J Quant Criminol (2017) 33:727–751
DOI 10.1007/s10940-016-9309-6

ORIGINAL PAPER

The Situational Prevention of Terrorism: An Evaluation of the Israeli West Bank Barrier

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Published online: 20 June 2016

Abstract
Objectives Informed by situational crime prevention (SCP) this study evaluates the effectiveness of the "West Bank Barrier" that the Israeli government began to construct in 2002 in order to prevent suicide bombing attacks.
Methods Drawing on crime wave models of past SCP research, the study uses a time series of terrorist attacks and fatalities and their location in respect to the Barrier, which was constructed in different sections over different periods of time, between 1999 and 2011.
Results The Barrier together with associated security activities was effective in preventing suicide bombings and other attacks and fatalities with little if any apparent displacement. Changes in terrorist behavior likely resulted from the construction of the Barrier, not from other external factors or events.
Conclusions In some locations, terrorists adapted to changed circumstances by committing more opportunistic attacks that require less planning. Fatalities and attacks were also reduced on the Palestinian side of the Barrier, producing an expected "diffusion of benefits" though the amount of reduction was considerably more than in past SCP studies. The defensive roles of the Barrier and offensive opportunities it presents, are identified as possible explanations. The study highlights the importance of SCP in crime and counter-terrorism policy.

Keywords Israel · Terrorism · Suicide bombing · Situational crime prevention · Security barriers · Displacement

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Introduction

Earth's only man–made structure visible from outer space is the Great Wall of China. Built to repel invading hordes, it may be the most famous wall of all, but history is replete with walls designed to keep people out (those surrounding medieval cities and castles) or, sometimes, to keep people in (prison walls and the Berlin Wall). The political justifications and controversies attending their construction have been much discussed, but the foreground of politics has eclipsed the prime underlying empirical and policy question: do such Barriers work? While not impregnable, it is generally assumed that the answer is that they do—otherwise, why would so much time and effort be invested in their construction? Despite this, a recent book has raised doubts about the security value of the Great Wall of China and other famous walls, such as Hadrian's Wall (Sterling 2009). This debate is too broad to enter into here; instead we focus on a narrower, but important question: do walls and their associated security dynamics prevent terrorists from reaching their targets?

As far as can be determined, nothing has been published on this subject apart from some anecdotal evidence that the Belfast "Ring of Steel" was effective in preventing terrorist bombings of the city center (Clarke and Newman 2006). A new opportunity to investigate the hypothesized preventive effects of walls is presented by the "West Bank Barrier" (hereafter the "Barrier"), built by Israel to prevent terrorists from entering the country from the neighboring Palestinian territories. This study investigates the Barrier's effectiveness by applying the established principles, concepts and methodology of situational crime prevention (SCP) (Clarke 1980, 1997, 2010). Because the Barrier was built in response to a spate of deadly suicide bombings, we first focused on these as our dependent variable.[1] However, given that suicide bombings are statistically rare events, the study goes beyond suicide bombings and examines the possible broader effects of the Barrier on other terrorist attacks and fatalities.

In fact, an abundance of SCP research supports the expectation that the West Bank Barrier would meet its objectives, simply because it would greatly increase the effort and risks—SCP's two main staples—for terrorists entering Israel. Increasing effort and risks predominated in Guerette's (2009) review of 206 tests of place-based situational prevention, which found that 75 % of the interventions were effective in reducing targeted crime problems. Furthermore, it has already been shown that SCP can be successfully applied to terrorism (Clarke and Newman 2006; Freilich 2009; Hsu 2013), of which the most important example discussed below is the sharp reduction in aircraft hijackings in the 1970s achieved through passenger and baggage screening.

Since the Barrier's inception in 2002, suicide bombings are widely believed to have declined substantially. In fact, this belief is supported by our findings, but it is in direct contradiction to the arguments of Pape (2005), Pape and Feldman (2010) and Bloom (2005, 2011), dominant theorists on suicide bombings, who place considerable emphasis on the ideological and motivational factors in the deployment of suicide bombings. As Bloom (2005, p. 39) argues: "…the key is to reduce the Palestinian motivations for suicide bombing rather than their capabilities to carry them out." Pape (2005) claims that suicide attacks are launched because they are effective in forcing foreign powers to retreat. His

[1] Soon after the Second Intifada, which began in Oct. 2000 and peaked in 2002, Ehud Barak, then the Prime Minister of Israel, vowed to build a separation Barrier. There had been 5180 terrorist attacks of all kinds originating from the Palestinian territories in 2001–2002 resulting in 603 deaths, according to the Israeli Security Agency (ISA).

proposed "intervention" is that the United States, Israel and other occupying forces should cease their foreign military occupations.

Premises of Situational Intervention

To assist the understanding of a complex evaluation, it is necessary to explain below some of the relevant theoretical features of SCP as well as its evaluation methodologies.

Fundamental Theoretical Assumptions

The rational choice perspective (Clarke and Cornish 1985; Cornish and Clarke 1986) is the principal theory underlying SCP—at least, as in the present case, where the interventions consist of increasing the perceived risks and difficulties of crime. Following Lewin (1936), the rational choice perspective assumes that crime is the outcome of the interaction between individual dispositions and situations (Clarke 2012). The relative contribution of these two determinants will vary with the nature of the crime under consideration, but in all cases SCP focuses on the situation for two reasons. First, situations are easier to modify than dispositions and, second, situations are "near" causes of crime, whereas dispositional causes are more "distant" (Ekblom 1994) This means that there is a much more direct effect on crime of situational than of dispositional interventions. This explains why causal language is often used, though carefully and advisedly, in explaining the effects of SCP interventions. In other words, if probable situational determinants are successfully modified, it is expected that this will cause crime to decline.

The Common Element of Highly Specific Crimes

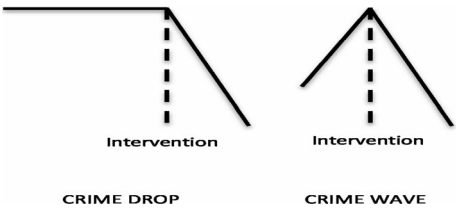
An important premise of both SCP and the rational choice perspective is that crime explanations and interventions must be focused on specific, commonly occurring kinds of crime because no two kinds of crime are sufficiently alike in their opportunity structures to merit treatment together. This applies as much to terrorism as to any other form of crime. In fact, terrorism is too broad a category of crime for a situational analysis because it covers a diverse range of acts with very different motivations, committed by diverse groups of offenders who occupy specific ecological niches, who have different skill sets and who require different levels of organization. To take an example that we return to below, hijacking airliners and sabotaging them might both be acts of terrorism, but they differ in many important ways. Hijackings are much more complex and might play themselves out over many days if not weeks. They require a considerable level of organization and, at least in the case of those committed in the 1970s, were mainly committed to extract specific concessions from a government. Placing a bomb on an airliner is a much shorter-term event, perhaps requiring less organization. Its purpose is to kill the passengers rather than to use them as bargaining chips in the terrorists' dealings with governments. Some of the preventive measures needed for these two forms of airline terrorism might overlap, but each form will also have its own interventions geared to its own particular opportunity structure. Merari (2010) has similarly pointed out the need to examine suicide attacks in a variety of different contexts.

