Deterring the ‘Undeterrable’: 

Nuclear Terrorism, Contemporary Deterrence Theory, and the Role of the United Nations

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Nuclear deterrence as a defensive strategy has seemingly lost favour in international security studies over the last two decades. The end of the Cold War and the War on Terror brought with them new actors, strategies, and an entirely new ontological direction for the paradigm. The problem of nuclear security follows this transition as private supply groups, individuals with specialized knowledge and terrorist organizations have become the focal points of analysis alongside states and military powers. The area of terrorism especially has been most often used by deterrence’s detractors to highlight its inadequacy and therefore seems like a natural place to start in determining what its role in contemporary security studies can be.

The value of Cold War security strategies has previously been debated by William Walker and Harold Brown. Walker argues that the lessons of the Cold War, such as nuclear deterrence, are being forgotten to the detriment of international security as states are opting instead for nuclear weapons management that rely solely on US conventional warfare and power.\(^1\) He believes that this new ‘counter-enlightenment’, is harmful to global security as it slowly erodes the core assumptions and lessons of the Cold War.\(^2\) Harold Brown and other conventional strategists argue that this erosion is necessary to meet the new realities of a post-Cold War world and more specifically the new non-state actors who inhabit it. These scholars suggest that extremist terrorist organizations, what Brown refers to as “the undeterrable”, lack any resemblance to old Cold War actors; lacking headquarters, governance structures, civilian populations, and even the basic rationality to feel the effects of deterrence.\(^3\) Brown suggests that rather than returning to deterrence and the ‘enlightenment project’ as Walker would argue, states

\(^2\) Ibid p. 10
need to spend their time and their resources on practical solutions that will prevent these organizations from obtaining nuclear materials and weapons.\(^4\)

Brown’s criticism makes the wrongful assumption that the deterrence strategies utilized during the Cold War were exhaustive to *deterrence by punishment*. An expansion of the concept towards *deterrence by denial* offers an effective means for deterring extremist terrorist organizations from obtaining a nuclear device and, should they receive one, from using it for an attack. Rather than being the irrational creatures that Brown and other critics suggest they are, extremist terrorists operate with long-term goals and demonstrate rational decision making capabilities. Understanding deterrence by denial as a framework for defense will encourage policy makers to increase the perceived costs of building a nuclear device or acquiring one from a nuclear state, thus altering the cost-benefits analysis for the terrorist. Altering the perceived value of an attack on the United States or other target state also allows deterrence by denial to be effective should the extremist terrorist organization obtain a nuclear device.

With their unique position in international relations the United Nations is the catalyst through which deterrence theory can evolve and adapt to the new security environment. A defense framework built on deterrence will still rely on pragmatic policy options and the use of conventional force by the United States and the international community. The United Nation’s various working groups and especially the UNSCR 1540 Committee have the potential to create near universal pragmatic policy options that are necessary for this new framework to function effectively. Although deterrence is not without its flaws it offers a unique perspective that should be examined in greater detail for its use in nuclear security policy and elsewhere.

\(^4\) Ibid p. 20-21
Deterrence as a Theory*5

To determine if deterrence can be a successful tool against nuclear terrorism the basic underpinnings of the concept need to be understood. At its core deterrence consists of six assumptions:

1. Deterrence is directed against another actor, rather than an unthinking ideology or a concept.6
2. The actor is trying to deter someone (the other actor) from doing something.
3. The actor assumes or presumes that the other actor is rational.
   - Rationality in this case suggests that the actor is able and willing to choose the most logical course of action given the weights of the perceived costs and perceived benefits of this action.7 The ‘irrationality’ or ‘craziness’ of the objective the other actor holds is not important; only that they can understand the costs and benefits of pursuing these objectives in the face of opposition.8
4. To be effective the communication between the actors must be clearly understood by both parties. This suggests that the actions or signals taken by an actor in a scenario must be comprehensible and understood by other actor.
5. An actor must have leverage over something the other actor values. This can be in the form of a punishment or a benefit and this leverage is centrally tied to the creditability that the actor will follow through with their threat.9
   - Glen Snyder writing in 1961 suggests that to gain this leverage the actor must understand the ‘value inventory’ of their adversary, allowing them to know what it is that they hold as valuable.10
6. If the actor is not deterred then they will follow through with the action the other actor is trying to avoid.11
   - If these preconditions are not available to be met then the deterrence option becomes less and less effective.

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5 It is important to note that this paper only analyses deterrence regarding nuclear weapons and not chemical, biological or other radiological weapons. For a more in-depth analysis of this topic see: (Champion and Mattis 2003) (Cole 2011)
7 Ibid 111
8 Ibid 111
9 Ibid p. 111
10 Ibid p. 114
11 Ibid p. 111
Robert Dorff and Joseph Cerami, among other rational choice scholars, argue that deterrence as a strategic concept is an adaptive creature that can be utilized in almost any defensive situation. This is due in part to its dual-nature. The Cold War was only witness to one version of deterrence, *deterrence by punishment*, whereby one actor informs the adversary that any action taken towards the undesired action (a nuclear attack) will be met with a severe response.\(^\text{12}\) Herman Kahn’s deterrence by punishment in the late fifties outlined the fundamentals of this strategy with three types of deterrence; whereby any direct use of nuclear weapons or conventional warfare on the United States (type 1), an ally of the United States (type 2), or acts of aggression anywhere in the world (type 3) would result in an instant punishment by nuclear retaliation.\(^\text{13}\) These classic strategies of nuclear deterrence are losing their value in academia and in domestic state policy as retaliation is complicated by the non-state arrangement of new organizations and the obvious asymmetry of nuclear superiority. Moreover, defenders of deterrence argue that to pigeon-hole this theory to one form of deterrence is problematic as it ignores the pre-Cold War understanding of the concept and how it can evolve to meet new actors.\(^\text{14}\)

