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Recalled emotions and risk judgments: Field study of the 2006 Israel-Lebanon War

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Abstract

The current study is based on a field study of the 2006 Israel-Lebanon war that was conducted in two waves, the first two weeks after the end of the war, and the second 18 months later (2008). The purpose of the study was to examine recalled emotions and perceived risks induced by manipulation using a short videoclip that recalled the sounds of the alarms and the sights of the missile attacks during the war. Before filling in the study questionnaire in 2008, the experimental group watched a short videoclip recalling the events of the war. The control group did not watch the video before filling in the questionnaire. Using the data provided by questionnaires, we analyzed the effect of recalled emotions on perceived risks in two different regions in Israel: the northern region, which was under missile attack daily during the war, and the central region, which was not under missile attacks. The videoclip had a strong effect on the level of recalled emotions in both regions, but it did not affect risk judgments. The results of the analytical framework in the northern region support both the valence approach, in which negative emotion increases pessimism about risk (Johnson & Tversky, 1983), and the modified appraisal tendency theory, which implies different effects for different emotions (Lerner & Keltner, 2000). The current study emphasizes the effects of recalled emotion in the context of the 2006 Israel-Lebanon war on perceived risks among those in the northern region who were under direct attack compared to those who were not directly exposed to the war. Understanding people's responses to stressful events is crucial, not only when these events take place but also over time, since media-induced emotions can influence appraisals and decisions regarding public policies.

Keywords: risk perception, emotions, terrorism, Israel.

1 Introduction

The current study is based on a field study of the 2006 Israel-Lebanon war. The study examines recalled emotions and perceived risks 18 months after the end of the war in two regions in Israel: the northern region, which was under missile attack daily during the war, and the central region, which was not under missile attacks.

The Israel-Lebanon war of July-August 2006 affected the lives of Israelis living in the north of Israel, which was hit by massive barrages of missiles sent by Hezbollah militias. Many civilians were injured, some lost their homes, and 44 lost their lives. In effect, the region's economy was paralyzed, and most places of work remained closed. Indeed, the war had an indirect impact upon the entire country. Naturally, the attacks generated anger, fear, and other negative emotions among the population.

In a 2006 study, we examined the effects of the 2006 Israel-Lebanon war on emotions and self-risk perceptions among civilians living in two regions: the north, which was under missile attack during the war, and the center, which was unaffected by the missiles (Benzion et al., 2009). In the current study we compare the emotions and risk judgments of individuals made at that time (2006) with the recalled emotions and risk perception of individuals from the same two regions 18 months later. The first wave of the study was conducted in September 2006 (two weeks after the end of the 2006 Israel-Lebanon War), while the second wave was in March 2008, 18 months after the end of the war. In addition, for one of the subgroups in the 2008 sample we used an experimental design that included a short videoclip recalling the sounds of the alarms and the sights of the missile attacks during

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the 2006 war. Participants in this group filled in a questionnaire about recalled emotions and future risk judgment after watching this videoclip.

Comparing the samples from 2006 and 2008 with and without the videoclip enables us to examine:

1. The effect of the videoclip on recalled emotions and perceived future risks estimation, by comparing the 2008 group that saw the videoclip to the 2008 group that did not see the videoclip.
2. The effect of time on recalled emotions and perceived risks, by comparing the 2006 group to the 2008 group that did not see the videoclip.
3. The differences in recalled emotions and perceived risk between the northern region groups (exposed to missiles attack) and the central region groups (not exposed to attacks), both in 2006 and 2008.
4. The effect of recalled emotions on future perceived risks 18 months after the end of the war.

In addition, the sample data enable us to compare two theoretical approaches: the valence approach (Johnson & Tversky, 1983, henceforth J&T) and a version of the appraisal tendency approach (Lerner & Keltner, 2000).

The paper is organized as follows: Section 2 presents the literature review, Section 3 describes the main hypotheses of the study, and Section 4 describes the methods. Section 5 presents the major results, and Section 6 summarizes the conclusions.

2 Literature review

Over the last two decades, several studies have considered the relation between emotions and risk perceptions (Lerner et al., 2003; Fischhoff et al., 2003a, 2003b, 2005; Holtgrave & Weber, 1993; Loewenstein et al., 2001; Mellers et al., 1999, Benzion et al., 2009). The theoretical findings of the valence approach (Johnson & Tversky, 1983; Wright & Bower, 1992) predict that fear and anger will have similar influences on judgment, both leading to pessimistic risk perception. Therefore, according to this approach, fearful and angry people should make relatively pessimistic risk assessments.

