

Beyond valence: Emotion-specific influences on citizens' perceptions of risk and implications for the design of effective risk communication

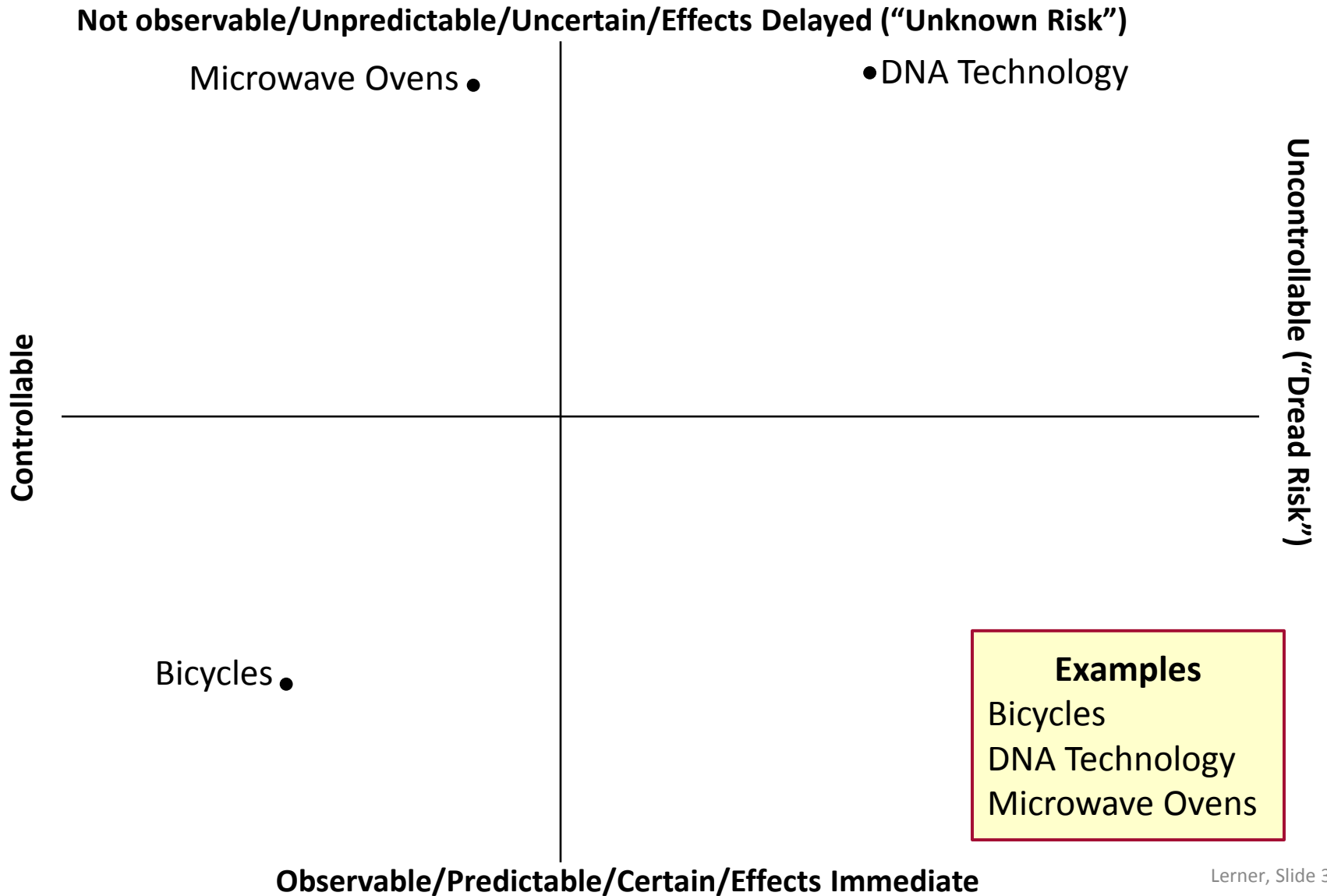
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Harvard University

I have a professional relationships with NIH, an organization involved in involved in clinical trials. I also have a professional relationship with Baxalta, Inc., an organization that manufactures antibiotics -- a topic under discussion today.

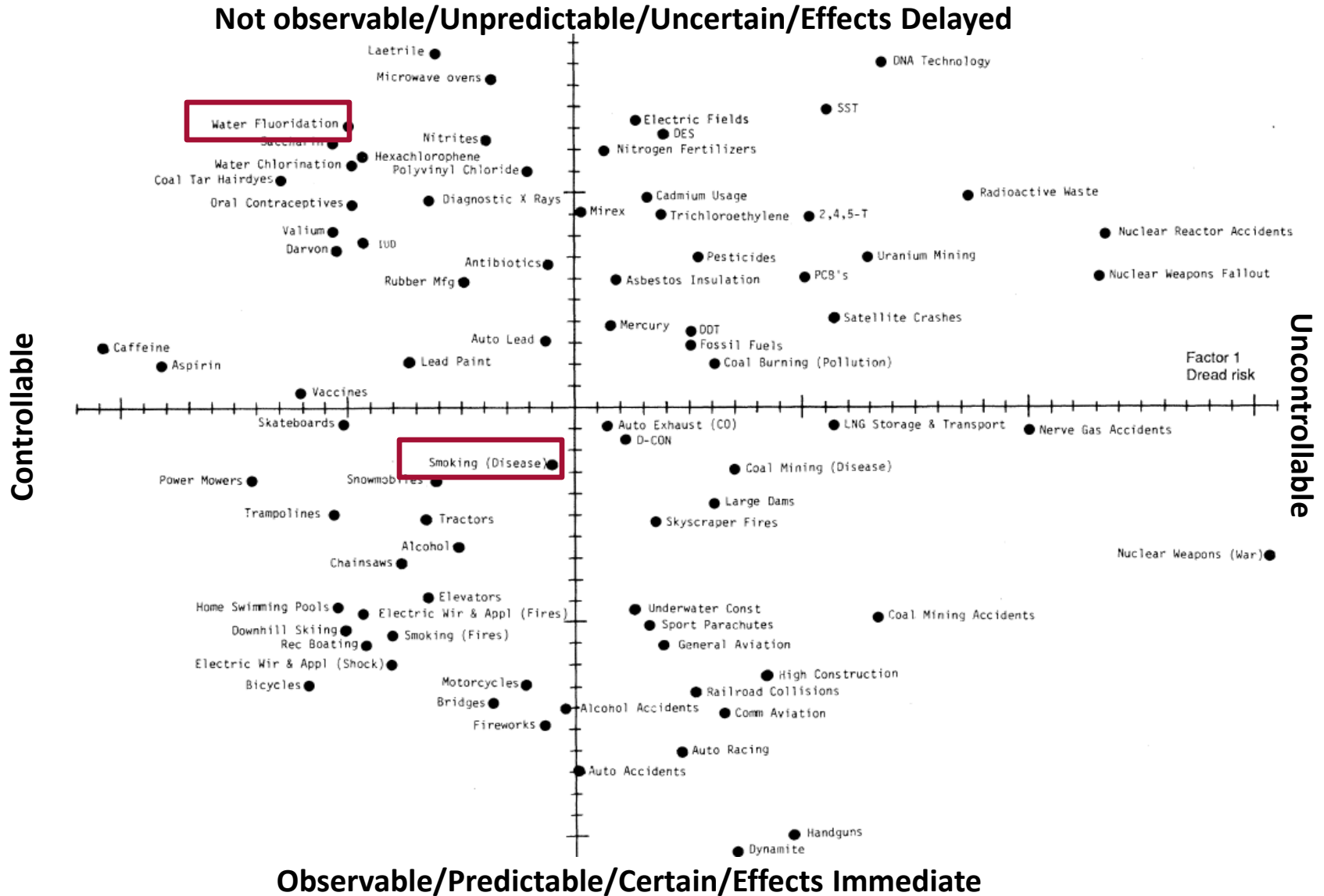
History: Psychology and Risk Perception/Communication

- 1950's: Behaviorism
 - $S \rightarrow R$
 - Silent re: what people think/hear about risks.
- 1970's – (approx.) 2000: Cognitive Revolution
 - $S \rightarrow C \rightarrow R$
 - Cognitive processing of risk-related information key. Departures from rationality explained through cognition.
 - (Example: Slovic slide)

The Psychology of Risk Perception



The Psychology of Risk Perception



Observable/Predictable/Certain/Effects Immediate

Certainty Heuristic (Unknown Risk)

The tendency to reject options that are associated with uncertainty. Also the tendency to reject options if one cannot see the risk with one's own eyes (e.g. nuclear power)



Controllability Heuristic (Dread Risk)