The second type of deterrence strategy being advocated here is *deterrence by denial*. If we can assume that both actors are rational and that the adversary is able to formulate a cost-benefit analysis of their actions, then it is possible to deter them from obtaining their value-item (nuclear device or nuclear attack) by increasing the perceived costs of, or decreasing the perceived benefits of acquiring the item of value.\(^\text{15}\) Rather than relying on complex notions of human nature or the problems associated with static agent of study this strategy builds off of the

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\(^{12}\) Ibid p. 113  
\(^{14}\) Dorff and Cerami 2011. p.109  
\(^{15}\) Ibid p. 115
fact that human beings must at some point face decisions. It is this simplicity that allows the concept to be woven into existing defense strategies or to build an entire defense system from the ground up with this at its core. It is also this simplicity that allows it to react to new threats and problems before they are able to occur. For example raising the perceived cost of a raid on a government research lab by installing a taller and stronger fence where one did not exist before will not only deter terrorists from this act but it may well also lower the chances of general theft, civilians storming the compound in a protest, or slow down rival military forces from accomplishing the same goal. Even if the value-item in question is different to each threat this strategy can, in a sense, begin to account for the problem before it occurs and it is through this strategy that terrorists can be deterred from obtaining a nuclear weapon and from using one if they acquire one.

It is interesting to note that while similar to each other at a theoretical level, technology denial strategies found in many non-proliferation strategies do not necessarily employ the same tactics as deterrence by denial. Deterrence by denial is very broad in its nature, preferring to change the costs/benefits without having to narrow down whom it will affect thus allowing the actors to adapt and change their behaviour on their own. Technology denial however takes a narrower stance on their intended audience (typically state actors and private supply groups) bringing in elements of punishment and compellence in order to cajole their intended outcomes. This approach has recently come under similar criticism as older deterrence by punishment schemes as it too has had difficulty keeping up with a globalised world that has a much wider
range of actors to account for and a dynamic economic and social marketplace that allows for instant ebbs and flows that can change the rules of the game all at once.\textsuperscript{16}

**Defining the Threat**

The first requirement of any defensive framework is to understand the threat that you are attempting to defend against. Terrorism as a delivery system for violence, political or otherwise, has been the subject of academic study for decades and its constant evolution has made it difficult to provide a concrete definition of terrorism. At its most basic it has been assumed by various authors that terrorism is an act of violence directed either at an individual, group of individuals, or innocent bystanders to create a sense of fear among the larger population or to call attention to a cause that they feel has been ignored by the mainstream avenues of political discourse.\textsuperscript{17} This leads to two questions regarding nuclear terrorism: which type of organization would attempt to use a nuclear weapon in a terrorist attack and what is the value of a nuclear weapon to this terrorist organization.

Ferguson and Potter from the Center for Non-proliferation Studies have already attempted to group these organizations by their likely- hood of attempting to obtain and ultimately use a nuclear weapon. They establish four categories: apocalyptic groups, politico-religious groups, nationalist/separatist groups, and single issue groups, with the first two being the most likely to have the incentives, finances, organizational skills, and willingness to take the risk of obtaining and using a nuclear device.\textsuperscript{18} Benjamin Cole writing on the recent history of chemical, biological, radiological, and nuclear (CBRN) terrorism is less quick to categorize or define what


organizations would be willing to seek out or use a CBRN weapon. A recount of all CBRN attacks or intentions to attack since the 1970’s suggests that there exist a wide spectrum of groups including religious cults, Islamic fundamentalists, Islamists, nationalist and separatist movements, and an assortment of radical right-wing groups that have all shown some interest at one point or another of using a CBRN weapon. Moreover, they suggest that attempting to generalize the intentions of these organizations can make presumptuous policy and that it is only by looking at the themes of previous attempts that scholars can arrive at a better understanding of the threat.

Given the difficulty of defining the threat of nuclear terrorism this paper will chose to examine the broader threat of an “extremist terrorist organization”, as defined by David Lake and other counter-terrorist scholars, without necessarily using labels to establish which types of organization this will encompass. This will be described in greater detail below as this paper calls into question the rationality of a terrorist and whether or not they are capable of being deterred.

Questions of Rationality

Critics of deterrence suggest that given the preconditions for its effectiveness there is little to no possibility that this strategy can prevent a terrorist from obtaining and using a nuclear device. Like Brown, they argue that extremist terrorists are inherently irrational. Critics assume that the War on Terror has brought the emergence of a new ‘ultra-violent’ terrorist who fanatically follows a religious or ideological doctrine that renders them “morally disengaged

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20 Cole p. 30-31
Deterring or bargaining with these terrorists is made all the more difficult because they have no short-term political goals. Instead they commit their attacks because of the grandiose, shocking, and symbolic nature of the act itself. Moreover, they assume that the terrorist’s consistent use of suicide as a means of assault represents the ultimate act of inherent, irrational and self-destructive behaviour. They argue that these people lack the basic rationality for deterrence to be effective and that should these terrorists obtain a nuclear weapon there will be no hesitation on their part to use it.

