

Economic Impact of Terrorist Attack and Pre-Crisis Risk Communication

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Presentation Objectives

- **Terrorist Attacks on Commercial Airlines**
 - Economic Impacts/Value of Risk Communication
- **Empirical Estimates** (Small attack-2 dead)
 - Indirect Impacts: **\$13.1B** (2yrs); **9x** direct impacts
- **Potential Solution:** Pre-crisis inoculation risk communication may increase public resilience by accelerating recovery after attack.
- **Why DHS and risk managers should care:**
 - **Value of Risk Communication: >\$100M**

A Risk Communication Experiment

Nationwide Panel tracked for 6 months

Survey 1	Baseline measures of perceived risk, emotion and confidence in DHS.	n= 445	Day 0
Survey 2	Randomly assigned to view four minute risk message video or not. Questions	n = 415	Day 6
Survey 3	All respondents view a 1 minute video of simulated newscast of an attack on an aircraft. Questions	n = 405	Day 10
Survey 4	Follow up survey questions (recovery)	n = 391	Day 22
Survey 5	Follow up survey questions (recovery) <i>followed by three new attack scenarios (checkpoint, bus, train).</i>	n = 335	Day 45
Survey 6	Follow up survey questions (recovery) followed by questions about the <i>Boston marathon attack.</i>	n = 325	Day 77
Survey 7	Follow up questions (recovery)	n = 304	Day 91
Survey 8	Follow up questions (recovery)	n = 293	Day 170

Inoculation Theory: Conferring Resistance to Persuasion

Goal: Increase Individuals' Resistance to Attitudinal or Behavioral Changes^{b,c}.

Analogous to medical model of vaccines

As a Risk Communication Strategy^{d,e}

Pre-Crisis: Alert individuals' that their attitude (e.g. it's safe to go to public events) is vulnerable to challenges (media stories, announcements from political groups)

This **threat** to attitude together with provided counterarguments motivates individuals' to develop their own counterarguments ("psychological antibodies")

Attitudinal resistance is increased

b: Banas, J. A., & Rains, S. (2010); c: Compton, J. (2013); d: Ivanov (2016), e: Farchi & Gidron (2010)

Video Risk Communication Message: Interview with Three Risk Experts

Viewed at start of Survey 2 six days into experiment

Three risk experts from USC were video interviewed by professional actor about terrorism risk on airlines-*4 minutes*:

Prevent terrorist attacks

Respond to terrorist attacks

Motivation of terrorists to “terrorize”

Risk is real

Preparedness and ability to respond will be questioned (e.g. media)

Mistakes have been made

Capabilities have been improved

Think and talk reasonably about terrorism risk



Simulated Attack on a Commercial Airline at LAX

Two Dead, 10 Injured and Plane Lands Safely

**Video Clip: One Minute Simulated Newscast Narrated by
Professional Actor**

“In the Event of an Attack, the Department of Homeland Security Would be Effective in *Minimizing* the Harm from a Terrorist Attack”

(7pt scale: Strongly Disagree-Strongly Agree)