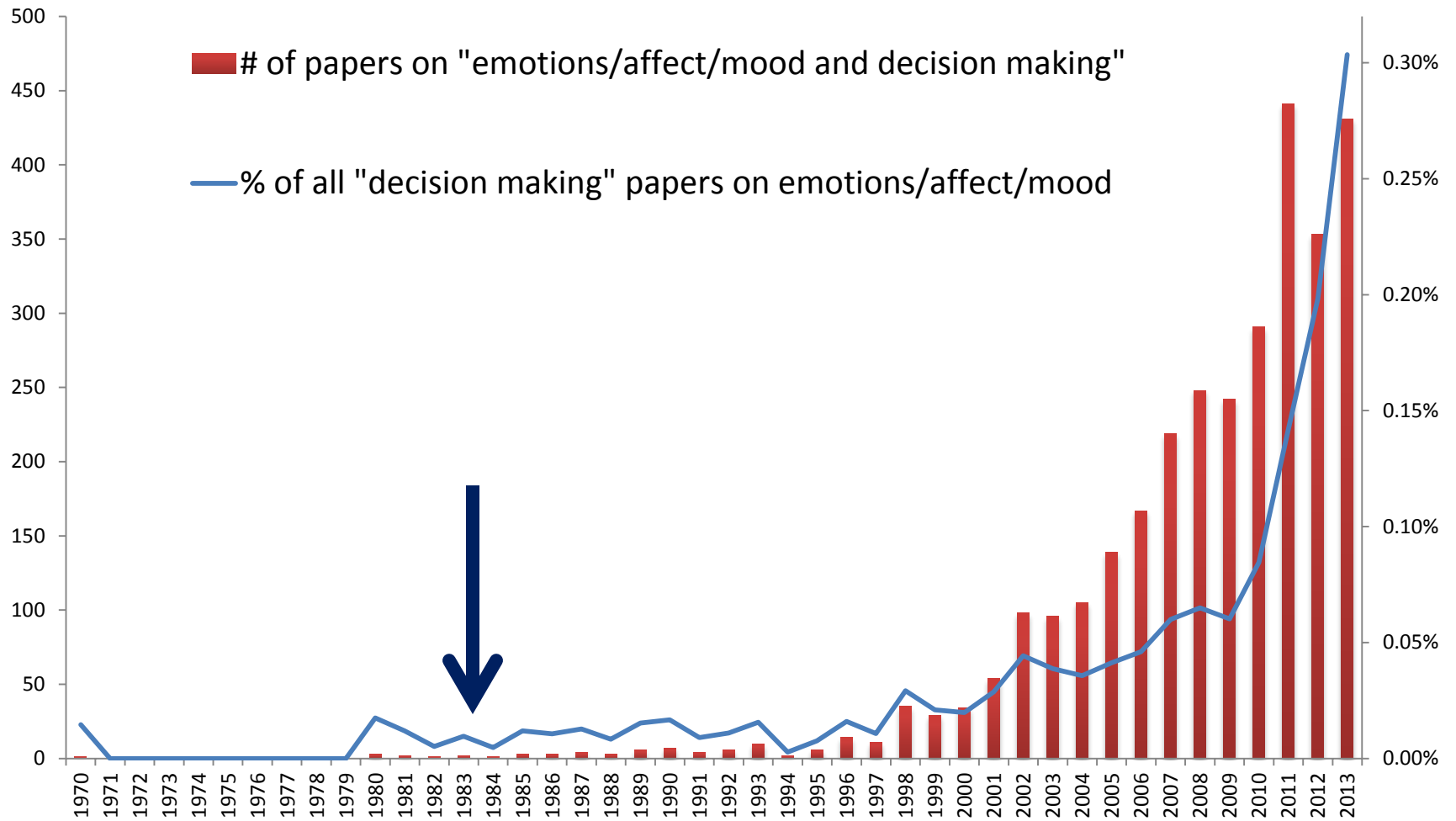
The tendency to see things as less risky if one feels in control while doing it (e.g. driving)



Psychology and Risk Perception/Communication

- 1950's: Behaviorism
 - $S \rightarrow R$
 - Silent re: what people think/hear about risks.
- 1970's – (approx.) 2000: Cognitive Revolution
 - $S \rightarrow C \rightarrow R$
 - Cognitive processing of risk-related information key. Departures from rationality explained through cognition.
- 2000 onward: Affective Revolution
 - $S \rightarrow E/C \rightarrow R$
 - (Example: citation slide)

Number of Scholarly Publications on Emotion & Decision Making Increasing Exponentially in Recent Years



Emotion as Perceptual Lens

- Mood-Congruent (Valence-Based) Processing:
 - Does being in a bad mood make you believe that bad things are more likely to happen?



Positive Affect → Optimistic Risk Estimates

Negative Affect → Pessimistic Risk Estimates

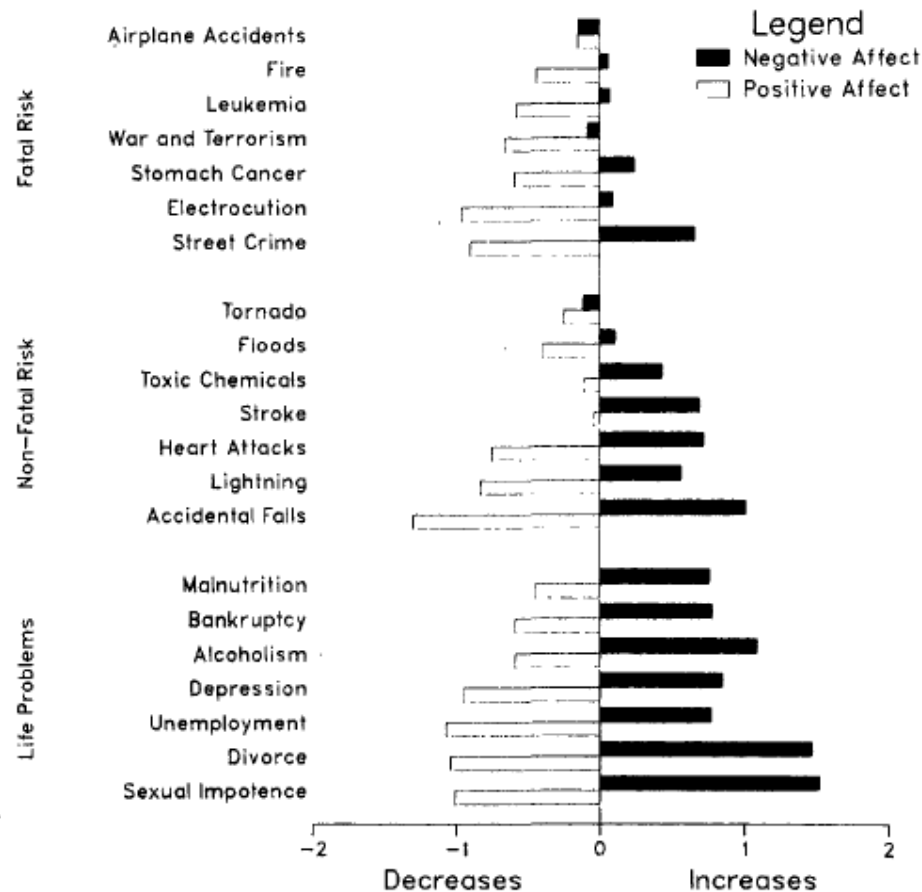


Figure 3. Increases and decreases (log scale) in estimated frequency, relative to control, induced by positive or negative affect for each of 21 risks.

A Theory of Specific Emotions and Judgment/Decision Making

- Cognitive Appraisal Tendencies

Definition: A proclivity to perceive new information in ways that are consistent with the original appraisal themes of an emotion (Lerner & Keltner, 2000; 2001).

- Research strategy: Compare emotions that are highly differentiated in their appraisal themes on judgments/choices that relate to that appraisal theme.