In fact, there are so many ways that specific kinds of crime might differ from others that SCP chooses to focus on the most important way in which they are all alike—all, of whatever form, whether violent or not, are committed to bring some expected benefit to the

offender. SCP acts to make that benefit less likely. This is equally true of terrorism, which, following Clarke and Newman (2006), we define as "crimes with a political motive." In this study, therefore, our definition of "terrorism" is simply a set of specific terrorist acts as defined by our data source, the Israel Security Agency (ISA) whose definition is similar to that of the U.N. Security Council resolution 1556.[2]

Crime Wave and Cliff Edge Studies

"Cliff edge" studies, so-called because of the precipitous drops in crime recorded (Ross 2013), examine effects of an intervention in two different scenarios as shown in the diagram below:



The first is one of an ongoing high crime rate that suddenly drops after an intervention. For example, the classic study of suicide (Clarke and Mayhew 1988) where the supply of progressively less toxic domestic gas in England and Wales led to a substantial drop in the overall numbers of suicides. The second examines the effects of a "crime wave" that quickly rises, and then drops precipitously after the intervention. For example, in the 1970s, a sudden rise in the robberies of bus drivers (not passengers) occurred in many US cities. Robbers were after the fares collected by the driver. From small beginnings, robbers all over the country seem to have quickly learned that this was a highly profitable crime with few risks. The robberies were brought under control by the bus operators who introduced flat fare (no change) systems and who required drivers to drop fares into new on-board safes (Chaiken et al. 1974; Stanford Research Institute 1970). In the field of terrorism, the introduction in the early 1970s of passenger and baggage screening measures to reduce a sudden spike in aircraft hijackings (Clarke and Newman 2006) resulted in an immediate and precipitate drop in the number of hijackings, first for American airliners and then for those belonging to other countries. Furthermore, there was no evidence of any displacement to bombings of airliners. Consistent with Nagin and Weisburd (2013), the evaluation required no detailed statistical treatment of the data since the intervention's effect was clearly evident in a simple time series. After the intervention, hijackings returned to previously low levels, especially when taking account of the vast increase in hijacking opportunities resulting from expansion of air travel. This pattern of success was broken only by the 9/11 terrorist attacks when the hijackers discovered new ways to defeat the passenger screening measures introduced in the early 1970s.[3]

[2] Israeli law stipulates that terrorism is: inflicting harm to a person's body, or freedom, or putting a person in danger of death or at risk of serious injury, creating a real risk to the health or safety of the public, serious damage to property and serious disruption of infrastructure systems or essential services - to influence political, ideological or religious issues. (http://www.nevo.co.il/law_html/Law01/999_377.htm#Seif1).

[3] Earlier studies undertaken by the economists Enders and Sandler (1993, 1995, 2004) claimed that the bag and passenger screening measures had displaced terrorism to other countries of the world. Clarke and

The measurement of the effects of the Barrier falls within the "crime wave" model, not unlike the bus robbery and airline hijacking examples. In this case attacks had suddenly spiked as a result of the Second Intifada and then dropped as a result of the intervention.

Displacement, Diffusion and Other Consequences of Successful Situational Intervention

Dispositional theories would predict that even if SCP successfully reduces targeted crimes, the gains are nullified because offenders are so highly motivated that they simply "displace" their crimes to another place, time, method, target, or to a different form of crime altogether (Reppetto 1976). At first sight, this same prediction would follow from the rational choice perspective (Clarke and Cornish 1985) because offenders hoping to benefit from their actions might seek alternative crime opportunities when those they had formerly exploited are blocked. However, as "reasoning criminals" they would consider not merely the benefits of these other opportunities, but also the risks and effort involved in taking advantage of them, as well as the costs and benefits of alternative courses, including simply making do with less.

In fact, considerable evidence exists that SCP measures that have reduced crime do not simply result in displacement. This is the conclusion of two recent reviews of place-based SCP interventions. In the first of these, Guerette and Bowers (2009) surveyed 102 SCP studies that examined (or allowed for examination of) displacement and reported that no evidence was found of displacement in 68 of these studies. In the second review, Guerette (2009) found that 75 % of 206 interventions were effective in reducing targeted crime problems. The favored explanation for this lack of displacement is that offenders are "tightly coupled" to specific places where they have learned how to exploit the concentrated crime opportunities that exist there and they find it difficult to move when these opportunities are reduced (Weisburd and Telep 2012).

In the case of terrorism, dispositional theorists, such as Pape and Bloom mentioned above, would claim that terrorists are much more likely to displace their attacks than other kinds of criminals simply because their motives are so much stronger. We would dispute this claim on the grounds that two other strongly motivated behaviors, suicide and homicide have been shown to be highly dependent on available opportunities to commit them. The evidence on suicide has been mentioned above (Clarke and Mayhew 1988), while it is well-established that homicide rates are greatly dependent on the availability of handguns (Grinshteyn and Hemenway 2015). Whatever the merits of these arguments, our study provides two opportunities to evaluate the possibilities of displacement, first, by examining whether the construction of the Barrier led terrorists, who could no longer enter Israel so easily, to attack Israeli settlements in the Palestinian territories. Second, the fact that the Barrier took several years to build and was constructed in sections that made up the six different segments enabled our study to examine whether terrorists increasingly entered Israel where the Barrier had not yet been built.

Footnote 3 continued
Newman (2006) criticized their conclusions on theoretical and methodological grounds. Among their criticisms were that Enders and Sandler were unaware of the SCP literature on the limits of displacement; they ignored the special skills, knowledge and resources required by different forms of terrorist attack; they ignored the very considerable differences in the purposes of different forms of terrorism, especially terrorism committed by far-flung groups; and they made the dubious assumption that terrorist organizations are somehow closely connected worldwide. See also Drakos and Kutan (2003) and Dugan et al. (2006).

This latter fact also facilitated the study of any possible "diffusion of benefits," which refers to the reductions in crime that often occur beyond the focus of situational measures introduced (Clarke and Weisburd 1994). In Guerette and Bower's (2009) review, diffusion of benefits was found in 39 of the 102 studies. The explanation for diffusion seems to be that potential offenders often know that new preventive measures have been introduced, but are unsure of their precise scope or to what extent they might be affected by them. This either deters them from committing crimes or discourages them. We would therefore expect such diffusion to occur—whereby reductions in terrorism will occur in nearby places not directly protected by the Barrier.

Apart from displacement and diffusion, two other important consequences of SCP interventions have been identified in the literature. The first is "anticipatory benefits," whereby publicity about new measures and preparations for their introduction, results in decreases of crime immediately before they are actually implemented. Smith et al. (2002) found that in 52 SCP studies that allowed the possible identification of anticipatory benefits, 22 (40 %) showed evidence of an anticipatory effect. In our study, we can examine whether there was any decline in terrorist attacks on Israel when Barrier segments were being built, but before they became operational. The second of these consequences is "adaptation" (Ekblom 2015), which refers to the fact that the offender population sometimes discovers vulnerabilities after preventive measures have been in place for some time. This differs from displacement in that offenders who discover these vulnerabilities are not the same ones whose crimes were originally targeted by the SCP measures. The classic example in the field of terrorism is the exploitation by the 911 hijackers in 2001 of weaknesses in the baggage and passenger screening measures that were introduced in the early 1970s. Possible evidence of adaptation in our study could be revealed, for example by later increases in certain forms of attack, once the Barrier had achieved its main preventive effect.

The West Bank Barrier: A Complex Independent Variable

The Barrier was constructed in different geographical areas and different periods of time and it is important to understand that it is not merely a static structure. It comes with many other security activities designed to reinforce its presence and make it more effective by utilizing a series of operational tactics such as patrols and checkpoints along the barrier to restrict the movement of Palestinians into Israel. When we refer to "the Barrier" in this paper we use the term to include the various offensive and defensive activities that it facilitates, but in the interests of brevity we do not always spell these out on each occasion.

History

The West Bank is the name of a politically controversial area of 5800 square kilometers, located west of the Jordan River and east of the Green Line, the 1949 armistice line between Israel and Jordan. This line was determined following the war in 1948–9 between Israel and neighboring Arab countries, which commenced following the establishment of the State of Israel (see Appendix 1 for map).

During the Six-Days War in June 1967, Israel captured the Jordanian portion of the West Bank, which according to international law is now considered to be occupied territory. This area is home to about two million Palestinians (the number is disputed) and

about 350,000 Israeli Jews. In 1993 Israel transferred some of the powers of government in the West Bank to the Palestinian Authority, but retained the responsibility for security.