In contrast, the appraisal-tendency framework (Lerner & Keltner, 2000) suggests that negative emotions such as fear and anger are likely to influence a variety of judgments in highly differentiated ways. Lerner and Keltner (2000) argued that, because anger and fear diverge, especially on appraisals of uncertainty and control, they should exert differential influences on risk assessments. Fear, which is marked by great uncertainty and situational control, should predict pessimistic assessments, while anger, which is marked by certainty and individual control, should predict optimistic assessments. Consistent with this appraisal-tendency view, Lerner and Keltner (2001) and Lerner et al. (2003) found that fearful individuals (as a result of the events of September 11, 2001) assessed level of risk in the environment differently than did angry individuals, with fear predicting higher risk assessments and anger predicting lower assessments of risk. Yet, the authors also mentioned that appraisal tendency predictions are goal-directed processes by which emotions affect judgment and choice in ways specific to the events that evoke them.

Our previous study (Benzion et al., 2009) examined how the emotions of fear and anger evoked by the 2006 Israel-Lebanon war affected perceptions of self-risk, including risks of terrorism and routine risks, among individuals living in the northern region, who were affected by the missile attacks and among individuals living in the central region, who were not exposed to the attacks. Regarding the emotion of fear, in the war-torn northern region, fearful people made pessimistic judgments with respect to risk. This result is compatible both with the valence theory (Johnson & Tversky, 1983; Wright & Bower, 1992) and the appraisal-tendency framework (Lerner & Keltner, 2000). Nevertheless, for the control group in the central region we did not find any relation between fear and perceived risk.

Regarding the emotion of anger, we found for the 2006 sample that among Jews living in the north, angry people made pessimistic judgments with respect to general self-risk and self-risk from terrorism. No impact of anger on risk perception was found for the control group (central region). This result is compatible with the valence approach, but is not compatible with the appraisal-tendency framework with respect to the relation between anger and risk perception.

Other studies have examined the ongoing state of war in Israel. Sagy and Braun-Levinsohn (2009) examined stress reactions among young people living under rocket fire. They found that young people living in the north, who experienced acute stress during the 2006 war, exhibited higher anxiety scores than their counterparts living in Sderoth in the south, who experienced ongoing missile attacks over a long period of time. Shamai and Kimhi (2006) focused on the implications of Israel's withdrawal from Lebanon in 2000 on Israeli teenagers. They found that the political attitudes and levels of stress of teens living in the north — close to the Israeli-Lebanese border — differed significantly from those of their counterparts living in the country's center, far from the border. Those from the center scored higher on pro-war political attitude, while those from the north scored higher on level of stress.

Studies by Lerner et al. (2003) and Fischhoff et al. (2005) about the events of September 11th used both experimentally induced emotions and those occurring naturally to examine the effects of anger and fear on risk judgments and policy preferences. Respondents under each condition (fear or anger) were shown a picture and listened to an audio clip about terrorism that had, in pretests, evoked the target emotion. All stimuli came from major USA media outlets (CNN and the *New York Times).* Fischhoff et al. (2005) found that a fear-inducing manipulation increased risk estimates, whereas an anger-inducing manipulation reduced them, in predictions as well as in memories and judgments of past risks. Similarly, Lerner et al. (2003) found that respondents exposed to a fear-inducing manipulation assigned higher probability to five negative consequences of terrorism compared to respondents exposed to an anger-inducing manipulation. These emotions carried over to probability judgments for routine risks having no obvious connection to the terrorism-related manipulations (e.g., coming down with the flu).

In point of fact, Johnson and Tversky (1983) also found that mood induced by brief reports had a large impact on estimates of risk frequency, and that the effect was independent of the similarity between the story and the risk. This result did not support their hypothesis, called "the gradient generalization hypothesis," which implies little or no effect on the estimated frequency of unrelated risks to the manipulation. This hypothesis is suggested by the classical notion that the gradient of generalization is determined by the similarity between the critical stimulus and the target.

Based upon Lerner et al. (2003), and Fischhoff et al. (2005), the present study uses priming manipulation by showing participants a short videoclip taken from the national media that recalls the sounds of the alarms and the sights of the missile attacks during the 2006 war. The current study contributes to the existing literature in the following ways: (a) Our field study examines the effect of recalled emotions, induced by videoclip, on perceived risks in the unique context of the 2006 Israel-Lebanon war. (b) The study compares recalled emotions and perceived risks between people from two regions: the north, where people were under constant missile attack during the two months of the war and at direct risk, and the center, where people were not directly exposed to the attacks and were not at risk. (c) Using the war-related data, we compare the relation between emotions and risk judgments based on two different theories: the valence approach and the appraisal tendency approach. (d) We retest J&T's gradient generalization hypothesis by comparing the effects of emotions on perceived self-risk of terror versus routine risks that are not related to the risk from war.