These critiques are problematic as they lack a broader analysis of the actual behaviour of extremist terrorists. David Lake argues that extremists use terrorism to provoke their target into committing a disproportionate response that will radicalize moderates in the community and expand the terrorist’s support network. Although they are seemingly without short-term goals these organizations function with the long-term in mind. They understand that, although their objectives and political inclinations are unpopular (i.e. extreme) in the current context, with continual disproportionate retaliation their long-term goals will gain support and they will enter into a future context where bargaining will be possible. Al Qaeda, for example, has the ultimate goal of unifying the Islamic world against the West and having all US presence out of the Middle East. This organization has political views that are deeply unpopular in their communities and their goal would be impossible to achieve in the short-term through bargaining. Instead, the

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22 Ibid. p. 30
26 Ibid. p. 17
27 Ibid. p. 19.
organization launches highly visible attacks on targets the West values to draw out a disproportionate response. As American and Western troops cause collateral damage this in turn radicalizes those who were previously moderate and al Qaeda wins popular support.\(^{28}\) These attacks rather than demonstrating violence for the sake of violence show rational calculations on the part of the extremist organization. They are weighing the relative low costs of a violent attack with the long-term benefits of radicalizing a new support network.

Even supporters of conventional tactics argue that the suicidal attacks by these extremists should not be discounted as completely irrational behaviour either. Brian Michael Jenkins suggests that from a strictly individual behaviouralist standpoint suicide is an irrational act unless the attacker views the sacrifice as beneficial to themselves and their cause.\(^{29}\) Although these suicide attackers may not care for their lives they still take great care in the planning and success of their mission. This demonstrates a valuation process whereby these attackers are placing a high-value on the benefits they will receive in their after-life.\(^{30}\) Jenkins further argues that terrorist groups in contrast to the individual terrorist will tend to behave more rationally in the secular sense of the term because suicide attacks are used specifically as a weapon and not as an organizational goal.\(^{31}\)

Michael Levi, Fellow for Science and Technology at the Council on Foreign Affairs, argues that the public’s image of the “ten-foot tall terrorist” is detrimental not only to public’s understanding of the War on Terror but more importantly it can skew policymakers to the reality of the on the ground situation.\(^{32}\) Similar to the public’s misconceptions of Communist Russia

\(^{28}\) Ibid. p. 19-20
\(^{29}\) Jenkins 2008. p. 280
\(^{30}\) Ibid. p. 281
\(^{31}\) Ibid. p. 281.
during the Cold War, envisioning terrorists as blood-thirsty criminals, socio-paths, or as creatures lacking remorse or rationality can distort the reality of the “five-foot tall terrorist” who is subject to the same natural laws of science and the effects of the market. While Levi is quick to point out that the five-foot tall terrorist can be just as deadly as their larger counterpart, the distortion of terrorism by some in academia can completely negate the scholarly work being done in counter-terrorism, psychology and other disciplines, especially if domestic and global policy is not seated in stronger perception of reality.

The scientific, social, and especially economic realities that a group attempting to obtain a weapon of mass destruction must face provide a deterrence by denial framework an advantage over similar strategies. Deterrence, like exchange in microeconomics, is a social phenomenon that takes place at the individual level whenever a person makes a choice. It is inevitable that an individual attempting to carry out an attack will at some point weigh the costs and benefits of their actions before they make a decision. If we assume that a terrorist will operate with a sense of rationality then it is possible to conceive of deterrence measures to prevent them from obtaining a nuclear weapon. Determining what their decision patterns are ahead of time and establishing policy that will account for unforeseeable decisions becomes the task then of the policy makers.

**Deterrence by Denial: Obtainment**

Deterrence by denial suggests that to prevent the actor from achieving their value-item the costs of obtaining the item should be increased to a point where obtainment is no longer valuable. In the context of the War on Terror this suggests that practical policy can be useful to increase the costs of obtaining a nuclear weapon for an extremist terrorist organization. If the costs of obtaining a nuclear weapon outweigh its utility or value to the terrorist organization then
deterrence can be effective. Starting from the beginning then, it is commonly assumed that there are two means by which an extremist terrorist organization could obtain a nuclear weapon and both can be made more costly through policy.

The first way that an extremist organization could obtain a nuclear weapon is to build one from scratch. This type of weapon would be classified as an improvised nuclear device (IND) and could potentially have a similar blast yield to that of Hiroshima.\(^{33}\) Moreover this device would likely be detonated from ground level thus multiplying the threat through the subsequent shower of fallout that would follow.\(^{34}\) A conceivable IND would consist of a gun-type design requiring the use of highly enriched uranium (HEU) and would likely target the heart of a large city to ensure a maximum amount of damage. The use of plutonium as a fissile material would require the much more difficult to manufacture implosion-type design and would most likely not be the first choice of a terrorist organization. This being said however all designs and materials should be included in any defense strategy against nuclear terrorism.