Emotion-Specific Approach to PERCEPTION OF RISK



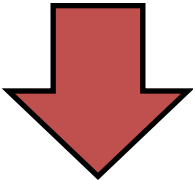

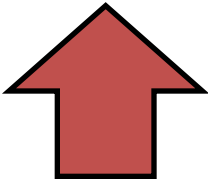
1: Identify appraisal dimensions that relate to risk:

- Control & certainty map on to Slovic's (1987) "dread risk" and "unknown risk"

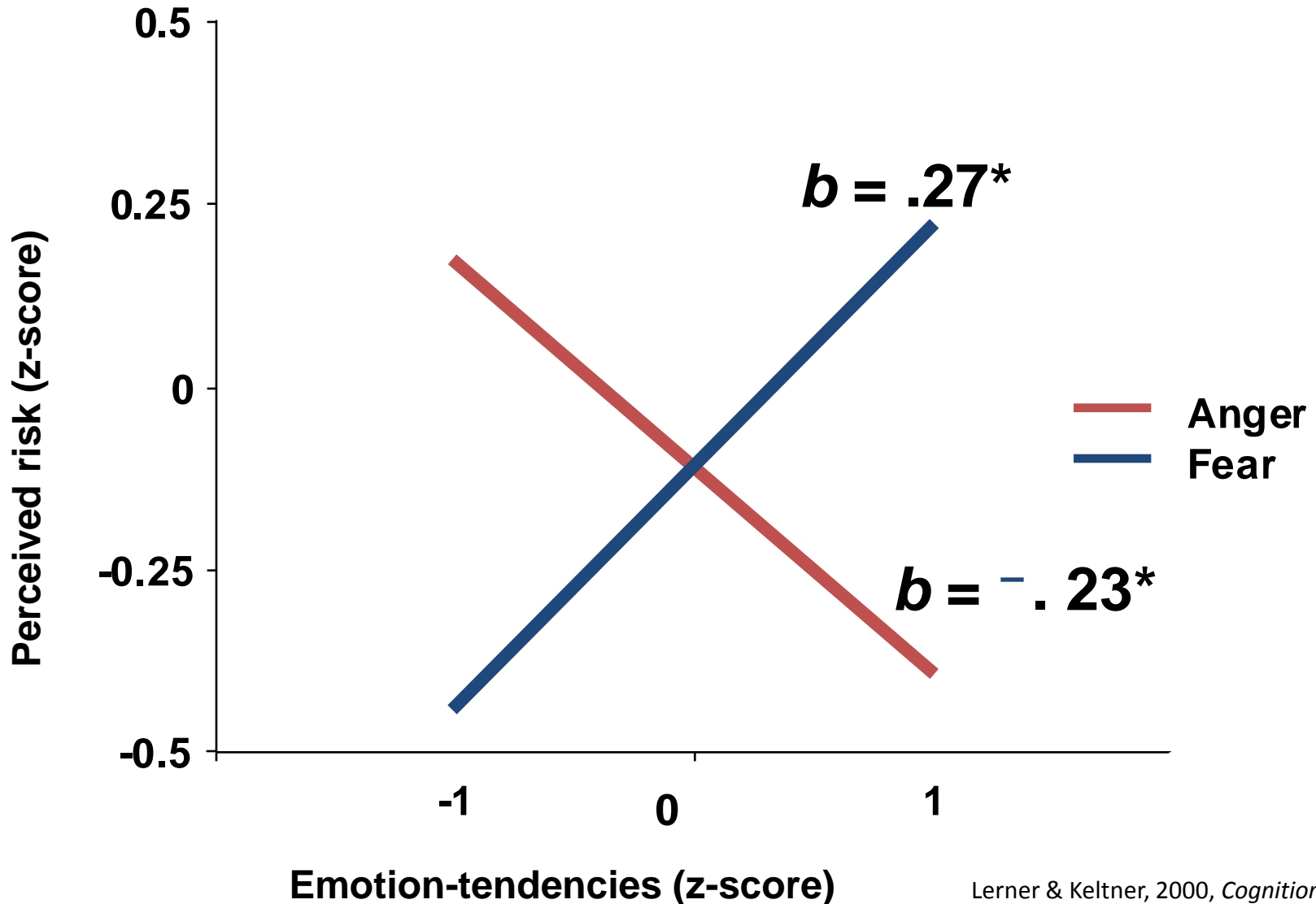
2: Select emotions that fall at opposite ends of these dimensions:

- Fear and anger

Study 1: Hypotheses for Perceived Risk

	Appraisal Tendency	Mood Congruent/ Valence
Fear		
Anger	 	

Fear is Associated With Higher Risk Estimates; Anger is Associated With Lower Risk Estimates



Risky Choice

Expected Values

The Same Across Versions

New Influenza Problem (Version G)

Problem 1: Imagine that the U.S. is preparing plans for the outbreak of a *new* strain of the flu, which is expected to kill 600 people in this country. There are two alternative programs. If Program A is adopted, **200 people will be saved**. If Program B is adopted, there is a **one-third probability that all 600 people will be saved** and a **two-thirds probability that no people will be saved**.

Which do you prefer, **Program A** (sure thing) or **Program B** (gamble)?

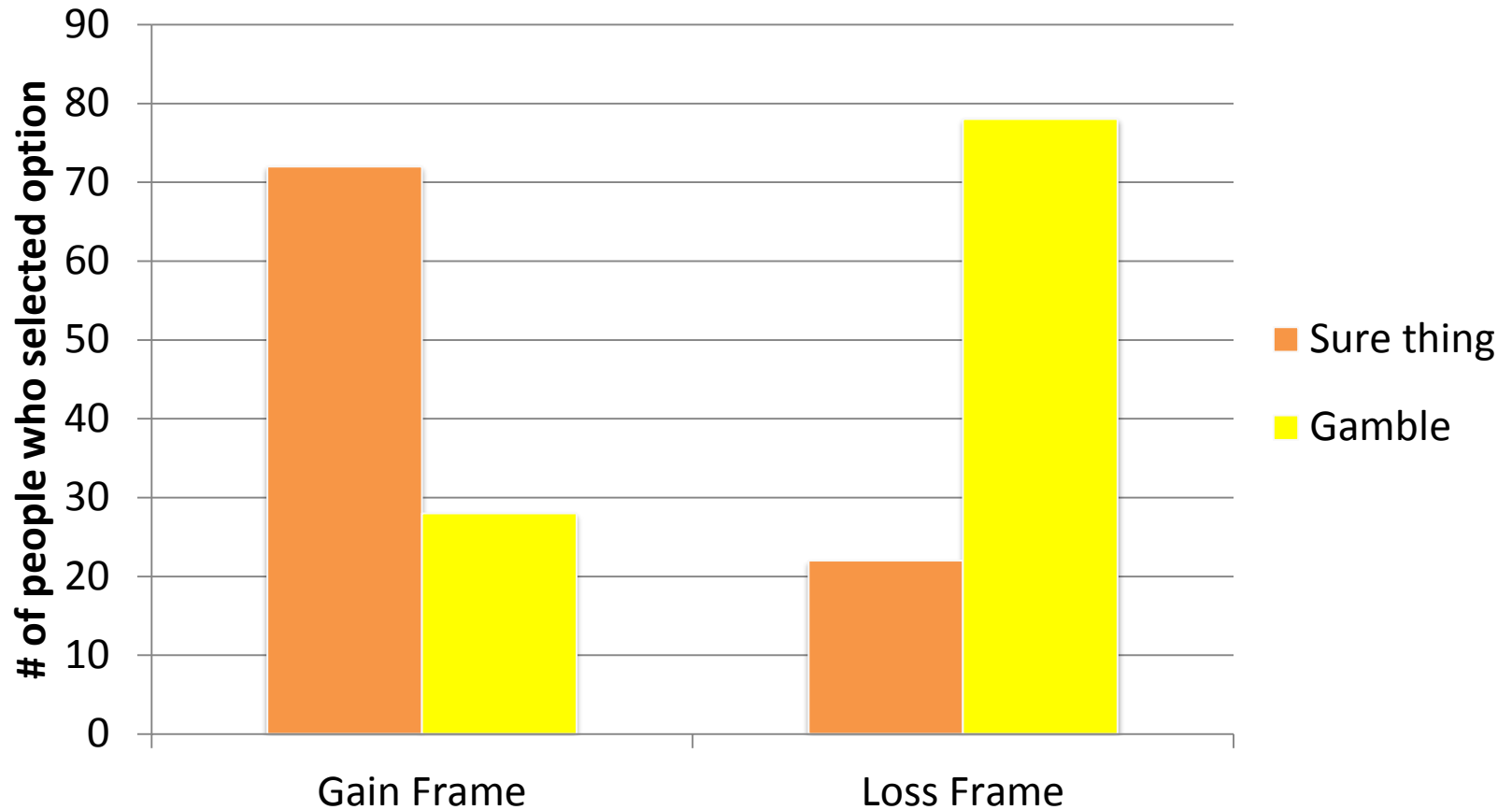
New Influenza Problem (Version L)

Problem 2: Imagine that the U.S. is preparing for the outbreak of a *new* strain of the flu, which is expected to kill 600 people in this country. There are two alternative programs. If Program C is adopted, **400 people will die**. If Program D is adopted, **there is a one-third probability that nobody will die** and a **two-thirds probability that 600 people will die**.

Which do you prefer, **Program C** (sure thing) or **Program D** (gamble)?

Typical finding: People are risk averse in the gain frame and risk seeking in the loss frame

New Influenza Problem



The Art of Risk Communication

A doctor could tell a patient that five years after a risky surgery...

