

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

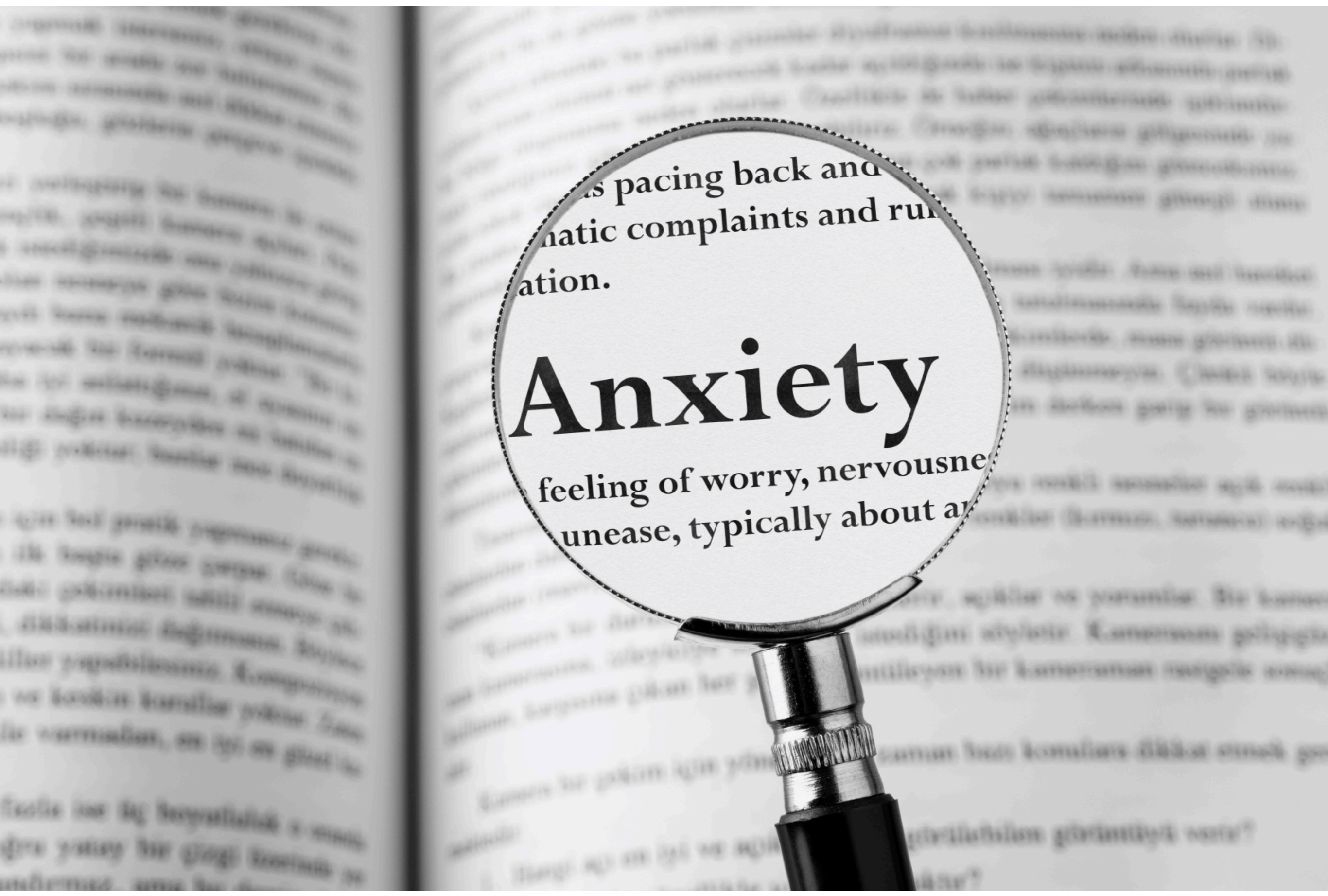
Caroline J. Charpentier, Jessica Aylward, Jonathan P. Roiser, and Oliver J. Robinson

Soyeon Kim

...is pacing back and
...omatic complaints and rum
...ation.