Regardless of design or material we can determine from the onset the minimum decisions and steps that must be made while attempting to develop a nuclear weapon. We can determine that this route will require at least two individuals and more than likely a well-defined network some or all of whom will have knowledge of the complete plan. Within this network (even if it is a network of two) we can expect to have a series of tasks that will be split up among its members, these can include crude versions of normal organizational jobs such as finances, budgeting, human resources and brokering, as well as more traditional aspects such as conventional arms procurement, transportation, planning and intelligence gathering, and also

\(^{33}\) Ibid and Ferguson et al., 2005
\(^{34}\) For more specifics on the potential power of INDs review Ferguson et al. 2005, Levi 2007, Mueller 2010
much more complex tasks which would require knowledge of the nuclear sciences. After this network has been established and tasks begin to disseminate we know that an organization would have to make at least one of five decisions to obtain the foremost necessary item for the device, its fissile materials. The group could either a) work with a broker within this network to establish a connection inside of a production facility, b) attempt the purchase of materials on the black market, c) plan an external theft of the materials by means of a raid, d) engage in an act of extortion or black mail, or e) accept the material as part of a gift from a state insider. Each of these decisions brings with them an entire host of costs and benefits to the outfit which are completely contextual to the group itself and which spawn off entirely different decision trees afterward. For example through any one of these five scenarios the organization must at a minimum verify that they have received the correct material and that it is in a state with which they can continue to manufacture it into the proper size and shape, which itself could require bringing in an expert and further risking being caught. Moreover at a minimum we can assume that the material will have to be safely transported to a secure location, made all the more difficult if this requires being sent across state lines. Then they must also face a decision whether to transport all of the material at once or attempt multiple trips and potentially multiplying their chances of being caught exponentially. As well as obtaining the material the organization faces a further multiplier threat due the need to gather technical schematics, blueprints, develop a detonation or launching device, as well as months of testing the workings of the device, the

35 Although due to its scarcity it is unlikely that anything close to a functioning market with working prices would exist or develop. This problem will exist for fully functional nuclear weapons as well.
38 Ibid p. 7-9 Levi uses his “Murphy’s Law of Nuclear Terrorism” and the “Lottery Paradox” to explain the principles of a layered defense.
delivery system, and acquiring an understanding of the explosive capacity of the weapon all without raising suspicion from counter-terrorist outfits.\(^{39}\)

In most scenarios to even gain access to facilities where the fissile materials are going to be stored will require that the terrorists pay off dozens of officials, guards, engineers or scientists, all of whom the terrorist organization must place a high level of trust in.\(^{40}\) Furthermore, given the low-skill set of the average terrorist the organization would have to look for highly skilled engineers that would be fully dedicated to their cause to take over the technical aspects of its manufacture.\(^{41}\) Another likely unforeseeable risk is the fact that to maximize a small range explosive yield an organization would need at least a hundred pounds of material and would run the risk of self-contaminating their team as they have to transfer the enriched materials to and from the site of production.\(^{42}\) Moreover, this team of engineers and scientists would then need to have months of testing at high-tech facilities to properly implement their materials and build the device.

The feasibility and costs of this option is the subject of much debate within academia. Zimmerman and Lewis argue that given the proliferation of technology and machinery, the free flow of information from communicative devices such as the internet, and the questionable security surrounding nuclear material sites, extremist organizations are in a position where, although it may be expensive, it is not outside the reach of the group to pull off the production of


\(^{40}\) \textit{Ibid}


\(^{42}\) \textit{Ibid}. 170 (although different studies have shown different requirements: see Frost 2005 or Zimmerman and Lewis 2006)
an IND. These scholars, and those who support this notion, offer examples such as the Nth county experiment, an American experiment in the 1960’s that sought to understand the difficulties of building a nuclear device by a non-state actor. In the experiment a group of ‘non-expert’ PHD students were successfully able to develop a nuclear device within two and half years to the point where the only missing component was the nuclear material, and those involved were shocked at the relative ease of the process. In a contemporary context Zimmerman and Lewis estimate that the entire process of developing a nuclear weapon from scratch would cost the terrorist organization a sum of only $10 million dollars.44

Mueller, Frost, and Wirz and Egger, argue that the odds of any organization developing a weapon from scratch are much lower than the ‘alarmists’ are suggesting. Wirz and Egger, for example, argue that the Nth country experiment was never built and never tested so its viability as a weapon would be questionable.45 They also pose questions to the actual costs of obtaining enriched materials and criticize Zimmerman and Lewis’ estimate as being far too optimistic and likely only a tenth of the real cost when the underlying costs of bribery, corruption and transportation are taken into account.46 There is also a debate on the technical aspects of the operation as well. Los Alamos National Laboratory research director Stephen Younger argues that simply expecting to detonate a device in theory sounds simple, for example a gun-type device simplistically consists of the slamming two chunks of fissile material into each other through a barrel, but the chances for error are extremely high.47 Simple mistakes such as having the gap between the barrel too loose or too tight will make the weapon inoperable and although

44 Mueller, 2010. p. 178
46 Mueller, 2010. p. 178
47 Ibid p. 174
this is an easy fix, it requires consistent experimentation which requires levels of technical resources that until recently only a few states had. He suggests that “to think that a terrorist group, working in isolation with an unreliable supply of electricity and little access to tools and supplies,” could build a nuclear weapon, “is far-fetched at best.” The nature of this debate is very important to policymakers when designing and implementing policies to deter nuclear terrorism.