90% of patients are still alive

or



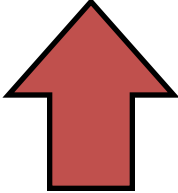

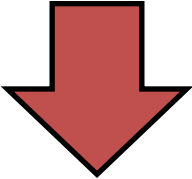
10% of patients are dead

or

90% of patients are alive *and* 10% are dead

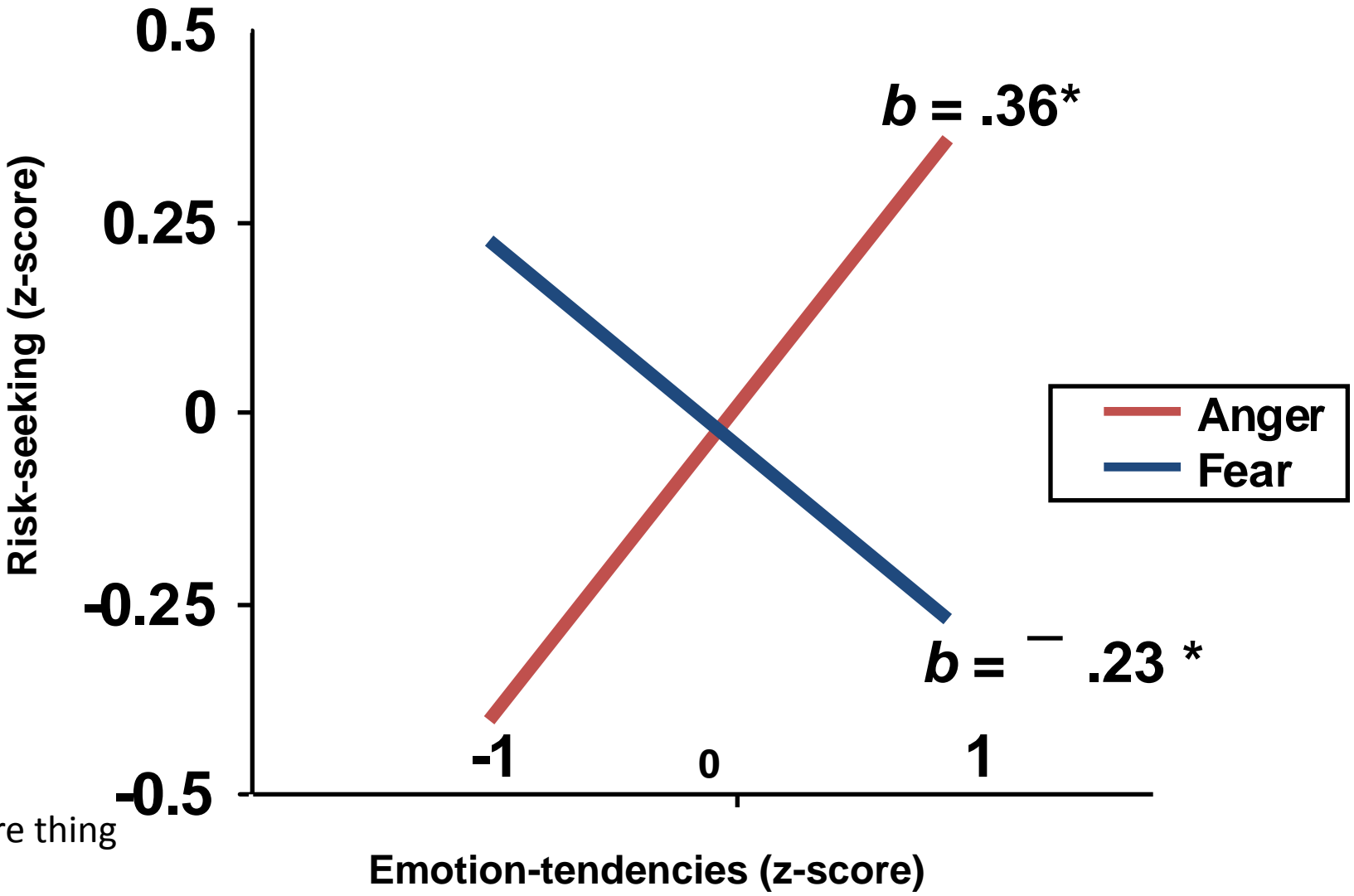
~~More Neutral~~

Study 2: Hypotheses for Choosing the Gamble (vs. Sure Thing)

	Appraisal Tendency	Mood-Congruent/ Valence
Fear		
Anger	 	

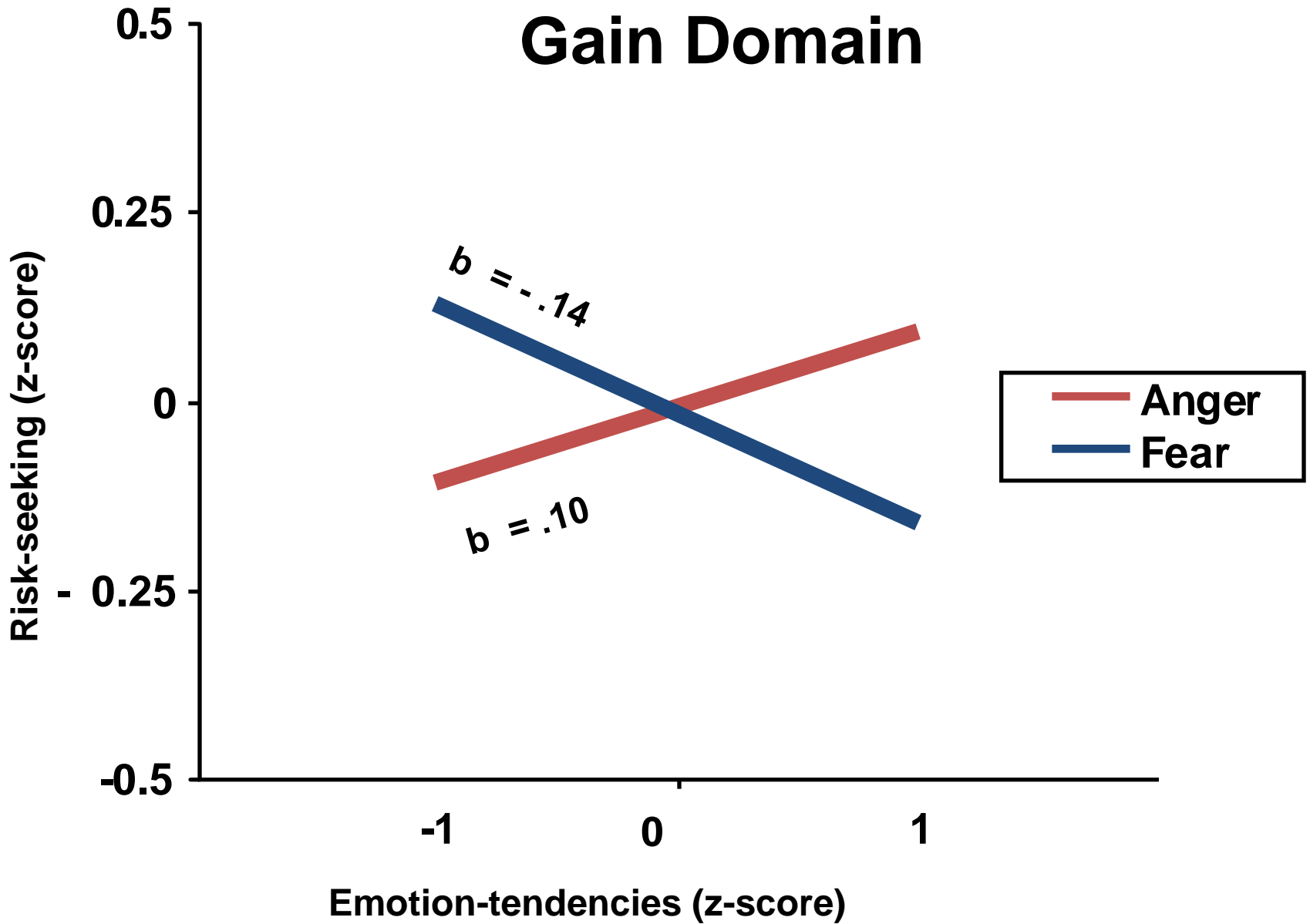
Loss Domain

gamble

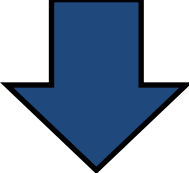
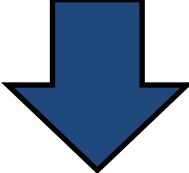
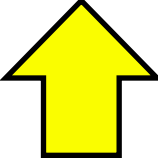

