

# The Role of Personal Experience in Contributing to Different Patterns of Response to Rare Terrorist Attacks

ELDAD YECHIAM

*Department of Psychology*

*Indiana University*

GREG BARRON

*Harvard Business School*

IDO EREV

*Department of Industrial Engineering and Management*

*Technion—Israel Institute of Technology*

---

---

An examination of the behavioral effect of repeated terrorist attacks reveals that local residents (of the attacked area) appear to be much less sensitive to this risk than international tourists. Furthermore, the limited sensitivity on the part of local residents seems to diminish with time, even when the attacks continues. An experimental study shows a similar pattern in a laboratory experiment that focuses on a basic decision task: when making a single decision based on a description of the problem, people tend to be more risk averse. Personal experience with the problem reduces this sensitivity. These results highlight an interesting relationship between basic decision-making research and the study of the response to traumatic events.

**Keywords:** *Decision making; experience; learning; terror; tourism; Al-Aqsa Intifada; underweighting of rare events*

---

---

**T**he effect of terrorist activity on tourism represents one of the main economic effects of terrorist activities (Weimann and Winn 1994). Understanding the factors that contribute to this effect is therefore important in an attempt to mitigate it. Empirical investigation of the effect of terrorist attacks on tourism demonstrates an interesting difference between international and domestic tourists. Whereas repeated (but rare) terrorist attacks have a dramatic effect on the behavior of international visitors to areas under terrorist attacks (Drakos and Kutan 2003; Krakover 2002; Sönmez 1998; Sönmez and Graefe 1998), the effect of these attacks on domestic tourists (i.e., local residents who travel within the country) does not seem to be very strong (Israeli Ministry of Tourism

---

AUTHORS' NOTE: Correspondence should be sent to Eldad Yechiam, Department of Psychology, Indiana University, 1101 East 10th Street, Bloomington, IN 47405; e-mail: eyechiam@indiana.edu. We thank Shaul Krakover, Jerry Busemeyer, and Igor Weinberg for comments. The data and an explanatory file are available at <http://www.yale.edu/unsy/jcr/jcrdata.htm>.

JOURNAL OF CONFLICT RESOLUTION, Vol. XX No. X, Month 2003 1-10

DOI: 10.1177/0022002704270847

© 2003 Sage Publications

2000, 2001; Israeli Central Bureau of Statistics 2002; see also Oberholzer-Gee and Frey 1995).

One set of contributing factors to this pattern involves economic considerations (see Becker and Rubinstein 2004). The cost of avoiding a risky area is much higher for local residents than to potential visitors. For an example, consider the situation in Israel (since 2000 to the current date), where local cafés are a target of terrorist attack. To avoid Israeli cafés, local residents have to give up sitting in cafés or to travel abroad. Potential tourists, on the other hand, can simply select a different destination on their next vacation.

A second set of contributing factors involves cultural and/or ideological differences (see Hurley 1988; Tremblay 1989). Different cultures are characterized by different value systems (Hofstede 1991) that can lead to dissimilar response patterns. For example, in some cultures, solidarity is important, whereas personal risk is underweighted (see, e.g., Figueredo et al. 2001). For instance, in an interview, the owner of a restaurant in Haifa, Israel, that was destroyed by a terrorist attack, killing sixteen customers and workers, said that when he reopened the restaurant, many people came to dine to support him (Ali Adawi, personal communication, **YEAR?**). There may also be more transient differences between cultures. For example, Tremblay (1989) noted that visitors from some countries are better informed about political events in their destination country. In this respect, locals are more likely to be better informed than international tourists.

The main goal of this article is to highlight the importance of a third set of factors. Specifically, we focus on the hypothesis that at least part of the observed difference in behavior between domestic and international visitors is a result of the sensitivity to recent personal experience (see Barron and Erev 2003). Under this “personal experience” hypothesis, local residents who are exposed to risk without suffering bad outcomes are likely to base future decisions on this (positive) experience. As a result, the typical experience of locals (i.e., going out without being harmed) reduces the effect of terrorist attacks.

This article is organized as follows. The first section summarizes the empirical evidence concerning the effect of terrorist attacks on international and domestic tourists. The second section presents an experimental study suggesting that a “personal experience” effect can contribute to this difference. The article concludes with a discussion of the policy implications of the present results.