Concrete walls and wire barriers to protect local communities have been constructed in Israel at least since 1992, usually in immediate response to a particularly horrific terrorist attack.[4] Some sections of a concrete wall were built in 1994 during the Oslo Accords and in 2000 leading up to the Camp David summit. Soon after a spate of Palestinian violence that began in October 2000 and peaked in 2002 (the Second Intifada) Israel began construction of the Barrier in the West Bank in the middle of 2002. Its stated purpose was to prevent unauthorized infiltration of Palestinians from the West Bank into population centers in Israel in order to commit terror attacks, especially suicide bombings.

Construction

When completed, the Barrier will be 560 km in length. Its central component is a "smart" chain-link fence, which includes an intrusion detection system that functions to alert the deployed forces to any attempt to cross the Barrier. The fence is supplemented by 40 km of concrete walls intended to block terrorists from shooting at Israeli vehicles traveling on highways alongside the pre-1967 borders. On the Palestinian side of the Barrier there is an anti-vehicle obstacle, mostly comprised of a ditch, 6–8 feet wide, intended to prevent vehicles from crashing into the fence. Along that trench there is a paved service road as well as another delaying obstacle comprised of barbed wire. On the Israeli side of the Barrier, there are several dirt roads or "tracking" paths (designed to reveal the footprints of those who have crossed the fence), a patrol and an armored vehicles road, as well as another fence. The optimal average width of the Barrier is 50–80 meters, but due to various physical constraints, some parts of the Barrier are narrower, and include only the components that support the electronic fence. In other cases, the Barrier can reach a width of 100 meters where allowed by topographical conditions.[5] Other observation tools including lookouts or electronic surveillance for additional security, such as cameras, have been installed along the Barrier. The Barrier includes dozens of checkpoints and secured gates that are intended to enable the movement of people and goods. Israeli Defense Forces (IDF) are active on both sides of the barrier when the barrier is constructed in the West Bank and when it is constructed on the "green line" the Border Police are in charge of securing the Israeli side.

The construction began with the most vulnerable segment, or the one experiencing the most serious attacks—Salem to Elkana. By the end of 2009 nearly 500 km of the Barrier were operational, mostly alongside the pre-1967 borders between Israel (and what was then the Jordanian) West Bank. Since then the construction of the Barrier has stalled. The segments intended to surround Jewish settlements within the West Bank are not yet constructed—the result of ongoing appeals to the Supreme Court, on behalf of both the Palestinians and Jewish settlers opposing the Barrier and its planned path. In addition, it is possible that the authorities' determination to complete the Barrier has waned with the realization that it would serve little preventive purpose since very few terrorist attacks have been launched in these segments.

[4] See the particularly informative and well documented review of the Barrier provided in Wikipedia: http://en.wikipedia.org/wiki/Israeli_West_Bank_Barrier.

[5] This description of the Barrier characteristics is based on the judgment of the Supreme Court President, Aharon Barak, case number 04/2056.

Location

Building a Barrier of such proportions requires large tracts of land, bringing with it the problems typical of building a four-lane highway anywhere: the splitting of towns, separation of citizens from facilities, and the acquisition of farmland or housing. The result is that in some places the Barrier follows a highway, in others it encircles towns and settlements and in others follows the availability of public land. Also like any large highway, the Barrier channels the movement of people and goods to particular "exits"—that is, check points.

The impetus for the Barrier came primarily from local communities to protect specific areas, so the locations of the Barriers were originally dictated by blocking well-known tracks or routes that terrorists repeatedly used.[6] However, the many legal cases against erection of the Barriers, and the political events that also developed, resulted in the Barrier moving away from protection of specific settlements so that today, almost all the Barrier follows the Green Line on the West Bank.

Research Design

Data

A unique database was constructed using ISA (Israel Security Agency) records of all terror attacks originating from within the West Bank (committed by Palestinians) from January 1999 to December 2011—a total of 17,706 attacks. These attacks comprised: shootings (7524); Molotov cocktails (6226); explosives (2309) (including 125 suicide bombings[7]); stabbings (1094); arsons (259); hand grenades (104); vehicles (79); kidnappings (46); car bombs (39); anti-tank weapons (26). The database also included information about the number of fatalities and the locations of the attacks, which were identified by the segments of the Barrier they were closest to—whether in Israel or the West Bank. The distance recorded was measured in relation to the center of the specific segment. The incidents do not include stone throwing or other acts of civil protest for which the ISA has no mandate to respond.

The present study is confined to measuring the effects of the Barrier between the West Bank and Israel and therefore does not include attacks from Gaza. The data on terrorist attacks were collected for both Israel (for convenience herein the "Israeli side" of the Barrier) and for Israeli targets in the West Bank (herein the "Palestinian side"). From 1999 to 2011, there were 3296 terrorist attacks on the Israeli side of the Barrier and 14,410 on the Palestinian side. Israel is able to collect data about terrorism in the Palestinian side

[6] At the beginning of the Second Intifada, Amitai Levy, a police officer in Jerusalem proposed the construction of improvised Barriers to block the routes suicide bombers were taking into his community. At the end of 2001 the Jerusalem District Police started constructing the improvised Barriers at critical locations. Contractors voluntarily undertook this work, while private security companies contributed security barbed wire. (Personal communication 1/14/2014 from Major General (retired) Miki Levy who approved the project and eventually received permission from the then-Prime Minister, Ariel Sharon, to continue construction.)

[7] This study uses the ISA definition of suicide bombings as attacks in which the bomber activates an explosive device that he or she carries or transports, deliberately killing her or himself in order to kill others. This conforms to the definition used by Weinberg et al. (2003) and Pedahzur et al. (2003). Broader definitions typically include those in which the perpetrator expected to be killed but was not (Cook 2002; Merari 1990).

because, in contrast to Gaza, security within the West Bank remained under Israel's jurisdiction after it transferred some of the powers of government in 1993 to the Palestinian Authority. Most of the attacks on the Palestinian side were committed against Israeli targets in the West Bank. A small number of attacks committed by Israelis against Palestinians were not included in the analysis. To be clear, terrorist attacks against targets on the "Palestinian side" refer to attacks targeting Israelis that took place in the West Bank and did *not* cross the Barrier. Terrorist attacks on the Israeli side refer to those attacks that crossed the Green Line (i.e. crossing the Barrier or its future path) targeting mostly Israelis in Israel as well as Israelis in the West Bank where there is no need to breach the Barrier.

Official incident records such as those recorded by the police and by ISA are usually considered to be incomplete and, in the case of crime, alternative data sources such as victim surveys are generally preferred. In the case of terrorism, the preferred data source is the Global Terrorism Database (GTD), which is based on secondary sources such as newspaper reports. The selection of incidents to be included is therefore likely to be influenced by a host of media and political considerations. Due to the high level of reporting of terror incidents, official data about terrorist attacks would be more accurate.[8] In fact, the ISA records contained far more terrorist attacks (17,706) than were recorded for the same period (1999–2011) by the GTD (1236).[9]

A second data set on the construction and deployment of the Barrier was collected by the Department of Defense. The data were divided into quarterly periods. Between the first quarter of 2003 (when the first part of the Barrier became operational) and the fourth quarter of 2009, 495 km of the Barrier alongside the pre-1967 borders became operational. The construction and deployment of the Barrier was divided into six segments between Tirat Zvi (the extreme northeastern point of the Barrier near the Jordanian border) and the area of Mezadot Judea (the extreme southeastern part of the Barrier near the Dead Sea). Security considerations determined which segments or parts of segments were prioritized for building the Barrier. The construction was begun on the Salem-Elkana segment in the beginning of the second quarter of 2002. At the end of fourth quarter of 2002 construction began on the Tirat Zvi-Salem segment and in the first quarter of 2003 construction commenced on the Ofer-Minharot segment. The Elkana-Ofer segment of the barrier was begun in the end of the second quarter of 2004, and the construction of the Minharot-Metzadot segment started in the first quarter of 2005. As to the Metzadot and further south segment, no construction has been done thus far.

