Analyzing Projected Behavioral and Emotional Responses to Terrorist Events
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1. Executive Summary

Generating fear within the civilian population is an expressed motive underlying most terrorist acts. Fear has both psychological and economic consequences. To better understand these consequences, our studies ask people to imagine how they would feel if an attack or series of attacks occurred, as well as how their plans would be affected. We elicit numerical ratings of the strength of the feelings generated by scenarios in which terrorists use MANPADS to shoot down passenger airplanes at a nearby international airport. We also ask respondents how future travel plans would be affected.

We attempt to influence the feelings and projected actions by factorially manipulating governmental responses and public reaction to the attacks within the scenarios. Governmental agencies inevitably address terrorist actions, and it is of practical interest to determine whether people feel or behave differently depending on what the government says or does. People also use social cues to guide their actions, so perceptions of how other folks are handling the threat may influence one’s response as well. Of particular concern is the way in which these factors might combine. This question is addressed using functional measurement methodology, which can determine whether the combination rule is additive or multiplicative. Additive combination, the simplest hypothesis, means the factors operate independently, which has the practical implication that the factors can be applied straightforwardly. Multiplicative combination, on the other hand, is a kind of interaction. Interaction is a more complex pattern that means one must check on possible amplification or cancellation effects when factors operate in concert.
We have used MANPADs attacks as the core of our two major empirical studies. A MANPADS is a shoulder-fired missile capable of downing a commercial plane. Its portability would make it an attractive weapon for a small group. Both of these studies were carried out in two locations. In the first study, conducted in California and Spain, we described a plot to cripple the airline industry by distributing MANPADS to terrorist cells around the country. Neither fear nor projected actions were systematically affected by the manipulations we built into the scenarios. The plot elicited only moderate fear, and most of the scheduled flights were going to be taken as planned.

In our second study, conducted in California and Israel, we attempted to escalate the fear by including reports that airplanes had actually been attacked by MANPADS. Furthermore, the scenarios contained additional attacks continuing over a three-week period. As the attacks unfolded, we asked the respondent to report feelings and projected actions after each successive wave. This set of manipulations was more powerful, in that high degrees of fear were reported and flights were canceled. Again, however, neither government action nor public reaction had much impact.

The international collaborations were with investigators from countries that have had lengthy experience with local terrorism. Surprisingly, the results from both studies were virtually identical across their two respective countries. In both studies, women expressed more fear than men.

Our methodological contributions are of two kinds. We developed a new statistical procedure for analyzing nominal responses, in this case projected actions, generated by a factorial design. With this tool, we can conduct parallel analyses of numerical data and nominal data. We are also promoting the use of our factorial scenario method to predict future actions. Policy makers presently rely upon intuition, small focus groups, or expert consultants to predict how the public will behave in new situations. We propose a more structured and more democratic approach to prediction.

Keyword 1: Terrorist attack  
Keyword 2: Emotional responses  
Keyword 3: Behavioral responses

2. Research Accomplishments

2.1. Study featuring plot to distribute MANPADS (California and Spain)

The common element in all 9 scenarios is that an intercepted email indicates a plot in the advanced stages of planning. There were 3 levels of both manipulated factors. The government response was an announcement that (1) the plot has been foiled; (2) we are still evaluating; (3) there is a serious problem. We expected fear to increase as the level increased. The public reaction, made plausible by a air industry price decrease, was (1) flying rates increased; (2) flying rates remained steady; (3) flying rates decreased. For this factor, we expected fear to decrease across successive levels. Within each country,
there were 20 respondents (50% male) in each of the nine design cells, yielding a total N = 180.

Emotional responses were made on a 10-point scale where 10 represents the highest degree of fear. Cell means (shown below) evince only moderate fear (“How fearful would you be after learning of this terrorist plot?”), and our manipulated variables did not influence the behavior in the expected way. Analysis of variance results confirmed the graphic results, in that only the interaction proved significant. These results were not unique to the fear response; we asked similar questions about worry (“To what degree would you be worried after learning of this terrorist plot?”) and risk (“To what degree would you feel that you were at risk after learning of this terrorist plot?”), and obtained similar results.

The above graph (in this case, for Spanish respondents) is typical of our between-subject results, with females consisting reporting higher fear and the manipulated variable (in this case social norm) having little effect.

We also incorporated a within-subject factor when we inquired about projected behavior. All respondents were asked to imagine 3 forthcoming trips in which they were scheduled to attend an event 1500 miles away within one month of the terrorist incident. We attempted to manipulate the importance of the trip. The three levels of importance were (1) best friend’s wedding (2) job interview with wonderful prospects (3) long-awaited vacation with friends and family. They were told they already had tickets (we did not mention whether the tickets were refundable) and asked what they would do about the trip. Although any response was possible because the option was presented as open-ended, all of the answers we obtained could be classified as either (1) fly as planned; (2) do not fly and cancel the trip; (3) defer the decision; (4) use alternate transportation. The preponderant choice was to go on the trip as planned for the wedding and interview. The vacation was much more likely to inspire a change of plans.
These results (in this case for the California sample) were confirmed by the nominal analysis; only trip and its interactions were significant. It is interesting that, although females expressed more fear (as illustrated above), there was no sex difference in the projected actions.

2.2. Study featuring multiple MANPADS attacks (California and Israel)

In this study, the scenarios described a series of three MANPAD attacks in which airplanes were fired upon near the local international airport, with increasingly serious casualties resulting. The attacks were presented as news reports separated in time. After each reported attack, the respondent answered our questions about fear and future travel. They did not know another attack was coming. We were interested in the cumulative effect of an ongoing threat.