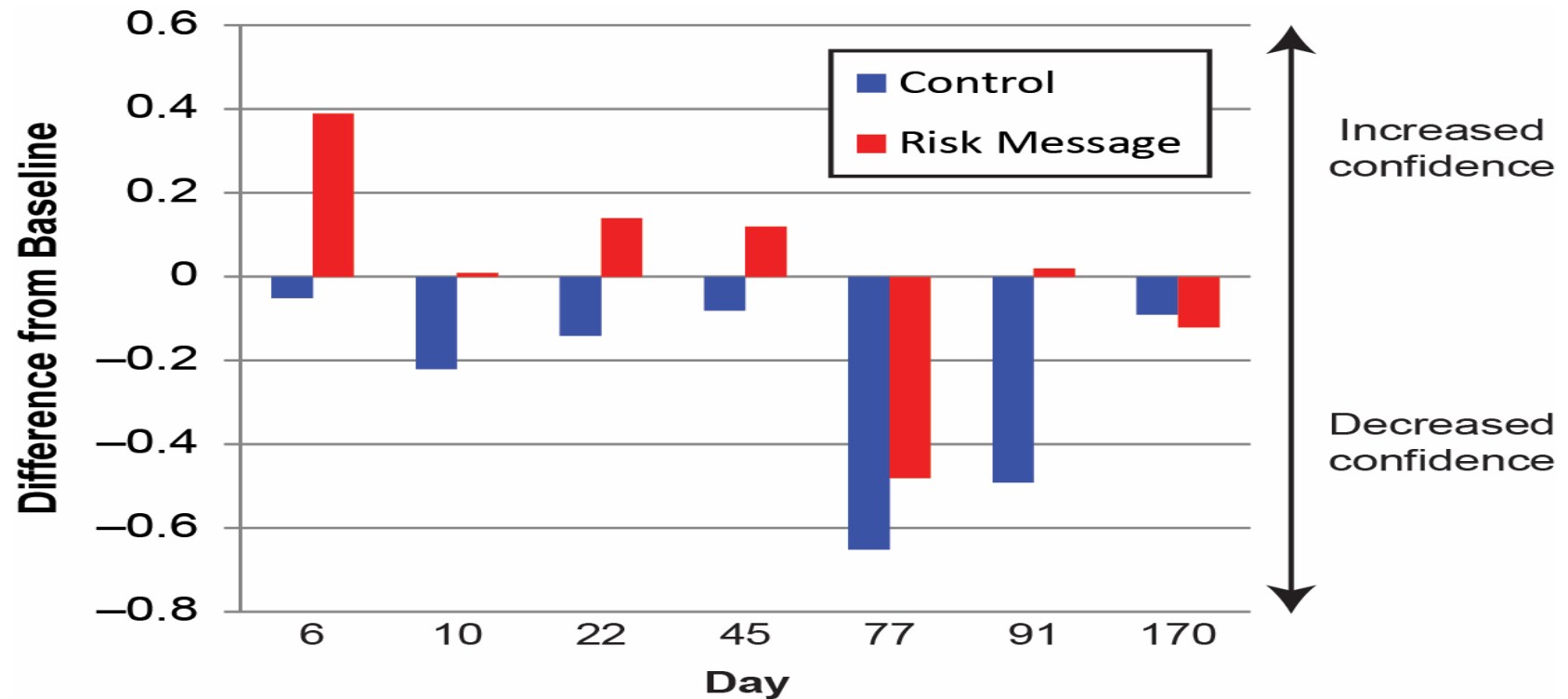


Figure 1. Change in confidence in DHS’s ability to minimize harm following a terrorist attack.

Economic Impacts of Airline Attack^{f,g}

Impact of Airline Attack	Year 1	Year 2	Total
Domestic Airline Trips Lost ¹	7%	4%	11%
Domestic Airline Revenues Lost ²	\$5.6B	\$3.3B	\$8.9B
Reduction U.S. GDP ³	\$8.0B	\$5.1B	\$13.1B
Ratio: Behavior/Ordinary Loss (GDP)			9x (4)

1: Derived from surveys reporting intention to postpone or cancel airline travel or switch to another mode of transportation.

2: Based on Computable General Equilibrium (CGE) model simulation

3: Based on CGE model simulation

4: Behavioral factors contribute **9 times** that of Ordinary loss (casualties, property, cleanup)

f: Rose et al. (2009); g: Rose et al. (2016)

Economic of Impact a Pre-Crisis Risk Communication Message

Impact of Risk Communication Message	Risk Message	No Message	Reduction
Domestic Airline Trips Lost ¹	10.35%	10.93%	.58% (4)
Domestic Airline Revenues Lost ²	\$8.4B	\$8.9B	>\$100M (5)
Reduction U.S. GDP ³	\$12.6B	\$13.1B	>\$100M

High Lever Policy: *Moving the needle of public reaction even a little can have a large impact on economic impacts of adverse event*

1: Derived from survey reporting intention to cancel airline trips

2: Based on CGE model simulation

3: Based on CGE model simulation

4: *This is not a statistically significant difference. Treat as an illustration.*

5: Potential reduction in lost airline revenues due to risk communication message