Anxiety

feeling of worry, nervousne
unease, typically about a

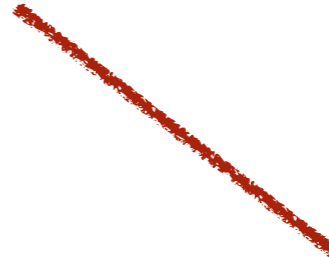
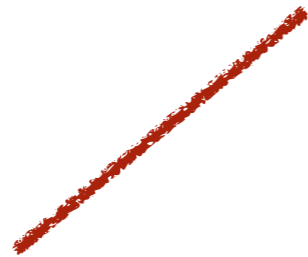


Anxiety

Working Memory

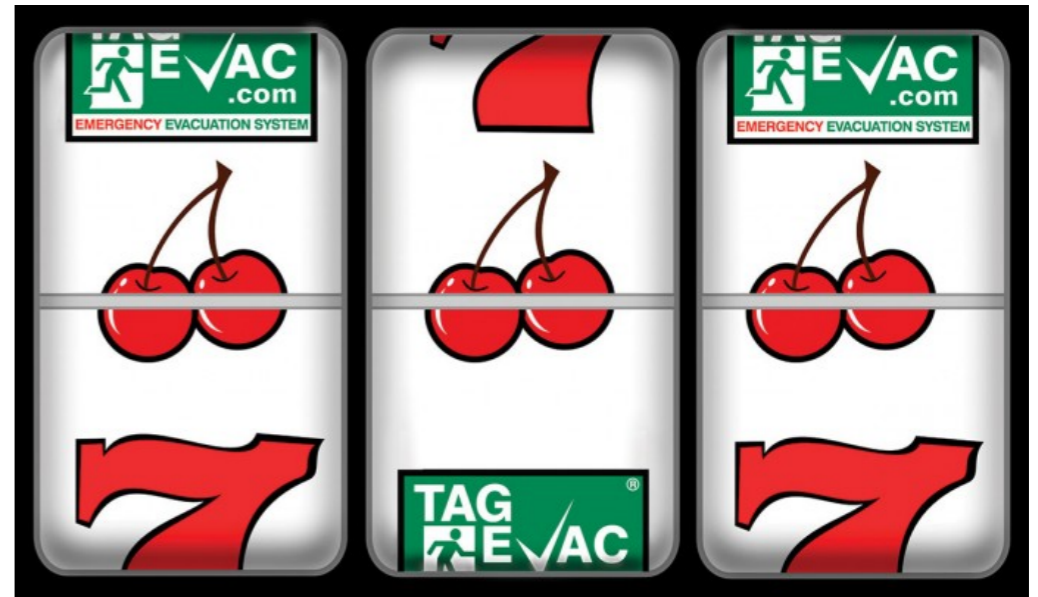
Decision Making

Emotional Processing





VS



Loss Aversion?

Risk Aversion?

Learning?