Understanding the necessary steps, their complexities, their feasibility, and most importantly their costs are crucial to deterring nuclear terrorism. To obtain a nuclear weapon requires the extremist organization to follow through with dozens (if not hundreds) of small steps, each one increasing the chance for the group to fall short of their goal. Levi argues that too often the public, and scholars as well, use the logic that defence strategies must work every time, but that terrorists need only succeed once. He uses the idea of ‘Murphy’s Law’ to suggest that what is true of defence strategies is inherently true for terrorists, what could go wrong might go wrong (or will always go wrong). For every single step needed to obtain the materials, the plans, the equipment, the transportation, the recon, the proper identification, the bribe, the finances, or any other aspect there is a chance that the organization can be caught. If defence strategies are put into place with this understanding then this can increase the risk (the cost) to the terrorist and deterrence by denial can be effective.

At every one of the steps to build a nuclear weapon the United Nations, the United States, and the international community can make the means more costly for the terrorists to pursue.

48 Ibid p. 175
49 Ibid p. 175
51 Ibid p. 8
Building from the momentum of previous counter-terrorism efforts, UNSCR 1373 in particular\(^52\), the United Nations Security Council Resolution 1540 makes a very rare use of Article Seven of the UN Charter to establish binding obligations for all UN member states regarding the continuing prohibition of state-led assistance to non-state actors attempting to obtain nuclear, biological, chemical, or radiological materials, equipment or weapons. The objectives of the resolution are set out in its first three articles:

Art. 1 That all States “shall refrain from providing any form of support to non-State actors that attempt to develop, acquire, manufacture, possess, transport, transfer or use nuclear, chemical or biological weapons and their means of delivery;”

Art. 2 That all States “in accordance with their national procedures, shall adopt and enforce appropriate effective laws which prohibit any non-State actor to manufacture, acquire, possess, develop, transport, transfer or use nuclear, chemical or biological weapons and their means of delivery, in particular for terrorist purposes, as well as attempts to engage in any of the foregoing activities, participate in them as an accomplice, assist or finance them;”

Art. 3 That all States shall take and enforce effective measures to establish domestic controls to prevent the proliferation of nuclear, chemical, or biological weapons and their means of delivery, including by establishing appropriate controls over related materials...”

The third article also outlines specific tasks for member states to accomplish including securing the production, storage, and transportation of dangerous materials; developing effective physical protection policies; enhancing border security and law enforcement; and enforcing national and international export controls.\(^53\) Moreover this piece of international legislation is unique in that it attempts to fill the gaps in the non-proliferation regime by compelling states to adopt multilateral agreements to “prevent the proliferation of nuclear, biological, or chemical weapons,” as well as compelling states to reaffirm their commitments to the frameworks of the

\(^{52}\) Peter van Ham and Olivia Bosch. “Global Non-Proliferation and Counter-Terrorism: The Role of Resolution 1540 and Its Implications.” Brookings Institution Press. 2007. p. 8

IAEA and other international organizations and conventions.\textsuperscript{54} While initially controversial due to the concern over its ability to dictate domestic laws of member states, these worries have largely subsided as states are allowed to reach the goals of the resolution by their own means including seeking out external support and funding.\textsuperscript{55} By 2006, 129 states had submitted reviews of the steps and progress that they have made and there has also been an increase in the number of states offering and accepting assistance in the form of technology dispersion and physical upgrades.\textsuperscript{56} As well as assisting smaller states in adopting international legislation this assistance can also be viewed within the security-development nexus as developing states often benefit from increased trade at newly secured ports and decrease in illicit trafficking from more efficient law enforcement.\textsuperscript{57} Even in traditional non-interference regimes such as South East Asia there has been a movement towards acceptance of the principles of the resolution, especially as Vietnam and Indonesia prepare for the implementation of their own civilian nuclear programs in the very near future.\textsuperscript{58} Article 4 of UNSCR 1540 also establishes the 1540 Committee to function as the facilitator ensuring that a full implementation of the resolution by all UN member states. It is this ad ministerial body that is able to implement the various outreach activities, assistance programs, and the development of international cooperation as it acts an international broker between states that require assistance and those that are willing to provide it.\textsuperscript{59}