Deployment of the Barrier was defined by (1) the quarter when construction began on sections of the particular segment of the Barrier and (2) the quarter when sections of the segment actually became operational. Both were assessed because anticipatory benefits of the Barrier could result from the start of construction. This brings with it a range of activities, including the building of roads and ditches and the deployment of additional security personnel to protect the construction teams.

[8] It might be argued that since the ISA's primary goal is to prevent terrorism, its clear interest (if manipulating the statistics) would be to demonstrate its effectiveness by under reporting the number of attacks. The considerable fluctuation in the number of attacks, (relatively low in 1999, sharply increasing at the end of 2000, and thereafter decreasing again) strengthens confidence in the reliability of the data. In addition, cross-sample tests that we performed, consisting of randomly selected comparisons between the attacks reported by the ISA and those reported by other sources, found no evidence of bias.

[9] We thank the anonymous reviewer of this paper for drawing attention to this discrepancy. The GTD data also included attacks from GAZA that were not included in our analysis. http://www.start.umd.edu/gtd/search/Results.aspx?chart=country&casualties_type=b&casualties_max=&start_yearonly=1999&end_yearonly=2011&dtp2=all&country=97,155.

Research Question

Given the detailed data set with its several dependent variables—suicide bombings, fatalities and total attacks—and the varied consequences of SCP interventions discussed above, a large number of possible research questions could be investigated. In addition, the effect of the Barrier's deployment should also be examined on both the Israeli and the Palestinian side. In the face of so many possible questions, we decided to limit the analysis to those that seemed to be most important for theory and policy, which are as follows:

1. Did the Barrier reduce suicide bombings, fatalities and the overall number of terrorist attacks on Israel? And were there any anticipatory benefits?
2. Did the Barrier displace attacks from, (i) segments with an operational Barrier to those without, (ii) from the Israeli side of the Barrier to the Palestinian side, or (iii) was there in each case a diffusion of benefits?
3. Did the terrorists adapt their modes of attack when the Barrier had been in place for some time?

Analysis

The current study utilizes a time series regression model of the form:

$$\Delta Y_t = \beta_0 + \beta_1 \Delta Initiated_{t-1} + \beta_2 \Delta Operational_{t-1} + \rho \Delta Y_{t-1} + \Delta e_t$$

where t refers to quarters, Δ is a difference operator, $Initiated_t$ is a dummy indicator for when construction on the barrier first commenced in the second quarter of 2002, and $Operational_t$ is the proportion of the total projected barrier that was operational as of a given quarter (note that the first section of the barrier became operational in the first quarter of 2003). The initiation coefficient assumes an immediate, permanent impact of barrier construction on the number of terrorism incidents and fatalities. The operational coefficient allows the impact of the barrier to either grow or decay over time as the barrier comes online. The model undergoes first differencing to address mild non-stationarity, and the lagged difference is included to address autocorrelation.[10]

In this regression model, there are two barrier impacts that may be estimated. The short-term or immediate impact of the barrier is simply estimated by β_1, representing the difference in mean terrorism activity in the initial quarter of barrier construction compared to quarters prior to construction. The long-term impact of the barrier is estimated by $\beta_1 + \beta_2$, representing the difference in mean terrorism activity in later quarters when construction on the barrier ceased compared to quarters prior to construction. As a supplement to statistical significance, an effect size known as Cohen's d (Cohen 1988) can be calculated by computing the ratio of each impact estimate to a standard deviation formed from the pre-barrier quarters:

$$\text{Cohen's } d(\text{Short Term}) = \beta_1 / s_{Y_{Pre}}$$

[10] Two comments about the statistical models are relevant here. The dependent variables, because they are differenced, are approximately normally distributed, although somewhat leptokurtic (i.e., more peaked or concentrated about the mean than a perfect normal distribution). We thus employ least squares regressions. In all models, we also confirm that the residuals are white noise, implying that the first-order lag suffices to remove autocorrelation.

$$\text{Cohen's } d(\text{Long Term}) = (\beta_1 + \beta_2)/s_{Y_{Pre}}$$

The pre-Barrier standard deviation is chosen since the intervention also corresponds with a reduction in the volatility of terrorist activity. An effect size in excess of 0.2 is generally used to signify an impact that is substantively meaningful, aside from its statistical significance or lack thereof (i.e., 0.2 = "small" effect size; 0.5 = "medium" effect size; 0.8 = "large" effect size).

Results

Did the Barrier Reduce Suicide Bombings, Fatalities and the Overall Number of Terrorist Attacks on Israel?

We begin with the question of whether the Barrier (and its associated security activities) brought about a reduction in suicide bombings, which was its officially stated objective. Suicide bombings require the attacker to get within close proximity of the target. They also require that the bombers must physically reach a specific target and they must begin the journey to that target from a specific location that is usually linked to the resources needed to implement such attacks—managers, handlers, bomb makers, trained operatives and so forth.[11]

Furthermore, suicide bombings require extensive planning, the training of cadres[12] (Kaplan et al. 2005) and many other details of logistics and local support (see Clarke and Newman 2006: 62–69, for an account of the special needs of suicide bombing operations). These attacks cannot be adapted easily to disturbances in their physical environment. They require specific locations and resources so they cannot be easily moved to completely different targets and locations. Because they are so specific in target selection and so well managed and orchestrated, they display two other important characteristics: they are more lethal than other kinds of terrorist attacks, but they are fewer in number, simply because they are more complex to undertake. In fact, for 2002 through 2006, the years in which suicide bombings were most frequent, they accounted for less than 5 % of all terrorist attacks in Israel, but over 50 % of all fatalities. It follows, therefore, that the building of a Barrier specifically directed at blocking suicide bombings should result in a significant reduction of suicide bombing attacks and associated fatalities.

Figure 1 shows clearly the cumulative effect of the Barrier on suicide bombings in Israel as it was built over the period of 2002 through 2009. What is perhaps even more significant is that by the time only half of the Barrier was completed (early in 2005) there were very few suicide bombings, reducing to zero in the final years of the study period. Figure 1 also provides some evidence of anticipatory benefits in that suicide bombings began to drop before Barrier had become operational.

Prior to the Second Intifada relatively few terrorist attacks were committed against Israeli targets on either side of West Bank border. With the beginning of the Second Intifada (September 28, 2000), the number of attacks increased sharply. On that date,

[11] One tactical advantage of suicide bombing is that bombers can in the process of the attack shift to a secondary target, which may even have been planned. However, this change in tactics is still location-bound because the secondary target would need to be close to the primary target.

[12] The extent to which suicide attacks require logistical support at their location varies according to venue and type of suicide attack (Merari 2010; Ganor 2000).

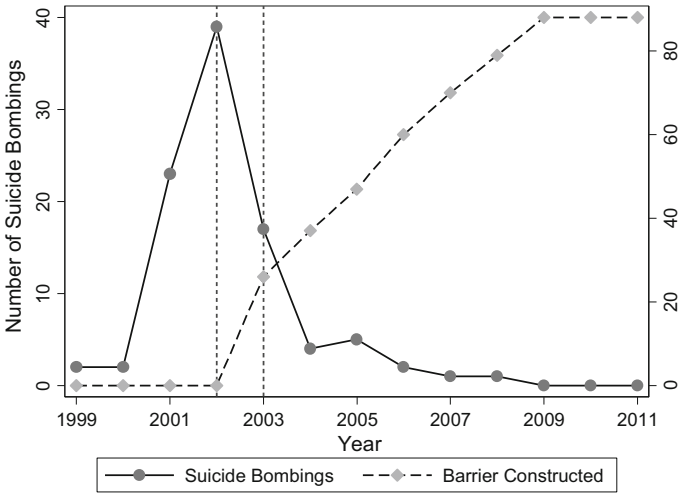


Fig. 1 Yearly suicide bombings and barrier construction (Israeli side of the Barrier). *Note* The *two vertical lines* identify the calendar years when construction of the Barrier was first initiated (2002) and when the Barrier first became operational (2003)

Ariel Sharon, leader of the opposition in Israel, made a visit to the Temple Mount in Jerusalem, which was seen by Palestinians as highly provocative. This produced a distribution of attacks and fatalities that fits the crime wave model, as shown in Fig. 2. The wave of attacks and fatalities peaked dramatically in 2002, dropped precipitously in 2003 after the Barrier was introduced, then reduced even further within a few years, suggesting that the intervention had a lasting effect. Evidence of the anticipatory benefit of the Barrier is again shown by the apparent decline in terrorist attacks and fatalities during quarters intermediate between initiation of the Barrier and when the first section became operational.