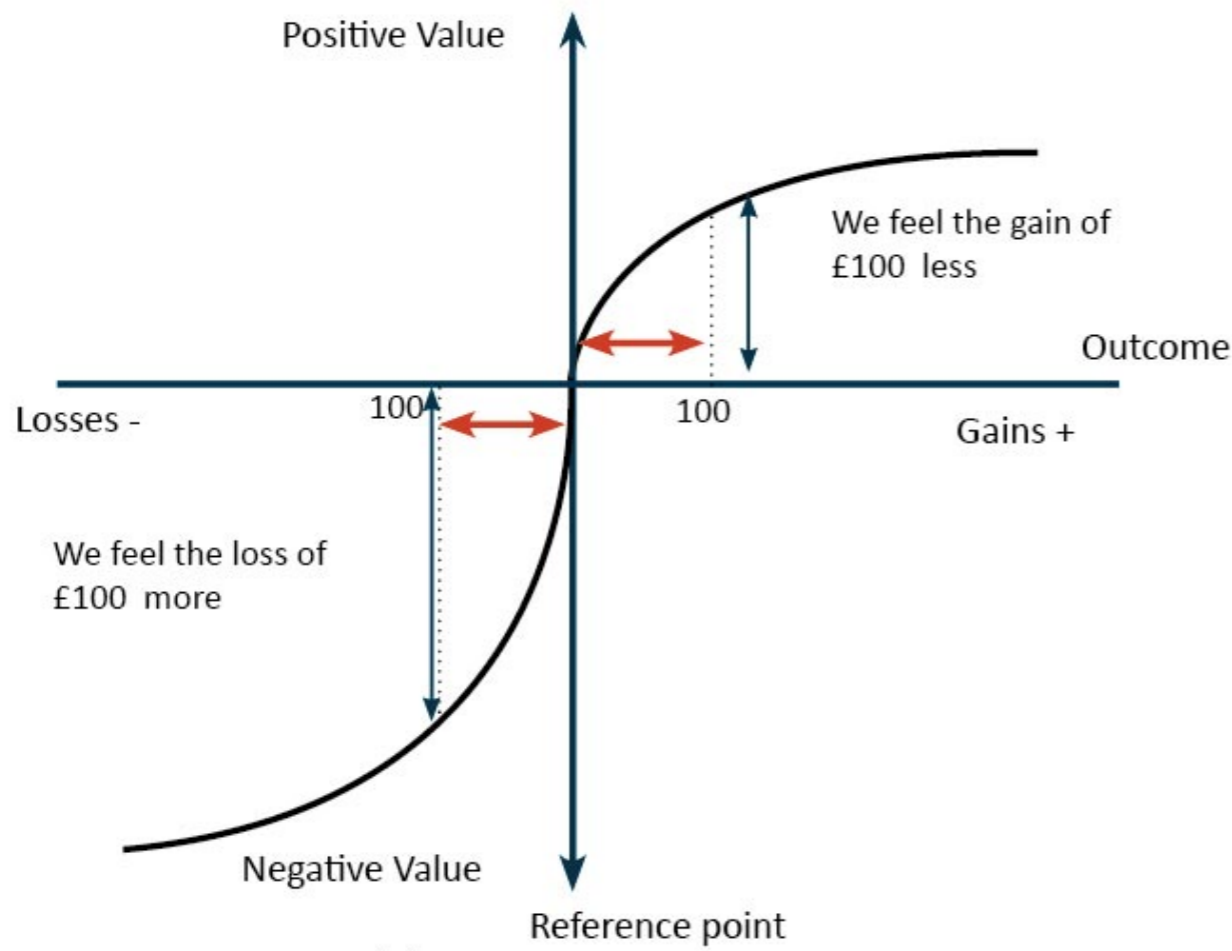


Hypotheses

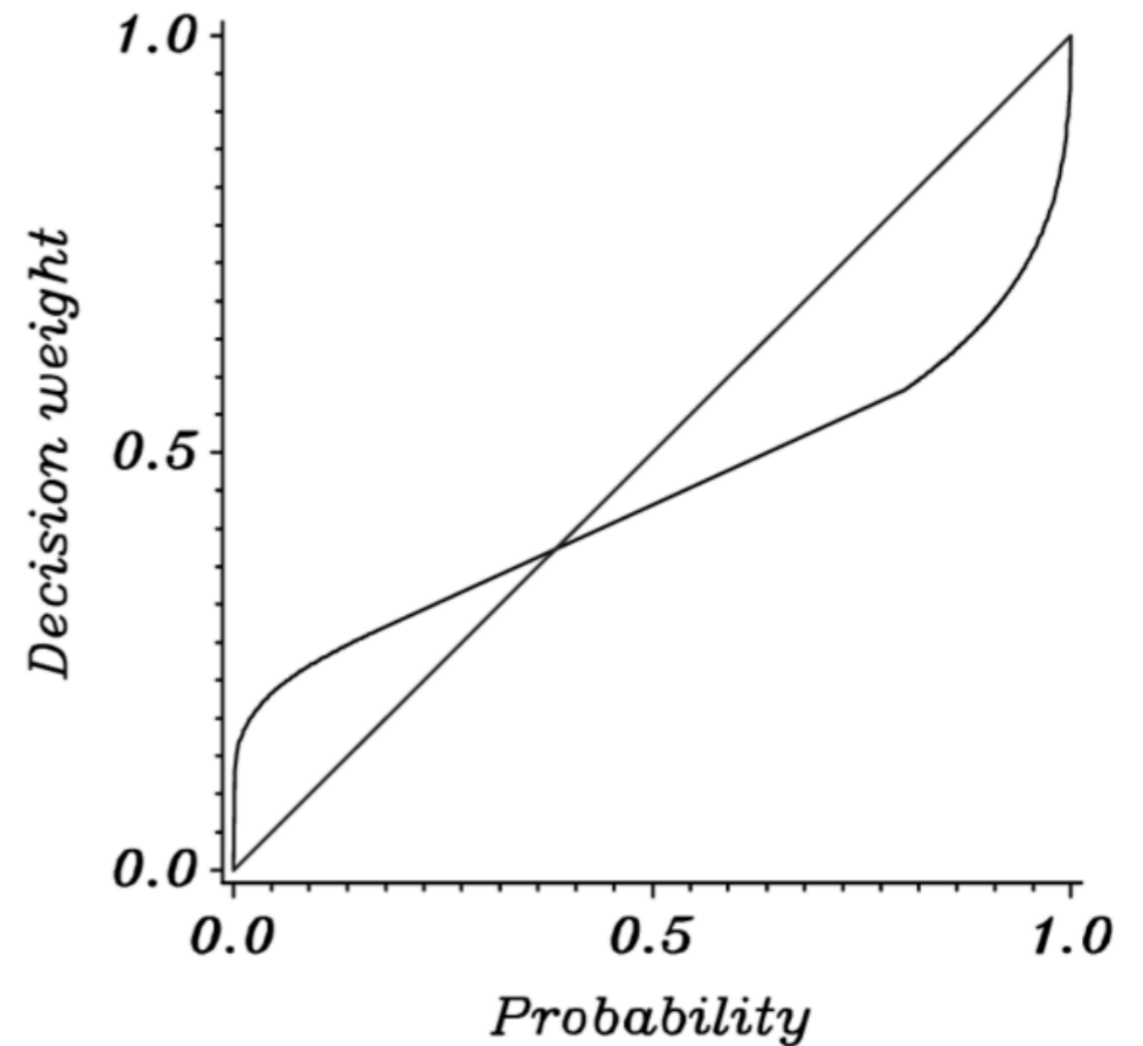
1. Pathologically anxious people would show increased **risk aversion** and **loss aversion**
2. Whether gambling decisions are modulated by the **emotional context** as a function of anxiety
3. Whether **working memory** is modulated by the **emotional context** & varies with **anxiety**