\textsuperscript{54} Ibid
\textsuperscript{55} Van Ham and Bosch, 2007. p. 3-9
\textsuperscript{57} Findley, 2009
\textsuperscript{58} Tanya Ogilvie-White. “Non-proliferation and Counter-terrorism Cooperation in Southeast Asia: Meeting Global Obligations through Regional Security Architectures?” \textit{Contemporary Southeast Asia} Vol. 28 No.1 2008.
\textsuperscript{59} Miles A. Pomper and Peter Crail. “Keeping WMD From Terrorists: An Interview with 1540 Committee Chairman Ambassador Peter Burian.” \textit{Arms Control Today}. Vol 37. No. 9. Nov 2007. p 21
The near universalism and requirements of UNSCR 1540 make it a prime example of a security framework for nuclear terrorism that is centered on deterrence by denial. The resolution is designed explicitly to increase the costs to a terrorist organization of attaining materials, equipment, expertise, etc. to build an IND while also increasing the costs to the host of steps that exist in-between these decisions. Upgrading the physical protection measures at research facilities with fissile materials or dual-use equipment, facilities that operate with the use of low-enriched uranium, nuclear power plants, and off-site nuclear waste holding facilities, civilian enrichment plants, or other sites with potentially harmful materials is an important first step in increasing the perceived costs of manufacturing an IND. Furthermore physical protections at border crossings, sea and air ports, and other sites of critical infrastructure can assist in the early detection and, if viewed as a credible threat to the terrorist organization, prevention of a nuclear attack. Far from only affecting terrorist organizations the UNSCR 1540 also makes it difficult to establish and maintain the required network of individuals that can be assumed will be needed to pull off the attack. If the terrorists were relying on the use of professional smugglers, traffickers, organized criminal syndicates, or black market brokers to assist in their plans then the strengthening of domestic laws, criminal prosecutions, and enforcement from UNSCR 1540 may serve to decrease the value and increase the costs of carrying out an already dangerous operation to these secondary but likely necessary individuals within the network. It is this value-added approach which aligns this resolution so well with the ideals of deterrence by denial.

Regionally, the United States and the G8 are already taking initiatives to deter extremists from obtaining nuclear materials and assisting the goals of the UNSCR 1540. The US Department of Defense under the START Treaty assists former Soviet-bloc states to construct and protect storage facilities for fissile materials, the State Department manages the International
Science and Technology Centers in Moscow and Kiev to provide grants to scientists and engineers to avoid selling their knowledge to terrorist organizations, and the US Department of Energy is working in Russia to convert its remaining fissile material reactors into fossil fuel plants.\(^{60}\) Canada and the G8 launched the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction in 2002 which also attempts to redirect the research of former nuclear scientists towards humanitarian purposes and assists in increasing the security around nuclear facilities worldwide.\(^{61}\) As well to the efforts of the G8 the Zangger Committee and the Nuclear Suppliers Group work alongside the UNSCR 1540 in raising awareness of export control policies and creating updated ‘trigger lists’ which identify dual-use and enrichment equipment to be monitored by states.\(^{62}\) If these operations are successful then it will increase the perceived costs for terrorist organizations to build their own bomb forcing a reassessment of their costs and benefits of obtaining the device through these means.

Given the technical and financial costs and risks of building a nuclear device a more likely alternative is that the extremist organization will attempt to purchase a nuclear weapon on the open market, steal one from a nuclear base, or extort one from a state government.\(^{63}\) One scenario, popular among the media and television, is that the terrorist organization could purchase a ‘suit case’ nuke such as the ones that are assumed to have gone missing from the Soviet Union after the Cold War, or obtain a weapon through the nuclear black market.\(^{64}\) This scenario is unlikely however as the technical difficulties of operating these devices, such as understanding of permissive action links (systems that protect against unauthorized use through


\(^{63}\) Schelling, 1982. p. 62

the use of codes before use), and the recognition of SAFF (safing, arming, fusing, and firing) procedures which may require “changes in altitude, acceleration, or other parameters verified by sensors built into the weapon [and] designed to ensure that the warhead can be used only according to a specific mission profile,” both of which would require exclusive knowledge of these safety measures.\(^{65}\) Even if this information was acquired the average shelf life of the ‘suitcase nukes’ is only a few years, making them all but unusable this far removed from their manufacturing date.\(^{66}\)

Instead of purchasing nuclear devices on the ‘open market’ some scholars suggest that the terrorist organization could accept, steal or extort a weapon from a state government.\(^{67}\) That a head of state would knowingly transfer a fully manufactured existing weapon is unlikely given that the state has no guarantee that the weapon will not be used against itself, that the heads of states are more often than not at odds with the extremist organization that is attempting to gain control over the state, and that the state has likely invested millions of dollars and human capital into the production of these weapons. A more plausible, yet still unlikely, scenario involves the sale of arms from rogue separatists or opportunists from within the state’s military or the overtaking of a weapons supply following a coup d’état or state failure.\(^{68}\)

Deterrence by denial can be bolstered with deterrence by punishment and compellence, in these scenarios to prevent the transfer of nuclear weapons, knowingly or otherwise, from the state to the extremist terrorist organization. Anders Corr suggests that the United States utilize a doctrine of negligence through which states will receive punishment if they are found to be the