3 Main hypotheses

We assume that the war events in 2006 and the videoclip recalling the sounds of the alarms and the sights of the missile attacks during the 2006 war will induce recalled negative emotions and will affect participants' risk judgments, as was found in previous studies (e.g., Fischhoff et al., 2005; Vastfjall et al., 2008; Johnson & Tversky, 1983).

We define two indexes: a *Negative Emotions* index, comprising a combination of anger and fear levels, and an *Anger-Fear* index, comprising anger level minus fear level. Based on the valence approach (Johnson & Tversky, 1983; Wright & Bower, 1992), which predicts that negative emotions will lead to pessimistic risk perception, we expect that higher scores on the Negative Emotions index will predict higher terror risk estimations (Hypothesis 1a below).

According to the appraisal tendency framework, fear predicts higher risk assessments and anger predicts lower assessments of risk. Based on a modified version of the appraisal-tendency approach that examines the impact of anger level minus fear level on risk perception, we expect that higher scores on the Anger-Fear index will predict lower terror risk estimates (Hypothesis 1b below).[1]

We also expect that recalled emotions will have a lower effect on routine risks in comparison to terrorism risks, since we expect these kinds of risks to seem less important compared to the risk of being attacked by missiles. This hypothesis is compatible with the gradient generalization hypothesis of Johnson and Tversky (1983)[2] (Hypothesis 1c below).

Therefore, we put forward the following hypothesis.

Hypothesis 1: The effect of recalled emotions on perceived risks:

(a) *Higher levels of negative emotions index will induce a more pessimistic perceived risk of terror.*

(b) *Higher levels on the Anger-Fear index will induce lower risk estimates.*

(c) *The Negative Emotions index and the Anger-Fear index will have less impact on perceptions of routine risks than on perceived self risk of terror.*

Regarding the effect of time on recalled emotions and perceived risk, there are two possibilities: (a) the passage of time since the 2006 war events will reduce concern over terrorism and hence reduce the level of emotions,

[1] The study by Lerner et al. (2003) used separate manipulations for fear and anger emotions, while in our study the war and the manipulation induced several negative emotions simultaneously.

[2] Nevertheless, Johnson and Tversky (1983) did not find evidence for their gradient generalization hypothesis.

Table 1: Summary of demographic and other characteristics of the sample.

District	Subgroup	N	Gender		Mean age
			Male(%)	Female(%)	
North	2006 group	86	47	53	30.6
	2008 with videoclip	122	24	76	24.4
	2008 without videoclip	164	24	76	25.7
	All north sub groups	372	29	71	26.4
Center	2006 group	84	62	38	30.2
	2008 with videoclip	69	57	43	31.4
	2008 without videoclip	47	51	49	24.1
	All center sub groups	200	58	43	29.2

(b) the passage of time will raise concerns over terrorism and hence increase the negative emotions, since during the 18 months after the war the Israeli media have focused on the growing power of the Hezbollah militias in Lebanon and their potential threat to Israel. In the absence of more information, we cannot predict which effect will be stronger.

4 Methodology

4.1 The questionnaire

The questionnaire was based on the questionnaire devised by Lerner et al. (2003), which was translated into Hebrew, adapted to the Israeli situation, retested, and validated in our previous study (Benzion et al., 2009). The questionnaire included items measuring:

1. Emotions: anger and fear were measured by a six-item Anger and Fear Subscale. Participants were asked to estimate the level of emotions they felt during the 2006 Israel-Lebanon war.

2. Measurement of perceived risk was based on the *Risky Events and Precautionary Actions for Self* questionnaire (Lerner et al., 2003). Respondents were asked to indicate how likely it was that they themselves might experience each of six risky events and precautionary actions within the next 12 months. The anchors for these scales were 0% (the event is impossible) and 100% (the event is certain to happen). Three items concerned terrorism (for example, "You will be hurt in a terror attack"), and three involved routine risks (for example, "You will come down with the flu").[3]

[3]The items were combined to form the scales based on the scales in Lerner et al. (2003), with the exception of several items that were omitted from the original questionnaire because they were not relevant to the Israeli situation.