First Year Economic Impact (\$B) and Loss of Life: Sensitivity Analysis

For details see: Dillon, Burns & John (2018)^h Table 6 (*Decision Analysis*)

$$y = kx^\alpha : \quad y = 8(z/2)^\alpha = 8(p\%/6.9\%) \quad \alpha = \ln((p\%/6.9\%)/(z/2))$$

		Values of α for power function										
		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5
Loss of	1	8.0	7.7	7.5	7.2	7.0	6.7	6.5	6.3	6.1	5.9	5.7
	life											
	50	8.0	9.4	11.0	13.0	15.2	17.9	21.0	24.7	29.0	34.1	40.0
	100	8.0	9.7	11.8	14.4	17.5	21.3	25.9	31.5	38.3	46.5	56.6
	150	8.0	9.9	12.3	15.3	19.0	23.5	29.2	36.3	45.0	55.8	69.3
	200	8.0	10.1	12.7	16.0	20.1	25.3	31.8	40.1	50.5	63.5	80.0
	250	8.0	10.2	13.0	16.5	21.0	26.7	34.1	43.4	55.2	70.3	89.4
	300	8.0	10.3	13.2	17.0	21.8	28.0	36.0	46.2	59.4	76.3	98.0



Supportive Slides

Economic Impacts of Airline Attack^{f,g}

Impact of Airline Attack	Year 1	Year 2	Total
Domestic Airline Trips Lost ¹	7%	4%	11% (4)
Domestic Airline Revenues Lost ²	\$5.6B	\$3.3B	\$8.9B (5)
Reduction U.S. GDP ³	\$8.0B	\$5.1B	\$13.1B (6)
Ratio: Behavior/Ordinary Loss (GDP)			9x (7)

1: Derived from surveys reporting intention to postpone or cancel airline travel or switch to another mode of transportation.

2: Based on Computable General Equilibrium (CGE) model simulation

3: Based on CGE model simulation

4: **6%-16%** (Margin of error 5%)

5: 2012 Dollars; **\$5B-\$13B** (scaled from % lost trips)

6: 2012 Dollars; **\$8B-\$16B** (compromise extrapolation from CGE simulation and scaled from % lost trips). *Rose (2009) estimated the reduction in GDP due to 9/11 at \$109B.*

7: Behavioral factors contribute **9 times** that of Ordinary loss (casualties, property, cleanup)

f: Rose et al. (2009); g: Rose et al. (2016)

Example Questions from a Number of Topic Categories

Category	Question	Surveys
Confidence in DHS	The Department of Homeland Security is effective in Preventing Terrorist Attacks. A 7-point scale from <i>Strongly disagree</i> to <i>Strongly agree</i> .	1–8
Likelihood of an attack	How likely do you believe the U.S. is to experience a damaging terrorist attack on a commercial airline in the next 12 months? A sliding scale from 0% to 100%.	1–4
Emotional reaction	How angry do you feel about the terrorist threats facing our country now? A 5-point scale from <i>Not at all angry</i> to <i>Very angry</i> .	1–4
Future risk	How great is the risk posed to your future quality of life from each of the following? A 7-point scale from <i>No risk</i> to <i>Extremely high risk</i> .	1–8
Travel decisions	[In response to the attack scenario] How long would you wait before flying for reasons of business or job? A sliding scale from 1 week to 104 or more weeks.	3–4

Inoculation As Two-Sided Persuasion

Identify Focal Belief or Attitude to Protect

It's safe to attend public events and use public transportation (DHS, local officials,)

Forewarn Target Group That Their Beliefs Could be Challenged and Offer Examples

"You may hear media stories claiming terrorist groups can strike at will in the U.S. and we have limited ability to stop them. These stories may also be echoed by some of our political leaders"

Offer a Balanced Counterargument

"Terrorists attacks may happen occasionally even here in the U.S for the foreseeable future. However, we should remember DHS and FBI have thwarted many attacks and are increasingly getting better at responding to such attacks. Like other national challenges in the past we will come through this one as well"

Call to Action Letting Individuals Think and Decide

"The goal of terrorists is to generate fear and doubt so don't let them manipulate you! *Make up your mind about what to think and do.* Take reasonable precautions for disasters. **Think sensibly about the risks.**"

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