Descriptive statistics for pre-Barrier terrorist activity are shown in Table 1, and the results from the quarterly time series regression models are shown in Table 2. The initiation of the Barrier was followed immediately by substantial declines in terrorist attacks and fatalities, as indicated by short-term effect sizes in the neighborhood of 1.0, universally regarded as a large effect size. As expected, the initially large (and statistically significant) reduction in terrorism attacks decayed over time, as indicated by the positive coefficient for the proportional length of the operational Barrier. In fact, the long-term effect size for the attack series is positive but very small, suggesting long-term adaptation to the Barrier. Both of the Barrier coefficients in the fatality series are negative and significant, with the long-term effect size substantially larger than the short-term effect size, indicating growth in effectiveness as the Barrier lengthened. The results in Table 2 therefore suggest that the impact of the Barrier was *immediate and substantial*, consistent with other crime wave studies, but that only the impact on fatalities was sustained with growth in the length of the Barrier.[13]

[13] Significance levels and effect sizes remained virtually the same when the pre-Intifada quarters were removed, that is, when beginning the analysis in the third quarter of 2000.

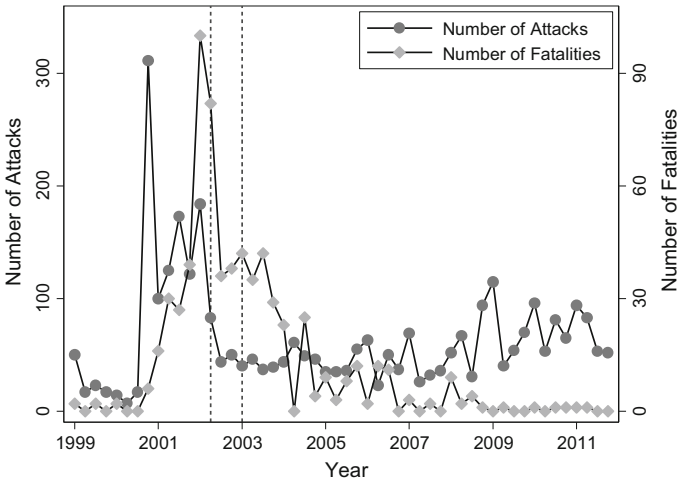


Fig. 2 Quarterly terrorist attacks and fatalities (Israeli side of the Barrier). *Note* The *two vertical lines* identify the quarters when construction of the barrier was first initiated (2002.2) and when the barrier first became operational (2003.1)

Table 1 Pre-barrier descriptive statistics for quarterly terrorism attacks and fatalities

	Israeli side of the Barrier		Palestinian side of the Barrier	
	Terrorist attacks Mean (Std. Dev.)	Terrorist fatalities Mean (Std. Dev.)	Terrorist attacks Mean (Std. Dev.)	Terrorist fatalities Mean (Std. Dev.)
Total activity	89.2 (92.0)	17.2 (28.3)	327.5 (364.8)	12.8 (16.2)
Total activity by segment				
Salem to Elkana	8.3 (9.6)	4.9 (10.6)	132.3 (158.9)	5.1 (6.3)
Tirat Zvi to Salem	5.5 (5.1)	3.9 (7.9)	2.2 (2.1)	1.1 (2.0)
Ofer to Minharot	60.6 (63.0)	5.4 (10.1)	32.7 (51.3)	2.2 (4.6)
Elkana to Ofer	2.7 (3.0)	2.5 (6.0)	27.8 (30.4)	1.5 (2.3)
Minharot to Mezadot	9.5 (14.1)	0.2 (0.4)	132.3 (149.5)	2.9 (3.6)
Mezadot to South	2.7 (2.7)	0.2 (0.6)	0.2 (0.6)	0.0 (0.0)

$T = 13$, encompassing the 13 quarters spanning 1999.1 to 2002.1. Segments are listed chronologically in the order in which the Barrier was initiated

Additional tests of the effectiveness of the Barrier can be devised by estimating segment-specific models (summary results are shown in Appendix 2).[14] The segments vary in a number of population variables, including the mix of Israelis and Palestinians, the proportions of residents who live in towns and cities and the proximity of these population

[14] Models were not estimated for two segments due to low volume of terrorist activity prior to initiation of the Barrier, or else sparsity following the Barrier becoming operational. These results are not tabulated, but the models parameterized the Barrier intervention identically to those in Table 3. Specifically, the models included a lagged dummy variable indicating the quarter when construction on the Barrier first began in the referent segment, and the lagged proportional length of the Barrier that is operational in that segment. The models also included the lag of the cross-border series to accommodate the possibility that a spike in terrorist activity on the Palestinian side of the Barrier bleeds over to the Israeli side. Otherwise, the lag of the referent series also remained in the models, and the models were estimated in first differences.

Table 2 Regression models of the impact of the Barrier on quarterly terrorist attacks and fatalities (Israeli side of the Barrier)

Coefficient	Series A: Terrorist attacks coef. (Std. Err.)	Series B: Terrorist fatalities coef. (Std. Err.)
Barrier initiated (Δ_{t-1})	−91.76 (19.27)***	−53.75 (2.69)***
Barrier operational (Δ_{t-1})	103.36 (237.85)	−131.24 (57.78)*
Series Lag (Δ_{t-1})	−0.52 (0.16)**	−0.24 (0.14)
Constant	0.74 (11.60)	3.38 (2.19)
Model *R*-square	0.26	0.33
Partial *R*-square (barrier)	0.06	0.32
Cohen's *d* (short term)	−1.00	−1.90
Cohen's *d* (long term)	+0.13	−6.54

$T = 50$ quarters ($df = 46$). The models are estimated in first differences, with robust standard errors reported. Cohen's *d* is a measure of effect size, and represents the ratio of the intervention effect to the standard deviation of the pre-intervention series (0.2 = small; 0.5 = medium; 0.8 = large). For the short-term barrier impact, the effect size numerator is $b_{\text{Initiated}}$, whereas for the long-term barrier impact it is $b_{\text{Initiated}} + b_{\text{Operational}}$

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed tests)

centers. They also vary in size and in the nature of the terrain, whether hills or deserts. With one notable exception—the Ofer-Minharot segment, which contains Jerusalem—these results largely confirmed the findings reported in the previous section. In fact, when this segment was removed from the full analysis, the impact of the Barrier on terrorist attacks changed in meaningful ways. Both the short-term effect size ($d = -1.33$) and long-term effect size ($d = -1.91$) were quite large. The impact on terrorist fatalities was unchanged.

In the Ofer-Minharot segment, the most populated and attack-prone segment, the Barrier is associated with a long-term increase in terrorism attacks and fatalities. Interestingly, the increase in attack volume suggests adaptation, as the short-term effect size is ignorable ($d = +0.13$) and the long-term effect size is large ($d = +3.17$). Concerning fatalities, on the other hand, initiation of the Barrier corresponds with an immediate increase in the number of civilian deaths ($d = +2.11$), although the effect moderates somewhat as indicated by the fact that the effect size declines ($d = +0.61$).

