening the door to falsification. The facts will never show that people do not use means to achieve ends. But empirical study might reveal that a person fails to respond to incentives, is not selfish, or holds systematically mistaken beliefs.

The rest of this section examines the rationality of these three types – sympathizers, active terrorists, and suicidal terrorists – in these three different senses of the word – responsiveness to incentives, narrow self-interest, and rational expectations. Table 1 summarizes the results for all nine of the resulting logical possibilities. To foreshadow, sympathizers are close to homo economicus, and all three types respond to incentives. The challenge for rational choice is reconciling the behavior of active terrorists and especially suicidal terrorists with narrow self-interest and rational expectations.

[1] In reality, these are fuzzy categories, but for purposes of this paper it is helpful to treat them as discrete.

[2] Another that I will not discuss is deviations from expected utility theory. For example, economists sometimes treat lack of a uniform index of absolute risk-aversion as a sign of irrationality (Rabin & Thaler, 2001). Economists emphasize that risk-preferring utility functions are not irrational (Rathbone & Rowley, 2002). But Rabin and Thaler (2001) would consider it irrational to be risk-preferring for some decisions and risk-averse for others. This is especially clear if one is risk-averse over small stakes and risk-preferring over large stakes.

2.1. Responsiveness to incentives

One standard of rationality is responsiveness to incentives – in short-hand, "having a negatively-sloped demand curve." Terrorist sympathizers plainly meet this standard. If the cost of participation drastically fell, if they could kill hated enemies at no risk to themselves, they would stop sitting on the sidelines. At the other end of the spectrum, however, there are terrorists who persist despite a high risk of death – or, in the case of suicidal terrorists, certain death. Can changing prices affect the behavior of people willing to give up their lives?

A diverse list of social scientists responds to this challenge (Berman & Laitin, 2005; Hoffman & McCormick, 2004; Pape, 2003). Terrorists do not assume high risks for their own sake. They use riskier tactics if and when they are more effective. While their demand curves are unusual, they still have a negative slope. Consider: What kind of causes engage in terrorism? As a rule, those that are too militarily inferior to win a conventional war. (Pape, 2003, p. 4) If losing causes were unresponsive to incentives, they would keep trying and keep losing. In practice, they focus their energy on tactics where the odds are in their favor.

The same holds for suicidal terrorism. Groups do not adopt suicide tactics for their own sake. They adopt them because they work. An average suicide attack claims anywhere from four (Hoffman & McCormick, 2004, p. 269) to over thirteen times (Pape, 2003: 5) as many victims as a non-suicide attack. Suicide campaigns are also more likely to extract concessions from their targets (Pape, 2003). Hoffman and McCormick (2004, p. 259) interestingly add that suicide tactics spread because "early adopters" showed that they were surprisingly cost-effective. Hezbollah's 1983 suicide attacks in Lebanon, for example, convinced the leaders of the Tamil Tigers to copy them.

Incentives also explain organizations' tactical mix. Berman and Laitin (2005, p. 22) explain that terrorists use suicidal tactics primarily against "hard targets" where "the probability of apprehension is high using a conventional attack technology." Suicide attacks are common inside tightly-defended Israel, but they almost never happen in the West Bank and Gaza, where hit-and-run attacks are viable:

> Palestinian insurgents in the West Bank and Gaza have a large choice of soft targets locally. Settlers and soldiers use roads that pass through heavily populated areas or through terrain that is easily attacked because of topography (Berman & Laitin, 2005, p. 22).

On balance, the view that terrorists are unresponsive to incentives is superficially plausible but incorrect. If having negatively-sloped demand curves equals rationality, even suicide bombers qualify.

2.2. Narrow self-interest

Rational choice scholars have an ambivalent relationship with narrow selfishness (Green & Shapiro, 1994).[3] It is rarely an explicit axiom. But almost all *applied* rational choice research assumes narrow selfishness, and treats compatible empirical evidence as support for the rational choice approach (Caplan, 2001a).

[3] Wintrobe (2003) provides a striking illustration. For some purposes, he equates rationality with having a "well behaved ordinal utility function" (2003: 18). But he later argues that an omnipotent God cannot credibly promise afterlife rewards because "there is no reason for him to fulfill his part of the bargain" (2003: 32). This argument only makes sense if we take for granted that God is narrowly selfish. The promise would be credible if "keeping promises" or "rewarding virtue" were in God's utility function.

Support is not in short supply. Empirically, people rarely help strangers who are unlikely to return the favor. There is a lot of mutually beneficial cooperation in the world, but little altruism. By international standards, Americans are unusually charitable, but they keep almost 98% of their disposable income for themselves. (U.S. Census Bureau, 2004, p. 364) Even most Palestinians care more about their material well-being than national liberation. Berman (2003, p. 25) recounts a telling incident in 1988 when Hamas. . .

> . . .distributed leaflets calling on Palestinians to stop working for Israeli employers, which would have amounted to an extreme sacrifice, especially among Gazans for whom day labor in Israel accounted for up to 40% of GDP. That demand was ignored by the general population and dropped at the time, though it was eventually achieved indirectly, when Israel responded to suicide bombings by closing access to her labor markets for Palestinian day workers.

In sum, Palestinians were unable to solve their free-rider problem by voluntary self-sacrifice; to make the boycott worked, they needed Israel to be their outside enforcer.

The assumption of narrow selfishness becomes even more realistic if we reinterpret it in light of evolutionary psychology. Human beings help their own children with little hope of compensation, but is this really altruism? As Richard Dawkins (1989) famously explained in *The Selfish Gene*, the unit of evolutionary selection is not the individual, but the gene. Unilateral sacrifices for the sake of blood relatives are often selfishly optimal from an evolutionary standpoint (Bell, 1997). You may perish as a result, but your genes prosper, a mechanism known as "kin selection."

