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Anger, Exposure to Violence and Intragroup Conflict: A "Lab in the Field" Experiment in Southern Israel*

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I examine how anger stemming from violence in the Israel-Palestine conflict influences intragroup retaliation. In July 2010 I conducted a series of experiments in two cities in the Southern District of Israel affected to varying degrees (high and low) by rocket fire from the Gaza Strip. For each experiment, subjects were partnered anonymously with a member of their community. They were then exposed to one of two emotional manipulations: one that induced anger or one that did not. Finally, each subject was given an opportunity to keep an endowment or allocate it towards destroying a portion, or all, of their partner's income ("pay to punish") in retaliation for their partner having taken money from them previously. This decision to "pay to punish" was designed to closely mimic the costly nature of conflict. The findings suggest that anger has a conditional effect on decisions to pay to punish: in Sderot (most affected by rocket fire), anger decreases punishment, while in Ofakim (less affected), it increases punishment. Additionally, higher exposure to violence made subjects more likely to engage in negative reciprocity.

KEY WORDS: Emotions, Intragroup Conflict, Behavioral Game Theory

How does exposure to violence influence anger and intragroup conflict? I investigate this question using a "lab in the field" experiment[1] and examine how experimentally induced anger leads to different outcomes in two Southern Israeli cities (Sderot and Ofakim) affected to different degrees by rockets from the Gaza Strip.

There is growing recognition in economics and political science that emotions play an important role in political (Brader, 2005; Bueno de Mesquita & McDermott, 2004; Marcus, Neuman, & MacKuen, 2000) and economic decisions (Fehr & Gächter, 2002; Loewenstein & Lerner, 2003). Most of the work is focused on American politics (Brader, 2005; Marcus et al., 2000) or theoretical decision making (Kugler, Connolly, & Ordez, 2012; McDermott & Druckman, 2008; McDermott, Tingley, Cowden, Frazzetto, & Johnson, 2009). With the exception of a few controlled, laboratory experimental studies (Johnson et al., 2006; Myers & Tingley, 2012; Tagar, Federico, & Halperin,

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[1] See Habyarimana, Humphreys, Posner, and Weinstein (2007) for an excellent discussion and application of laboratory experiments conducted on a population of specific interest with application to ethnicity and public goods provisions.

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2011) and survey experiments (Halperin, Russell, Dweck, & Gross, 2011; Lerner, Gonzalez, Small, & Fischhoff, 2003), few scholars have taken an experimental approach to understand the connection between violence and emotions that is thought to be central to many conflicts.

The question of how violence against civilians influences subsequent behavior, particularly decisions to respond to perceived aggression by members of the affected population, remains a hotly contested question. Within the context of the Israeli-Palestinian conflict, Benmelech, Berrebi, and Klor (2010) find a distinction in subsequent Palestinian violence against Israelis between punitive house demolitions (decrease Palestinian violence) performed by the Israeli Defense Forces (IDF) and seemingly arbitrary house demolitions (increase Palestinian violence). Using geographic and temporal variation in terrorist attacks, Gould and Klor (2010) find that Israelis respond to higher levels of Palestinian terrorism by favoring increased territorial concessions to Palestinians up to a point, after which they oppose increased concessions. Several recent scholars have also argued that exposure to trauma or violence, such as kidnapping and child soldiering in Uganda (Blattman, 2009) and civil war exposure in Nepal (Gilligan, Pasquale, & Samii, 2010), leads to prosocial outcomes (more collective action, increased voter participation, etc.).

The lengthy and sustained level of violence surrounding the Israeli-Palestinian conflict make it an important case to examine how exposure to violence and emotions influence retaliatory behavior in a seemingly intractable conflict (Bar-Tal, 2001). Recent studies have found that exposure to rocket fire leads to increased levels of post-traumatic stress disorder (PTSD) (Palmieri, Canetti-Nisim, Galea, Johnson, & Hobfoll, 2008) and exclusionist attitudes towards Palestinians (Canetti-Nisim, Halperin, Sharvit, & Hobfoll, 2009). Others have looked at how rocket fire and emotions influence risk perceptions (Benzion, Shahrabani, & Shavit, 2009; Rosenboim, Shahrabani, Benzion, & Shavit, 2010; Shahrabani, Benzion, & Shavit, 2009). Anger is generally seen as a risk-taking/action-oriented emotion (Lerner et al., 2003; Lerner, Small, & Loewenstein, 2004). In the context of intergroup conflict, it has been shown to make individuals support taking risks for both peace (Halperin, Russell, et al., 2011; Tagar et al., 2011) and military conflict (Huddy, Feldman, & Cassese, 2007). Yet how anger and risk from terrorism influence group conflict in an incentivized game[2] is an understudied phenomenon.

In this study, I investigate incidental emotions—those not directly related to the current situation (Dunn & Schweitzer, 2005; Gino & Schweitzer, 2008)—and their influence on actions in a different domain. I measure how anger at the rocket attacks from Gaza and the threat level from rockets influence an individual's willingness to retaliate against a partner from their own community by erasing their partner's income in a behavioral economics experiment. This issue is important, as terrorism may not only affect behavior towards the group perpetrating terrorism (out-group) but also influence individuals' behavior towards their own community (in-group). Like Abbink, Irlenbusch, and Renner (2000), Fehr and Gächter (2002), and McDermott et al. (2009), I use behavioral games in which subjects can erase a partner's income to model conflict behavior. Finally, unlike many other behavioral games that attempt to understand the effects of conflict through public goods or Prisoner's Dilemma-type games (Gilligan et al., 2010; Habyarimana et al., 2007), my experiment mirrors the decisions of actual conflict in two key ways. First, negative reciprocity—both sides responding to perceived provocation—plays a central role in many conflicts.[3] In my experiment, I explicitly model this reciprocity by giving subjects the opportunity to respond to aggression by their partner. Second, conflict is generally viewed as costly (Fearon, 1995), so any experiment that seeks to understand the dynamics of conflict needs to make decisions to retaliate costly. By making subjects pay to destroy a portion of their partner's income, my experiment takes into account the costly nature of conflict.

[2] See Camerer (2003) for an excellent overview as to why incentivized behavioral games are an advantageous way of getting individuals to reveal preferences.

[3] See Goldstein and Freeman (1990), and for reciprocity specifically related to the Israeli-Palestinian, see Haushofer, Biletzki, and Kanwisher (2010), Jaeger and Paserman (2006), and Zeitzoff (2011).

Subjects were recruited in two demographically similar cities in Southern Israel that have faced varied exposure to rocket fire from the Gaza Strip: Sderot (high exposure) and Ofakim (low exposure). In the experiment, subjects were randomly primed for anger or not. They were then given an opportunity to retaliate against an anonymous partner (a member of their community also participating in the experiment) who had previously taken money from them. In the decision to retaliate, each subject faced a trade-off: how much income from an endowment they wanted to keep versus how much they were willing to give up in order to punish their partner by erasing their partner's points. Of key interest is how emotions and threat from rocket fire affect subjects' decisions to "pay to punish" their partner.

I find that induced anger has opposing effects on the decision to "pay to punish": in Sderot (most affected by rocket fire), anger decreases punishment; while in Ofakim (less affected), it increases punishment. Controlling for other factors, subjects who received the anger manipulation in Sderot erased approximately 27 of their partner's points less on average than than those that received the anger manipulation in Ofakim.[4] I also find that subjects' decisions in Sderot to erase their partner's income were influenced to a larger extent by what their partner had taken from them in the first round than in Ofakim. This suggests that continued exposure to violence may make individuals more likely to engage in negative reciprocity.

The subsequent sections of the article are structured as follows: The second section outlines the theory on which the experiment rests, the third describes the threat from rockets in Southern Israel, and the forth section discusses the recruitment of the subjects and gives an overview of the experiment. THE fifth section displays summary statistics and observable characteristics of the subject pool, the sixth contains the manipulation check, the seventh presents the empirical results in Sderot and Ofakim separately, and The eighth section provides some context for the findings and suggests future areas of research.

A Theory of Anger, Threat, and Intragroup Conflict

The following study poses two theoretical questions and seeks to test them using an experimental framework: (1) How does varied exposure to violence influence individuals' willingness to engage in negative reciprocity? (2) How does anger that arises from intergroup conflict interact with exposure to violence to affect *intragroup conflict*?

Fehr and Gächter (2000) defines reciprocity as, "in response to friendly actions, people are frequently much nicer and much more cooperative than predicted by the self-interest model; conversely, in response to hostile actions they are frequently much more nasty and even brutal" (p. 159). Fehr and Gächter (2002) present compelling evidence that the threat of negative reciprocity—in terms of punishment for perceived free riding—can enforce human cooperation. Continued, intractable conflict can be seen as an extreme case of negative reciprocity in which which both sides continue to respond to provocations with greater force than if they were purely considering instrumental benefits (Bar-Tal, 2001). Nisbett and Cohen (1996) shows that "cultures of honor," where necessity and social pressure demand swift retribution for perceived slights and greater sensitivity to these slights, evolved out of socialization into violence and subsequently lead to higher overall levels of violence. While negative reciprocity is important for driving conflict, and cultural norms influence accepted levels of reciprocity, an important question that arises is how do norms of negative reciprocity evolve under exposure to violence?