4.2 Sample and procedure

The study was conducted at two points in time: in September 2006, two weeks after the end of the 2006 Israel-Lebanon War, and in March 2008, 18 months after the war ended. At both study points, the sample included 572 individuals, 372 (mean age 26.4) from the northern region who had been directly affected by the missile attacks in 2006, and 200 (mean age 29.2) from the central region who had not been affected by the missiles.

The participants in both waves included: (a) students at the Emek Yezreel College and the northern branch of the Open University who live in the north; (b) students from the Open University in Tel-Aviv and Ramat-Gan and the College of Management in Rishon Lezion, all living in the central region.[4,5]

The questionnaires were distributed during class among students in these higher education institutions and collected after about half an hour. In both waves, most of the students in the classes answered the questionnaire (very few refused to answer).

As mentioned above, the groups of participants from the northern and central regions were each divided into three sub-groups: (a) participants who completed the questionnaire in September 2006, two weeks after the war ended (2006 group); (b) participants who completed

[4]In addition, the 2006 sample included a small group of employees (27) of an industrial plant in the north. For these participants, the questionnaires were distributed in envelopes in several departments and were collected a day later. The response rate among the employees was about 60%.

[5]Thirty-five participants partially answered the part on risk in the questionnaire, while 10 participants partially answered the emotions part. We used these partially completed questionnaires to compute the average test where possible, but not for the regression analysis. For each statistical test we show the degrees of freedom.

the questionnaire in March 2008, after watching a four-minute videoclip drawn from the national news media recalling the events of the 2006 war (2008 videoclip group); and (c) participants who completed the questionnaire in March 2008 without watching the videoclip (2008 group without the videoclip).

5 Results

Tables 2 and 3 show the mean values, standard deviations, t-statistics and p-values for each set of items for the northern and central regions respectively for the three sub-groups: 2006 group, 2008 group with the videoclip, and 2008 control group without the videoclip.

The emotions of fear and anger were each measured as an average of all the relevant items on the questionnaire (in line with Lerner et al. 2003, and Benzion et al., 2009). The Cronbach's alpha values were 0.905 and 0.951 for fear and anger items, respectively. In addition, two indexes were measured: (a) the Negative Emotions index was measured as an average level of the combination of fear and anger levels together. The Cronbach's alpha value was 0.902 for this index, (b) the Anger-Fear index was calculated as the difference between anger and fear levels. In addition, the general self-risk was measured as an average level of all the items relevant to risk in the questionnaire. The Cronbach's alpha for this part was 0.73.

5.1 Manipulation checks

The impact of the videoclip on participants' recalled emotions and perceived risk can be seen in column 5 of Tables 2 and 3, which show the differences between the 2008 videoclip group and the 2008 without the videoclip control group.

1. *Effect of the videoclip on recalled emotions:* The results indicate that, in the north, the 2008 with the videoclip group and the control group differ significantly on level of emotions. That is, in 2008 individuals who were given the intervention (videoclip) recalled experiencing higher levels of fear and anger during the 2006 war compared to the levels of experienced emotions reported by those who did not watch the video. In addition, the Negative Emotions index (combination of fear and anger) was significantly higher for the intervention group, while the Anger-Fear Index did not differ significantly between the intervention and the control groups. For the center group, we found higher reported levels of recalled anger among those who watched the videoclip compared to the control group, while no effect of the videoclip was found on level of recalled fear (since this region had not been under missile attack during the war and suffered no terrorism risk, as did those living in the north). In addition we found that the Negative Emotions index and the Anger-Fear index were significantly higher for the intervention group than for the control group.

2. *Effect of videoclip on perceived risks:* In general, we did not find any significant differences in perceived self-risk between the 2008 sub-groups with and without the videoclip in either the north or the center. In other words, the videoclip did not have any impact on level of estimated self-risk, including general risk, risk of terrorism, and routine risks. In section 5.3 (the regression model) we examine the impact of the videoclip on perceived risks while controlling for Negative Emotions index, Anger-Fear index, gender, and age.

5.2 The impact of time on emotions and perceived risk

To examine the effect of time on participants' recalled emotions and perceived risk, we compare the 2006 group to the 2008 without the videoclip group. Column 6 in Tables 2 and 3 reveals the following results:

- *Emotions:* For the northern region only, fear level was *higher* for the 2008 group than for the 2006 group, indicating that the passage of time *increased* concerns about terrorism. A possible explanation is that, in the north, people were more concerned because of the growing power of the Hezbollah militias in Lebanon since the end of the 2006 war. Nevertheless, for anger no significant difference was found between the 2006 group and the 2008 without the videoclip group. For the central region, which had not been exposed to missile attacks, we did not find any effect of time on level of emotions.