However, if evidence of selfishness supports the rational choice approach, evidence of unselfishness undermines it. The millions who merely sympathize with terrorists pose little challenge to the assumption of narrow selfishness. But active terrorists are another story. What is in it for them?

The literature on terrorism usually responds that active terrorists are just not selfish. They love their group or cause – and hate their enemy – more than they love themselves (Gambetta, 2005; Hoffman & McCormick, 2004). But there are reasons to be skeptical. First, the typical member of a typical terrorist organization is fairly safe. As Iannaccone (2003, p. 10) observes, "[T]he number called upon to die is very small relative to the total number working for the firm. Ex ante, the typical worker may face risks no greater than those endured by most criminals or war-time soldiers." Second, terrorists' opportunity cost is low. The CIA (2005) estimated 2002 per-capita GDP in the West Bank to be $800. Terrorists admittedly have above-average income and education (Berrebi, 2003). But at least among Palestinians, it is also true that the well-educated have high unemployment and low returns to education (Krueger & Maleková, 2003: 128). Third, the families of fallen terrorists earn large death benefits from both domestic and foreign sources. (CBSnews.com, 2002) From an evolutionary point of view, dying for your cause is less costly than it looks – which is why Table 1 classifies active terrorists as "probably close" to the standard assumption of narrow selfishness.

Suicidal terrorism is a far stronger counter-example to narrow self-interest. From a non-evolutionary point of view, it is impossible to reconcile the two. No matter how much you receive for your services, it does you no good if you are not alive to consume anything. Furthermore, if you get paid first and die later, there is an end-game problem. A selfish agent would take the money, then do everything in his power to back out.

From a "gene's eye" point of view, however, the conflict between self-interest and suicide is less clear-cut. A terrorist movement could use family members as hostages. It is selfishly optimal to carry out a suicide mission if a credible threat to kill three siblings for

insubordination accompanies the order. The Tamil Tigers allegedly recruit suicidal terrorists by threatening their families (Berman & Laitin, 2005, pp. 25 – 26).

Similarly, if the family of a suicide bomber receives enough financial benefit to save the lives of three of his siblings, he makes a genetic profit.[4] Rewards for the families of suicidal terrorists are apparently routine. Saddam Hussein offered a reward of $10,000 to the families of suicide bombers – an amount later raised to $25,000 (CBSnews.com, 2002). Other charities also provide generous payments. If your family lives in severe poverty, these benefits might make the difference between life and death.

Economists' main objection to this hypothesis is that suicidal terrorists are relatively well-off (Krueger & Malečková, 2003; Berrebi, 2003). But this finding is not conclusive, because (a) relatively rich families are usually poor in absolute terms, and (b) some suicidal terrorism is skilled labor (Krueger & Malečková, 2003, p. 142; Berman & Laitin, 2005, p. 27). The upshot is that well-educated terrorists have a selfish reason to volunteer for suicide missions, and their leaders have a reason to prefer them over less-educated candidates.

The qualitative literature (Gambetta, 2005; Lewis, 2003; Rashid, 2000; Sprinzak, 2000) makes a more convincing case against reconciling self-interest and suicide. Interviews with unsuccessful suicidal terrorists and life histories of successful suicidal terrorists rarely reveal that their main goal was to financially help their family. As Gambetta (2005, p. xii) puts it, "some suicide bombers do say that they do it to save or revenge family or friends, but most say that they do it for their group and its cause." (Notice that "saving" and "revenging" are very different from "financially assisting.") If anything, family seems to be a restraining influence. When death benefits work, they do so by making volunteers feel *less guilty* about abandoning their family; they do not think they are doing their family a favor (Elster, 2005, p. 243). Like all empirical methods, interviews are imperfect; but if anything, you would expect interviewees to *over*-emphasize the fact that their action could have lifted their children, younger siblings, nephews, and nieces from extreme poverty.

On balance, the common sense view that suicide attacks are self-destructive, not self-interested, is probably correct. Table 1 reflects this assessment. The main point in favor of the narrow self-interest assumption is that suicidal terrorism is extremely rare. Terrorist movements are unusual to begin with, and the large majority of terrorist movements do *not* use suicide tactics. As Kalyvas and Sánchez-Cuenca (2005, p. 209) explain, "[O]nly 113 out of 7053 terrorist incidents (1.6 per cent) were suicide bombings and the great majority were attributed to a handful of organizations." Nor is the supply of suicide attacks very elastic. Hoffman and McCormick (2004, p. 271) write that rivalry between Palestinian factions in 2002 "set in motion an almost macabre competition among them to see which group could execute the largest number of martyrdom operations, generate the largest number of casualties, and carry out the single bloodiest attack." Their cutthroat competition increased the total number of successful suicide attacks to only five per month.

Members of terrorist organizations often claim to have a long queue of volunteers for suicide missions (Ricolfi, 2005), but there are good reasons to be skeptical. Terrorists have a strong motivation to exaggerate the power of their organization and their personal readiness for self-sacrifice. It was a mistake for Western visitors to believe that Stalin and Mao created a New Socialist Man, eager to toil for the good of the people; claims about a New Terrorist Man eager to *die* for the good of the people are less credible still. Furthermore, a typical

[4] Suicide could also pay if it raises your family's social status, allowing your siblings to marry higher status spouses.

estimate of the total cost of a terrorist attack is $150 (Hoffman & McCormick, 2004, p. 269).[5] If terrorist organizations have the volunteers and the money to launch many more attacks, why have they not already done so?

2.3. Rational expectations

The main reason many see terrorists and their sympathizers as irrational is probably that their *beliefs* are so improbable and dogmatic (Wiktorowicz, 2004). What hard evidence is there that suicide bombers go straight to paradise and enjoy the company of 72 virgins? That the World Trade Center was destroyed by Israeli agents? Osama bin Laden affirms that:

> We are certain that we shall – with the grace of Allah – prevail over the Americans and over the Jews, as the Messenger of Allah promised us. . . We anticipate a black future for America. Instead of remaining United States, it shall end up separated states. . ." (PBS, 1998)

To be "certain" about such extreme predictions is plainly foolish.