Previous research suggests a positive relationship between exposure to violence, stress, PTSD, and subsequent aggression (Jakupcak et al., 2007; Palmieri et al., 2008). Central to many theories of reciprocity is the idea that individuals use past experience to form expectations about how individuals will react in a given social situation. Expectations about social norms are based on beliefs formed

[4] See Figure 2.

through previous experience about the proper responses to right and wrong. These social expectations are not only influenced by direct behavior but by general environmental factors.[5]

An increase in levels of exposure to violence, particularly the randomized violence of rocket exposure, represents a shock to expectations. Previous research shows that the random nature of terrorism and the stress it places on individuals can lead to increased support for a variety of negative behavior (increased ethnocentrism, support for political violence, etc.) against the target group (Jakupcak et al., 2007). However, increased support for group-targeted behavior is not the only effect. Shifts in equilibrium levels of environmental violence change group norms and expectations as to how violence and aggressive behavior operate. The randomness of the violence associated with rocket fire tends to undermine individuals' beliefs that each outcome is a function of the previous norms of reciprocity. Even actions perceived as innocuous under past norms may be interpreted as threatening, given the increase in overall environmental violence. *As a result, individuals in places such as Sderot are much more sensitive to perceived negative actions and more likely to respond negatively in turn, resulting in a new, stronger norm of negative reciprocity.*

Central to this argument of reciprocity is the idea of group norms and how these are shaped. Intergroup emotions are a powerful part of group norm regulation (Mackie, Devos, & Smith, 2000). Distinct emotions, whether they be anger or fear, are dependent on the intergroup context and create different behavior tendencies (Mackie et al., 2000, p. 613). Specific to this study, frustration over failure of the in-group to behave appropriately in dealing with an out-group threat can lead to *increased* in-group directed anger (Cheung-Blunden & Blunden, 2008; Maitner, Mackie, & Smith, 2006, p. 726).

How does intergroup violence shape group emotions—particularly anger—and subsequent behavior toward the in-group and out-group? Several recent studies provide evidence that high levels of violence associated with conflict may lead to positive in-group outcomes, including increased social capital (Gilligan et al., 2010) and greater political participation (Blattman, 2009). However, it may also lead to negative consequences (i.e.,"pro-in-group" ethnocentrism; Jakupcak et al., 2007). Halperin, Russell et al. (2011) suggest that group anger is neither a positive nor a negative emotion, but dose specific: in small amounts, intergroup anger can lead to an increased willingness to take risks for peace with an out-group, but in too large amounts, it can lead to outright hatred. I further argue that intergroup anger is context dependent and that exposure to violence can change the way group anger is processed. Exposure to intergroup violence plays a moderating role in whether members of the affected populace direct their anger inward (towards their own group) or outward. High levels of violence may lead to in-group cohesion and positive in-group behavior in order to cope with the threat and the fearful emotions it creates. For instance, a group under threat from violence may provide fellow members protection from further violence (material benefits) or social support (psychological benefits). When anger over the violence is cued in a high-threat setting, it activates in-group cohesion, and the anger is directed outwards and becomes a positive in-group emotion.[6] For communities and areas that have been continually exposed to violence, group anger and fear are inherently intertwined, with anger over the violence also priming fear and thus reinforcing the need for group cohesion. Conversely, in a low-threat setting (Cheung-Blunden & Blunden, 2008; Mackie et al., 2000; Maitner et al., 2006) anger, in the absence of fear, stemming from conflict can lead to frustration and a general desire for vengeance, including that directed towards the in-group if individuals feel the threat has not been properly addressed. This extension of intergroup emotions provides concrete predictions. *In the high-threat setting, anger arising from exposure to intergroup violence reinforces in-group cohesion and positive in-group behavior. However in the low-threat setting, it manifests itself in negative in-group behavior.*

[5] For instance, a child may not directly be the subject of conflict between his parents, yet that interaction—whether positive or negative—partially shapes their outlook on proper behavior in conflicts going forward.

[6] While the effect of raising intergroup anger may be positive in the in-group setting, its effects in an out-group setting are not probed in this setting and may be negative. I am thankful to a reviewer for pointing this out to me.

Threat from Rockets

Since 2001, over 8,000 rockets have been launched into Southern Israel by a variety of Palestinian groups in the Gaza Strip.[7] The vast majority of rockets lack any guidance system and are lobbed in the general direction of their targets (Intelligence and Terrorism Information Center, 2009). The aim of each rocket is subject to extreme variability, with many rockets simply falling harmlessly in the desert, while others land in the middle of cities.[8] Most of the rockets fired into Israel are of the homemade Qassam variety with a range of 3–12 km. The longer-range 122-millimeter Grad rocket has a range of 18–40 km. Over the course of the 2008–2009 Gaza Conflict, around 550 rockets and 200 mortars were fired into Israel killing three civilians and one soldier (Intelligence and Terrorism Information Center, 2009).[9] The cities of Ashdod and Beersheeba, previously outside the range of the rockets, first came under fire during the Gaza Conflict.

The random nature of the rocket attacks has resulted in few casualties but has provoked widespread fear among the Israeli populace within range (Palmieri et al., 2008).[10] Particularly hard hit has been the city of Sderot, which lies 1 kilometer to the east of the Gaza Strip. Sderot has faced a constant threat of rockets since 2001, with increased rocket attacks following the Israeli disengagement from Gaza in September 2005 and during the Gaza Conflict. In Table 1, I compare the level of exposure[11] to rocket attacks from June 2004 through December 2009 in Sderot to the level in

Table 1. Demographic Characteristics (Israel Central Bureau of Statistics, 2010) and Rocket Exposure (June 2004–December 2009) in Sderot and Ofakim (National Counterterrorism Center, 2010)

Variable	*Sderot*	*Ofakim*
Demographics		
Total Population	20,700	24,000
Monthly Median Wages in Shekels (NIS)[12]	4,977 NIS	4,966 NIS
Median Age	29	26
% Foreign Born (Jews)	58.8	66.4
%Completed High School	57.6	49.1
Rocket Exposure		
Total # Rocket Attacks	984	16
Total # Wounded	709	0
Total # Killed	10	0
Total # Wounded and Killed	719	0

[7] Including Hamas, Islamic Jihad, and the Popular Front for the Liberation of Palestine (PFLP). See the "Q and A Middle East Conflict" at http://www.bbc.com.

[8] Additionally, a production strategy that Hamas has employed to speed up manufacturing of rockets has come at the expense of accuracy (quantity over quality)—further randomizing the chief weapon of Hamas (Intelligence and Terrorism Information Center, 2009).

[9] See "Shin Bet: 565 rockets, 200 mortar shells fired at Israel since start of Gaza op" at http://www.haaretz.com.

[10] Given the random nature of the rocket attacks and the fear they instill, the Israeli government has attempted to provide a warning system for Israelis living within range. When Israel's early-warning system detects a possible attack, it gives citizens approximately 15–45 seconds to head for cover.

[11] It is important to note that the level of rocket exposure in Table 1 is not a definitive measurement of all the rocket attacks and their effects on Sderot and Ofakim. National Counterterrorism Center (2010) uses news reports and other local sources to document terrorist attacks. However, in conversations with local citizens in Sderot and Beersheba and those familiar with Israel's Home Front Command (the agency responsible for defense from rockets), the Israeli government does not release data on all rocket attacks to prevent calibrating of the rockets. So the measures below are a bit "rough."

[12] To calculate median wages for each city, I used (Israel Central Bureau of Statistics, 2010) data on the percentage of individuals that were employed versus self-employed. I weighted data on median wages for employed versus self-employed individuals to construct average median wages. For Ofakim = 0.075*3,560 NIS (self-employed) + 0.925*5,080 (employed) = 4,966 NIS. For Sderot = 0.056*4,940 NIS (self-employed) + 0.94*5,000 NIS (employed) = 4,977 NIS. The median monthly wage is remarkably similar between Ofakim and Sderot—so average differences between the two cities are not driven by average income differences.

Ofakim, a demographically similar city situated approximately 30 kilometers east of the Gaza Strip. Table 1 also presents a demographic comparison between Ofakim and Sderot.

The rocket attacks have have had a substantial economic (Yagna, 2010) and psychological impact (Berger & Gelkopf, 2007; Palmieri et al., 2008) on cities within range. The threat of rocket fire both from Gaza and Hezbollah and Lebanon has also substantially influenced major Israeli foreign policy decisions, including the 2006 Lebanon War (Gross, 2008) and the 2008–2009 Gaza Conflict (The New York Times, 2009). While many scholars have looked at how rocket exposure influences risk and political attitudes (Benzion et al., 2009; Canetti-Nisim et al., 2009; Rosenboim et al., 2010; Shahrabani et al., 2009), a systematic exploration of how emotions and the threat from rocket fire influences interactive decision making, specifically retaliatory behavior, is lacking. In the next section, I outline the recruitment and experimental protocol I administered in a series of experiments that were conducted in the Southern District of Israel in July 2010.

Experiment Overview

Recruitment

I recruited subjects in Sderot and Ofakim. Both cities are known as "development towns"—cities founded in the 1950s[13] to settle Mizrahi Jews[14] and populate uninhabited regions of the countries. In the 1961 Israeli Census, both Sderot and Ofakim had overwhelming concentrations of Mizrahi Jews (97.1% and 95%, respectively; Yiftachel, 2000, p. 423). Each city has also faced similar subsequent waves of immigration, first from Ethiopia, and then later from the former Soviet Union. The residents of Sderot and Ofakim have also continually had lower economic opportunities compared to the cities and suburbs of Jerusalem, Tel Aviv, and Haifa (Mirovsky, 2010).

I use Ofakim as a quasi-control for Sderot. It is true that people tend to sort themselves along similar lines that usually confounds using residency as an exogenous source of variation. However, the Israeli government policy of assigning new immigrants to development towns (Yiftachel, 2000), such as Sderot and Ofakim, partially remedies this. A bigger worry may be that residents of Sderot most sensitive to the fear instilled by the rocket attacks may have left Sderot—meaning the average citizen of Sderot is different in their baseline sensitivity to terrorism than the average citizen in Ofakim. However, the lower socioeconomic status of these cities has made it more difficult for residents of Sderot to leave, attenuating the bias.[15] Finally, other researchers, such as Berger and Gelkopf (2007) in their study of exposure to rockets and PTSD, have used Ofakim as a control for Sderot.