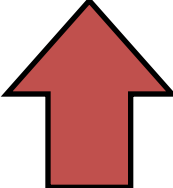

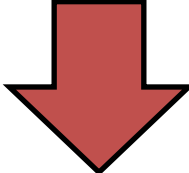


sure thing

Gain Domain



Study 3: Hypotheses for Optimism

Tendency	Appraisal	Mood Congruent/ Valence
Fear		
Happiness		
Anger	 	

LIFE EVENTS QUESTIONNAIRE

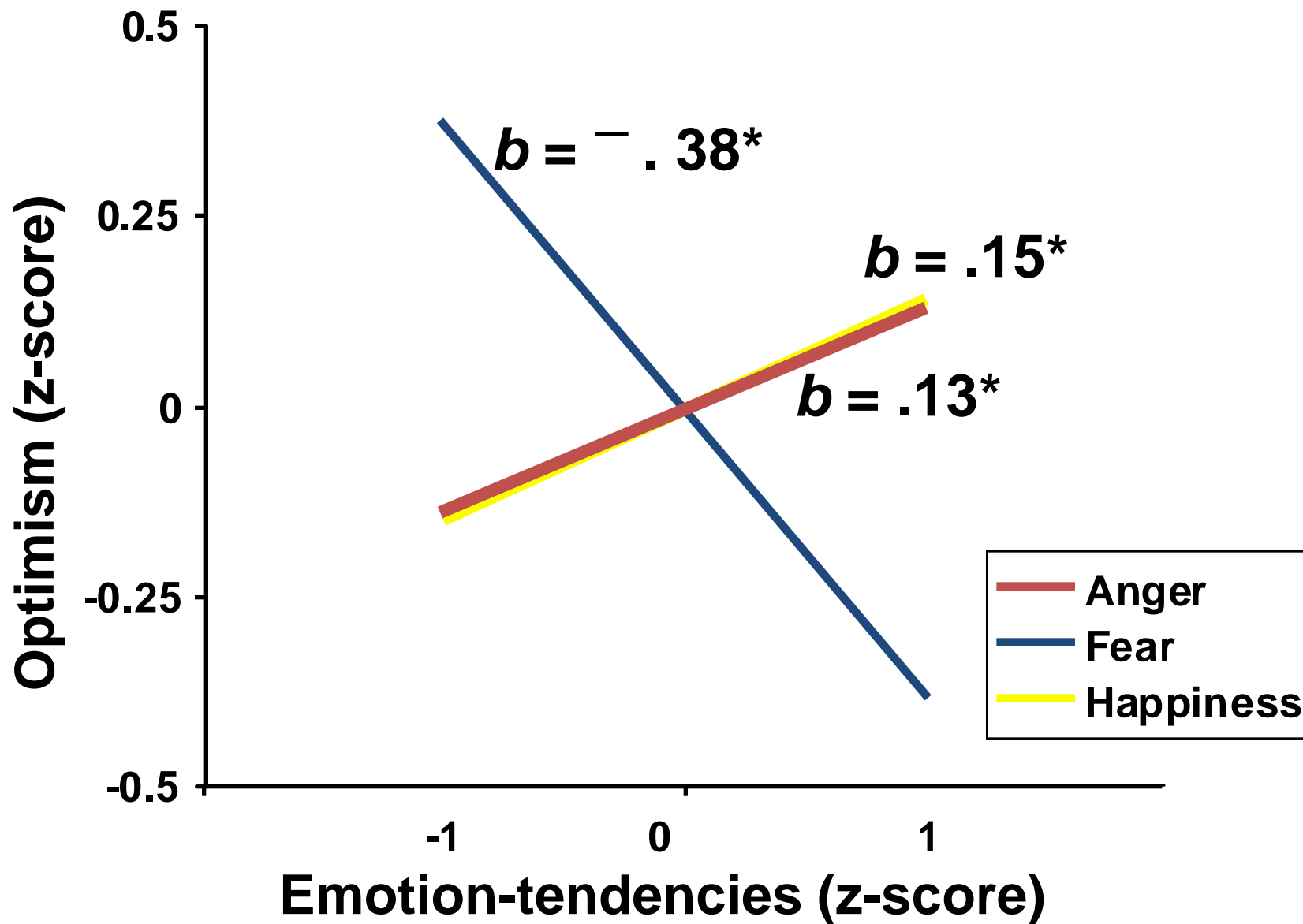
Compared to the average student (of your same gender) at your own college, please estimate as accurately as you can the chances that a similar event will happen to you at least once in your life.

-4	-3	-2	-1	1	2	3	4
Very Much Less Likely Than Average				Very Much More Likely Than Average			

Sample items (7 out of 26)

1. I enjoyed my post graduation job.
2. I had a heart attack before age 50.*
3. I bought my own home.
4. I was sued by someone.
5. I married someone wealthy.
6. I divorced < 7 years after I got married.*
7. My home doubled in value in 5 years.

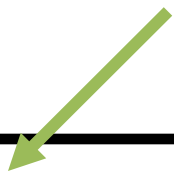
Support For Appraisal Tendency Hypothesis



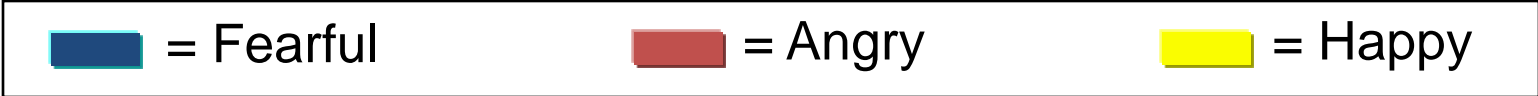
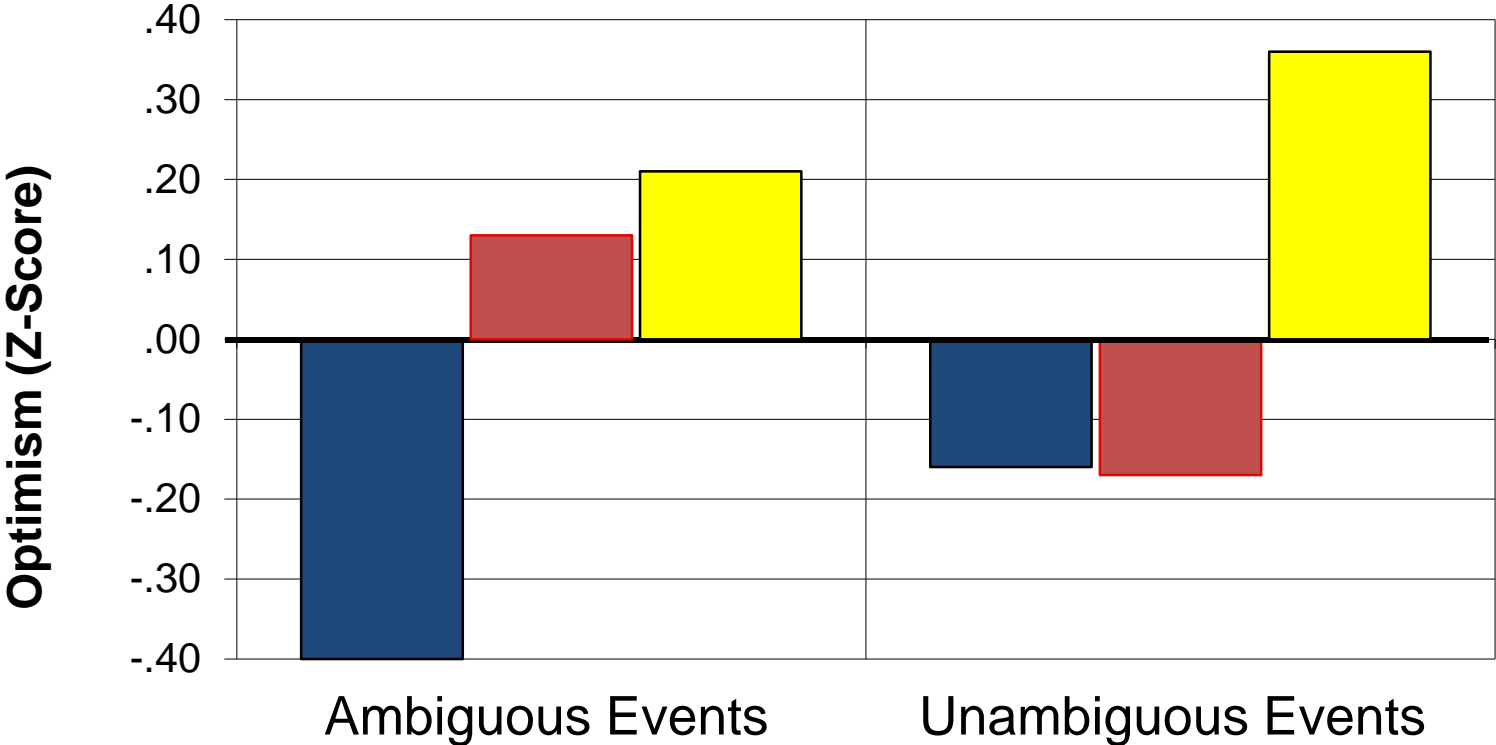
Study 4