\(^{65}\) Levi 2007, p. 124-5  
\(^{66}\) Ibid p. 165-166.  
\(^{67}\) Schelling, 1982, p. 62  
\(^{68}\) These scenarios are explored more in-depth in Levi 2007
source of manufacturing for a detonated weapon. Through the science of nuclear forensics task force teams (likely from the US or the IAEA) would be able to characterize and interpret nuclear materials that are confiscated intact or brought in from post-explosion debris.\footnote{“Nuclear Forensics: Role, State of the Art, and Program Needs.” Joint Working Group of the American Physical Society and the American Association for the Advancement of Science.} This deductive analysis will then allow law-enforcement and intelligence teams to track down the location of manufacturing and enrichment of the material as well as the equipment. Although this does not necessarily deter the terrorist from using the device, as they situate themselves in multiple states and across the globe, this strategy will place the responsibility of any nuclear attack on the United States or any other state on the state-source of the material.\footnote{Anders Corr. “Deterrence of Nuclear Terror: A negligence doctrine.” Non-Proliferation Review. Vol. 12, no. 1 March 2005. p. 135-136} Corr argues that the guilty state under this doctrine would then be met with full conventional strategic warfare up to and including the use of nuclear weapons for retaliation.\footnote{Ibid p. 136-137} Most critics of deterrence theory still accept the notion that the heads of states are rational creatures and therefore having the United States and the international community place the responsibility of any nuclear attack by a terrorist on a state, rogue or otherwise, will likely deter them from selling off their weapons and compel them to increase the levels of protection and security they place on their nuclear weapons, materials, delivery systems and equipment, from fear of being caught off-guard and taking the blame for an attack.\footnote{Ibid p. 142-143} This tightening of security, in turn, will increase the perceived costs of obtaining the weapons and will make the terrorists reassess the costs and benefits of the nuclear device, thus effectively deterring the extremist organization. In this scenario it is a deterrence by punishment scheme which will support the broader deterrence by denial.
Kenneth Waltz controversially suggests that this ability to track back nuclear devices from terrorists is the reason why there is no evidence that Suddam Hussein was ever planning on selling off his WMDs to al Qaeda or other terrorists in the months and years leading up to the Iraq war.\textsuperscript{73} Waltz suggests that as a rational actor Suddam Hussein understood that if a sale could ever be traced back to him that the United States would present an existential threat to his country.\textsuperscript{74} Although the invasion came regardless of these transactions, the movement of the US into Iraq presents a level of credibility for this deterrence model. Regardless of the rhetoric surrounding the Iraq war, if the US was willing to invade a country under suspicion of assistance to terrorists then it communicates to other states that they will likely retaliate ten-fold in a case where there is evidence of the transfer of nuclear devices.\textsuperscript{75}

This doctrine of negligence is not without criticism as there are still questions of credibility with this strategy. If the nuclear device were found to originate in Russia would the United States still treat the incident with the same level of intensity, risking global thermo-nuclear war? If it was found to be from North Korea, would the United States really surround an ally of China and Russia with more troops and potentially risk the launch of a nuclear device on Japan or South Korea? Although not necessarily pertinent to this specific discussion of deterring nuclear terrorism, the invasion of the United States into Iraq regardless of evidence may actually provide incentives for states to accelerate clandestine nuclear operations as a means of deterring US intervention. There are other abstract examples of the problems with this doctrine but this does not discredit it fully.

\textsuperscript{73} Interview with Kenneth Waltz, Columbia News. “Spread of Nuclear Weapons Nothing to Fear, says Waltz.” March 2003. \url{http://www.columbia.edu/cu/news/03/03/kennethWaltz.html} (ac. April 5 2012)
\textsuperscript{74} Ibid.
\textsuperscript{75} Corr, 2005. p. 135-136, 138
Todd Masse suggests that even with its shortcomings, nuclear forensics has the ability to garner international cooperation for deterrence by denial and can develop incentives for states to inform the United States and the IAEA when nuclear materials or devices go missing. Masse admits that international or bilateral agreements to build and finance international research teams are still likely far-off, but it is this type of arrangement that Harold Brown would support because it can use US conventional military power and mix it with practical policy all in an attempt to deter extremist terrorists.

The behaviour and reaction of the United Nations to past tragedies worldwide is somewhat mixed but in the aftermath of the 9/11 attacks it was able to quickly pass UNSCR 1368, 1373 and 1378 putting into place multi-lateral sanctions on the Afghan state, implementing new counter-terrorism objectives, and allowing a US-led multi-lateral military operation to overtake the current ruling regime. State governments would have to take the collective security responsibility of the United Nations into account and realize quickly that the UNSC would likely side with the victim state. This bolsters the credibility of an American conventional military operation in response to a nuclear terrorist act. The United Nations also opens the door for the possibility of cooperation prior to an attack. If states realize that not only the United States, but also the world, will be lined up against them following a nuclear terrorist attack then they are more likely to cooperate with the objectives of the UNSCR 1540 committee and the IAEA which reports to the General Assembly and the Security Council. In this sense the United Nations allows the inclusion of norms of non-proliferation and counter-proliferation to work together with the conventional power politics to compel state action to deter nuclear terrorism.

76 Masse, 2011. p. 196
77 Ibid p. 197
Deterrence by Denial: Use of a Nuclear Weapon

Should an extremist terrorist organization obtain a nuclear device deterrence by denial will still offer a set of effective strategies to change the perceived values of a nuclear attack. It suggests that states employ policy to decrease the perceived benefits of a nuclear strike by an extremist terrorist organization.

Contemporary critics of deterrence like Harold Brown argue that unlike Hamas, Hezbollah, or the Tamil Tigers, there is no ‘return address’ for retaliation on a multi-state terrorist organization should they actually use a nuclear device.\textsuperscript{78} The US and the West lack the ability to pick and choose from their adversary’s value inventory because they do not have any tangible targets or infrastructure that they hold as valuable.\textsuperscript{79} Without a credible retaliation strategy deterrence falls apart leaving the terrorist organization free to utilize a nuclear attack on the US or its allies.