I recruited subjects through an Israeli survey company—the Mahshov Institute—using a land-line sampling frame. In each city, prospective subjects were randomly contacted via telephone by the survey company a week prior to the experiment and asked if they were interested in participating in a study of interactive decision making and current affairs at a local community center in return for monetary compensation.[16] Eligible subjects had to be Jewish Israelis,[17] over the age of 28 (at least of voting age since the rockets began in 2001), and literate in Hebrew. Ofakim and Sderot both had very

[13] Sderot was founded in 1951 and Ofakim in 1955 (Israel Central Bureau of Statistics, 2010).
[14] Literally "Eastern Jews" and is the term for Jews from Arab lands.
[15] There has been an estimated 10–15% of the population that left Sderot following the uptick in rocket attacks in 2007. Most of the emigrants have been those of higher socioeconomic standing. See "Sderot: Those who can afford it have already left" at http://www.ynetnews.com.
[16] The recruitment script was intentionally vague to avoid priming subjects.
[17] This was done due to demographic reasons—both cities are overwhelmingly Jewish—and for experimental control, as it was not clear how Palestinian Citizens of Israel, a marginalized ethnic group, would respond to the manipulations.

similar response rates of approximately 11%—that is, for every 100 people contacted, 11 agreed to participate in the study.[18] Reminder phone calls were made the night before the experiment. Of those who verbally committed over the phone (135 in Sderot and 164 in Ofakim), approximately 30–40% showed up.[19]

Experiment Protocol

One hundred subjects (52 in Sderot and 48 in Ofakim) participated in the four sessions (two in Sderot and two in Ofakim) of the experiment for a total of 98 observations[20] in the first and second week of July in 2010.[21] Subjects were given a show-up fee of 40 shekels (NIS).[22] They earned additional money through the accumulation of points during the experiment. These points were redeemable at the end of the experiment at a rate of 4 points to 1 shekel. Payoffs ranged between 40 and 90 NIS, with the average payoff being 60 Shekels, or about $15.90. The experiment lasted approximately an hour and 15 minutes. Throughout the experiment, all subjects were seated in a large auditorium within a local community center. The large show-up fee with respect to income earned was to guard against the fact that subjects could—and did in a few cases—destroy all of their partner's income earned during the experiment.

Upon arrival, subjects completed a short (10–15 minute), self-administered survey of basic demographic information and psychometric measures of personality and emotions.[23] In return for the completion of the survey, subjects received 100 points. These points were redeemable for cash at the end of the experiment. They were then informed that they were partnered with another subject in the experiment and that the partnership would remain anonymous to both of them. All interactions between subjects took place anonymously using pencil and paper and via the research team; at no time during or after the experiment did subjects find out the identity of their partner. Subjects were then asked to indicate how many of their partner's points they would like to take and add to their own (in multiples of 10 points ranging from 0 to 100 points). They were aware that their partner was making a similar choice about taking points from them. After this decision, they were asked what they would do given an extra hypothetical endowment of 100 points. They could hypothetically put the 100-point endowment toward their own point total or allocate it towards paying to "destroy" a portion, or all, of their partner's income (every 10 points allocated destroys 10% of their partner's income). Destroyed points were considered lost from the experiment. For each possible multiple of 10% that their partner could have taken in the first interaction period, subjects indicated how much (in multiples of 10 points) they would hypothetically allocate of their endowment towards destroying their partner's postinteraction point total.[24]

After subjects decided their allocation of the hypothetical endowment, the researchers collected their decisions, and the experimental manipulations were administered. Each subject was given a

[18] There was a minor issue of religious refusals (affecting only 1% in each city) and language issues (affecting 20% of households contacted). The latter was much more significant and means that foreign born and/or lower educated residents may have been excluded at higher rates from the study. When discussing these results, this must be kept in mind.

[19] This fairly low overall response rate of 3–4% is not unexpected given the nature of recruitment. A bigger issue which will be discussed at length is whether there were systematic differences in those who showed up in Sderot versus those who showed up in Ofakim.

[20] One subject was dropped in each city due to not following experimental instructions.

[21] This was a marked period of calm in rocket attacks for Sderot. See "2010 Statistics: Rocket and Mortar Fire from the Gaza Strip as of October 7th, 7 Oct 2010" at http://idfspokesperson.com/.

[22] At an exchange rate of 1 dollar (USD) to 3.8 shekels (NIS).

[23] These include The Positive Affect Negative Affect Schedule (PANAS) (Thompson, 2007), The Vengeance Scale (Stuckless & Goranson, 1992), and Stanford Acute Stress Reaction Questionnaire (SASRQ) (Cardeña, Koopman, Classen, Waelde, & Spiegel, 2000).

[24] The effect of the hypothetical decision on subsequent destroyed decisions was designed to examine how hypothetical choices differ from concrete choices and how emotions affect this.

Figure 1. Anger and sadness manipulation.

survey that contained an emotional manipulation.[25] In the emotional manipulation, subjects randomly received a picture of either a Hamas rocket team getting ready to fire rockets (anger manipulation) or a picture of a mother clutching her daughter following a rocket attack (sadness manipulation) with a descriptive, factual caption (see Figure 1).

Subjects were then asked to respond (in writing) to the following:

> "The rocket attacks from Gaza have evoked a lot of emotions in people. We are particularly interested in what makes you most SAD/ANGRY about the rocket attacks. Please describe in detail the one thing that makes you most SAD/ANGRY about the attacks. Write as detailed a description of that thing as possible. If you can, write your description so that someone reading it might even get SAD/ANGRY from learning about the situation."

This Autobiographical Emotional Memory Task (AEMT) is the exact same kind of emotional manipulation developed by Ekman (1992) and used in Lerner et al. (2003) and Myers and Tingley (2012).

[25] The survey also contained an informational manipulation. In the informational manipulation, subjects were randomly assigned a passage that was factually oriented and did not contain editorial language (factual manipulation) or a passage that deemphasized the risk posed by rocket fire from Gaza (low-risk manipulation). However, the information manipulation was not found to be effective in influencing subjects' perceived risk from rockets (as measured in a survey). It also did not influence any of the subsequent regression results. In subsequent discussion of the results, I do not include it.

After they finished the written portion of the emotional manipulation, subjects completed a short manipulation check to gauge emotions (the perceived risk from rocket attacks was measured in the postexperiment survey). The researchers then collected the manipulation checks and informed the subjects of the results from their interaction with their partner (including their pre-interaction point total, their postinteraction number of points, and how many points their partner took). They were then given an actual, not hypothetical, 100-point endowment in addition to their current level of points. In this final interaction, they were told that they could either cash out the extra 100 points or allocate them towards erasing a portion, or all, of their partner's points. It was emphasized that this was a real and not hypothetical decision. A subject *i*'s final income in points is equal to the following:

$$Y_i = \left(1 - \frac{E_j}{100}\right)[100 + T_i - T_j + (100 - E_i)], \tag{1}$$

where Y_i is the final income of subject i (in points without the participation fee), E is how much i and j (i's partner) erase after the emotional manipulation respectively, and T is how much they each take from the other.[26] The Nash equilibrium of this game is very straightforward: if all subjects care about is earning more money, then they should take all of their partners' points in the first round and erase nothing. This is also a dominant strategy. After subjects made their decisions, and while the payoffs were tallied, a postexperiment survey was administered. This postexperiment survey asked subjects their thoughts and feelings regarding the experiment and decisions to punish and also questions about their political ideology and level of exposure to rocket fire.

In subsequent sections, I present summary statistics, demographic information on the subject pool, and results from the experimental manipulation. I then analyze what motivates subjects to sacrifice a portion of their income to punish their partner by erasing their income.

Summary Statistics and Observable Characteristics

Summary statistics for the experiment are presented in Table 2.[27] In Table 3, I compare the observable characteristics of subjects in Sderot and Ofakim. If subjects in Ofakim are systematically different than in Sderot, then the treatment effects I estimate for subjects in Sderot as compared to Ofakim may not be solely due to differing exposure to rocket fire. As can be seen below, Sderot and Ofakim are fairly well balanced in the means across gender, foreign born, and those who served in combat units. Moreover, there does not appear to be a difference in the trait level of vengeance (preexperiment measure, The Vengeance Scale; Stuckless & Goranson, 1992), or intriguingly levels of stress (preexperiment measure, Stanford Acute Stress Reaction Questionnaire; Cardeña et al., 2000), or social ties (measured by the number of friends they would feel comfortable borrowing a car from if licenses or insurance were not a concern). One concern is that subjects were on average five years older and somewhat more secular in Sderot.[28] In a later section, I will address concerns about the difference in age and secularity using matching.

[26] For instance, a subject, whose partner took 60 points from them, took 50 points from their partner, erased 10% of their partner's income, and their partner erased 30%, would receive the following final total:

$$(1 - 0.3)[100 + 50 - 60 + (100 - 10)] = 0.7(90 + 90) = 126_{points}. \tag{2}$$

[27] The difference between *took from partner* and *partner took* in the summary statistics is due to the fact that the *partner took* values for subjects who were dropped were still included for their partner's that were not dropped.

[28] On average, subjects in Sderot were squarely "traditional" (a response of three) meaning they observed the Jewish Shabbat. Whereas in Ofakim, they leaned "traditional," meaning they actively followed the Jewish commandments.

Table 2. Summary Statistics and Variable Descriptions ($N = 98$)

Variable Name	*Mean*	*Std. Dev.*	*Min.*	*Max.*	N	*Description*
Took from partner (T_i)	55.2	26.6	0	100	98	How many of their partner's points they took
Partner took (T_j)	54.8	27.2	0	100	98	How many of their points their partner took
Erase decision (E_i)	28.6	29.1	0	100	98	How many of their partner's points they erased
Sex	0.429	0.497	0	1	98	1 if the subject is a male, 0 if female
Age	50.0	12.1	29	74	97	In years
Native born	0.531	.502	0	1	98	Born in Israel = 1, 0 otherwise
Sderot	0.520	.502	0	1	98	Resident of Sderot = 1, 0 if Ofakim
Combat unit	0.293	0.458	0	1	92	Member of IDF combat unit = 1, 0 otherwise
Secular	2.86	0.816	1	5	97	From Haredi (very religious) = 1 to anti-religious = 5
Anger manipulation	0.45	0.50	0	1	98	1 = received anger manipulation, 0 otherwise
Right leaning	1.74	2.57	–4	6	89	Difference in feeling thermometer scores for right- and left-wing Israelis
Risk from rocket	3.86	1.75	1	6	90	Perceived risk of injury from rockets (1 = extremely unlikely to 6 = extremely likely)
Rocket exposure	5.07	12.5	0	100	69	Sum # of people know killed & hurt and # of rocket attacks witnessed

Table 3. Characteristics of Participants (from *t*-test with unequal variances)

Variable	*Mean in Sderot*	*Mean in Ofakim*	*Difference*	*Two-tailed p-value*
Oberservables				
% Male	0.431	0.426	0.006	0.954
% Native born	0.510	0.553	–0.043	0.671
Age	52.560	47.234	5.326	0.030
Secular	3.020	2.681	0.339	0.042
Combat Unit	0.333	0.250	0.083	0.384
Psychological Measures				
Trait Vengeance	13	12.093	0.907	0.443
Reported Level of Stress	13.913	13.045	0.868	0.392
Social Ties	3.713	3.239	0.474	0.592

Manipulation Checks

The upper section of Table 4 reports the results for the manipulation check on emotions[29] that were administered immediately following subjects' responses to the emotional manipulation. The manipulation check for anger is the difference in mean-reported angry feelings (sum of angry, hostile, and furious) of subjects who received the anger manipulation versus the sadness manipulation. The manipulation check for sadness is the difference in mean-reported sad feelings (sum of hopeless, lonely, and sad) for those receiving sadness manipulation versus the anger manipulation. The manipulation check for fear is the difference in mean-reported fearful feelings (sum of afraid, nervous, and scared) for those receiving anger manipulation versus the sadness manipulation.