- **If appraisal tendencies explain the opposing effects, then differences between fear and anger should be strongest when events are ambiguous with regard to certainty and controllability.**

Study 4: Hypotheses for Optimism

	Appraisal Tendency	Mood-Congruent
Ambiguous E. 	Angry > Fearful	Angry = Fearful
Unambiguous E.	Angry = Fearful	Angry = Fearful

Difference Between Fear & Anger Varies as a Function of Event Ambiguity



Study 5

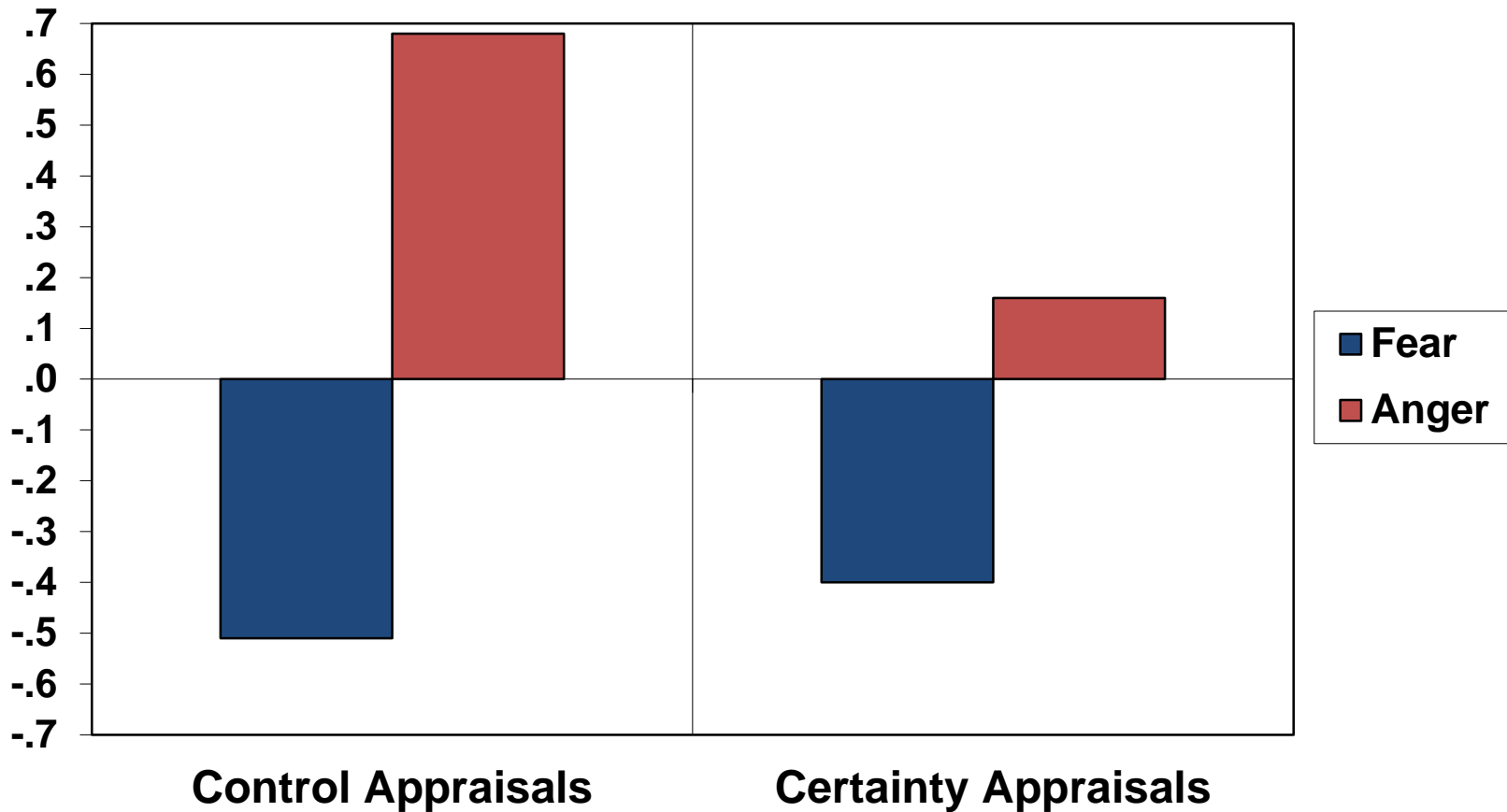
- Do perceptions of control and certainty mediate the effect?

Study 5: Hypotheses

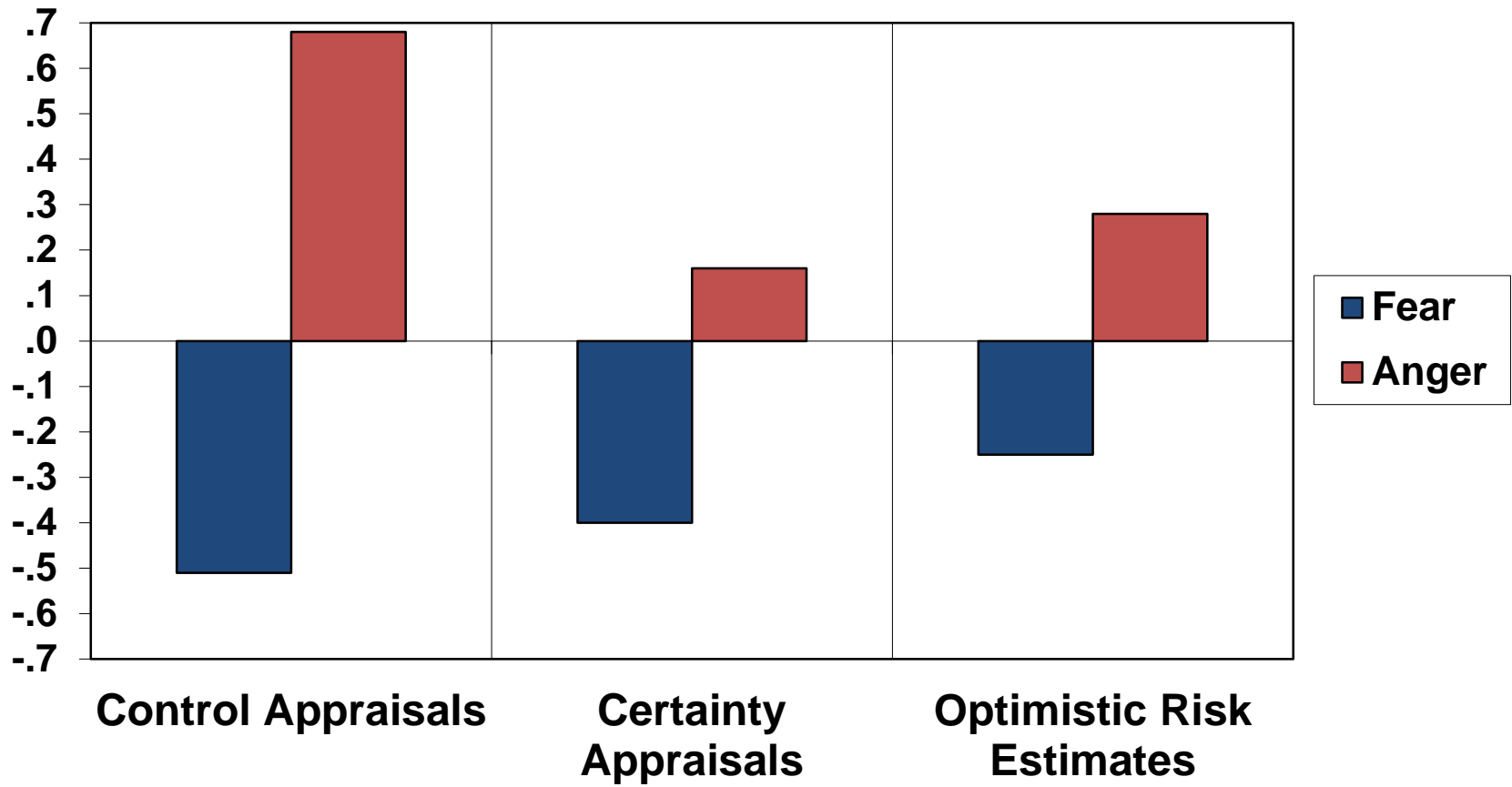
Fear  Anger 

- appraisals of certainty
- appraisals of individual control
- optimistic risk assessments