This could be because building the Barrier in that segment was more complex, resulting in gaps in the Barrier. In addition, Jerusalem and its surrounding areas house some 250,000 Palestinians. These Palestinians are desirable recruits for terrorist organizations, especially Hamas, because of their facility in Hebrew language and culture and their Israeli documentation. They are able to move freely within and between Israel, the West Bank and especially Jerusalem. In a later section, we turn our attention to the Ofer-Minharot segment when we consider patterns of long-term adaptation to the Barrier.

Notwithstanding the segment in proximity to Jerusalem, these results leave little doubt that the Barrier brought about a direct reduction in terrorist attacks committed in Israel by Palestinians. In addition, however, ISA argues that the progressive construction of the Barrier allowed their counter-terrorism activities to switch increasingly from a defensive to an offensive mode such that it became more possible to prevent attacks before they were launched, halt the attacks once they were unleashed, and mitigate the casualties and damage (Weisburd et al. 2009). By keeping terrorists on the run it was possible to uproot

them or at least leave them with less time, resources and capabilities to plan and carry out terrorist attacks (Perry 2014).

In the specific case of suicide bombings this is important because the Barrier meant that those in charge of the bombings had to involve other co-conspirators to find a way around the Barrier. The participation of other co-conspirators forces the use of extra communication channels leaving "intelligence footprints," thereby increasing the prospects for intelligence collection. This in turn creates ongoing intelligence and operational pressure and generates a hostile setting for terrorists making it difficult for them to rely on partners (Perry 2014). The difficulties created for the terrorists are confirmed in the report of an interview that ISA conducted with a prominent terrorist[15]:

> "Amjad Abidi, who served as the head of Islamic Jihad in Jenin and was behind a series of attacks and attempted attacks including the suicide attack at the "Maxim" in Haifa, under interrogation by the ISA, admitted that when operating with Saleh Jaradat, (a senior Islamic Jihad activist who was killed during clashes with Security forces in June 2003) the construction of the Barrier compelled the two to change the targets. Abidi noted that if the Barrier had been completed they would have to think of other ways to carry out attacks."

Did the Barrier Displace Attacks, (i) From Segments with an Operational Barrier to Those Without, (ii) From the Israeli Side of The Barrier to the Palestinian Side, or (iii) Was There in Each Case a Diffusion of Benefits?

If terrorists are so strongly committed to crossing into Israel to kill Jews but the Barrier stops them from reaching their targets, why would they not instead attack Jewish targets on the Palestinian side of the Barrier? Would they not switch their attention from segments where the Barrier was built to those where it was not yet brought into operation? And would not the Barrier displace terrorist attacks from the Israeli side to the Palestinian side of the Barrier? Since the overall numbers of suicide bombings are statistically small—as generally is the case in all suicide bombing studies (Merari 2010)—drawing valid conclusions about displacement of suicide bombings to other locations is difficult. However, we can examine fatalities (which we know are disproportionately due to suicide bombings) and we can also examine whether the numbers of all terrorist attacks display any indication of spatial displacement.

If the Barrier resulted in displacement, we would expect that Barrier construction in one segment would increase terrorist activity in neighboring segments where construction was not yet underway. For example, a very direct test of this hypothesis can be performed using data from the Mezadot-South segment, the southernmost segment of the Barrier. The Barrier has not yet been constructed in this section, affording an opportunity to evaluate whether Barrier construction in other segments pushed terrorist activity there. Not only was the coefficient neither statistically nor substantively significant, it was even negative. Additional models for other segments, which exploit the differential timing of Barrier initiation, confirm this basic finding.[16]

[15] From a 2004 review, "Summary of 4 years of Conflict—Data and Trends of Terror" on the ISA web site.

[16] These models were estimated as before, but supplemented with a lagged dummy variable indicating initiation of the Barrier in at least one contiguous segment, as well as the lag of the total volume of terrorist activity in contiguous segments. Displacement was indicated by a positive coefficient on Barrier initiation in spatially proximate segments. In no instance was this coefficient positive.

If the Barrier resulted in displacement, we would also expect that as each segment came online, there would be an increase in terrorist activity on the Palestinian side. But if anything, implementation of the Barrier was followed by substantial reductions in the volume of attacks (summary results are shown in Appendix 3). As mentioned in the previous section, the only evidence of displacement is observed from the increase in the volume of attacks, but a decrease in the volume of fatalities, in the Ofer-Minharot segment. This implies growth in the frequency of attacks but a decline in their lethality on the Palestinian side.

Altogether, these results indicate little or no displacement of terrorist attacks, excepting the Palestinian side of the Ofer-Minharot segment. To the contrary, there is evidence of a very considerable diffusion of benefits extending to sections of the barrier where construction had not yet begun, as well as to the Palestinian side.

Did the Terrorists Adapt Their Modes of Attack When the Barrier Had Been in Place for Some Time?

We chose to study the possibility of "adaptation" by examining whether terrorists changed their methods of attacking Israel through discovering vulnerabilities in the Barrier's defenses after it had been in place for a while. As noted above, most of the 17,706 terrorist incidents recorded in this study comprised four main methods of attack: shootings, Molotov cocktails, explosives and assaults with deadly weapons including knives. Prior to introduction of the Barrier, shootings were the most frequent attacks against Israel, but these declined substantially in subsequent quarters (see Fig. 3). Part of the reason could be that the sections of the Barrier built as high concrete walls worked as planned to reduce shootings. Another reason is that the checkpoints set up at various places along the Barrier served to identify weapons and thus reduce their use on the Israeli side.

Evidence specifically of adaptation is provided, however, by the steady increase in the volume of Molotov cocktails and assaults on the Israeli side of the Barrier, particularly in the vicinity of the Ofer-Minharot segment. This segment includes Jerusalem, which has a large population of Palestinians who reside on both sides of the Barrier. While the significant number of Hamas supporters and other residents hostile to Israel would find it difficult to take guns or explosives through the checkpoints, they do not require any special equipment for Molotov cocktail attacks or assaults. The increase in these kinds of attack is unlikely to be the result of displacement because Molotov cocktails and assaults are among the simplest of terrorist attacks. Those making them were probably not the same group of sophisticated terrorists who had previously orchestrated suicide bombings, which require detailed planning and a complex support infrastructure.[17]

Can the Reductions Be Explained by Factors Unrelated to the Barrier?

The results of this study conform closely to those of a typical crime wave study where a sudden increase in crime is followed by a sudden drop—in this case in terrorist attacks and fatalities that immediately declined followed the building of the Barrier. Since it was built

[17] Pape and Bloom notwithstanding, there is no evidence that *all* terrorist attacks in Israel on the West Bank are centrally organized. There is plenty of evidence that suicide bombings and other complex attacks are so organized in Gaza, but not on the West Bank where many of the attacks are the outcome of local initiatives, and are not directed by the central leadership (Pedahzur 2005: 170).

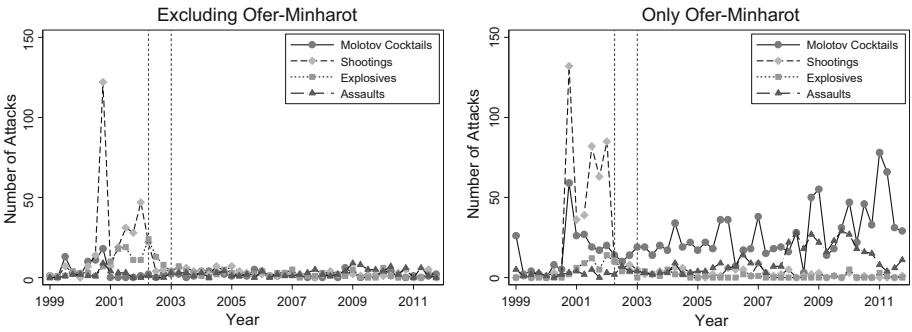


Fig. 3 Quarterly terrorist attacks by weapon type (Israeli side of the Barrier). *Note* The *two vertical lines* identify the quarters when construction of the barrier was first initiated (2002.2) and when the barrier first became operational (2003.1)

in stages and in different segments, there would need to be a constant external factor lasting for the period of the Barrier's construction to account for its effects, or an "historical event" that had first an immediate and then long range effects regardless of the barrier's period of construction. As shown (see Fig. 3), the effects of the Barrier varied considerably according to local conditions, thus excluding any overall external factor interfering with the effects of the barrier. Or, at a minimum, if there were an external factor operating, local conditions specific to the Barrier overrode it.