Subjects in the anger manipulation reported higher levels of anger ($p < 0.009$). The sadness manipulation was ineffectual, and in fact, subjects in the anger manipulation reported higher levels of sadness, though this was insignificant ($p < 0.154$). The anger manipulation also led to higher

[29] The focus of this article is principally on anger and secondarily fear. Other secondary emotions were not manipulated in the design and for brevity's sake are not presented here.

Table 4. Manipulation Check: Two Sample *t*-test with Unequal Variances

Variable	*Mean Difference*	*T-Statistic*	*Two-tailed p-value*
Anger Manipulation			
Anger	1.54	2.66	0.009
Sadness	0.81	1.44	0.154
Fear	1.14	1.77	0.080
Sderot Quasi-Manipulation			
Anger	0.74	1.30	0.200
Sadness	0.56	1.02	0.308
Fear	1.24	2.01	0.047
Risk from Rockets	0.68	1.88	0.064

reported levels of fear, albeit at a less significant level than anger ($p < 0.08$).[30] The finding that anger also heightens fear echoes the findings of other researchers that manipulating anger may also indirectly increase fear (Myers & Tingley, 2012; Ryan, 2012).

It is important to point out the implications of the failure to induce sadness on erase decisions. *The effect of the emotional manipulation on subjects' decisions in the experiment is actually comparing heightened anger to those in a more neutral emotional state—not anger to sadness*.

I have previously argued that the residents of Sderot and Ofakim are largely similar except for their exposure to rocket fire. In the bottom section of Table 4, I examine how subjects' reported levels of anger, fear, and sadness differed between the cities. I also look at how the perceived likelihood of injury, both personal and to friends and family members, from rockets differs between the cities. I label their different behaviors and perceptions due to their city of residence a quasi-manipulation.

Table 4 shows that there does not appear to be a significant difference in anger ($p < 0.200$) or ($p < 0.308$) sadness between Sderot and Ofakim. Unsurprisingly, Sderot had a higher level of reported fear ($p < 0.047$) and relatedly, the perceived risk from rockets to friends and family was higher in Sderot than in Ofakim ($p < 0.064$).

Analysis

Censoring Issues

In Figure 2 (top), I plot a histogram of subjects' erase decisions. It is apparent that a large number of subjects, about one-third of them, played the dominant strategy and erased 0 points. The observed value (y) of how much subjects is a statistical censoring problem. Subjects "true" erase decisions are a latent variable (y*) derived from the emotional treatment they receive, their demographic characteristics, and previous play in the game. Within this framework, there is left-censoring ($y = 0$) and right-censoring ($y = 100$).[31] The observed erase decision y is equal to the latent variable = y^* when $0 < y < 100$. A proper estimation strategy has to take into account the censored nature of the dependent variable y. The Tobit model is one such estimation strategy (Greene, 2008).

How does living in Sderot and receiving the anger manipulation (compared to the more neutral emotional state) affect a subject's willingness to erase a portion of his or her partner's income? In

[30] All manipulation check findings are robust to the Wilcoxon Rank Sum Test.

[31] While a few subjects did erase 100% of their partner's points (right censoring), the vast majority of the censoring is that of the left variety—and is the Nash Equilibrium and a corner solution.

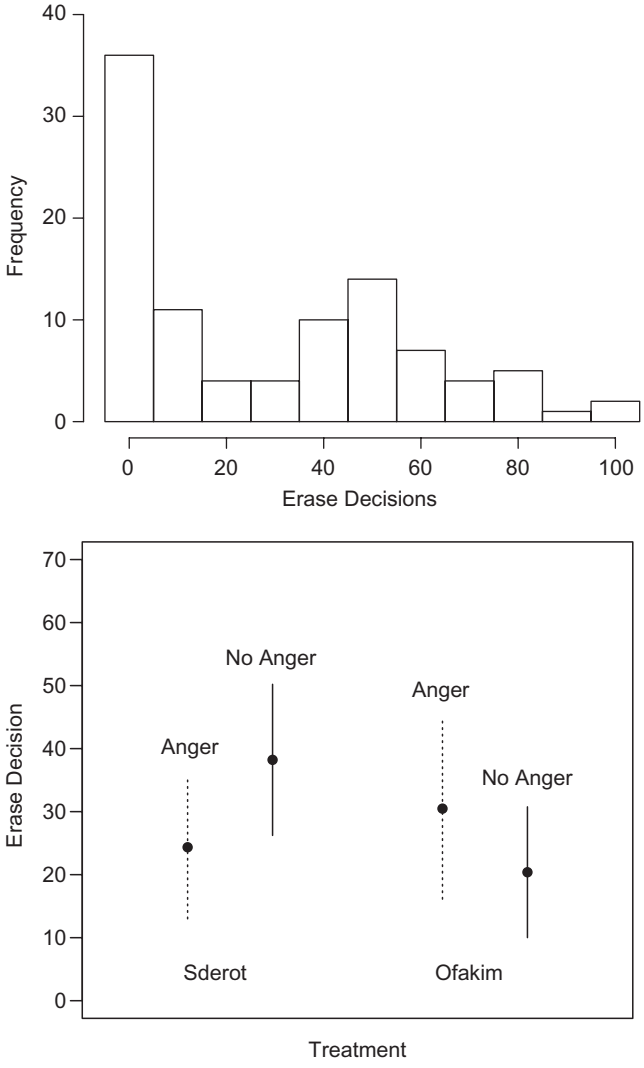

Figure 2. Distribution of erase decisions (in points) and mean values across cities and treatments (95% CI bars).

Figure 2 (bottom), I plot the mean erase decisions with 95% confidence interval (CI) bar across cities (Sderot and Ofakim) and treatments (Anger and No Anger).

The plot largely confirms the hypothesis that anger has different effects in high-versus low-threat communities. The effect on erase decisions of receiving the anger manipulation in Sderot is different than in Ofakim (decreases in the former and increases in the latter). The raw mean differences are not significant (the confidence bars overlap). However, the decision to erase is a function of previous interaction in the game (i.e., nested within a game), so it is necessary to control for what an individual took and what their partner took.[32]

[32] For example, individuals may make very different decisions in a game in which their partner took 20 points from them as opposed to 80 points. They may become more angry at a partner who takes a lot of their points and choose to "punish" that partner more. McDermott et al. (2009) recognizes this and in a similar game uses deception to experimentally control for previous partner's decisions.

Table 5. Disaggregated Tobit Results (robust standard errors in parentheses)

Variable	*Dependent Variable: Erase Decision*					
	Sderot			**Ofakim**		
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Constant	34.904***	−52.698*	−101.478***	4.419	−58.305*	−104.634**
	(7.471)	(31.362)	(33.745)	(10.362)	(32.053)	(51.305)
Anger manipulation	−23.970*	−30.682**	−40.620***	15.582	21.965*	26.237*
	(12.535)	(11.664)	(12.718)	(14.608)	(13.078)	(13.984)
Partner took		0.459*	0.674***		0.158	0.194
		(0.236)	(0.246)		(0.273)	(0.269)
Took from partner		2.373**	1.936***		2.133**	1.877*
		(0.931)	(0.864)		(0.951)	(0.969)
Took from partner squared		−0.018**	−0.015**		−0.017*	−0.014
		(0.008)	(0.007)		(0.009)	(0.009)
Age			1.123**		0.960	
			(0.473)		(0.628)	
Right leaning			−4.804**			−0.009
			(2.208)			(2.641)
σ	39.740	34.976	29.979	45.310	41.683	42.371
	(4.529)	(3.710)	(3.857)	(6.580)	(5.932)	(6.514)
N	51	51	43	47	47	45
Left Censor ($Y = 0$)	16	16	16	20	20	20
Right Censor ($Y = 100$)	1	1	1	1	1	1
Pseudo R^2	0.011	0.040	0.089	0.004	0.029	0.035
Log Likelihood	−188.739	−183.078	−136.126	−153.109	−149.273	−138.825

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table 5 presents results from the Tobit regression for Sderot and Ofakim with robust standard errors[33] in parentheses. The coefficients can be interpreted much as those from (ordinary least squares (OLS), with the knowledge that they are the effect on the latent variable *y**. Columns 1–3 look at the effect of the *anger manipulation* on erase decisions in Sderot. Columns 4–6 examine its effects in Ofakim. In Sderot, there is a fairly large and significant negative effect on subjects' latent erase decisions (a decrease between 23 and 40 points). The effect in Ofakim is smaller, positive, and less significant. There appears to be a curvilinear relationship between how much a subject took from their partner in the first interaction and how much they erased (positive and significant coefficient on *took from partner* and negative and significant coefficient on *took from partner squared*).[34] This quadratic relationship can be viewed as differentiating between two types of subject. For one type of subject, who took less than approximately 65 points,[35] the more they took from their partner, the more they erased. For those who took less than 65 points, I interpret how much they took from their partner as a proxy for aggressiveness. Other subjects, who took beyond 65 points, were playing closer to the Nash Equilibrium and erased less the more they took from their partner. Subjects in Sderot whose partner took more from them erased more. In Ofakim, there is no such relationship. This appears to confirm the hypothesis that exposure to violence may make subjects more willing to engage in negative reciprocity.