Economists have several standards for judging the rationality of beliefs, but the most common in modern research is *rational expectations* (Sheffrin, 1996; Pesaran, 1987). Rational expectations requires, among other things, that actors have unbiased beliefs; their errors must average out to zero. Making mistakes is one thing; making the same mistake over and over is another. Random mistakes can be easily explained by the cost of information. Recurring mistakes, in contrast, suggest *disregard* for information (Caplan, 2001b).

I argue elsewhere (Caplan, 2001b, 2002, 2003) that religious and political beliefs are frequently irrational in the rational expectations sense of the term. For example, over the history of Islam, Muslims have frequently been militarily defeated by non-Muslims. The main predictor of Muslim dominance has not been religious purity, but relative military and economic might. The historical record predicts, then, that victory will elude bin Laden. If this were an isolated error, it would not show that bin Laden and his millions of admirers lack rational expectations. But they are hardly equally likely to underestimate the prospects of pious Muslims struggling against the infidel in other venues. Allah promises success in all of them.

The *certainty* of bin Laden and his admirers is another symptom of departure from rational expectations. One corollary of rational expectations is that rational people are only "certain" about events that happen 100% of the time (Lichtenstein, Fischhoff, & Phillips, 1982). Otherwise, you systematically overestimate your probability of being right.

There is good reason, then, to suspect that religious terrorists and their sympathizers are irrational in the rational expectations sense of the term. Furthermore, it does not seem to be a small departure from rationality. Bin Laden is not certain about conclusions that turn out to be right 95% of the time. He is certain about many conclusions that are probably false.

There is one sense, then, in which the perception that terrorists – including sympathizers – are irrational is probably true. They do hold many systematically mistaken beliefs. And

[5] Iannacone (2003: 13) seems to argue that $150 is a gross underestimate. Suicidal terrorists "must be 'produced' through a *social* process that involves recruitment, interaction, and training. Tremendous effort is required to build commitment, maintain obedience, and prevent defection." But if there were really a long queue of volunteers, these would largely be sunk costs.

while similar charges could be made against most people's political and religious convictions, terrorists' deviations from rational expectations seem unusually severe.[6]

Yet the full-blown irrationality story explains too much. Recall Mosca's observation that an army of pious Muslim would always conquer or fall to the last man. Why do so few risk their lives for their cause? Many economists will be tempted to say there is a Prisoners' Dilemma. But if you genuinely believe that death in a jihad brings infinite reward, you have no temptation to defect. As Elster (2005, p. 243) puts it, "If those who claim to be religious believers were as sure of the afterlife as they are that the sun will rise tomorrow, *and* if they thought they could get there by performing good actions, we would observe a vastly greater number of martyrs than we actually do." Given such beliefs, dying on your feet is more *selfishly* rewarding than living on your knees (Wiktorowicz, 2004).

My model of rational irrationality (Caplan, 2000, 2001b) tries to resolve this sort of paradox. Suppose that in addition to material success, agents have a second argument in their utility functions: fidelity to cherished beliefs. There are specific conclusions that they *prefer* to believe, even if the evidence is against them. The benefits could be purely psychological: Beliefs give people a sense of meaning and personal identity. They could also be social: If you change your worldview in light of new evidence, you risk losing friends and family, who like their worldview the way it is.

Either way, irrationality has a benefit: It lets you retain your preferred beliefs despite logic and evidence. Instead of using your mind to understand the world, you use your mind to distort it. In 1984, George Orwell coined to the term "doublethink" to capture this process:

> *Doublethink* means the power of holding two contradictory beliefs in one's mind simultaneously, and accepting both of them. The Party intellectual knows in which direction his memories must be altered; he therefore knows he is playing tricks with reality; but by the exercise of *doublethink* he also satisfies himself that reality is not violated. The process has to be conscious, or it would not be carried out with sufficient precision, but it also has to be unconscious, or it would bring with it a feeling of falsity and hence of guilt. . . Even in using the word *doublethink* it is necessary to exercise *doublethink*. For by using the word one admits that one is tampering with reality; by a fresh act of *doublethink* one erases this knowledge; and so on indefinitely, with the lie always one step ahead of the truth (Orwell, 1983, p. 177).

This does not mean that people select beliefs based *solely* on psychological and social benefits. False beliefs sometimes cause materially costly mistakes. They lead you to take the action that would be optimal if your belief were true, instead of the action that is optimal in the world as it is. If you believe you can fly, you will not believe it for long. If you falsely believe you have the brains to be a doctor, you may waste years of your life training for a career you will never have.

As long as agents care about *both* their material success *and* their beliefs, they have to weigh the psychological and social benefits of irrationality against its material costs. This

[6] Some economists argue that terrorist organizations would not want to recruit irrational members because they would be too unpredictable. It is worth pointing out, then, that a person who deviates from rational expectations can be very predictable; indeed, he could easily be more predictable than a person *with* rational expectations. Rathbone and Rowley (2002: 218) observe that "mentally unstable" individuals rarely "achieve significant leadership roles in substantive terrorist groups. They do not do so because terrorist groups pursue rational goals that would be subverted or nullified by unpredictable behavior." But consider a person who, all evidence to the contrary, views his leader as infallible. There is no reason why his irrational belief would make him unpredictable; in fact, his leader would find his behavior *especially* predictable because he follows his orders without question.