The government response was the announcement of a defensive action it had undertaken. The three levels were (1) improve airport perimeter security; (2) harden the fuselage of aircraft; (3) install laser jamming technology on planes to interfere with the MANPAD guidance system. The public reaction factor again consisted of changes in flying rates, with traffic either holding steady or decreasing by either 10% or 50%. As in the previous study, each respondent was exposed to only one of the nine combinations. All of the respondents addressed the three attacks. Within each country, there were 28 respondents (50% male) in each of the nine design cells, yielding a total N = 252.

As can be seen in the California data below, neither what the government promised to do nor what the flying public was reported to have done influenced the fear expressed by our respondents. This result replicates the result obtained in the first study.
In contrast, what did affect fear was the escalation of attacks. As the number of attacks and level of destructiveness increased, the fear mounted. As some respondents remarked, it was no longer possible to invoke the perspective that lightning will not strike twice. And as we have consistently observed, women reported more fear than men. These effects can be seen in the graph below, which features Israel data.

The behavioral projections mirrored the emotional responses with respect to escalation. Successive attacks inspired more changes of plans. And as we have seen previously, the sex difference in emotional response did not translate into a sex difference in projected action. Here are the California nominal responses:
3. **Applied Relevance**

3.1. **Substantive relevance**

Our substantive intention is to provide proactive guidance on how the public will respond to a type of attack that has not yet occurred. The MANPADS threat described in our scenarios can be avoided simply by not flying. Thus, unlike a biological or dirty bomb attack, one’s degree of exposure to personal risk is under individual control. The economic consequence of widespread reluctance to fly would be devastating to airlines and to a host of associated industries. Accordingly, it is crucial to understand the connection between the emotional and behavioral responses to the threat. It is also important to understand how mitigation strategies or explanations that government agencies provide affect these responses. So far, we have not been able to find government responses that generate consistent effects.

3.2. **Methodological innovation**

Our methodological intentions are twofold. First, we have developed a statistical technique for analyzing nominal responses. Projected actions are a more natural way for people to report how a disaster will affect them than are numerical responses. The concreteness, the ease of envisioning oneself in the situation and deciding what to do, make this type of response more meaningful than a report of an abstraction such as willingness to fly. In addition, action may be inconsistent with attitude, because they have different constraints. There are tradeoffs involved in deciding upon an action (or inaction), while an emotional response is simple. The contrast between the dependent variables we observed, that women express more fear than men, but anticipate behaving in about the same way, illustrates that an important contribution of the new technique is to encourage researchers to ask about behavior as well as attitudes.

Our other methodological contribution, the use of factorially constructed scenarios, may prove to be generally valuable because it exemplifies how scenario studies can inform policy decisions. This methodology is not really novel, in that factorial designs have traditionally been in the toolbox of experimental psychologists. What is new is our attempt to use the scenarios to predict the future, a notoriously difficult task. Factorial manipulations give the policy maker a chance to see if particular components or combinations of components have the desired effect. In contrast to asking experts or lay members of focus groups their opinions about a proposed policy change, the scenario study calls for respondents to imagine being in the new situation. To the extent that lay people can envision themselves in a hypothetical situation, this approach can predict the success of a modification in the physical, political, or economic environment. The particular challenge in promoting this methodology is that we cannot verify the predictions by examining future behavior; that is, external validation is infeasible. However, we can borrow from functional measurement methodology the idea of testing internal validity, that is, looking for particular patterns of consistency among the responses themselves.
4. Collaborative Projects

Our international collaborations were instigated by Weiss’s presentations at international conferences. Interested audience members initiated conversations that led to their translating our instruments and collecting data in their home countries. We have done the data analyses here. Our Spanish colleagues, Thomas Baumert, Mikel Buesa, Javier González Gómez, and Aurelia Valiño, are from the Universidad Complutense de Madrid. They are co-authors on Study 2.1. Our Israel colleagues are Tal Shavit from The College of Management and Mosi Rosenboim from the Ben-Gurion University of the Negev. They are co-authors on Study 2.2. The insights from these scholars, who have closely observed terrorism and interviewed victims of terrorism, have enriched our papers.

The surprising outcome we have obtained in both studies, that the data are virtually identical across countries despite the difference in level of exposure to real terrorist events, attests to the generality of the results. This congruence supports the idea that what we can learn about mitigation and coping will be broadly useful in the worldwide struggle against the terrorists.

5. Research Products

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5.1. Publications and Reports

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<td>1. Weiss, D., &quot;Nominal Analysis of Variance,&quot; Behavior Research Methods, 41, 901-908, 2009</td>
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Three additional manuscripts are at various stages of the publication pipeline.

3. Weiss, D. J., John, R. S., & Rosoff, H. Using scenario studies to inform policy decisions.

5.2. Presentations – Conference


5.3. Presentations – Outreach

Weiss, D. “Evaluating People who Evaluate People,” presented at the University of Auckland, New Zealand, August 2010

Weiss, D., “Factorial Analysis of Nominal Responses,” presented at the Center for the Study of Choice, University of Technology, Sydney, Australia, August 2010

Weiss, D., “Factorial Analysis of Nominal Responses,” presented at the University of Adelaide, Australia, July 2010

5.4. Models, Databases, and Software Tools and Products

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