[33] Robust standard errors are derived from Huber-White heteroskedastic-consistent errors and are more resistant to out-liers and, in general, more robust to misspecification (Angrist & Pischke, 2008, 307).

[34] The likelihood ratio test statistic on whether a quadratic specification improves the model is significant in both Sderot ($\chi^2 = 6.85$, $p < 0.009$) and in Ofakim ($\chi^2 = 5.52$, $p < 0.019$.).

[35] The maximum of this relationship is 65 points $\frac{2}{2(0.015)} \approx 65$. The maximum of the marginal effect of *took from partner* from the pooled model also is very close to 65 points (≈63) based on 5,000 bootstraps.

There are large generational differences in political and democratic values between younger and older Jewish Israelis (with younger Jewish Israelis being more conservative than older Jewish Israelis). Therefore, I control for *age*.[36] Older subjects punish more than younger subjects. The first dimension of Israeli political competition (what defines "left" and "right") is generally considered national security and attitudes towards peace with the Palestinians (Schofield & Sened, 2005)—with right-wing Israelis taking a more hard-line on peace and coexistence than left-wing Israelis. Right-wing political sympathies, which I operationalize as *right-leaning*, serve as a rough proxy for feelings towards the out-group. I find that more right-leaning subjects erase less of their partner's income.

In the next section, I examine the pooled results for Ofakim and Sderot. I also explore the marginal effect of the emotional treatment and city of residence, whether the results are robust to matching, the effect of rocket exposure on erase decisions, and how reported levels of fear and anger mediate the outcome.

Pooled Results

Table 6 presents the pooled Tobit regression result for both Sderot and Ofakim. As in the previous models, there is a curvilinear relationship between how much subjects took from their partner and how much they erased. The effect of how much subjects' partners took is also positive and significant. Older subjects erased more and right-leaning subjects less.

Given the opposite findings for *anger manipulation* in Sderot and Ofakim, I interact *Sderot* and *anger manipulation*. The coefficient on *anger manipulation* × *Sderot* is negative and significant across specifications. Subjects who received the anger manipulation in Sderot had latent erase decisions that were 40–70 points less than subjects in Sderot who did not receive the anger manipulation. The effect of the anger manipulation in Ofakim is positive—albeit not significant across specifications. Comparing subjects who did not receive the anger manipulation, subjects in Sderot erased more than those in Ofakim.

While the Tobit regression coefficients of the latent erase decisions in Tables 5 and 6 demonstrate interesting relationships in the data, Greene (2008) recommends reporting additional marginal effects. Two types of marginal effects from the Tobit model are particularly relevant for a behavioral economics experiment with a unique Nash equilibrium that is a "corner solution" (erase decision = 0): (1) What is the effect of the independent variables on the probability of being uncensored ($P\ (0 < y^* < 100)$). The large left-censoring in the data gives this quantity a nice interpretation in the context of my experiment: what are the effects of the treatments (the manipulation received and city of residence) on the probability that a subject would move from erasing nothing to erasing anything.[37] (2) The second quantity of interest is the marginal effect of the treatments on the expected value of the observed erase decision ($E[y]$).

Given the small sample size and possible presence of outliers, bootstrapping is one method to build up confidence intervals on marginal effects using the observed data (Efron & Tibshirani, 1993). For each estimated quantity (γ), I first sample with replacement from the data (the empirical distribution) stratifying on the treatment variables—city of residence and whether they received the anger manipulation or not. I then estimate a Tobit model and the marginal effects from the core specification (Column 2, Table 6). I repeat this 5,000 times and get a bootstrapped estimate of the distribution of γ and use this to calculate confidence intervals on the marginal effects. In Figure 3, I plot the marginal effect of the anger manipulation and living in Sderot based on 5,000 bootstrapped stratified samples across treatments (*Sdeort* and *anger manipulation*).

[36] For an excellent article in the *Huffington Post* discussing different generational effects, see http://www.aolnews.com/2011/03/31/study-young-israelis-leaning-more-conservative/.

[37] While it is true that there were two subjects that erased 100 points, 36 subjects erased 0. Therefore, I interpret the marginal effect of the probability of being uncensored as a change from being left-censored to being uncensored.

Table 6. Pooled Tobit Results (robust standard errors in parentheses)

Variable	*Dependent Variable: Erase Decision*				
	(1)	*(2)*	*(3)*	*(4)*	*Matching (5)*
Constant	5.795	–66.518***	–111.076***	–94.281***	–60.879**
	(9.299)	(23.105)	(33.666)	(32.107)	(22.903)
Anger manipulation	15.152	21.387*	25.455*	39.679***	23.856
	(13.964)	(12.695)	(13.389)	(14.466)	(15.045)
Sderot	28.833**	28.464***	29.123***	45.665***	19.040
	(11.797)	(10.781)	(11.001)	(14.948)	(14.465)
Anger manipulation × Sderot	–39.919**	–52.089***	–68.480***	–74.981***	–61.846***
	(5.795)	(17.583)	(19.320)	(20.202)	(21.549)
Partner took		0.287*	0.363*	0.423*	0.439**
		(0.181)	(0.185)	(0.212)	(0.204)
Took from partner		2.221***	1.880***	1.830**	2.164***
		(0.662)	(0.699)	(0.728)	(0.634)
Took from partner squared		–0.018**	–0.014**	–0.016**	–0.017***
		(0.006)	(0.006)	(0.007)	(0.006)
Age			1.019***	0.758*	
			(0.382)	(0.406)	
Right leaning			–2.498	–	
			(1.642)	–	
Rocket exposure				–6.311***	
				(2.044)	
Rocket exposure × Sderot				3.762	
				(2.605)	
σ	42.150	38.259	37.255	34.236	35.296
	(3.816)	(3.276)	(3.887)	(3.999)	(4.698)
N	98	98	88	67	65
Matched (Sderot, Ofakim)	–	–	–	–	33,32
Unmatched (Sderot, Ofakim)	–	–	–	–	18,15
Left Censor ($Y = 0$)	36	36	36	25	23
Right Censor ($Y = 100$)	2	2	2	2	2
Pseudo R^2	0.010	0.035	0.052	0.063	0.043
Log Likelihood	–342.056	–333.323	–278.203	–216.791	–223.023

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

The top plot shows the marginal effect of living in Sderot, and the anger manipulation on the probability subjects erased anything. There appears to be a conditional effect of the anger manipulation on erase decisions. Subjects who received the anger manipulation in Sderot were about 25% less likely to erase anything. Subjects in Sderot who did not receive the anger manipulation were 25% more likely to erase. Neither of these confidence intervals overlap or straddle the zero. Comparing the marginal of the anger manipulation in Sderot and Ofakim, I find that the anger manipulation decreases the likelihood of erase decisions by 30% in Sderot but increases it by about 15% in Ofakim (albeit the confidence interval slightly straddles 0).

The bottom plot examines the effect of living in Sderot and the anger manipulation on the expected value of erase decisions. The pattern mirrors that of the above plot in the conditional effects of anger. The marginal effect of living in Sderot and receiving the anger manipulation is to decrease erase decisions by 10 points, while the effect of living in Sderot and not receiving the anger manipulation is an increase in erase decisions by 20 points. The marginal effect of the anger manipulation is to decrease erase decisions in Sderot by 15 points and increase them in Ofakim by 15 points (albeit with slightly wider confidence intervals that straddles 0).

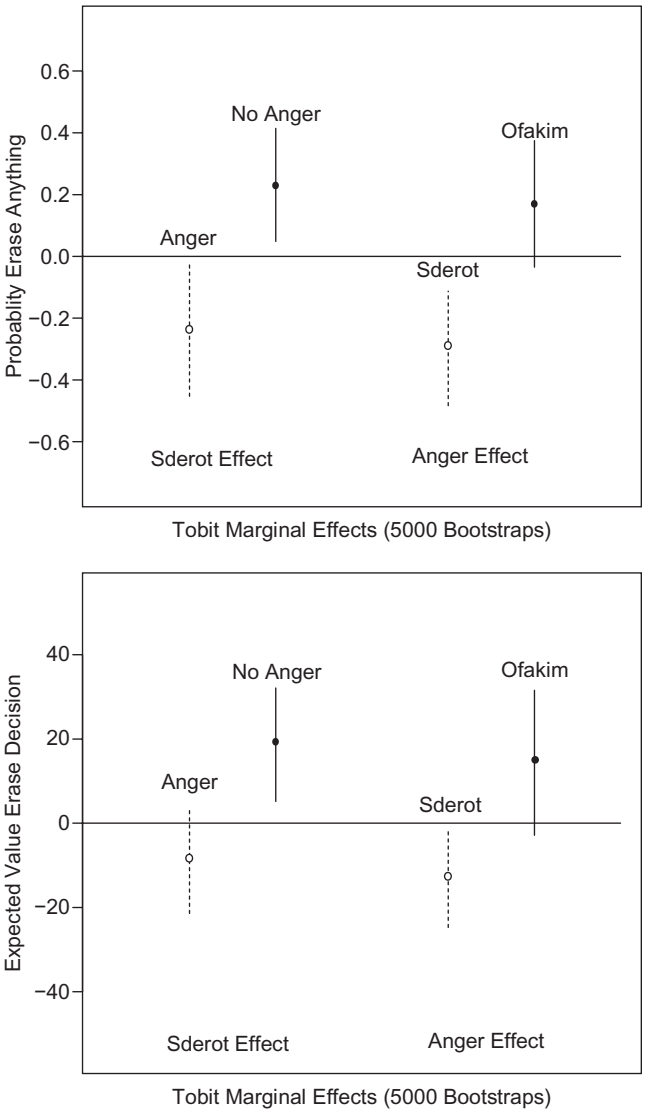

Figure 3. Tobit marginal effects of anger and sderot. 95% CI bars from 5,000 bootstraps. Y-axis in top graph represents change in probabilities and bottom graph change in points erased.