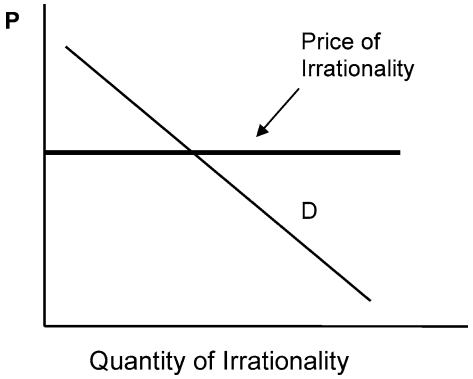

Fig. 1 The demand for irrationality

takes us to the key assumption of my rational irrationality model: Agents estimate the costs and benefits of irrationality *without bias*. In equilibrium, they may hold many irrational beliefs; but the choice to be irrational reflects a rational estimate of the price. In Figure 1, demand for irrationality has its usual negative slope. When the price of irrationality in terms of practical consequences falls, the quantity of irrationality that individuals "buy" increases.

If a believer pays nothing for his error – if the price of irrationality is zero – then someone *close* to the rational expectations assumption can be highly irrational. Beliefs can be extreme without being intense. All it takes is a mild preference for some beliefs over others, yielding the unusual – but still (weakly) negatively sloped – demand curve shown in Figure 2. Since people consume free goods up to their satiation point, they can subscribe to an radical doctrine like Biblical literalism or Islamism even though they get little consumer surplus from it.

The price of irrationality is zero in two kinds of situations. First: abstract issues bereft of practical implications. What would you *do* differently if you were a creationist, or believed the Civil War preceded the Revolutionary War, or accepted the doctrine of transubstantiation? If the same thing happens either way, there is no material cost of being wrong.

Second: issues where the costs of error are *external* to the believer. If the same thing happens *to you* either way, there is no material cost of being wrong. If one more person believes in and votes for protectionism, for example, the probability of protectionist policy stays virtually the same, because elections are almost never decided by a single vote. Protectionism

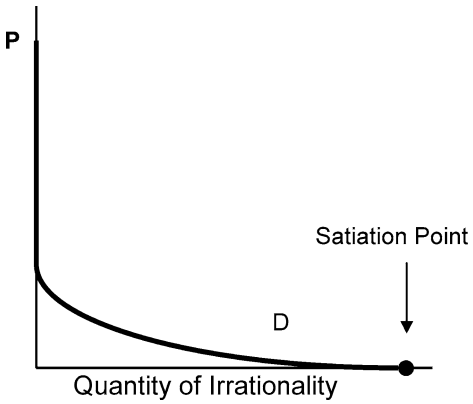

Fig. 2 Weak preferences, strong beliefs

makes countries poorer, but their citizens pay the costs whether or not they are protectionists themselves (Caplan, 2003; Akerlof, 1989).

Terrorists' irrational beliefs usually fall into the second category. Their irrationality has consequences. But the consequences are primarily paid by *other people*. It is unpleasant to live in a region where conventional wisdom says that suicide bombers go straight to paradise. The problem is that such regions are unpleasant for everyone, not just those who embrace the doctrine (Olson, 1996; Brennan & Lomasky, 1993). Indeed, a doubting Thomas who lives in the midst of true believers is arguably worse off than they are. Psychologically, he has to turn his back on the worldview he grew up with. Socially, he must either hide his real views or become a hated traitor (Caplan, 2000). Table 1 accordingly classifies active terrorists as "probably close" to rational expectations.

Occasionally, of course, your belief that suicide bombers go straight to paradise kills you. When the movement asks for volunteers for the next suicide attack, true believers raise their hands. Rational irrationality predicts, however, that far fewer hands go up than you might think. The moment the movement asks for volunteers, the price of irrationality drastically increases. If people choose their irrational beliefs based on a rational assessment of the costs of those beliefs, they tend to abandon them when the cost rises. As Mosca pointed out, this is precisely what we observe. People who believe that death is the path to paradise suddenly have second thoughts when they get their big chance to die.[7] If the cost increase is only temporary, of course, their apostasy will be temporary as well. George Orwell's *1984* is again on the mark:

> "What are the stars?" said O'Brien indifferently. "They are bits of fire a few kilometers away... The earth is the center of the universe. The sun and the stars go round it.... For certain purposes, of course, that is not true. When we navigate the ocean, or when we predict an eclipse, we often find it convenient to assume that the earth goes round the sun and that the stars are millions upon millions of kilometers away. But what of it? Do you suppose it is beyond us to produce a dual system of astronomy? *The stars can be near or distant, according as we need them.* Do you suppose our mathematicians are unequal to that? Have you forgotten doublethink?" (Orwell, 1983, p. 219; emphasis added).

An alternative interpretation of the faithful who do not raise their hand is they are insincere. Perhaps they secretly believe that death is the end, and that neither suicide bombers nor anyone else goes to paradise. But it is rather implausible that closet disbelief is widespread. A few putative adherents of a religion may secretly doubt their faith. But is the typical fundamentalist of any religion merely *pretending* to embrace its doctrines? Try arguing with one (Hoffer, 1951).

If this is too subjective, formal statistical evidence reaches the same conclusion. When questioned anonymously in the General Social Survey, almost two-thirds of average Americans admit "no doubts" about the existence of God.[8] Education and intelligence both seem to

[7] Like other goods, of course, demand for irrationality is probably more elastic in the long-run than the short-run. This might explain why people on suicide missions are normally given very little time to change their minds (Elster, 2005, p. 240; Cowen, 2005: 8).

[8] Variable identifier GOD, which ranges from 1 ("I don't believe in God") to 6 ("I know God really exists and I have no doubts about it").

reduce certainty in a multiple regression, but the estimated effects are modest.[9] The ignorant and stupid are far from having a monopoly on dogmatism even in the general population, much less in self-selected groups of fundamentalists.

Rathbone and Rowley (2002, p. 219) take the more moderate view that terrorist *leaders* are far less religious than they pretend to be:

> It is doubtful whether the affluent leaders of these groups, for example Osama bin Laden in the case of *al Qaed*a, or Dr. Rathi Abd al-Aziz and Sheikh "As" ad Bayyud al-Tamimi in the case of the *Palestinian Islamic Jihad,* have any serious use for the Muslim faith other than as a device for attracting followers. Certainly their respective life-styles do not conform to the stringent standards required by that faith.