### **THE EFFECT OF TERRORIST ATTACKS ON LOCAL RESIDENTS AND INTERNATIONAL TOURISTS**

The empirical research presented here focuses on the wave of terrorist attacks in Israel, known as the Al-Aqsa Intifada. This wave has three properties that make it a convenient problem for empirical study. First, the Intifada had a well-defined beginning (September 2000, marked by Ariel Sharon’s visit to the Temple Mount and the first surge of terrorism in the city of Hadera). Second, terrorism within the State of

Israel (not including the West Bank and Gaza Strip) was targeted toward specific civilian targets, including hotels, restaurants, cafés, and clubhouses. Third, the terrorist activity was continuous. Between September 2000 and October 2003, there were terrorist activities in each month that led to fatalities (for a complete list, see International Policy Institute for Counter-Terrorism [ICT] 2004). This can therefore be described as a period in which there was a small probability of being a victim of terrorism as a result of taking part in several relatively well-defined leisure activities.

To evaluate the effect of the Intifada on tourism, the Israeli Central Bureau of Statistics (2002) calculated the number of bed nights in Israeli hotels by population type (inbound or domestic tourists) prior to and following the outbreak of the Intifada. *Bed nights* denotes the number of beds occupied overnight by accommodation establishments (World Tourism Organization 1993). The examination included hotels that were either certified by the Ministry of Tourism as tourist hotels or have issued a petition for certification. Overnight stays in these hotels comprise more than 80 percent of the total overnight stays in Israeli hotels. The results (see Figure 1) show an initial drop in overnight stays by both inbound tourists and domestic visitors in October 2000 during the initial terrorist activities. The drop was almost 60 percent for inbound tourists and about 10 percent for domestic ones.

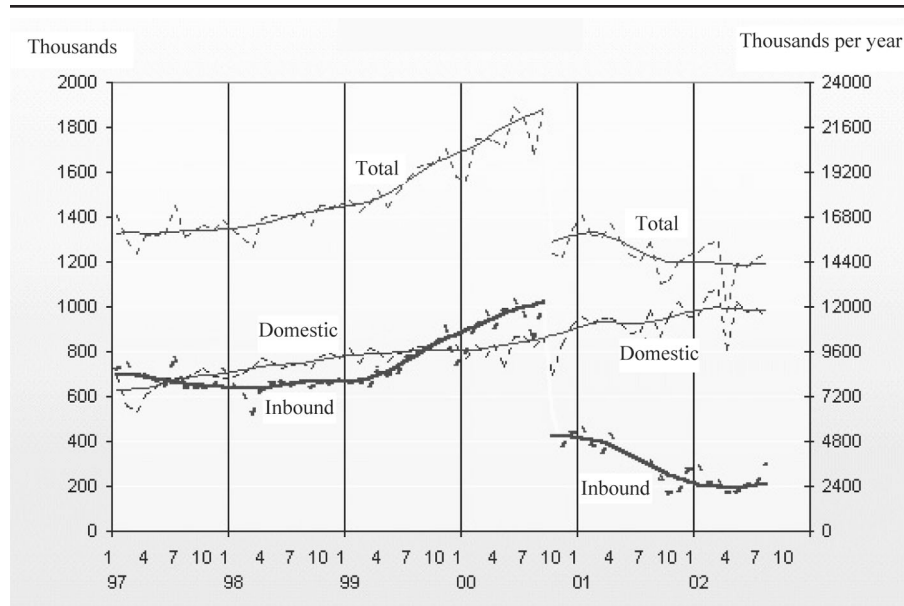
The difference between inbound and domestic tourists increased in the following months. Indeed, after the initial decrease, domestic tourists' overnights in hotels rebounded and even increased, while the overnights of inbound tourists continued to decrease. For example, a comparison of October 2000 with October 2001 shows an 80 percent decrease for inbound tourists and a 20 percent increase for domestic tourists.

Notice that at least part of the quick recovery in domestic tourism may be a result of price reduction. However, this price reduction effect is only part of the story. Most important, it does not seem to affect international tourists. In addition, the best deals were available in January 2001,<sup>1</sup> and the increase in local tourism continues after this date.