- *Perceived risks:* For the northern region (Table 2), the sub-groups did not differ significantly with respect to perceived risk. For the central region, however, we found that estimated general self-risk and perceived risk from terror have decreased over time (no effect of time was found in either region for routine risks). This result indicates that over time people became more optimistic in the central region with respect to the risk of terrorism, but not in the northern region.

In general, the results in Tables 2 and 3 suggest that the videoclip had a strong effect on level of emotions in both regions, while the passage of time had practically no impact on emotions in either region (except for the increased

Table 2: Mean values and standard deviations of emotion levels and various self-risk estimations for the northern group.

	2006 Group	2008 with videoclip group	2008 without videoclip group	t-value (p value, df) 2008 with and without videoclip groups (video effect)	t-value (p value, df) 2006 and 2008 without videoclip groups (time effect)
Recall emotions at war					
Anger	5.27 (2.11)	6.26 (1.86)	5.54 (2.28)	2.85 (0.00, 278)	0.90 (0.18, 243)
Fear	4.88 (1.96)	5.97 (2.07)	5.38 (2.34)	2.20 (0.01, 278)	1.68 (0.05, 243)
Negative Emotions index	5.07 (1.72)	6.12 (1.72)	5.46 (2.09)	2.81 (0.00, 278)	1.45 (0.07, 243)
Anger-Fear Index	0.39 (2.19)	0.29 (1.91)	0.16 (1.97)	0.56 (0.29, 278)	−0.83 (0.20, 243)
Risks					
General self risk	36.24 (18.35)	36.86 (19.52)	37.43 (17.37)	−0.24 (0.40, 257)	0.50 (0.31, 238)
Terror risks					
Being hurt by terror attack	41.15 (25.80)	38.57 (27.39)	38.53 (25.84)	0.01 (0.50, 260)	−0.77 (0.22, 239)
Trouble sleeping	32.53 (29.90)	35.85 (32.5)	33.85 (28.45)	0.53 (0.30, 268)	0.34 (0.37, 242)
Travel less	32.93 (37.91)	31.65 (35.20)	36.10 (35.33)	−1.02 (0.15, 268)	0.65 (0.26, 242)
Routine risks					
Coming down with the flu	40.06 (34.08)	41.06 (29.63)	44.27 (30.90)	−0.85 (0.20, 264)	0.98 (0.16, 242)
Being a victim of a violent crime (other than terror)	30.61 (25.48)	31.28 (22.65)	30.67 (24.61)	0.21 (0.42, 262)	0.02 (0.49, 240)
Dying from any cause	40.17 (25.56)	43.38 (26.54)	40.30 (23.99)	0.98 (0.16, 259)	0.04 (0.48, 239)

level of fear in the northern region). The videoclip had practically no impact on the risk judgments of individuals in either region, while the passage of time had a strong effect on reducing terror risk estimations among people from the central region (but not the northern region).

Table 4 compares the north and the center with respect to emotions and perceived risks in the following three cases: (a) a comparison of emotions and risks in 2006 between north and center, (b) a comparison of the effect of the videoclip between north and center in 2008, (c) a comparison of the effect of time between north and center in 2008.

The results in Table 4 indicate that, for the comparisons made in 2008 (columns 3–4 in Table 4), fear and the Negative Emotions index were higher for the groups in the north than for those in the center. However, we found no significant differences between level of anger in the northern and the central groups for the 2006 groups and no significant differences for the 2008 sub-groups without the videoclip. In addition the Anger-Fear index was significantly lower for the northern region than for the center, suggesting that level of fear relative to level of anger was higher in the north compared to the center. Still, the videoclip in 2008 increased the level of anger in the north more than it affected the level of anger in the center.

Table 4 also indicates that in general perceived risks are higher in all cases (columns 2–4) for the northern groups than for those in the center. However, we were unable to reject the hypothesis that there is no difference between the groups for the following cases: (a) the risk of coming down with influenza (flu), (b) traveling less than usual on public transportation (no significant difference between the 2008 with videoclip groups, and the 2006 groups), (c) the risk of dying from any cause, and the general risk for the 2006 groups.

Table 3: Means and standard deviations of emotion levels and various self-risk estimations for center region group.