Some of these facts are in dispute: According to Bergen (2002), for example, bin Laden lives modestly and conforms to stringent Muslim standards. But in any case, hypocrisy is weak evidence of serious religious doubt, much less disbelief. Is the typical Christian adulterer a closet atheist? If not, why impute disbelief to a Christian *leader* who adulterers? Once you accept the truism that Christians at all levels often sin despite their convictions, it is hard to doubt that the same holds for their Muslim counterparts.

Rational irrationality is a better story than secret insincerity for followers and leaders alike: People genuinely embrace irrational beliefs, but remain rational enough to adjust their convictions when the price of irrationality has a spike.

What about the outliers who do risk their lives for their beliefs? Are they too "rationally irrational"? Or are they are "irrationally irrational," i.e., plain irrational? It depends. If, as the last section argued, active terrorism is a fairly prudent career option for those who choose it, belief in afterlife rewards has little material cost. You are doing the same thing you would have done anyway, and getting a psychological benefit for free.

On the other hand, suicidal terrorists probably are simply irrational. Table 1 records this conclusion. While we cannot read their minds (Holmes, 2005), suicidal terrorists apparently prefer to die rather than doubt their worldview. They do not buy less irrationality when the price skyrockets, suggesting that they believe their doctrines all the way down. It is important not to exaggerate the size of this exception; to repeat, few terrorist organizations engage in suicide attacks in the first place. But unless we buy the unconvincing kin selection story, suicidal terrorists are exceptions to the rule that people consume less irrationality when the price rises.

3. Deterrence, persuasion, and appeasement

There is a loose connection between the belief that the rational choice approach is irrelevant to terrorism and the belief that little can be done about it. How can you deter "completely irrational" people? The standard Beckerian approach to crime seems useless. Increasing the probability and severity of punishment will not deter someone who plans to commit suicide anyway. Perhaps the only solution is to capture or kill terrorists (and potential terrorists) before they kill you.

My analysis of terrorism has two implications. First, since the rational choice model of terrorism is not that far from the truth, the Beckerian analysis of crime remains useful. Second,

[9] An OLS regression of GOD on a constant, years of education (EDUC), and a 1–10 measure of IQ (WORDSUM) yields: GOD = 6.123–.041 * EDUC–.058 * WORDSUM. The absolute *t*-stats on both education and IQ slightly exceed 5.6.

since mild preferences can lead to highly irrational beliefs, cheap talk and what I term "cheap action" have more than their usual potential. Of course, just because a tactic is effective does not automatically make it morally acceptable (Scheffler, 1988; Nozick, 1974, pp. 26–53).

3.1. Deterrence

Volunteering for suicide missions is deadly, but belonging to a terrorist organization is usually not. Members risk their lives in exchange for what Westerners regard as meager payment. But the danger is moderate, and their opportunity cost is usually low. There might be better ways for active terrorists to pursue their self-interest, but their career choice does not reveal disdain for worldly goods. There is little reason to doubt that old-fashioned deterrence reduces the quantity of terrorism, and could reduce it more if the probability and severity of punishment increased.

In contrast, it is hard to deter a suicide bomber by increasing his probability and severity of punishment. But these are not the only forms of deterrence. Evolutionary psychology highlights an uncomfortable alternative: family responsibility. A person who does not fear his own death still probably fears negative consequences for his relatives. This would obviously be true if suicidal terrorists' main goal were to financially help their families. But it remains true on the more realistic assumption that death benefits make suicidal terrorists feel less guilty about abandoning their families. Cutting off the death benefit – or worse – would restore that guilt.

3.2. Persuasion

It is hard to persuade *homo economicus* of anything. "Cheap talk" is worth what it costs. Emotional appeals fall on deaf ears. Homo economicus does not change his beliefs about the world because you make an eloquent, heartfelt plea.[10] Furthermore, cognitive appeals frequently backfire. A rational agent's beliefs are already on average correct conditional on available information, so new information is as likely to push his beliefs away from yours as it is to pull them closer.

Matters change if, as I have argued, people hold irrational beliefs – especially in low-cost areas like politics and religion. Irrationality does not *imply* greater openness to persuasion. Stubborn dogmatism is a form of irrationality. Yet irrationality creates an opening for cheap talk to work. You can persuade an irrational person by rhetorically targeting feelings rather than facts. If people tend to believe what makes them feel best, you can change their beliefs by changing how they feel. Furthermore, a person who holds systematically biased beliefs has more room for improvement than homo economicus. A well-crafted cognitive appeal has a bigger upside.

While economists are traditionally skeptical of efforts to change behavior by "raising awareness," my analysis is more hopeful about persuasion. It is one thing to persuade people not to take actions that are plainly in their self-interest. You are not going to convince people that walking is easier than driving. But persuading people to select one costless belief instead of another is a different story. If you can make the new belief more *appealing* than the old one, your task is done.

[10] He might change his preferences (as opposed to his beliefs), though even this is controversial (Stigler & Becker, 1977).

Most social scientists who study terrorism – including a number of economists – emphasize the role of persuasion (Gambetta, 2005; Wiktorowicz, 2004; Iannacone, 2003; Berrebi, 2003). My analysis of persuasion diverges in two ways. First, it emphasizes that in standard rational actor models, persuasion would not work. Second, it explains why persuasion in politics has more potential than persuasion in markets.

Still, reducing terrorism with persuasion has its problems. One is that beliefs are habit forming (Becker, 1996). People – especially older people – do not like to abandon beliefs they have held for a long time. So propaganda is likely to work with a substantial lag. Another problem is that people usually prefer to hold the same beliefs that others hold. Propaganda may be unable to give currently unpopular ideas the foothold they need to spread (Kuran, 1995).