Another indication for the nonlinear effect of the terrorist attacks on local residence comes from an investigation of Israeli coffee shops. Whereas the terrorist attacks led to an initial decrease in the popularity of coffee shops, there was an increase in the revenues of coffee shops in Israel in 2002 and 2003 (see Business Data Israel 2003). The pattern of hotel and coffee shop visits on the part of Israeli consumers is similar to the statistics about flying after the terrorist attacks in the United States on September 11, 2001 (see Rabinski et al. 2003; see also Gigerenzer 2004). However, the peculiar thing about the Israeli situation is that there has been no decrease in the number of terrorist attacks during the period of recovery (ICT 2004).

Examination of recalled responses to terrorist attacks suggests that this nonlinear trend occurs within individuals. In Yechiam, Barron, and Erev (2003), we asked 152 Haifa residents (in a short telephone survey) to recall their responses to the recent wave of terrorist attacks. Forty percent of the respondents reported that they planned to decrease their restaurant visits in the area. However, 42 percent of them changed their

1. This assertion was supported with conversations with four travel agents who specialized in finding vacation deals for organized groups.



**Figure 1: Bed Nights of Domestic and Inbound Tourists in Israeli Tourist Hotels from January 1997 to August 2002**

SOURCE: Israeli Central Bureau of Statistics (2002). Used with permission.

NOTE: Seasonally adjusted average (dashed line) and trend (solid line) are presented.

original intention after a short period (of about a month, on average). Only 1 respondent exhibited the opposite pattern.

### A CONTROLLED STUDY OF THE EFFECT OF PERSONAL EXPERIENCE

The field data summarized above are consistent with the assertion that the sensitivity of local residents to repeated terrorist attacks diminishes with personal experience (of being exposed to, but not hurt by, these attacks). However, the main evidence involves only one set of dependent observations: the behavior of Israelis during one period. And as noted above, other factors are likely to contribute to the observed pattern. To clarify the effect of personal experience, we chose to study it in a controlled experiment.

In the present context, *experience* refers to the opportunity to decide between a safe alternative (e.g., “stay at home”) and a riskier alternative that exposes the decision maker to a small probability of being attacked. During the Intifada, almost any occasion when local residents go to a public place (walking in the street or sitting in a café) implies a selection of the risky alternative. Obviously, in most cases, the experience has a “good” outcome: “no attack.” Under the personal experience hypothesis, these

common experiences are expected to reinforce the tendency to participate in similar activities in the future. That is, this experience contributes to the tendency of local residents to take the risk associated with staying in hotels, dining out, and visiting malls in Israel.

Previous experimental studies that support the personal experience hypothesis focus on situations in which personal experience was the sole source of information (e.g., Barron and Erev 2003; Hertwig et al. 2004). In these situations, personal experience leads to a tendency to underweight low-probability events. People behave as if they rely on recent experiences and overweight the typical outcomes. The main difficulty in generalizing this pattern to the current context comes from the fact that in the context of terrorist attacks, decision makers can develop a good approximation of the relevant outcomes and their probabilities without relying on personal experiences.

To improve our understanding of the role of personal experience in the current context, the present research examines its effect in a laboratory setting in which the payoff distributions are known. Three experimental conditions were compared. In the Description-100 condition, participants were asked to allocate 100 choices between a safe and a risky option. They did not experience the outcome of their choices. In the Experience condition, participants actually made these choices and were presented with the outcomes following each choice.

In a third condition (Description-Binary), participants were asked to choose only once between the risky and safe options and were told that the computer would play this choice 100 times. This condition was added to simulate the Description condition faced by international tourists, who have to decide only once whether to travel (and spend time) in an area under terrorist attack.

It was predicted that participants in the Experience condition would choose the risky option to a larger extent than in the Description conditions because the outcomes of most of their risky choices are reinforcing. In addition, we predicted an increase in the proportion of risky (R) choices in the Experience condition as a function of time.

## METHOD

*Participants.* Seventy-eight Technion students participated in the experiment (thirty-nine men and thirty-nine women). Participants were randomly allocated to the three conditions: thirty to the one-choice Description condition, twenty-four to the Description-100 condition, and twenty-four to the Experience condition. The proportion of men to women was equal under all three conditions.

*Procedure and measures.* Three experimental conditions (Description-100, Description-Binary, and Experience) were compared. In the Description-100 condition, participants were given the following instructions:

Your payoff in this experiment will be 2,000 agorot [showing-up fee; 4.5 agorot = about 1 U.S. cent] minus your losses during the experiment. Losses will be accumulated during 100 trials. In each trial, you will play a gamble with negative outcomes. The outcomes of the gambles will be determined by the color (red or yellow) independently selected by the

computer in each trial. Please indicate the number of trials that you want the computer to play the gamble (a total of 100 choices).