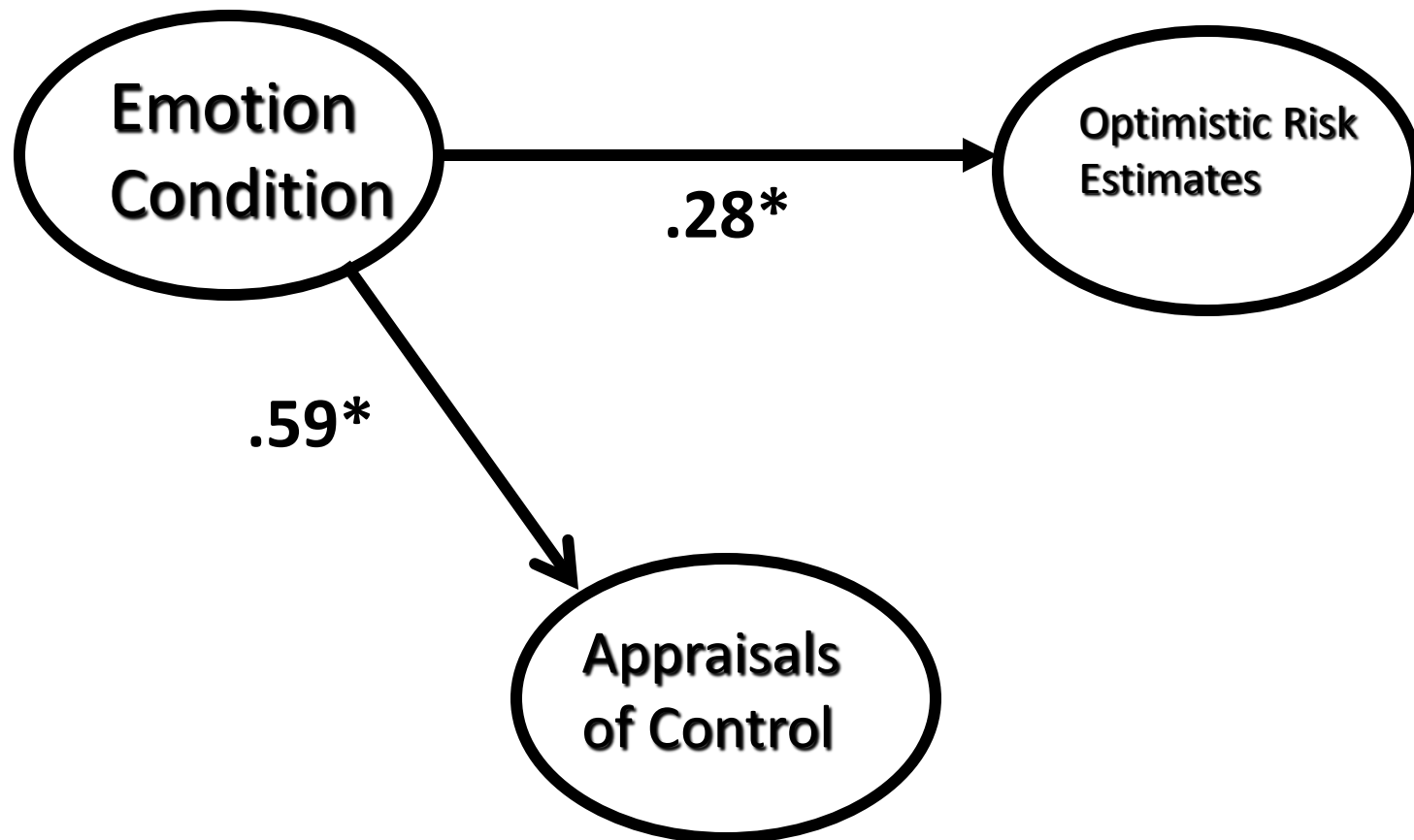
Fear & Anger Have Opposite Effects on Appraisals



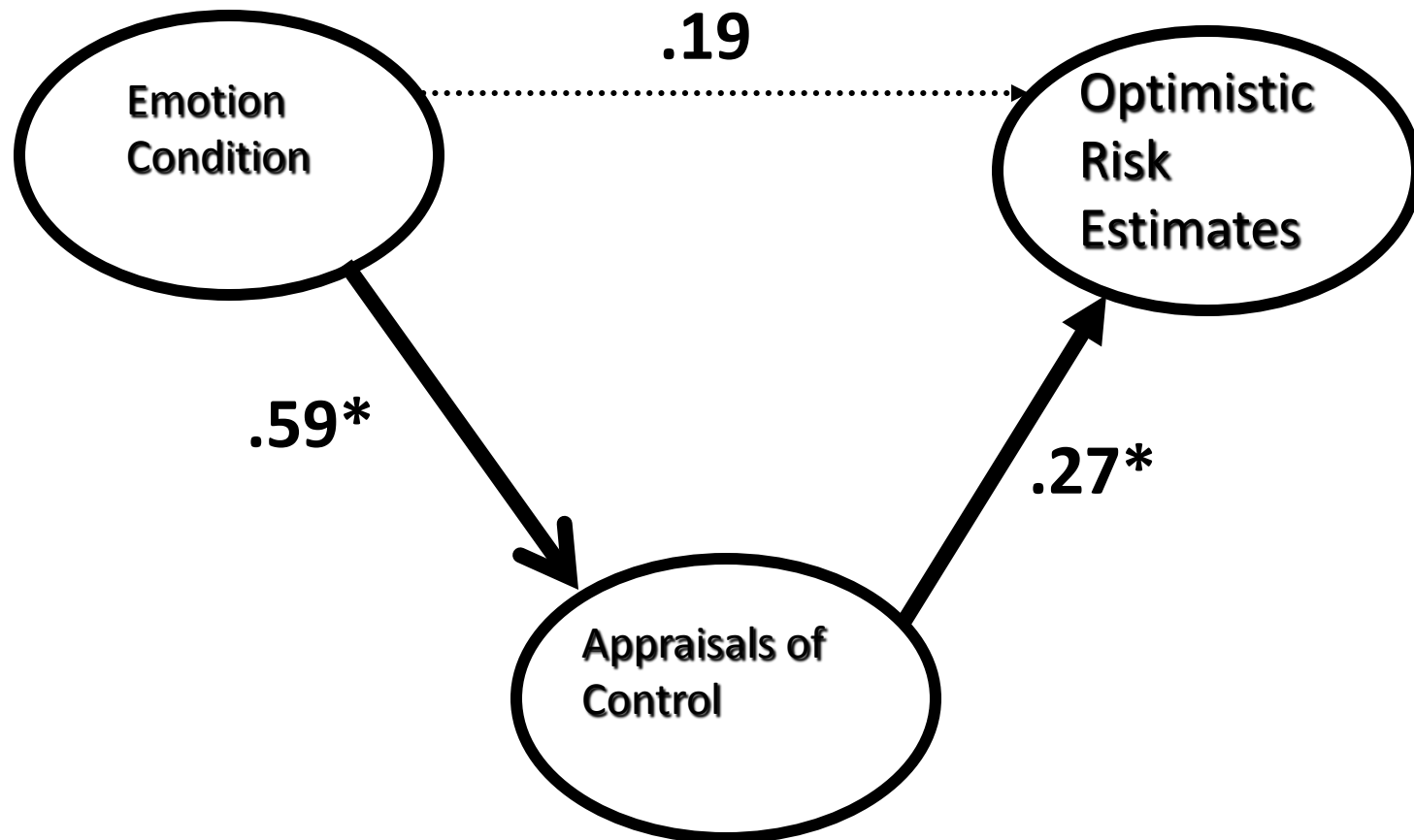
Fear & Anger Also Have Opposite Effects on Optimism



Path Analysis: Initial Steps



Step 2: Control Appraisals Mediate Emotion-Optimism Effect

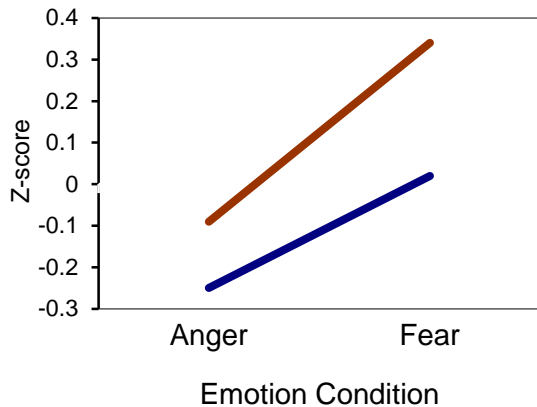


Does emotional carry-over matter for national events?