	2006 Group	2008 with videoclip group	2008 without videoclip group	t-value (p value, df) 2008 with and without videoclip groups (video effect)	t-value (p value, df) 2006 and 2008 without videoclip groups (time effect)
Recall emotions at war					
Anger	5.41 (2.08)	5.81 (1.67)	5.03 (2.09)	2.22 (0.01, 113)	−0.99 (0.16, 128)
Fear	4.14 (1.85)	4.35 (1.75)	4.06 (1.89)	0.84 (0.20, 113)	−0.25 (0.40, 128)
Negative Emotions index	4.78 (1.72)	5.08 (1.40)	4.54 (1.72)	1.83 (0.04, 113)	−0.74 (0.23, 128)
Anger-Fear Index	1.27 (1.93)	1.46 (1.97)	0.97 (2.01)	1.30 (0.10, 113)	−0.82 (0.21, 128)
Risks					
General self risk	32.73 (20.43)	25.84 (16.41)	23.13 (15.84)	0.87 (0.19, 108)	−2.79 (0.00, 129)
Terror risks					
Being hurt by terror attack	30.45 (25.39)	18.89 (20.94)	23.91 (22.99)	−1.20 (0.12, 110)	−1.46 (0.07, 129)
Trouble sleeping	24.80 (26.67)	18.18 (22.45)	13.67 (18.90)	1.13 (0.13, 113)	−2.53 (0.01, 129)
Travel less	34.07 (39.48)	25.29 (36.35)	10.62 (18.36)	2.54 (0.01, 110)	−3.84 (0.00, 129)
Routine risks					
Coming down with the flu	46.77 (35.64)	44.07 (28.58)	40.85 (31.27)	0.57 (0.28, 113)	−0.95 (0.17, 129)
Being a victim of a violent crime (other than terror)	24.30 (22.05)	22.09 (21.65)	20.26 (19.01)	0.47 (0.32, 112)	−1.06 (0.15, 129)
Dying from any cause	35.97 (26.52)	27.95 (23.59)	29.45 (25.87)	−0.32 (0.38, 111)	−1.36 (0.09, 129)

5.3 Regression analysis

Tables 5–6 summarize the results of the OLS regression analyses separately for the north and the center region groups. In all the regressions, the dependent variables include a general estimation of self-risk, three items estimating self-risk of terrorist attacks, and three items estimating routine risks. The independent variables are the Negative Emotions index, the Anger-Fear index, a dummy variable for the videoclip (0=without videoclip, 1=with videoclip), and a dummy variable for gender (0=female, 1=men) and age. The regression analysis enables us to examine the impact of each of the independent variables separately on the dependent variables (all risks items), while controlling for all other variables. Tables 5–6 present the regression coefficients, with the significance level in parentheses under each coefficient.

Tables 5 and 6 indicate that:

- A higher Negative Emotions index leads to *an increase* in general perceived self-risk and risk of terrorism to the self for the north region but not for the center region.[6] These results, which are compatible with Hypothesis 1(a) for the north region but not for the center region, may suggest that the valence approach (Johnson and Tversky, 1983) is supported for the north region.

- A higher Anger-Fear index leads to *a decrease* in general perceived self-risk and in items referring to perceived risk of terrorism to the self (including having trouble sleeping and traveling less) for the north region but not for the center region. These results for the north region support Hypothesis 1(b) and are compatible with the prediction of the modified version of the appraisal tendency framework.

[6] An exception is that a higher Negative Emotions index leads to an increase in the risk of having trouble sleeping in the center.

Table 4: Mean difference values of emotion levels and various self-risk estimations between north and center

Problem	(a) North-Center 2006	(b) North-Center 2008 with videoclip groups	(c) North-Center 2008 without videoclip groups
Recall Emotions at war			
Anger	−0.14	0.42^{++}	0.51^{++}
Fear	0.74^{+}	1.61^{+}	1.32^{+}
Negative Emotions Index	0.30	1.04^{+}	0.91^{+}
Anger-Fear Index	−0.88^{+}	−1.17^{+}	−0.81^{+}
Risks			
General self risk	3.51	11.02^{+}	14.39^{+}
Terror risks			
Terror attacks	10.7^{+}	19.68^{+}	14.61^{+}
Trouble sleeping	7.74^{+}	17.67^{+}	20.18^{+}
Travel less on public transportation	−1.14	6.36	25.48^{+}
Routine risks			
Come down with the flu	−6.72	−3.01	3.42
Be a victim of a violent crime	6.31^{+}	9.19^{+}	10.41^{+}
Die from any cause	4.20	15.43^{+}	10.85^{+}

+ Testing the null hypothesis that the difference does not differ from zero (less than 5% significance).