<i>S (Safe)</i>	<i>R (Risky)</i>
Lose 8 agorot if red occurs ( $p = .005$ )	Lose 200 agorot if red occurs ( $p = .005$ )
Lose 2 agorot if yellow occurs ( $p = .995$ )	Lose 1 agora if yellow occurs ( $p = .995$ )
The computer will play this gamble (0 to 100) _____ times.	The computer will play this gamble (0 to 100) _____ times.

The R option is riskier because it includes a substantial penalty that is realized with a small probability. The order of the two options was randomized (they were called “A” and “B” in the study).

In the Description-Binary condition, participants were given the same instructions, except for the last sentence, which read as follows: “Please indicate which gamble you prefer to play (this gamble will be played 100 times by the computer).” They were then asked to circle the option that they preferred.

In the Experience condition, participants were given the following instructions:

Your payoff in this experiment will be 2,000 agorot [showing-up fee] minus your losses during the experiment. Losses will be accumulated during 100 trials. In each trial, you will have to select a gamble (by clicking on it). The outcomes of the gambles will be determined by the color (red or yellow) selected by the computer after you make your choice.

They were then presented with the computer screen that appears in Figure 2. The screen included the complete information of the payoff distributions. Thus, participants in the Experience condition were exposed to the same information as participants in the two Description conditions. Following each choice, the computer selected the color (yellow with  $p = .995$ , red otherwise), which occupied the bottom panel of the form for one second. At the same time, the implied payoff was presented to the decision maker.

## RESULTS AND DISCUSSION

The proportion of R choices was .69 in the Experience condition and .42 in the Description-100 condition. This difference was significant,  $t(46) = 1.95$ ,  $p < .05$  (one-tailed in the specified direction).

To facilitate comparison of the Description-Binary condition and the other conditions, we analyzed the modal response of each participant. The percentage of individuals who selected R most of the time was 67 percent (sixteen out of twenty-four) in the Experience condition and only 41 percent and 40 percent in the Description-100 and Description-Binary conditions, respectively. The differences between the Experience condition and the two Description conditions were both significant ( $Z = 1.74$ ,  $p < .05$ , and  $Z = 1.95$ ,  $p < .05$ , accordingly).

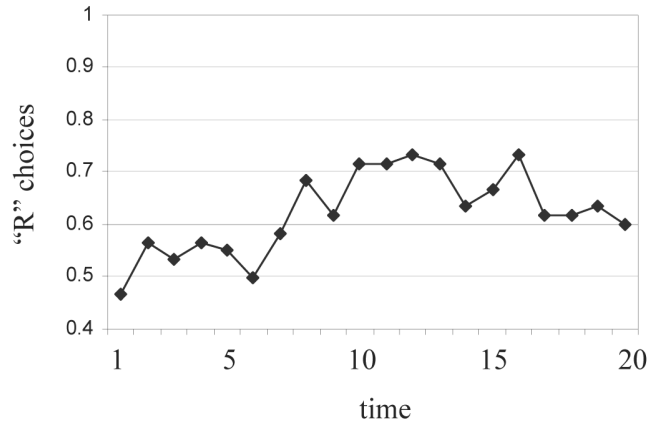
<b>A</b>	<b>B</b>
Lose 200 agorot if Red ( $p = 0.005$ )	Lose 8 agorot if Red ( $p = 0.005$ )
Lose 1 agora if Yellow ( $p = 0.995$ )	Lose 2 agorot if Yellow ( $p = 0.995$ )
<b>0</b>	
<b>Total</b>	<b>0</b>

**Figure 2: Choice Task Displayed for Players in the Experience Condition**  
 NOTE: Below the two buttons are the current payoff (initially 0) and the accumulating payoff (initially 0). The color (yellow or red) occupies the panel below the accumulating payoff.

Figure 3 presents the proportion of R choices as a function of time (averaged in blocks of five trials) in the Experience condition. As predicted, the results reveal an increase of R choice with experience. The difference between the first half (.58 choices of R) and the last half (.67 choices) was significant,  $t(23) = 2.65, p < .05$ . Moreover, the initial (trial 1) proportion of R choices in the Experience condition was below 50 percent and similar to the observed proportion in the Description conditions (the difference is insignificant).