Prospect theory

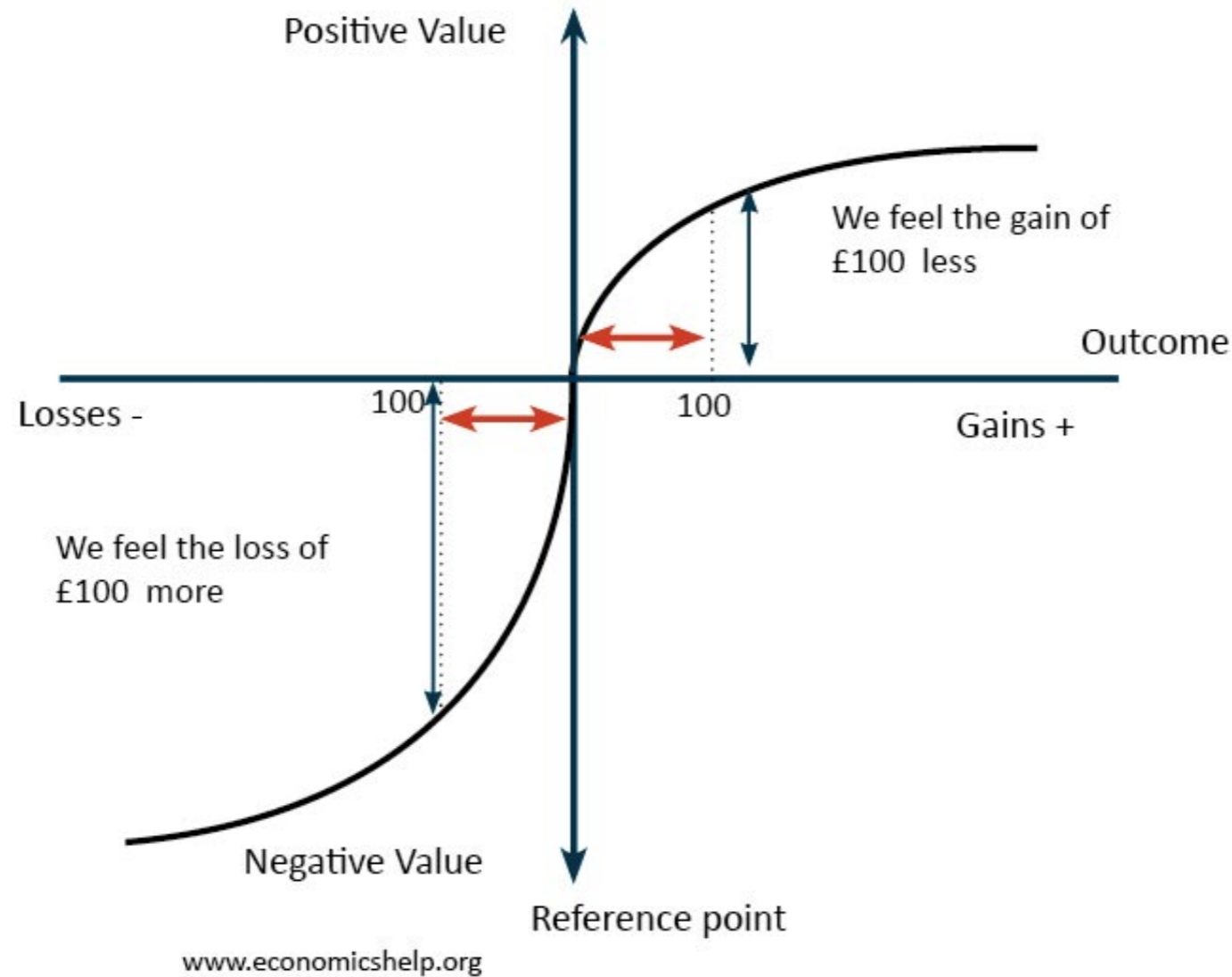
$$\text{Utility} = V(x) \times W(p)$$



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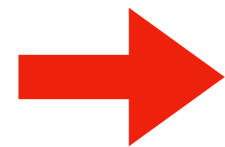


Prospect theory



$$v(x) = \begin{cases} x^\alpha & \text{if } x \geq 0 \\ -\lambda(-x)^\beta & \text{if } x < 0. \end{cases}$$