To suggest that extremist terrorist organizations lack physical infrastructure or tangible targets in a single state is only half true and deterrence by denial can take advantage of the intangible commodities that the organization requires. Extremists require attention and support from their public; if they lose this intangible commodity then they will be unable to change future bargaining contexts and will not be able to obtain their objectives.\textsuperscript{80} A nuclear attack carries with it images of the greatest destruction and loss of life imaginable. An attack of this type by al Qaeda or an extremist organization would likely result in a strong backlash and a loss of support from the moderates in the community they are trying to radicalize. The goal of the extremists is to make the other actor look the more radical of the two through disproportionate

\textsuperscript{78} Champion and Mattis, 2003. p. 34
\textsuperscript{79} Brown 2007-08. p. 10
\textsuperscript{80} Lake 2002. p. 17
It is very unlikely that the victim’s state’s retaliation could be viewed as disproportionate or unjustifiable compared to the nuclear attack and without the growing support from the moderate community the extremists will ultimately have to concede their objectives.

As part of the United Nations’ Counter-Terrorism Taskforce, the UN Working Group on Supporting and Highlighting Victims of Terrorism may provide a forum that will dampen the efforts of extremist organizations to radicalize the moderates in their society. This working group attempts to bring a global voice to the victims of terrorist attacks by re-humanizing individuals who otherwise would be a statistic and includes “exploring at the General Assembly the possibility of developing practical mechanisms assistance to victims.”

The long-term goal of this working group is to return a sense of illegitimacy to terrorism, specifically this is meant to take place in the society where the attacks are occurring. If this effort is successful it could work to off-set the goals of the extremists as they will lose public support through their own actions, lowering the expected long-term output of gaining the moderate’s support.

Deterrence by denial could have the target state ‘escape’ the nuclear scenario by decreasing or removing the utility or value of an attack by changing the perceived results of terror. A nuclear strike intends to cause massive wide-spread devastation to their target with the ultimate goal of bringing panic and fear to their population and heads of state. This reaction can be mitigated by implementing policies that enhance the resiliency of the state and its population to an attack. Deterrence scholars suggest that if a state is able to strengthen or brace itself for an attack, resulting in solidarity, resolve and resilience instead of fear and panic, then the terrorist

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81 Ibid. p. 19
82 UN Counter-Terrorism Task Force Art. 8
83 “Supporting Victims of Terrorism.” UN Working Group on Supporting and Highlighting Victims of Terrorism. 2008
84 Dorff and Cerami, 2011. p. 115
85 Jenkins, 2008. p. 283-284
organization will see less value in attacking that state.\textsuperscript{86} If the terrorists assume that a small-range nuclear explosion in the United States will not bring the desired results then the perceived benefits for the attack decrease and could reach a point where they do not outweigh the costs.

This strategy is not perfect however as there are issues of communication and credibility. If the target state were to implement policies to bring about resiliency to an attack it would be difficult to communicate this readiness to the terrorist organization. Press releases suggesting the United States should be preparing for a nuclear strike would likely bring about panic and fear rather than resilience. There is also the problem of showing credibility in this scenario. How is the terrorist organization going to know how the United States is going to react to a nuclear strike if it has never had one on its soil? This problem is somewhat easier to overcome. Brian Michael Jenkins suggests that the overall rationality and resilience shown by the of the US population and its decision-makers following the 9/11 attacks has already sent a message to extremist terrorist organizations that the United States will overcome disaster and will not give into demands.\textsuperscript{87}

Although it may be more difficult for deterrence by denial to deter a nuclear attack by a terrorist when they have already obtained a nuclear weapon, this strategy still offers a vision that can bolster existing political realities and ultimately decrease the benefits for the terrorist organization.

**Conclusion**

Despite its flaws deterrence by denial can alter the perceived costs and benefits for an extremist terrorist organization to obtain or use a nuclear device and help deter them from doing

\textsuperscript{86} Ibid p. 284
\textsuperscript{87} Jenkins, 2008. p. 285
so. Rather than being irrational these terrorists carefully calculate the costs and benefits of their attacks and demonstrate rationality as they attempt to change the context in which they can bargain their objectives in the long-term. Deterrence by denial increases the costs and the risks for a terrorist organization attempting to build or obtain a nuclear device from a state. If these extremist terrorists are able to obtain a nuclear device then deterrence by denial can lower the perceived benefits of the attack, decreasing the chance that they will want to use the weapon. The United Nations serves a facilitator role for deterrence by denial like no single state can as it allow a for near-universal policy that can increase the perceived costs of obtaining a nuclear weapon for an extremist terrorist organization and moreover it can also assist in the resiliency of states should an attack occur.

Although Brown is quick to dismiss deterrence, these strategies offer assistance to his own policy recommendations of preventing the international spread of fissile materials and using American conventional force if necessary. Combining the deterrence aspect of Walker’s ‘enlightenment project’, by expanding its approach to include deterrence by denial, allows the chance to reconcile these two author’s arguments and moving forward offers new policy to protect global security in the War on Terror. Deterrence by denial, far from its stagnant cousin, can also open the framework to new include other concepts and strategies from schools of thought such as macro-prudential policy from international finance and complex systems from chaos theory and physics; suggesting that research into this strategy may prove not only fruitful but also applicable outside of this subject matter.

88 Brown, 2007-08. p. 8-10
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