Enhanced Risk Aversion, But Not Loss Aversion, in Unmedicated Pathological Anxiety

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Anxiety

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VS



Loss Aversion?

Risk Aversion?





Hypotheses

- 1. Pathologically anxious people would show increased risk aversion and loss aversion
- 2. Whether gambling decisions are modulated by the **emotional context** as a function of anxiety
- 3. Whether working memory is modulated by the emotional context & varies with anxiety

Prospect theory

Utility = V(x) x W(p)



Prospect theory



Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

• If Program A is adopted, 200 people will be saved.

• If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

• If Program C is adopted 400 people will die.

 If Program D is adopted there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die. Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

- If Program A is adopted, 200 people will be saved.
- If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.
 - If Program C is adopted 400 people will die.
 - If Program D is adopted there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die.

Prospect theory





25 %

0.01 %



Method

Procedure



- 1. Mini-international Neuropsychiatric Interview
- 2. Wechsler Test of Adult Reading
- 3. Emotional Decision-Making Task

Method

Emotional Decision-Making Task



Method

Behavioral Data Analysis

 $u(gamble) = 0.5 \times gain^{\rho} + 0.5 \times \lambda \times (-loss)^{\rho}$

$$u(sure) = sure^{\rho}$$

$$P(gamble) = \frac{1}{1 + e^{-\mu[u(gamble) - u(sure)]}}$$

Propensity to gamble



Healthy controls

Risk Aversion & Loss Aversion



Risk Aversion & Loss Aversion



Impact of Emotion

A. Gambling decisions





Caroline J. Charpentier et al., (2017)

Working Memory



- Pathologically anxious people would show increased risk aversion and loss aversion
- Whether gambling decisions are modulated by the emotional context as a function of anxiety
- 3. Whether working memory is modulated by the emotional context & varies with anxiety





Behavior Therapy Volume 37, Issue 2, June 2006, Pages 181-189

The Role of Risk Avoidance in Anxiety \Rightarrow

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https://doi.org/10.1016/j.beth.2005.11.003

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Hypotheses

• Different probability weighting function between anxiety patients and healthy control

• Effect of illusion of control

Task

[Phase 1]



Task

[Phase 2]



Model

U(gamble) = w(p) x λ x shock $\wedge \rho$ $w(p) = \frac{p^{\delta}}{(p^{\delta} + (1-p)^{\delta})^{1/\delta}}$ or $w(p) = \frac{\delta p^{\gamma}}{\delta p^{\gamma} + (1-p)^{\gamma}}$



Procedure





Study 1

Study 2







Task

[Phase 1]



Task

[Phase 2]