**PERCEIVING SALIENT RISKS OF
TERRORISM**

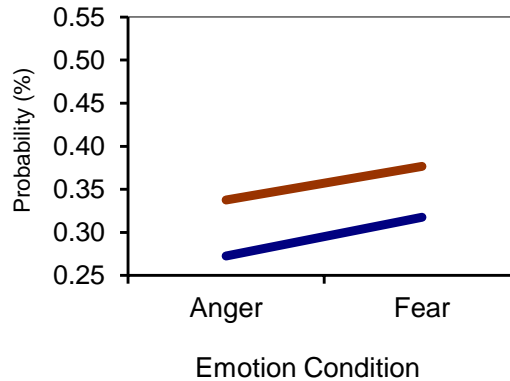
Perceiving Salient Risks of Terrorism

Perceived riskiness of future events for the United States



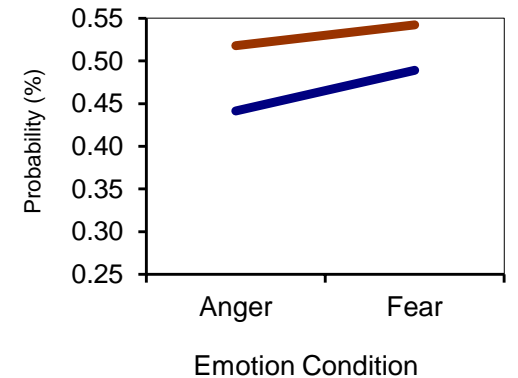
Male Female

Probability of risky events & precautionary actions for self



Male Female

Probability of risky events & precautionary actions for average American

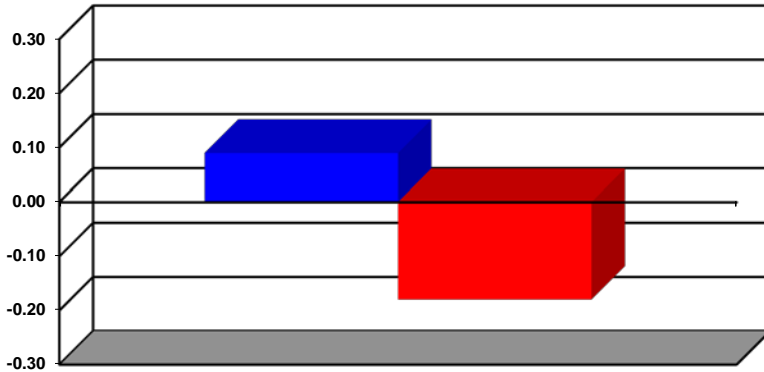


Male Female

Note: Differences in self-reported experience of fear and anger accounts for 80% of variance associated with gender

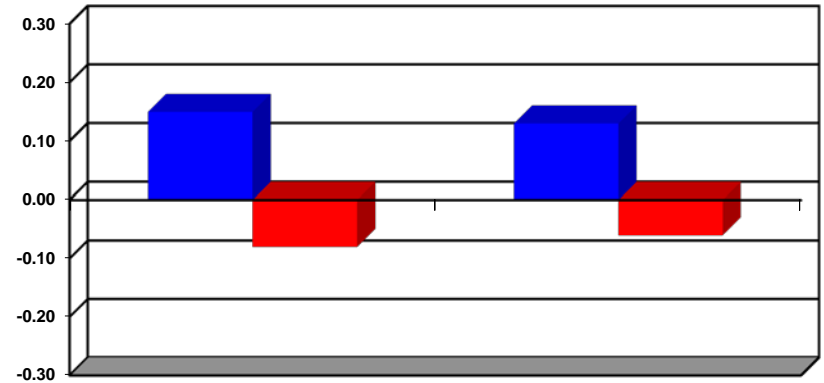
Correlations of Naturally-Occurring Emotions Right After the Attacks and Risk Estimates 2 Months Later

Riskiness of Future Events



■ Anxiety ■ Vengeance

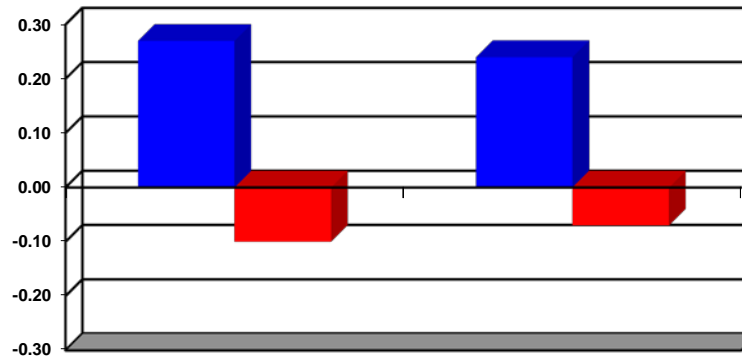
Terror Risks



Self Average American

■ Anxiety ■ Vengeance

Routine Risks



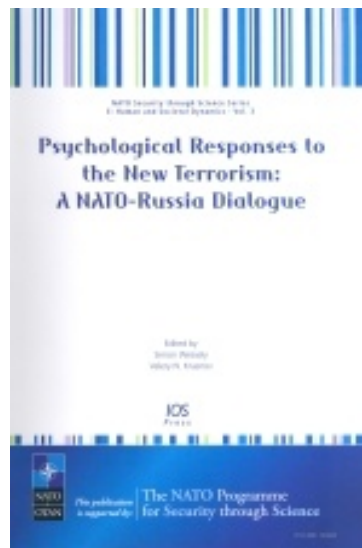
Self Average American

■ Anxiety ■ Vengeance

NATO-Russia Dialogue



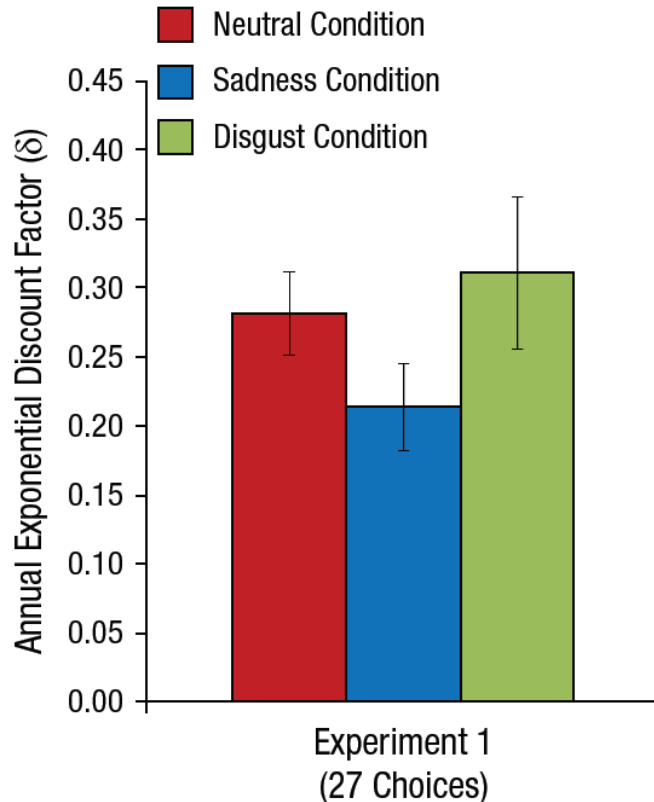
Results elucidate global responses to attacks and disasters.



Implications for Risk Communication

- Emotions (both state and trait) have highly specific effects on the perception of risk.
- Public service announcements that arbitrarily evoke a variety of different negative emotions (e.g., fear, anger, disgust, sadness) will correspondingly evoke a variety of different responses.
- Some responses will backfire. (slide)

Sadness Increases Impatience For Reward

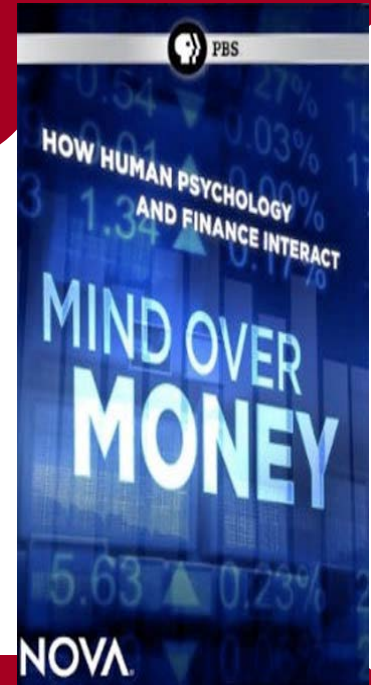


- Instead of receiving \$85 in 3 months:
- Median **SAD** decision maker wants \$37 immediately;
 - Median **NEUTRAL** decision maker wants \$56 immediately.

Implications for Risk Communication

- Emotions have highly specific effects on the perception of risk and individual differences matter.
- Public service announcements that arbitrarily evoke a variety of different negative emotions (e.g., fear, anger, disgust, sadness) will correspondingly evoke a variety of different responses.
- Some responses will backfire. (slide)
- Risk communication needs to be designed with a comprehensive understanding of affective science.

**Thank you for your open-mindedness
and eagerness to learn!**



**Check out Harvard's
Leadership Decision Making executive
education program if you'd like to learn more.**

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