But the fundamental problem with persuasion is free entry. Opponents of terrorism can propagandize against the ideology of terrorism and hope the next generation changes its mind. But proponents of terrorism compete to radicalize the same audience. In equilibrium, highly suggestible people could easily have the same belief they would have had in isolation. Even if irrationality makes "brain-washing" highly effective, persuasion is no panacea.

3.3. Appeasement

At least since the Munich Conference in 1938, appeasement has had a terrible reputation (Hirshleifer, 2001). Giving in to aggression encourages aggressors to simply ratchet up their demands. While this is an oversimplification (McGuire & Olson, 1996), it is a plausible prediction if your opponent is a rational maximizer of wealth or power. Sheep that do not fight back get fleeced – or worse.

But what if your opponents are irrational zealots who attach great importance to symbolic demands that you can satisfy at low cost? Appeasement is arguably your best response. If "cheap talk" – persuasion – fails, perhaps you can get the same result with "cheap action" – token concessions that neutralize a toxic worldview without removing it.

Cheap action is especially attractive if your opponents are decentralized. Giving them what they ask for robs them of their focal points (Schelling, 1978). A centralized opponent might immediately make new demands after you satisfy the original ones. He does not have to wait for a new consensus to spontaneously emerge. For a decentralized movement to ratchet up its demands, in contrast, it has to surmount serious coordination problems.

What relevance does this have for terrorism? On my admittedly fallible reading, many terrorists' demands fit my description. They are not clever efforts to tax opponents at the peak of the Laffer curve. Their demands are, from the perspective of the disbeliever, arbitrary. As a result, appeasement is often a cheap way to reduce terrorism, and one set of concessions does not, contrary to popular belief, open the floodgates to more concessions.

To take an example from the not too distant past, terrorism was often used by nationalist movements against European colonizers (Holland, 1985). The key terrorist dogma was that the mother country exploited the colonies; the key demand, accordingly, was independence. Sooner or later, Europeans opted for appeasement. It was too hard to persuade anti-colonialists that the terrorists' premise was incorrect. Cheap talk failed. But precisely because the terrorists were generally wrong – the mother countries' prosperity did not depend on colonial exploitation – it was possible to defuse their demands with *cheap action*. European governments eventually said, in effect: "If they want independence so badly, they can have it." Life in the former colonies frequently got worse afterwards, but life in the mother countries stayed about the same. In the short run, as the usual analysis of appeasement predicts, granting independence emboldened terrorists in other colonies. But appeasing all of the serious

independence movements worked. Movements from newly independent nations almost never threatened terrorism to extort further concessions from the mother countries.

Virtually everyone accepts the logic of appeasement on some level. One obvious argument against family responsibility is that this draconian measure would make your enemies angrier, leading to more terrorism. This is basically the same as granting your enemies' demands in order to placate them. The only difference is that you are refraining from giving your enemies a new grievance rather than taking an existing grievance away.

Could cheap action work again? There is admittedly an element of luck. Irrationality might lead terrorists to fixate on trivial, symbolic demands, but it also might lead them to demand the impossible. To take the most pressing contemporary example for the United States, where on this spectrum do bin Laden's demands fall?[11] In a 1998 interview (PBS, 1998), bin Laden had three main complaints against the United States.

(1) The presence of its soldiers in Saudi Arabia ("the land of the two Holy Mosques")
(2) Support for the "oppressive, corrupt and tyrannical" government of Saudi Arabia
(3) Support for Israel

A 2004 statement (Washington Post, 2004) by bin Laden appears to make at least one more demand:

(4) U.S. withdrawal from Iraq

The first demand has in large part already been met. As pessimists would predict, it has done little if anything to placate terrorists (BBC News, 2003). Others counter that it would have worked if the U.S. had avoided war with Iraq. In any case, it was evidently cheap for the U.S. to comply.

The second demand is widely seen as expensive due to U.S. reliance on Saudi oil. Presumably bin Laden's hope is that the "oppressive, corrupt and tyrannical" Saudi monarchy would be replaced by rule of people like himself. That might mean an oil embargo against the U.S. However, basic facts and basic economics reveal this fear to be vastly overblown. Fuller and Lesser (1997, p. 42) estimated that "The Pentagon pays up to $60 billion a year to protect the import of $30 billion worth of oil that would flow anyway." By 2003, *total* U.S. expenditure on oil imports was only $99 billion, and Saudi Arabia supplied 15.8% of that (U.S. Census Bureau, 2005; Department of Energy, 2004). Since the U.S. imported 56.1% of its oil, the Saudis provided only 8.9% of U.S. consumption. The U.S. gets more oil from Canada, and got more from Venezuela until socialist Hugo Chavez's assumption of power in 1999 (Department of Energy, 2004).

Assuming that a Saudi embargo would reduce U.S. oil consumption *proportionally*, the effect is tiny as a percentage of GDP. And this assumption is extremely economically naive. Domestic production can increase. There are numerous other suppliers. Above all, oil is a fungible commodity. As long as it sells on world markets, it eventually reaches its highest-value destination. In sum, as Fuller and Lesser suggest, ending support for the Saudi regime is not just cheap action; the cost is probably negative.