One concern about the differing effects of anger between Sderot and Ofakim may be that the results are driven by initial take decision differences. For instance, subjects in Sderot took more in the first round than subjects in Ofakim, and this is what is driving differences in the response to the manipulations. However, there is not a significant difference in how much subjects in Sderot and Ofakim took from their partners ($t = 0.409$, $p < 0.684$).

Robustness to Matching

Table 3 showed subjects' observable characteristics and raised concerns that baseline differences in age and secularity[38] in the subjects recruited in Sderot and Ofakim may have influenced the

[38] For example, religious values actually dictate charity, which may influence experimental behavior.

experimental findings. I use coarsened exact matching (CEM)[39] (Iacus, King, & Porro, 2012) to match on observable characteristics (*sex*, *age*, *secular*, *native born*,[40] and *combat unit*) and achieve balance across Sderot and Ofakim. Column 5, Table 6 presents the results using CEM.

The results from matching compare favorably with that of Column 2, Table 6. However, almost one-third of the observations are lost via the CEM matching procedure. The Tobit marginal effects of the anger manipulation and living in Sderot with the matched data are presented in Figure 4 and largely conform to those in Figure 3, albeit with slightly wider confidence intervals, most likely due to the smaller sample size.

Another interesting question is how individual-level rocket exposure affects individuals decision to erase. In the postexperiment survey, I asked a series of questions related to how many rocket attacks they had witnessed and how many friends or family were killed, wounded, or injured in rocket attacks. The sum of these two questions become a rough measure of rocket exposure. Residents in Sderot on average scored a 7 on the rocket exposure scale, whereas residents of Ofakim scored a 1 (t-test difference $p < 0.001$).[41] Column 4, Table 6, examines the effect of rocket exposure on erase decisions.

With the inclusion of *rocket exposure*, the signs and significance of the main variables largely match those from Table 6 (Columns 1–3). Given the differing levels of rocket exposure in Sderot and Ofakim, I interact[42] rocket exposure with Sderot (*rocket exposure* × *Sderot*).[43] I find that every incident of rocket exposure in Ofakim led to about a 6-point decrease in the latent erase decisions (y^*). In Sderot, the effect of one more incident of rocket exposure is more muted.[44] However, there needs to be caution when interpreting these results. Almost one-third of subjects did not answer some of the rocket questions.[45] In Table 7, I explicitly model the covariates that explain the missing data in rocket exposure.

Table 7 reports marginal effects from a probit model with a binary dependent variable (1 if rocket exposure data is missing, 0 if it is not). Marginal effects for dummy variables are a discrete change from 0 to 1. Continuous variables (marked with a *) are the marginal effect of a one standard deviation increase from the variables at their mean. Subjects in Sderot who did not receive the anger manipulation were about 30–37% less likely to respond to the rocket-exposure questions. Subjects who received the anger manipulation in Ofakim were approximately 37–47% less likely to answer rocket-exposure questions. There was an interactive effect to subjects who received the anger manipulation in Sderot. Using the coefficients in Model 1, subjects who received the anger manipulation in Sderot were ≈ 45% less likely to respond to the rocket-exposure questions ($37 + 31 - 23 \approx 45$) than a subject from Ofakim who did not receive the anger manipulation. It also appears that the way the game played out (positive coefficients on *took from partner* and *partner takes*) influenced subjects' willingness to answer rocket-exposure questions (albeit to a smaller extent than *Sderot* and *anger manipulation*). There may be an issue that people who had high levels

[39] CEM matches across the distribution—not only at the means—and explicitly allows the user to progressively coarsen the matching procedure.

[40] As previously discussed, Sderot and Ofakim have faced different waves of immigrants. It could be that Jews born in different regions (e.g., Former Soviet Union vs. North Africa) make different decisions and that not controlling this leads to omitted variable bias (I am grateful to a reviewer for pointing this out to me). In an online appendix, I explore this and show that controlling for Jews from different regions does not alter the results.

[41] This is excluding one resident of Sderot who had a rocket-exposure score of 100.

[42] This interaction is meant to capture the fact that it is unlikely that individuals who have lived for nearly 10 years under continual threat from rockets (Sderot) versus two years of sporadic threat (Ofakim) will have the same marginal response to rocket exposure. Moreover, research by Friedland and Merari (1985) theorizes such a nonlinear reaction to terrorism exposure.

[43] I also tested a quadratic specification for *rocket exposure* but find that the quadratic term is not significant (results not reported).

[44] $\beta_{rocketexposure} + \beta_{rocketexposure \times Sderot}$.

[45] Hobfoll, Canetti-Nisim, and Johnson (2006) term this kind of aversion to bringing up traumatic events as "defensive coping."

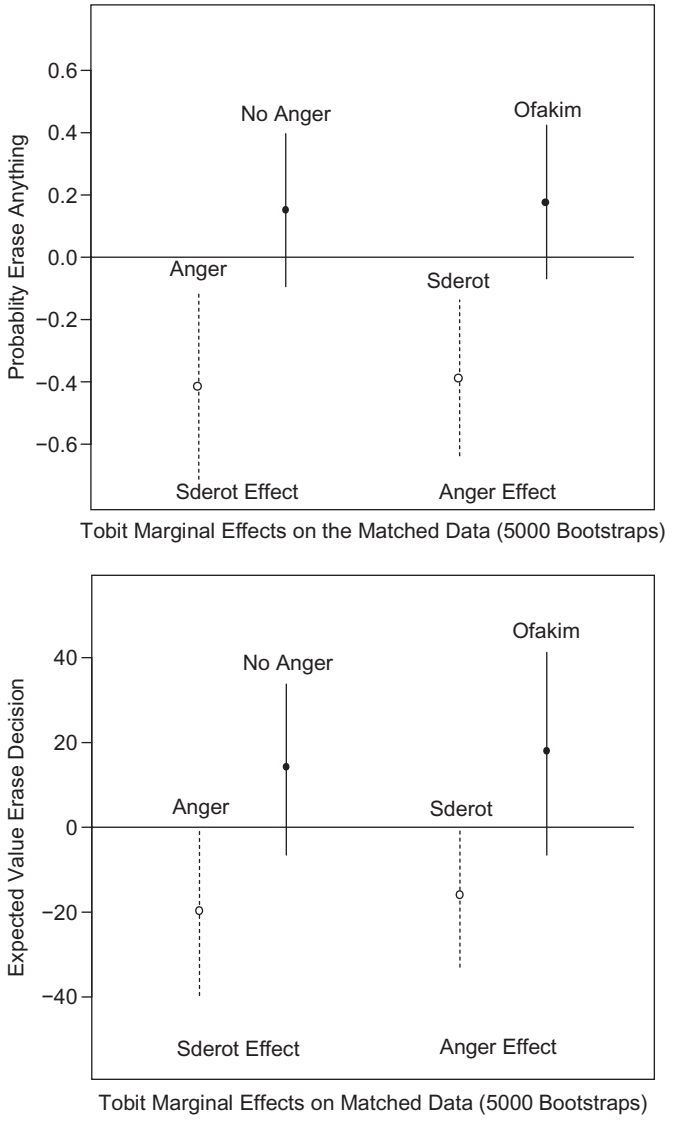

Figure 4. Tobit marginal effects of anger and sderot on matched data. 95% CI bars from 5,000 bootstraps. Y-axis in top graph represents change in probabilities and bottom graph change in points erased.

of rocket exposure did not want to answer the rocket questions ("high-exposure missing") or conversely that those with lower levels chose not to answer the question ("low-exposure missing").

In order to address the missing data for rocket-exposure questions and see how different assumptions about the missingness, "high-exposure missing" or "low-exposure missing" influence the results, I compare imputation under the two assumptions and derive bounds between which the true effect of rocket exposure likely resides. For "low-exposure missing", I assume that individuals who did not answer the rocket-exposure questions were more likely to have had low exposure. Therefore, I impute the missing rocket data at the 10% level of rocket exposure within each city city (0 in Ofakim, 2 in Sderot). Conversely, to model "high-exposure missing," I assumed that nonresponse in the rocket-exposure questions is due to high exposure, so I impute missing rocket

Table 7. Missingness in Rocket Exposure in Sderot and Ofakim (95% CI in parentheses)

Variable	*Dependent Variable: Missing Data (Binary)*	
	Model 1	*Model 2*
Anger manipulation	0.370	0.466
	[0.096, 0.645]	[0.212, 0.720]
Sderot	0.307	0.369
	[0.057, 0.557]	[0.126, 0.611]
Anger manipulation	–0.230	–0.304
× *Sderot*	[–0.484, 0.024]	[–0.499, –0.108]
*Took from partner**		0.127
		[0.025, 0.229]
*Partner took**		0.073
		[–0.013, 0.159]
N	98	98
Pseudo R^2	0.087	0.168

* Continuous variables

data at the 90%-level of rocket exposure (3 in Ofakim, 14 in Sderot). Using the same Tobit specification from Column 4, Table 6, I impute the missing data for *rocket exposure* with 10%-level imputation and 90%-level imputation. I then compare the effect of rocket exposure in the imputed data with the baseline data.[46]

The plots in Figure 5 compare the marginal effect of rocket exposure on the expected value of the erase decision (y) with the missing data case and rocket exposure imputed at the 10% level and at the 90% level. The top plot shows that the marginal effect of one more incident of rocket exposure is negative, small, yet fairly significant in the missing and 90% case for Sderot. The 10% imputation for Sderot largely straddles 0. The estimated effect of one more unit of rocket exposure in Ofakim is negative and has a larger coefficient than in Sderot but with larger confidence intervals in the missing case and 90% imputation. This is an important result—the effect of additional rocket exposure has a largely prosocial effect on intragroup conflict (it reduces erase decisions).