One might argue that many of the participants in the Experience condition were never exposed to the severe negative outcome of -200. This would imply that the results focus on situations with very small probabilities. Two replies are possible. First, that this is indeed the case; our goal was to model a decision-making situation with some similarity to the rarity of a terrorist incident. It appears that in such situations, direct experience leads to more choices of risky alternatives.

Second, an in-depth examination of the results of the (four) participants who did receive the severe negative outcome suggests that the results might be more general. According to the recency explanation, participants who experience the severe penalty for choosing R may revert back to choosing it after experiencing safe outcomes. In reality, after a single instance of the severe negative penalty (-200) followed by safe outcomes (-1), all four participants had more R choices than safe (S) choices.



**Figure 3: Experience Condition: Proportion of Risky (R) Choices as a Function of Time (in Blocks of Five Trials)**

## GENERAL DISCUSSION

Evaluation of the effect of the 2000-2003 wave of terrorist attacks in Israel reveals an interesting difference between the reaction of local and international tourists. Whereas both groups showed high initial sensitivity to the attacks, many of the activities of local residents quickly rebounded. For example, a comparison of the number of nights spent in hotels a year after the beginning of the attacks shows an 80 percent decrease for inbound tourists and a 20 percent increase for domestic tourists. Moreover, despite the sharp decrease in international tourism, there was an increase in the revenues of Israeli coffee shops in 2002 and 2003.

The present analysis highlights one contributor to this pattern. A laboratory experiment shows that students tended to exhibit high sensitivity to low-probability risks when making decisions based on a description of the possible outcomes. However, this sensitivity diminishes when decision makers can rely on personal experience (of being exposed to the risk). In other words, we suggest that the fact that local residences are repeatedly exposed to the risk of terrorist attacks is sufficient to reduce their sensitivity to this risk.

We believe that the current analysis has two attractive features. First, it demonstrates how complex social processes (reaction to terrorism) can be related to the basic properties of human choice behavior. A second attractive feature involves the clear policy implications that shed light on well-known successful interventions.

The most important implication is the suggestion that the negative effects of rare terrorist attacks can be reduced by ensuring that citizens continue to partake in relatively safe leisure activities. Interestingly, this suggestion summarizes one component of Mayor Rudolph Giuliani's response to the September 11, 2001, attack in New York City. Giuliani suggested that citizens should invest less in direct contributions (like

helping digging and collecting blankets) and spend more time shopping and dining in New York. While this suggestion seemed counterintuitive at the time, the current analysis suggests that it was productive for reducing the negative long-term economic effect of the attack.

Interestingly, this policy is related to some of the most successful clinical methods of treating disorders such as phobias and acute stress syndromes. Sufferers of these disorders avoid objects, people, or situations that can lead to a negative outcome. The basic idea behind most successful treatments involves reintroduction in a protected environment and the establishment of safe experience. For example, in exposure treatments, the patient is exposed to the phobic stimulus as part of the therapeutic process (Foa and Kozak 1986). Another example appears in the treatment of battle stress. The well-known intervention principles of proximity, immediacy, and expectancy (e.g., Artiss 1963; Salmon 1919) imply that the treatment should be carried out as quickly as possible (immediacy) in a safe environment as close to the battlefield (proximity), with a clear expectation of returning to duty (expectancy). The present analysis suggests that the success of these methods can be driven by the same factors that influence decision making in experimental settings. Certain phobias and stress disorders can be described as the overweighting of rare events (Kleinknecht 1982), and personal experience can reduce this bias (Foa and Kozak 1986; Solomon and Benbenishty 1986). Under this interpretation of the results, initial terrorist attacks create phobia-like responses. However, when the attacks are rare, experience with the environment provides a therapeutic-like process that reduces the long-term effect of terrorism.