While it is impossible to account for all real or imagined external factors that may account for the reductions in terrorist attacks and fatalities reported in this study, we discuss below the two main ways in which factors unrelated to the Barrier could have contributed to the reductions. The first are changes that may have occurred in the counter-terrorism operations of ISA, the Israeli police (INP) or other agencies in responding to or preventing terrorist attacks. The second are events in the external environment affecting terrorist operations.

Changes in Counter-Terrorism Operations

Increases in Counter-Terrorism Personnel

A personnel increase could indicate a significant increase in activity against terrorism and could possibly explain a significant decrease in the number of fatalities, regardless of the Barrier (or in concert with it). According to the Budget Division of the Ministry of Finance, however, there was only a moderate increase of 14.4 % in total personnel in the INP over a ten-year period from 2000 to 2009. Relative to the population in Israel that grew 21.6 % in that time period, the ratio of police force to residents has in fact declined. Nor did the number of police fluctuate in relation to number of those killed by terrorist attacks during the period of our study.

Deterrence and Retaliation

It is clear that the Barrier led the security forces to alter their tactics (see the Discussion below), but did they also change their operations in ways unrelated to the presence or construction of the Barrier, for example by bulldozing the houses of the families of suicide

bombers? In fact, an IDF-appointed team concluded in January 2005 that retaliatory demolition was not an effective policy and, consequently its use was reduced during the period studied.[18] Moreover, Lafree et al. (2009) found that retaliatory responses against terrorist attacks in Northern Ireland resulted in a backlash by terrorists. Dugan and Chenoweth (2012) using GTD data also reported that terrorist attacks increased following retaliatory actions by Israeli forces during the Second Intifada, however the study by Bejan and Parkin (2015) did not confirm their findings. These two studies used media sourced data which under reported the number of terrorist attacks by some 90 % when compared to our data source obtained from the ISA records. Finally, a study by Sharvit et al. (2013), found some support for the effects of retaliation, but also found support for the independent effects of the barrier. However, this study also used media sourced data supplemented with other unspecified "open source" data so that it also suffers from the similar defects of underreporting the number of terrorist attacks. Given these mixed results and the inadequacy of the data used in these studies, we think it reasonable to conclude, until new studies emerge, that the security activities of the ISA not directly related to the barrier, have not conclusively been shown to have retaliatory effects.

External Political Events or Environmental Changes

As shown in Figs. 1 and 2, overall declines in suicide bombings, fatalities and attacks after the barrier was built occurred well before the ending of the Second Intifada which is considered to have been February 8, 2005, when President Mahamoud Abbas and Prime Minister Ariel Sharon agreed at Sharm el-Sheikh to stop all acts of violence against Israelis and Palestinians and affirmed their commitment to the "Roadmap for Peace." In other words, the declines in attacks and fatalities cannot be attributed to this political agreement, unless it is assumed that this is an example of "anticipatory benefits" (Smith et al. 2002).

If funding of Hamas or Hezbollah were cut-off and their logistical support reduced this could have had the same kind of dampening effect on their operations, which has been found elsewhere in other terrorism arenas (Clarke and Newman 2006:146). But there is no indication of any disruption in financial or logistical support of the Palestinian terrorists—if anything, support continued to increase.[19]

Finally, one measure of the terrorists' commitment is the number of attempts they have made to carry out attacks. No accurate data are kept about attempts, but the ISA keeps records of the intelligence threats that it receives. It categorizes these into four levels according to severity, whereby level one is specific and immediate information about an attack and level four is preliminary information. The information about threats is highly classified, but the ISA allowed us to examine the data for 1999–2009, strictly for the purposes of our study. This examination concluded that there was little or no change in recorded threats for levels one and two (the most specific and immediate threats) and a slight increase for levels three and four. Therefore, these data indicated that the decline in the number of the fatalities is almost certainly not an outcome of a decrease in the terrorist commitment and willingness to carry out attacks, but rather reflects the "situated choice" of terrorists in the face of increased difficulties, risks and rewards, real or perceived.

[18] http://www.ynet.co.il/articles/0,7340,L-4536731,00.html.

[19] http://www.terrorism-info.org.il/data/pdf/PDF_18892_1.pdf; http://www.terrorism-info.org.il/Data/articles/Art_20852/H_128_15_632639130.pdf.

Summary of Findings

The Israeli government's stated objective of constructing the West Bank Barrier was to bring an end to suicide bombings committed by Palestinian terrorists against targets in Israel and this study examined whether the Barrier succeeded in this objective. The study's unique data also allowed other effects of the Barrier to be examined including, (i) possible declines in fatalities and overall terrorist incidents in Israel and, (ii) any effects of the Barrier on terrorist attacks against Israeli targets in the Palestinian territories. The main results of the study can be summarized as follows:

1. Suicide bombings against targets in Israel were almost eliminated—a result substantially achieved by the time that only half the Barrier was built.
2. Declines in suicide bombings, fatalities and attacks anticipated the actual implementation of the Barrier.
3. With the exception of Ofer-Minharot, most segments showed a decline in attacks and fatalities.
4. There is little evidence of displacement of attacks to the Palestinian side of the barrier, and the results suggest that overall the Barrier produced a considerable "diffusion of benefits." However, in the Ofer-Minharot segment, growth in the number of attacks coupled with a decline in fatalities suggests that the deadliness of attacks declined.
5. The Ofer-Minharot segment showed adaptive changes in methods of attack after the construction of the Barrier, with increases in the frequency of Molotov cocktails and assaults/stabbings.

Discussion

As noted earlier, the success of SCP intervention in preventing aircraft hijacking is well established (Clarke and Newman 2006) and it should not be surprising that the West Bank Barrier, together with the security activities that it facilitated, has been effective in preventing terrorist attacks and fatalities. In addition, the fact that no displacement occurred from the Israeli to the Palestinian side of the Barrier adds to the long line of extant studies showing that displacement is neither inevitable nor common. Prior research shows that criminals and terrorists generally like to work with what they know. Criminals will repeatedly burgle houses and operate in streets with which they are familiar (Farrell and Pease 2001; Weisburd and Telep 2012). Terrorists will attack targets that are closer to their base of operations, and if they are far from their base, they will move their base close to the target (Clarke and Newman 2006; Newman 2014).

More surprising, however, is the finding that fatalities and attacks reduced as much on the Palestinian side of the Barrier as the Israeli side. How could the Barrier possibly have reduced attacks on both sides of it to such a large degree, especially when the majority of terrorist attacks originate on the Palestinian side and it was the Barrier's intended purpose to stop terrorists from crossing into Israel to commit their attacks? While this appears to be an example of a "diffusion of benefits," it is much greater than in other SCP studies where diffusion has been observed.

Part of the explanation for this greater diffusion might lie in our often repeated observation about the nature of the Barrier. We have gone to considerable lengths to explain the complex material, geographic and organizational process involved in its

construction and implementation. Indeed, it is not one Barrier, but several. Further, it brings with it a host of security enforcement activities, checkpoints, surveillance, security patrols, all of these anticipated and in fact designed into the Barriers. It is therefore important to understand that the Barrier is a dynamic not passive intervention; it is not simply a wall that you build then walk away. As explained above, the Barrier altered the terrorists' operating environment, generated a hostile setting, and created ongoing intelligence and operational pressure on the terrorists. This pressure resulted in an ineffective, stressful, and defensive mode of self-preservation. Terrorists "on the run" had less time, resources and capabilities to plan and carry out terrorist attacks whether on the Palestinian or Israeli side of the Barrier.