++ Testing the null hypothesis that the difference does not differ from zero (less than10% significance).

- Both the Negative Emotions index and the Anger-Fear index have a lesser impact on routine risks in the north and no impact in the center region. These results are in general compatible with Hypothesis 1(c), and support the Johnson and Tversky (1983) gradient generalization hypothesis.[7] It is possible that, in the case of crucial events such as the 2006 war, routine risks may seem less important to individuals than risks from terror.

- The videoclip has no direct effect on risk perception of participants from the north. For the center region, however, the videoclip manipulation leads to a decrease in perceived terror risk.

- Gender had an effect on almost all risk items in both regions. In particular, women estimated higher perceived risks to the self than did men. This result is compatible with the findings of Lerner et al. (2003) that males report less pessimistic estimates of risk than females.

- Age increased the general judgment of self-risk and the perceived risk of terrorism to the self in both regions. In other words, older people were more pessimistic about their own general risk and risk of terror.

[7] Fischhoff et al. (2005) found that the impact of priming manipulation on routine risks was lower than their impact on terror risks (Figure 1, p. 134).

6 Summary and Conclusions

The current study is based on a field experiment of the 2006 Israel-Lebanon war conducted in two waves: the first two weeks after the end of the war, and the second 18 months later (2008). The purpose of the study was to examine the effect of time and of priming manipulation (in the form of a short videoclip with the sounds of the alarms and the sights of the missile attacks from the 2006 war) on recalled emotion levels and on judgments of future risks to self 18 months after the end of the 2006 Israel-Lebanon War. We analyzed the effect of recalled emotions on perceived risks in two different regions in Israel: the north region, which was under daily missile attacks during the war, and the center region, which was not exposed to missile attacks.

Table 5: Regression analysis for the northern groups

Dependent variables	Independent variables							
	Constant	Negative Emotions Index	Anger-Fear Index	Age	Gender (0=women)	Dummy Video (0=without video)	R-square	*d.f*
General self risk	9.73 (0.17)	3.04 (0.00)	−1.28 (0.02)	0.51 (0.02)	−7.17 (0.01)	−1.16 (0.56)	0.211 (0.00)	249
Terror risks								
Self-risk of terror attack	11.40 (0.29)	2.84 (0.00)	−0.98 (0.25)	0.55 (0.09)	−8.54 (0.04)	−0.63 (0.84)	0.101 (0.00)	252
Trouble sleeping	−19.81 (0.08)	6.43 (0.00)	−2.70 (0.00)	0.82 (0.01)	−9.06 (0.04)	−0.85 (0.80)	0.271 (0.00)	260
Travel less	2.25 (0.88)	3.76 (0.00)	−3.12 (0.01)	0.51 (0.24)	1.83 (0.76)	−5.23 (0.23)	0.072 (0.00)	260
Routine risks								
Come down with the flu	34.76 (0.01)	1.91 (0.08)	0.08 (0.94)	0.05 (0.90)	−10.87 (0.03)	−3.56 (0.35)	0.055 (0.01)	256
Be a victim of a violent crime	18.95 (0.07)	0.66 (0.45)	−0.31 (0.70)	0.35 (0.26)	−4.58 (0.26)	1.41 (0.64)	0.019 (0.45)	254
Die from any cause	23.33 (0.03)	1.69 (0.06)	−0.44 (0.60)	0.38 (0.22)	−10.06 (0.02)	3.62 (0.24)	0.077 (0.00)	251

In general, in both regions, the videoclip manipulation had a strong impact on individuals' level of emotions, similar to previous studies, but had practically no effect on individuals' risk judgments, unlike previous studies (e.g., Vastfjall et al. 2008). One possible explanation is that the induced anger level was higher than the induced fear level, which in turn affected the risk judgments in opposite ways (mainly for the north region people who suffered from the missiles attacks). Furthermore, the passage of time had practically no effect on emotions in both regions (except for the increased level of fear in the northern region), though it did reduce estimations of risk of terrorism among people from the central region.