The marginal effect of one more unit of rocket exposure is a good metric to get at the differential effect of rocket fire in the two cities. However, Sderot has been comparatively affected to a much larger extent than Ofakim. Another quantity of interest is the marginal effect of having one standard deviation above the mean exposure within each city. This has an intuitive interpretation—what is the effect of having above average rocket exposure within a subject's community. To calculate the effect of above-average rocket exposure, I multiply the marginal effect sizes by the standard deviation in rocket exposure—two in Ofakim and five in Sderot.[47] The bottom plot in Figure 5 shows the effect of above-average rocket exposure on erase decisions in Sderot and Ofakim. These effects are almost identical in the missing case (≈ -8.55 in Sderot and ≈ -8.47 in Ofakim) and the 90% imputation (≈ -6.21 in Sderot and ≈ -6.21 in Ofakim). In the 10% imputation, the results are less equal (≈ -3.43 in Sderot and ≈ -6.74 in Ofakim) and the confidence intervals wider.

There are two observations that can be gleaned from this graph: (1) The estimated effect from the missing data overstates the effect of above-average rocket exposure by 1.3–2 times; (2) I hypothesize from Table 7 that those who have higher levels of exposure were probably more likely to avoid answering the rocket-exposure questions (given the fact that those in Sderot were less likely to answer). This would imply that the 90% missing estimates are better estimates of the true effect

[46] All calculations omit the outlier observation who reported a rocket exposure of 100.
[47] This is excluding the outlier for rocket exposure.

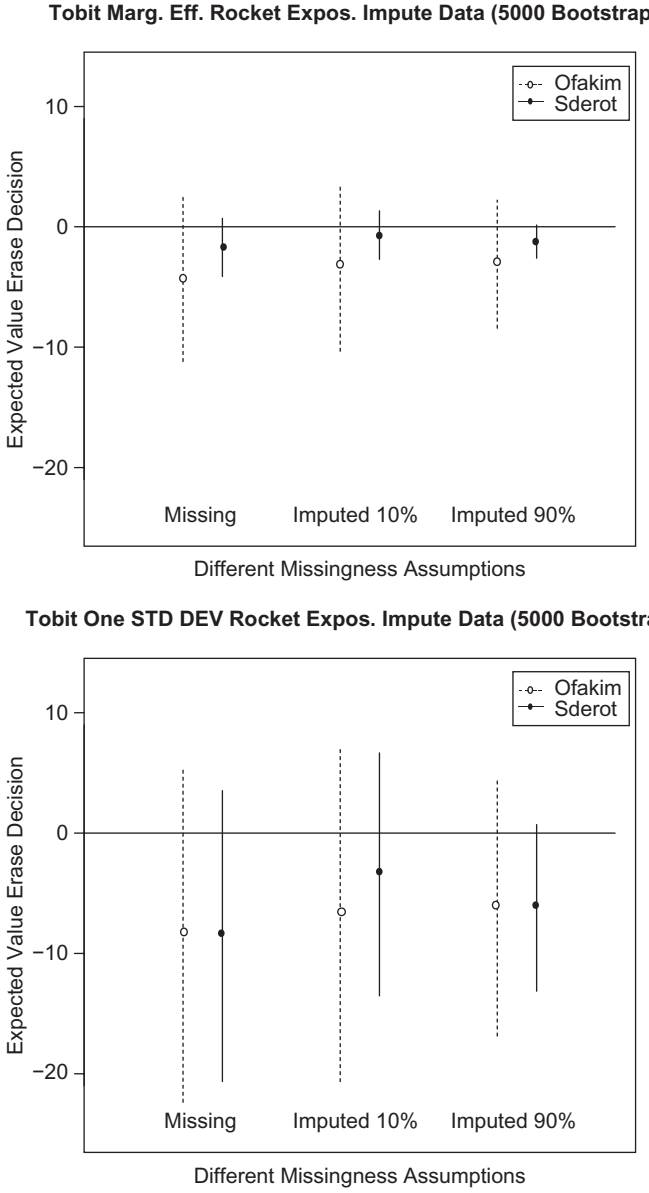

Figure 5. Missingness and marginal effect of rocket exposure. 95% CI bars from 5,000 bootstraps. Y-axis represents a change in points.

of above-average rocket exposure in Sderot and Ofakim—and the effect of having above-average rocket exposure in the two cities is almost identical. It may be that citizens calibrate their response in reference to the equilibrium level of rocket exposure within their community.

Mediating Effect of Reported Emotions

The previous sections suggest a conditional effect of the anger manipulation on erase decisions. While the anger manipulation did increase reported levels of anger and fear (slightly), it is still

unclear through which emotions (if any) the manipulation mediates subjects' erase decisions. To see whether emotions actually influence erase decisions, it is crucial to empirically test whether the anger manipulation was mediated via the reported emotions (anger or fear). Imai, Keele, and Tingley (2010) provide a framework for examining these mechanisms by updating the work of Baron and Kenny (1986) to estimate average causal mediation effects (ACME). Myers and Tingley (2012) look at how manipulated discrete emotions (using similar writing tasks to the one in this study) mediate decisions in a trust game using the Imai, Keele, and Tingley (2010) framework in the mediation package implemented in the R statistical software. They demonstrate the importance of measuring effects via mediated emotions.[48]

I use the mediation package to examine the effect of reported levels of fear and anger in the manipulation check and their effect on subject's erase decisions. I estimate two equations. In the first stage, I estimate a linear equation for reported levels of fear and anger separately for Sderot and Ofakim. For both emotions (anger and fear), I include a trait-level emotion. To predict fear, I use reported levels of stress (Cardeña et al., 2000). For anger, I use willingness to seek vengeance (trait-level) (Stuckless & Goranson, 1992). These measures capture individual differences in baseline sensitivity to the particular emotion. Additionally I include a dummy variable for the sex of the subject (male or female) to control for sex differences in emotional responses.[49] Of chief importance, I also include a dummy variable whether or not they received the anger manipulation to estimate their emotional state. For the second equation, I estimate a Tobit model using the same specification in Columns 2 and 4 from Table 5 and adding the relevant reported emotion (anger or fear) for Sderot and Ofakim. The ACME results for fear and anger with a 95% Quasi-Bayesian confidence interval from 1,000 simulations calculated using the mediation package are presented in Figure 6.

Each graph provides estimates of five effects: (1–2) the mediation effect of the reported emotion (fear or anger) and its effect on the erase decision for treated subjects (those receiving the anger manipulation) or the untreated subjects (those not receiving the anger manipulation), (3–4) the direct effect of the anger manipulation on erase decisions for treated and untreated subjects, and (5) the total effect is the combination of the mediation effect and the direct effect. I am principally interested in the mediation effect of reported emotion (1–2) and whether it is similar in magnitude and direction to the direct effect (3–4).

The top graphs estimate the ACME for Sderot for the anger mediator (left) and fear mediator (right). In both graphs, the ACME for reported levels of fear and anger is zero, with confidence straddling the x-axis, and does not mediate the direct effect. There does not appear to be different effects for treated and untreated subjects (i.e., no interactive mediation effect). The total effect and direct effect for receiving the anger manipulation is negative for both the fear and anger mediator and echoes the previous findings for the effect of the anger manipulation in Sderot.

The bottom graphs estimate the ACME for Ofakim for the anger mediator (left) and fear mediator (right). In both graphs, the total and direct effects appear to be positive, as opposed to negative (like in Sderot). However, the confidence interval does slightly overlap zero. The fear mediator also appears to be ineffective—estimated at zero in Sderot. The pertinent graph is the one of the anger mediator in Ofakim. The estimated mediation effect is largely negative and in the opposite direction of the direct effect. Higher reported levels of anger appear to dampen the direct effect of the anger manipulation—particularly for treated subjects. This is a key result—reported levels of anger following the anger manipulation appear to mediate the direct effect of the manipulation in Ofakim, but not in Sderot. In the next section, I will explore what may account for the differential response and effects from the anger manipulation in Ofakim and Sderot.

[48] They find mixed results for the ACME measures for reported anxiety and anger mediating the emotional inductions on trust decisions.

[49] See Campbell (2006).

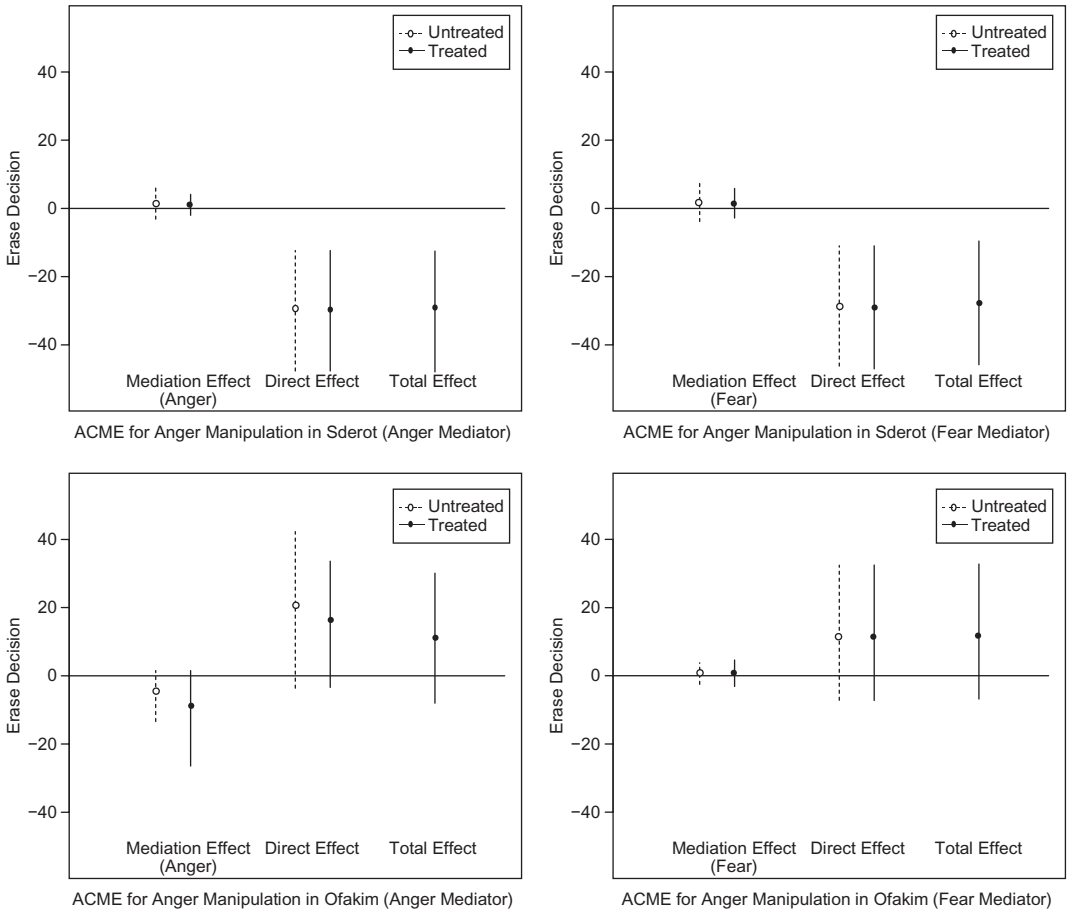

Figure 6. Mediating effect of anger and fear on erase decisions in points. 95% CI bars from 1,000 Simulations. Y-axis represents a change in points.