In this instance, therefore, it is impossible and indeed mistaken in evaluating the Barrier's effects to force a separation of it from the actual security forces actions that are in fact embedded in it. Since security forces operate on both sides of the Barrier it is therefore not that surprising that "diffusion of benefits" occurs on the Palestinian side.

A second plausible, and perhaps more important reason for the considerable diffusion observed may lie in the explanations that the literature has provided for this phenomenon. Diffusion is said to rely on the mistaken belief of potential offenders (including terrorists) that the reach of preventive measures is greater than in fact it is. Therefore, they are (i) deterred by the perceived increased risk of offending and, (ii) discouraged by the perceived increase in the effort needed (Clarke and Weisburd 1994). Without discounting the explanation dependent on perceived increased risks, we suspect that the building of the Barrier, and the associated increased security activity, might have been a source of deep discouragement to the Palestinian terrorists. After all, for a number of years, they had been able to inflict severe casualties on the Israelis almost with impunity. This gave them the upper hand, it might have emboldened them and it surely provided them with enormous propaganda benefits among Palestinians at large. The Barrier destroyed these benefits and it is not hard to imagine how this might have substantially demoralized the terrorists. That is not to say they no longer wished to kill Israelis (we discussed ISA data above indicating that the threat of terrorism did not decrease after the building of the Barrier), but they simply could not find ways to put these wishes into effective action. This is a speculative line of argument, but if correct, it is consistent with the SCP's emphasis on the power of situations to determine criminal behavior. It also suggests that more intensive investigation of the possibly important role of discouragement could be an important new line of SCP research.

Conclusions

This paper began by pointing out that the politics of building walls for security reasons overshadowed the most basic question that should be asked before building a barrier: do they work? The plethora of barrier building in areas of conflict that has occurred in the past decade would suggest that there is a strong belief that they do[20] and that their benefits outweigh the severe political repercussions both domestic and foreign that inevitably

[20] The wall around Baghdad that was built during the U.S. occupation was torn down in 2008 after the successful surge that reduced conflict in Iraq, only to be resurrected again in 2016 in the face of renewed conflict (Reuters, Baghdad, Wednesday, 3 February 2016). One media report claimed that 65 countries had recently built walls for security reasons (*Daily Mail.* Thursday, Feb 4th 2016). Walls have been or are in the process of being built in Jordan, Yemen, Libya, Turkey and Saudi Arabia. http://www.dailymail.co.uk/news/article-3205724/How-65-countries-erected-security-walls-borders.html#ixzz3zCpOnCKw.

accompany them. As far as Israel's West Bank Barrier is concerned, this study has shown that, for the period studied, it significantly contributed to the reduction of suicide bombings to zero, dramatically reduced fatalities and even reduced attacks on both sides of the Barrier. From an SCP perspective, this result was largely expected. It is also consistent with the expectations of the Israeli authorities when, at considerable economic cost and in the face of international opprobrium, they embarked on building the Barrier.

The result is also theoretically important because it is in direct contradiction of claims discussed above made by Pape, Bloom and other prominent terrorism researchers (Davis 2003; Gupta and Mundra 2005) that only by addressing the motivations of terrorists can suicide bombings or terrorist attacks be reduced. The policy assumptions of these researchers are that only by addressing the broader social and political issues (i.e. solving the Israeli-Palestinian problem) will suicide bombings and related terrorist attacks be truly eliminated. However, Perry and Hasisi (2015), acknowledging that social, economic, religious and political conflicts are important in reducing motivations for terrorism in the long term, nevertheless argue that it is at least as important and more practical to attempt to minimize the capabilities and opportunities for carrying out such attacks. We would add that the policy ambitions of SCP are much more modest than those of political and social scientists seeking far reaching changes in political and economic conditions which they claim facilitate terrorism (and which SCP also does not deny). However, in respect of the Barrier or other interventions whether of crime or terrorism, SCP demands results in the short term, i.e. that it is shown empirically that a specific intervention works in specific environmental settings and it is to these specific settings that its moral and political justifications are confined (Freilich and Newman 2015). It is worth noting as a footnote, that walls and barriers are often "temporary" interventions, and may be removed after they have fulfilled their preventive purpose and external conditions have changed such that they are no longer needed. Some obvious examples are the Berlin Wall, the ring of steel in Belfast and more recently the building of the barrier around Bagdad in Iraq during the first invasion, its removal in 2008 after the "surge" that produce relative peace, and now it's rebuilding in 2016 in response to growing conflict (see footnote 19).

In sum, SCP expresses the general principle that an intervention whose effectiveness we know is more justifiable than one whose effectiveness we do not know. Making use of unique data, the present study shows that, over the period studied, the Barrier and its inherent security dynamics likely saved many lives. On the face of it, this is a powerful human benefit that should at a minimum be taken into account by politicians and their critics when forming long term security strategies.

Appendix 1

See Fig. 4.

Fig. 4 Map of barrier built, segment borders and 1967 lines

Appendix 2

See Table 3.

Table 3 Effect sizes (Cohen's *d*) from regression models of the impact of the Barrier on quarterly terrorist attacks and fatalities (Israeli side of the Barrier)

Segment	Terrorist attacks		Terrorist fatalities	
	Short term	Long term	Short term	Long term
1 Tirat Zvi to Salem	−0.04	−1.02	+0.82	−3.42
2 Salem to Elkana	−0.89	−1.64	−3.34	−4.44
3 Elkana to Ofer	–	–	–	–
4 Ofer to Minharot	+0.13	+3.17	+2.11	+0.61
5 Minharot to Mezadot	−0.37	+0.18	–	–
6 Mezadot to South	–	–	–	–

The models from which these estimates derive include a dummy indicating all quarters when the barrier was first initiated in the referenced segment, the proportion of the barrier that is operational in the referenced segment, the lag of the referent series, and the lag of the cross-border series. All variables are lagged and differenced. Cohen's *d* is a measure of effect size, and represents the ratio of the intervention effect to the standard deviation of the pre-intervention series (0.2 = small; 0.5 = medium; 0.8 = large). For the short-term barrier impact, the effect size numerator is $b_{\text{Initiated}}$, whereas for the long-term barrier impact it is $b_{\text{Initiated}} + b_{\text{Operational}}$. Some effect sizes are not shown due to low volume of terrorist activity prior to initiation of the Barrier, or else sparsity following the Barrier becoming operational (refer to Table 1)

Appendix 3

See Table 4.

Table 4 Effect sizes (Cohen's *d*) from regression models of the impact of the Barrier on quarterly terrorist attacks and fatalities (Palestinian side of the Barrier)

Segment	Terrorist attacks		Terrorist fatalities	
	Short term	Long term	Short term	Long term
1 Tirat Zvi to Salem	–	–	–	–
2 Salem to Elkana	−0.47	−0.28	+0.91	−0.34
3 Elkana to Ofer	−0.35	−1.75	−0.01	−0.41
4 Ofer to Minharot	−0.11	+0.97	+0.14	−0.67
5 Minharot to Mezadot	−0.08	+0.05	−0.13	−0.96
6 Mezadot to South	–	–	–	–

The models from which these estimates derive include a dummy indicating all quarters when the barrier was first initiated in the referenced segment, the proportion of the barrier that is operational in the referenced segment, the lag of the referent series, and the lag of the cross-border series. All variables are lagged and differenced. Cohen's *d* is a measure of effect size, and represents the ratio of the intervention effect to the standard deviation of the pre-intervention series (0.2 = small; 0.5 = medium; 0.8 = large). For the short-term barrier impact, the effect size numerator is $b_{\text{Initiated}}$, whereas for the long-term barrier impact it is $b_{\text{Initiated}} + b_{\text{Operational}}$. Some effect sizes are not shown due to low volume of terrorist activity prior to initiation of the Barrier, or else sparsity following the Barrier becoming operational (refer to Table 1)

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