On the theoretical level, the study combines two indexes in one analysis for the first time: the Negative Emotions index and the Anger-Fear index. The study lends support to two theories: the valence approach and the modified version of the appraisal-tendency approach, which examines the impact of Anger minus Fear on risk judgments. We are not aware of any previous study that examined the two approaches in such a way and found support for both theories.The findings of the regression analysis indicate a positive relation between the Negative Emotions index and the perceived self-risk from terror and a positive relation between the Anger-Fear index and items referring to perceived self-risk from terror for the north region but not for the center region. A possible explanation for the difference in findings between the two regions is that people in the north experienced the events of the war for almost two months and were left with ongoing concerns about the growing power of Hezbollah militias, while people in the center were not at risk during the war and did not experience the war events directly. Yet, compatible with our previous findings (Benzion et al., 2009) and compatible with the gradient generalization hypothesis of J&T, we found no significant effect of the emotion indexes on routine risks. Recent research on risk assessment suggests that people tend to prioritize strong feelings when making judgments about risk (Slovic, et al., 2005; Wilson & Arvai, 2006). On the one hand, emotions can help people integrate their beliefs and feelings (Gray, 2004). Still, emotions can also leave people prey to transient affective states and to manipulation by others (Loewenstein & Lerner, 2003).

The current study compared perceived risks among those who were under direct attack in the northern region to those who were not directly exposed to missiles. The results point to the differential effects of recalled emotions with and without the videoclip manipulation 18 months after the 2006 Israel-Lebanon war on these per-

Table 6: Regression analysis for the center groups

Dependent variables*	Independent variables							
	Constant	Negative Emotions Index	Anger-Fear Index	Age	Gender (0=women)	Dummy Video (0=without video)	R-square	*d.f*
General self risk	8.84 (0.29)	1.54 (0.15)	−0.82 (0.29)	0.60 (0.02)	−12.30 (0.00)	−1.13 (0.74)	0.242 (0.00)	108
Terror risks								
Self-risk of terror attack	9.03 (0.45)	1.78 (0.24)	−0.01 (0.99)	0.58 (0.09)	−12.96 (0.01)	−9.85 (0.04)	0.145 (0.01)	110
Trouble sleeping	−8.77 (0.40)	2.84 (0.03)	−1.32 (0.17)	0.78 (0.01)	−14.61 (0.00)	−1.52 (0.72)	0.264 (0.00)	113
Travel less	−14.53 (0.40)	2.96 (0.18)	−1.71 (0.29)	0.52 (0.31)	2.03 (0.78)	10.10 (0.15)	0.085 (0.09)	110
Routine risks								
Come down with the flu	42.33 (0.01)	−0.28 (0.89)	−1.14 (0.44)	0.31 (0.51)	−14.87 (0.03)	3.76 (0.57)	0.081 (0.10)	113
Be a victim of a violent crime	5.72 (0.61)	0.65 (0.65)	−0.28 (0.79)	0.76 (0.02)	−12.26 (0.01)	−3.38 (0.46)	0.12 (0.02)	112
Die from any cause	27.60 (0.04)	0.35 (0.84)	−1.30 (0.29)	0.44 (0.24)	−16.64 (0.00)	−3.51 (0.51)	0.146 (0.01)	111

ceived risks. Understanding people's responses to stressful events, not only while these events are taking place but also over time, is crucial, as previous studies suggest that media-induced emotions can influence appraisals and decisions regarding public policies and that government and media responses in turn amplify emotions among the public (Ahern, et al., 2004).

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Appendix: The Questionnaire.

Part A: Anxiety

Likert-scale response options ranged from 0 (not experienced) to 5 (experienced very often)

1. I had difficulty falling or staying asleep.
2. I felt restless.
3. I would jump in surprise at the least thing.
4. I felt hyper-vigilant or “on edge".
5. I had difficulty concentrating.

Part B: Risky events and precautionary actions for self

Participants entered probabilities ranging from 0% to 100%, with “0” indicating it was impossible they themselves would experience such an event within the next year and “100” indicating it was certain they themselves would experience the event within the next year.

1. You will be hurt in a terror attack.
2. You will have trouble sleeping because of the terror situation.
3. You will travel less than usual on public transportation.
4. You will come down with the flu.
5. You will be the victim of a violent crime (other than terrorism).
6. You will die from any cause (crime, terrorism, illness, accident, etc.).

Part C: Israeli Economy

1. I feel that despite the war, the Israeli economy will continue to grow.
2. I feel that despite the war, the Israeli stock exchange will continue to rise.

Part D: Scale for self-reported anger

(Likert-scale response options ranged from 0 (did not feel the emotion the slightest bit during the war) to 8 (felt the emotion more strongly than ever during the war).

1. Wrathful
2. Mad
3. Angry

Part E: Scale for self-reported fear

(Likert-scale response options ranged from 0 (did not feel the emotion the slightest bit during the war) to 8 (felt the emotion more strongly than ever before during the war).

1. Worried
2. Frightened
3. Terrified