The third demand – ending support for Israel – is also cheap for the U.S. to satisfy. The main prudential argument for supporting Israel is probably that we need a strong regional ally to protect our oil supply; but as we have seen, the economic benefits of "protecting

[11] The demands in the 2002 "Letter to America" are far more onerous than the following four, though Bernard Lewis (2003: 177) notes that it is unlikely that bin Laden is the true author. Peter Bergen (2002) maintains that all of bin Laden's public statements show that he is focused almost exclusively on U.S. foreign policy in the Middle East, not cultural or religious differences with the West.

our oil supply" are surprisingly small. Furthermore, there is little doubt that Israel could defend itself without U.S. assistance. Israel's 2003 GDP was $121 billion (CIA, 2005), and U.S. foreign aid to Israel averages around $3 billion (Mark, 2002). Only two-thirds of U.S. foreign aid is military in nature. To a first approximation, Israel could maintain its current military dominance by reallocating 1.7% of its GDP from non-defense spending to defense spending.[12]

Ironically, it is bin Laden's newest demand – U.S. withdrawal from Iraq – that now seems most expensive to meet. A hasty U.S. withdrawal might pave the way for an extremely hostile government to assume control in Iraq. Holding other U.S. policies fixed, terrorists could have a new safe haven. Of course, the costs of a pull-out will decline sharply if the new government takes root.

Reducing terrorism by what I call "cheap action" seems like wishful thinking. But there is at least a prima face case that Americans could cheaply meet the demands of the terrorists they are most concerned about. There is a risk that appeasement would prompt more demands, but the European decolonization experience shows that decentralized movements focused on largely symbolic demands rarely do so. Appeasement is no panacea – it would probably not work for Israel under current circumstances. But it has worked in the past and could work again.

4. Conclusion

To discard the rational choice model because of a few outliers is premature. If there were really a billion people on earth eager to commit suicide for their cause, it is doubtful whether civilization could survive. The level of terrorism we observe is consistent with almost everyone being close to homo economicus, especially if we think in terms of the selfish gene rather than the selfish individual.

The biggest difference between standard rational choice models and the real world is the popularity of irrational political and religious beliefs. Since most of the cost of these beliefs is external to the believer, even a mild taste for irrational belief can lead people to passionately embrace highly improbable conclusions. Just like pollution, however, the social cost of these private choices may be substantial. It is unpleasant to live in areas where terrorist ideologies are popular – even for those who do not share them.

Since the marginal terrorist is closer to homo economicus than usually believed, curtailing the externalities of terrorism using "orthodox" Beckerian deterrence is viable. But the link between irrational beliefs and terrorism raises the possibility that "heterodox" tactics might be more effective. Propaganda or "cheap talk" fails to change the mind of homo economicus, but it can sway people who fall short of perfect rationality. Appeasement only encourages opponents who rationally maximize money or power, but symbolic concessions or "cheap action" can and have defused terrorist movements driven by irrational ideologies.

Is the rational choice model relevant for terrorism? Definitely. The fit between the model and the facts is imperfect – but remains good. When the rational choice model fails, it remains a valuable analytical starting point. Relaxing standard assumptions until we fit the facts is much more productive than throwing out rational choice models and starting anew.

[12] Furthermore, since the U.S. would not be abandoning an ally to certain or even probable defeat, there is little reason to think cutting off foreign aid would hurt U.S. credibility in other areas of foreign policy, such as Taiwan.

Acknowledgements For discussion and useful suggestions I would like to thank Larry Iannacone, Tyler Cowen, Robin Hanson, Alex Tabarrok, Charles Rowley, Kail Padgitt, Matt Mitchell, Ronald Wintrobe, Eli Berman, and participants at the Political Economy of Terrorism Conference. Steve Miller and Kail Padgitt provided excellent research assistance. The standard disclaimer applies.

References

Akerlof, G. (1989). The economics of illusion. *Economics and Politics*, *1*(1), 1–15.
BBC News. (2003). U.S. pulls out of Saudi Arabia. April 29. http://news.bbc.co.uk/2/hi/middle_east/2984547.stm
BBC News. (2003). Palestinians get Saddam funds. March 13. http://news.bbc.co.uk/2/hi/middle_east/2846365.stm
Becker, G. (1996). *Accounting for tastes*. Cambridge: Harvard University Press.
Bell, G. (1997). *Selection: the mechanism of evolution*. New York: Chapman and Hal.
Bergen, P. (2002). *Holy war, Inc.: inside the secret world of Osama bin Laden*. New York: The Free Press.
Berman, E., & Laitin, D. (2005). Hard targets: evidence on the tactical use of suicide attacks. http://dss.ucsd.edu/~elib/RatMartyrs.pdf.
Berman, E. (2003). Hamas, Taliban, and the Jewish underground: an economist's view of radical religious militias. *NBER Working Paper* No. 10004.
Berrebi, C. (2003). Evidence about the link between education, poverty and terrorism among Palestinians. *Princeton University Industrial Relations Sections Working Paper* #477.
Brennan, G., & Lomasky, L. (1993). *Democracy and decision: the pure theory of electoral preference*. Cambridge: Cambridge University Press.
Caplan, B. (2003). The logic of collective belief. *Rationality and Society*, *15*(2), 218–242.
Caplan, B. (2002). Systematically biased beliefs about economics: robust evidence of judgemental anomalies from the survey of Americans and economists on the economy. *Economic Journal*, *112*(479), 433–458.
Caplan, B. (2001a). Libertarianism against economism: how economists misunderstand voters and why libertarians should care. *Independent Review*, *5*(4), 539–563.
Caplan, B. (2001b). Rational ignorance versus rational irrationality. *Kyklos*, *54*(1), 3–26.
Caplan, B. (2000). Rational irrationality: a framework for the neoclassical-behavioral debate. *Eastern Economic Journal*, *26*(2), 191–211.
CBSnews.com. (2002). Salaries for suicide bombers. April 3. http://www.cbsnews.com/stories/2002/04/03/world/main505316.shtml.
CIA. (2005). *World factbook*. http://www.cia.gov/cia/publications/factbook/geos/we.html
Cowen, T. (2005). Terrorism as theater: analysis and policy implications.
Dawkins, R. (1989). *The selfish gene*. Oxford: Oxford University Press.
Department of Energy. (2004). Table 5.7 Petroleum net imports by country of origin, 1960–2003. http://www.eia.doe.gov/emeu/aer/txt/ptb0507.html
Doyle, A. (1930). Silver blaze. In: A. Doyle (Ed.), *The Complete Sherlock Holmes* (pp. 335–350). Garden City, NY: Doubleday and Company, Inc.
Elster, J. (2005). Suicide missions: motivations and beliefs. In: D. Gambetta (Ed.), *Making sense of suicide missions* (pp. 233–258). Oxford: Oxford University Press.
Fuller, G., & Lesser, I. (1997). Persian Gulf myths. *Foreign Affairs*, May/June: 42–52.
Gambetta, D., (Ed.) (2005). *Making sense of suicide missions*. Oxford: Oxford University Press.
Green, D., & Shapiro, I. (1994). *Pathologies of rational choice theory: a critique of applications in political science*. New Haven, CT: Yale University Press.
Hirshleifer, J. (2001). Appeasement: can it work? *American Economic Review*, *91*(2), 342–346.
Hoffer, E. (1951). *The true believer: thoughts on the nature of mass movements*. New York: Harper and Row.
Hoffman, B., & McCormick, G. (2004). Terrorism, signaling, and suicide attack. *Studies in Conflict and Terrorism*, *27*, 243–281.
Holland, R. F. (1985). *European decolonization 1918–1981: an introductory survey*. New York: St. Martin's Press.
Holmes, S. (2005). Al Qaeda, September 11, 2001. In: D. Gambetta (Ed.), *Making sense of suicide missions* (pp. 233–258). Oxford: Oxford University Press.
Iannaccone, L. (2003). The market for martyrs. *Global Prosperity Initiative Working Paper* 48.
Kalyvas, S., & Sánchez-Cuenca, I. (2005). Killing without dying: the absence of suicide missions. In: D. Gambetta (Ed.), *Making sense of suicide missions* (pp. 209–232). Oxford: Oxford University Press.