## REFERENCES

- Artiss, Kenneth. 1963. Human behavior under stress: From combat to social psychiatry. *Military Medicine* 128:1011-15.
- Barron, Greg, and Ido Erev. 2003. Feedback-based decisions and their limited correspondence to description-based decisions. *Journal of Behavioral Decision Making* 16:215-33.
- Becker, G., and Y. Rubinstein. 2004. Fear and the response to terrorism: An economic analysis. Working paper, University of Chicago. Accessed from [http://econ.tau.ac.il/papers/faculty/beckerrubinstein\\_may11.pdf](http://econ.tau.ac.il/papers/faculty/beckerrubinstein_may11.pdf)
- Business Data Israel. 2003. The coffee-shop chains sector 2003—a sector review. Accessed from <http://www.bdi.co.il>
- Drakos, Konstantinos, and Ali M. Kutan. 2003. Regional effects of terrorism on tourism in three Mediterranean countries. *Journal of Conflict Resolution* 47:621-41.
- Figueredo, Aurelio José, Victor Corral-Verdugo, Martha Frías-Armenta, Karen J. Bachar, Janine White, Prentiss L. McNeill, Beth R. Kirsner, and Irasema del Pilar Castell-Ruiz. 2001. Blood, solidarity, status, and honor: The sexual balance of power and spousal abuse in Sonora, Mexico. *Evolution and Human Behavior* 22:295-328.
- Foa, Edna B., and Michael J. Kozak. 1986. Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin* 99:20-35.
- Gigerenzer, Gerd. 2004. Dread risk, September 11, and fatal traffic accidents. *Psychological Science* 15:286.
- Hertwig, Ralph, Greg Barron, Elke U. Weber, and Ido Erev. 2004. Decisions from experience and the effect of rare events. *Psychological Science* 15:534-9.
- Hofstede, Geert H. 1991. *Cultures and organizations: Software of the mind*. New York: McGraw-Hill.

- Hurley, John A. 1988. The hotels of Rome: Meeting of the marketing challenge of terrorism. *The Cornell Quarterly* 29:71-9.
- International Policy Institute for Counter-Terrorism (ICT). 2004. Middle Eastern terrorism: Terror Attack database. Accessed from <http://www.ict.org.il/>
- Israeli Central Bureau of Statistics. 2002. *August 2002: Data on person-nights at hotels*. Jerusalem: Government of Israel.
- Israeli Ministry of Tourism. 2000. *Tourist survey: Annual report—2000*. Jerusalem: Government of Israel.
- . 2001. *Tourist survey: Annual report—2001*. Jerusalem: Government of Israel.
- Kleinknecht, Ronald A. 1982. The origins and remission of fear in a group of tarantula enthusiasts. *Behaviour Research & Therapy* 20:437-43.
- Krakover, Shaul. 2002. Estimating the effects of atrocious events on the flow of tourism to Israel. Paper presented at the annual meeting of the Association of American Geographers, March, Honolulu, HI. (Available from the author by request at [shaul@bgumail.bgu.ac.il](mailto:shaul@bgumail.bgu.ac.il))
- Oberholzer-Gee, Felix, and Bruno S. Frey. 1995. Learning to bear the unbearable: Towards an explanation of risk ignorance. Paper presented at the annual meeting of the European Society for Risk Analysis, May, Stuttgart, Germany.
- Rabinski, Kenneth A., Jennifer Berkold, Tom W. Smith, and Bethany L. Albertson. 2003. *America recovers: A follow-up to a national study of public response to the September 11th terrorist attacks*. Chicago: NORC. Accessed from <http://www.norc.org/projects/reaction/pubresp2.pdf>
- Salmon, Thomas W. 1919. War neuroses and their lesson. *New York Medical Journal* 108:993-4.
- Solomon, Zahava, and Rami Benbenishty. 1986. The role of proximity, immediacy and expectancy in front-line treatment of combat stress reaction among Israelis in the Lebanon War. *American Journal of Psychiatry* 143:613-7.
- Sönmez, Sevil F. 1998. Tourism, terrorism, and political instability. *Annals of Tourism Research* 25:416-56.
- Sönmez, Sevil F., and Alan R. Graefe. 1998. Influence of terrorism risk on foreign tourism decisions. *Annals of Tourism Research* 25:112-44.
- Tremblay, Pascal. 1989. Pooling international tourism in Western Europe. *Annals of Tourism Research* 16:477-91.
- Weimann, Gabriel, and Conrad Winn. 1994. *The theatre of terror*. New York: Longman.
- World Tourism Organization. 1993. *Recommendations on tourism statistics*. Madrid, Spain: World Tourism Organization.
- Yechiam, Eldad, Greg Barron, and Ido Erev. 2003. Description, experience, and the effect of rare terrorist attacks. Paper presented at the Biennial Conference on Subjective Probability, Utility, and Decision Making (SPUDM 19), July, Zurich, Switzerland.