Interpretation and Conclusion

The results of the experiments in Sderot and Ofakim find support for the hypothesis that anger and heightened threat may lead to greater in-group cohesion (reducing erase decisions in Sderot).[50] The mediation analysis further suggests that the differences between responses in Ofakim and Sderot are partially mediated by anger, not fear. While the anger manipulation increased fear in Sderot and not in Ofakim, the higher levels of fear do not seem to be driving the mediation results. Furthermore, while fear and anger over the rockets are inherently intertwined in Sderot, it appears the anger in the absence of fear (Ofakim) versus anger in the presence of fear (Sderot) is driving the divergent results in the two cities. Given the small sample size in the current study ($n = 98$), this is a strong effect. Moreover, an important distinction between the current study and others (Halperin, Russell, et al., 2011; Huddy et al., 2007; Lerner et al., 2003; Tagar et al., 2011) is that my experiment measures the interactive effect of anger and exposure to violence on intragroup conflict. However, the effect of

[50] This increase in in-group cohesion can also be seen as an increase in solidarity. This solidarity is not based on social ties—there are no differences in social ties between Sderot and Ofakim (see Table 3)—rather when the threat from rockets is activated, residents of Sderot show more solidarity to each other.

exposure to violence (living in Sderot) and rocket exposure is less clear. While rocket exposure seemed to have a smaller influence on subjects living in Sderot than in Ofakim, a standard deviation above each city's mean in exposure was almost identical. However, both of these results are somewhat complicated by missing data.

A further important difference in the findings between Sderot and Ofakim is the differing levels of negative reciprocity. Subjects responded to higher amounts that their partner took from them with higher erase decisions in Sderot—whereas in Ofakim, the erase decisions were not correlated with what their partner took from them. Additionally, in a postexperiment survey question[51] that asked subjects what they thought was the motivation for their partner's decision, subjects in Sderot were more likely to believe that their partner was "out to get them" as opposed to "just playing the game" ($t = 1.784$, $p < 0.078$). This result was independent of which manipulation they received and previous history in the game, suggesting that continued exposure to violence may make individuals more sensitive to responding to perceived provocation and more likely to assign negative intentions to them.[52]

The conditional effect of anger on subjects' willingness to punish an anonymous partner deserves further scrutiny. The finding that subjects from Ofakim who were primed for anger were more likely to lash out against a member of their community, whereas in Sderot the opposite occurred, is consisent with group emotion theory (Mackie et al., 2000; Maitner et al., 2006). Yet what can account for the different reactions to the anger manipulation? One clue lies in the strikingly different content of the anger manipulation in Sderot and Ofakim. The following is a typical response to the anger manipulation in Sderot.

> "The thing that makes me so angry is that in our country we (residents of Sderot) are considered the lowest of the low. So there is no pressure from Israelis to stop the bombing. And now we are stressed about what will happen to our children. Someone who lives in the center (of Israel)[53] can't feel what it is like to be in our shoes. It's like he is in some other country living happily ever after in comparison to what is going on in Sderot."—Sderot subject

Subjects in Sderot largely expressed frustration at the central government for not protecting them from rocket attacks and felt abandoned. Not one of the residents of Sderot suggested taking military action against the Palestinians. The content of the anger manipulation in Ofakim was quite different.

> "So I am angry because the state of Israel should have put an end to this (the rocket attacks) a long time ago. I served in Gaza in the Gaza Brigade and I remember the Oslo Accords in 1997. We gave them weapons from our base, rifles from our base, in order for them to kill with and hurt us? We are to blame for everything that happened. If Israel would have treated them (the residents of Gaza) with an iron fist, it wouldn't end up like this. We are giving too much to them and this is why they are launching rockets at us. I think that if Israel responds with an iron fist to each Qassam and bombs their underground tunnels, then they (Hamas and Gazans) will learn. I can say almost for sure that the Palestinians citizens are not to

[51] It was administered before subjects found out how much their partner erased.

[52] Some might question whether there is simply a lot of "lashing out" behaviors in Sderot (I am grateful to a reviewer for pointing this out to me). However, residents of Sderot have expressed cohesion within the members of their own community and turned their struggle in bomb shelters towards positive outlets. For example, Sderot has become a focal point for a growing rock and music scene within Israel. See http://www.nytimes.com/2007/04/27/world/middleeast/27sderot.html.

[53] The core is a term for the major urban centers in Israel: Tel Aviv, Haifa, Jerusalem. The periphery refers to the surrounding areas and generally less economically and socially important areas.

> blame, but their leadership is. . . . I think we should try to make peace, if that doesn't work, we should teach them a lesson."—Ofakim subject

In Ofakim, subjects almost universally lamented the perceived impotence of the Israeli government in the face of continued rocket attacks and expressed anger towards the Hamas. In contrast, in Sderot residents felt abandoned by the government because of its inability to protect them[54] and actually sympathized with the Palestinians.[55] These divergent attitudes towards the Palestinians suggest that willingness to seek out retribution does not linearly increase with exposure to violence. Rather, past a certain point, it may actually lead the affected population to be more willing to make accommodations with armed groups.[56]

The most interesting and important finding (reflected in the content of the anger manipulation) is that exposure to violence moderated the differential reaction via group emotions. Frustration and the perceived inability of the Israeli military to halt the rockets led to negative in-group behavior in Ofakim. However, in Sderot the shared experience of rocket fire appears to have led to greater in-group cohesion (lower erase decisions). Further reflected in the response to the anger manipulations in Sderot is the idea that, as residents of Sderot, they share a common psychological and economic hardship that binds them together as a group. Rather than define their in-group/out-group as Israeli versus Palestinian (as in Ofakim), they appear to define it as Sderot versus the rest of Israel. For instance, a common refrain of residents in Sderot was the feeling of abandonment. As one subject in Sderot noted, "nobody came to see what was going on with us (following the rocket attacks); not the Welfare Ministry (Israeli Ministry of Welfare and Social Services), nor anyone else from the government." The cohesion theory outlined earlier suggests that those who stayed behind in Sderot after the rocket fire began may have had stronger community ties or developed them after the attack—and that this could be driving differences between Sderot and Ofakim. However, there is no significant difference in the number of social ties in Sderot and those in Ofakim (see Table 3). This finding suggests that a history of violence partially shapes the way individuals define their in-group and how group emotions, particularly anger stemming from the conflict, are processed. Furthermore, the psychological process has important implications for our understanding of political conflict, particularly in a country such as Israel, where geography largely defines risk from terrorism (Gould & Klor, 2010) and may influence strategic behavior by both the Israeli government and the Palestinians.[57]

Two limitations of the present study also emerge: (1) The findings suggest that anger, and to a lesser extent, fear, can influence in-group behavior following violence. However, as Halperin, Sharvit, and Gross (2011) suggest, other secondary group emotions beyond the scope of this study (such as pride, shame, guilt, and frustration) may also play important factors in group conflict situations. Further studies should focus on these. (2) While exposure to violence and cueing anger may increase in-group solidarity, its effect on intergroup relations (between Israelis and Palestinians) is not probed in this study since only Jewish Israelis participated.[58] Recent research I have conducted in Acre, Israel—a mixed Jewish and Palestinian Citizens of Israel (PCI) city that experienced four

[54] See the following article on the continued delays in funding and deployment of the "Iron Dome" missile shield designed to guard against rockets from Gaza: http://www.haaretz.com/news/iron-dome-rocket-defense-system-will-take-years-to-deploy-1.265642.

[55] One subject in Sderot noted, "Residents of Gaza have a right to defend themselves (against Israeli attacks) and so do we (against the rocket attacks)" in response to the lack of government defense.

[56] Friedland and Merari (1985) and Gould and Klor (2010) find similar results for exposure to violence and terrorism.

[57] See Getmansky (2011) for an excellent analysis of how geography and domestic politics influence counterterrorism protection strategies and terrorists' target selection in Israel.

[58] Another question may be about whether having an interaction, rather than a text manipulation, with an out-group member influence these findings. Recent research by Gubler (2011) suggests that the results of this are nonobvious. See http://joshuagubler.wordpress.com/research-papers-publications-data/.

nights of ethnic rioting in 2008—extends this project to study the intergroup effects of anger. It looks at how priming group anger over the riots influences allocations in a similar behavioral economics experiments both within (Jewish-Jewish and PCI-PCI) and across groups (PCI-Jewish) living in Acre (Zeitzoff, 2012). I find that PCIs personally exposed to riot violence and primed for anger are more generous to their Jewish partners than those in a neutral condition. However, this effect is not found for Jews—suggesting that group status (Jewish Israelis are generally richer and have more economic and social opportunities than PCIs)—influences the processing of group emotions.

The finding of the conditional effect of exposure to terrorism and incidental anger on retaliation (punish a partner from their community in a game) is a first step towards disentangling the effects of emotions and exposure to violence on economic and political behavior. However, more work is necessary to understand how anger and blame attribution affects intragroup as well as intergroup relations. Given the importance of the Israeli-Palestinian conflict, exploring how anger affects relations between Israelis and Palestinians (living in Gaza and the West Bank) who remain in direct conflict represents an important future direction for political psychology research.

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