Krueger, A, & Malečková, J. (2003). Education, poverty and terrorism: is there a causal connection? *Journal of Economic Perspectives*, *17*(4), 119–144.
Kuran, T. (1995). *Private truths, public lies: the social consequences of preference falsification*. Cambridge: Harvard University Press.
Lewis, B. (2003). *The crisis of Islam: holy war and unholy terror.* New York: Random House.
Lichtenstein, S., Fischhoff, B., & Phillips, L. (1982). Calibration of probabilities: the state of the art to 1980. In: D. Kahneman, P. Slovic, & A. Tversky (eds.), *Judgment under uncertainty: heuristics and biases* (pp. 306–334). Cambridge: Cambridge University Press.
McGuire, M., & Olson, M. (1996). The economics of autocracy and majority rule: the invisible hand and the use of force. *Journal of Economic Literature*, *34*(1), 72–96.
Mark, C. (2002). Israel: U.S. Foreign assistance. Washington, DC: Congressional research service. http://fpc.state.gov/documents/organization/11062.pdf
Mises, von L. (1966). *Human action*. Chicago: Contemporary Books, Inc.
Nozick, R. (1974). *Anarchy, state, and utopia*. New York: Basic Books, Inc.
Observer. (2002). Full text: bin Laden's 'Letter to America.' November 24. http://observer.guardian.co.uk/worldview/story/0,11581,845725,00.html
Olson, M. (1996). Big bills left on the sidewalk: why some nations are rich and others are poor. *Journal of Economic Perspectives*, *107*(2), 3–24.
Orwell, G. (1983). *1984*. New York: Signet Classic.
Pape, R. (2003). The strategic logic of suicide terrorism. *American Political Science Review*, *97*(3), 1–19.
PBS. (1998). "Interview with Osama bin Laden." May. http://www.pbs.org/wgbh/pages/frontline/shows/binladen/who/interview.html
Pesaran, M.H. (1987). *The limits to rational expectations*. Oxford: Blackwell.
Rabin, M., & Thaler, R. (2001). Anomalies: risk aversion. *Journal of Economic Perspectives*, *15*(1), 219–232.
Rashid, A. (2000). *Taliban: militant Islam, oil and fundamentalism in Central Asia*. New Haven, CT: Yale University Press.
Rathbone, A., & Rowley, C. (2002). Editor's commentaries on September 11, 2001: terrorism. *Public Choice*, *112*(3/4), 215–224.
Ricolfi, L. (2005). Palestinians, 1981–2003. In: D. Gambetta (Ed.), *Making sense of suicide missions* (pp. 77–129). Oxford: Oxford University Press.
Scheffler, S., (Ed.) (1988). *Consequentialism and its critics*. Oxford University Press: Oxford.
Schelling, T. (1978). *Micromotives and macrobehavior*. New York: Norton.
Sheffrin, S. (1996). *Rational expectations*. Cambridge: Cambridge University Press.
Sprinzak, E. (2000). Rational fanatics. *Foreign Policy*, *120,* 66–74.
Stigler, G., & Becker, G. (1977). De gustibus non est disputandum. *American Economic Review*, *67*(2), 76–90.
Tullock, G. (1974). *The social dilemma: the economics of war and revolution*. Blacksburg, VA: University Publications.
U.S. Census Bureau. (2005). U.S. imports of crude oil. http://www.census.gov/foreign-trade/statistics /historical/petr.txt
U.S. Census Bureau. (2004). *Statistical abstract of the United States 2004–5*. http://www.census.gov/prod /www/statistical-abstract-04.html
Washington P. (2004). On tape, Bin Laden tries new approach. December 17. http://www.washingtonpost.com /wp-dyn/articles/A3927-2004Dec16.html
Wintrobe, R. (2003). Can suicide bombers be rational? http://cas.uchicago.edu/workshops/cpolit/papers/suicide.pdf
Wiktorowicz, Q. (2004). Suicide bombings: do beliefs matter? http://www.unc.edu/∼kurzman/Soc3264/Wiktorowicz_EXPLAINING_SUICIDE_BOMBINGS.doc