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.*

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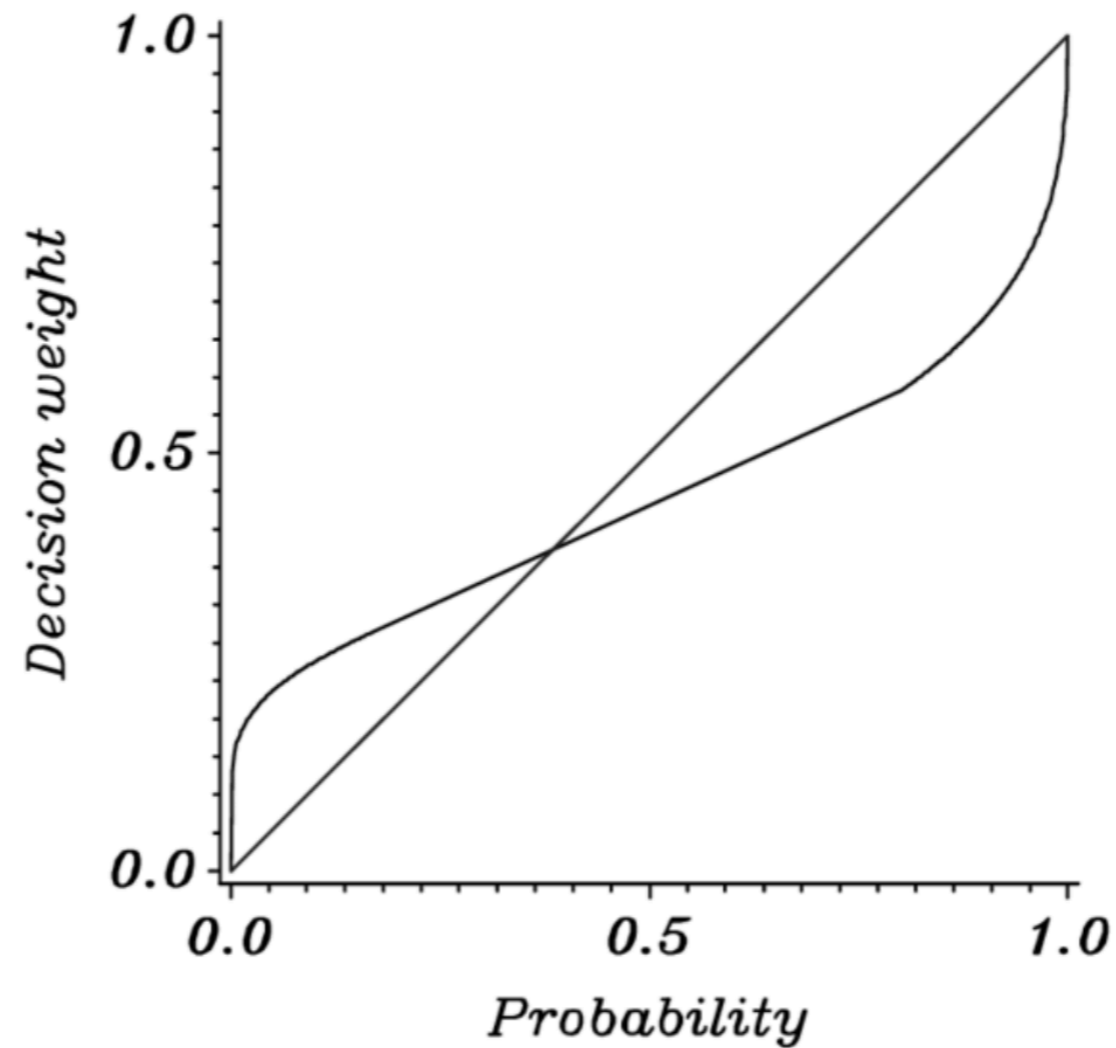
- *If Program A is adopted, 200 people will be saved.*

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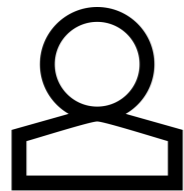
- *If Program C is adopted 400 people will die.*

- • *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



$$w^+(p) = \frac{p^\gamma}{(p^\gamma + (1-p)^\gamma)^{1/\gamma}}, \quad w^-(p) = \frac{p^\delta}{(p^\delta + (1-p)^\delta)^{1/\delta}}.$$



25 %

0.01 %



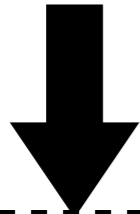
1 %

25 %

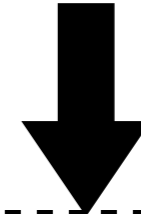
Method

Procedure

State-Trait Anxiety
Inventory



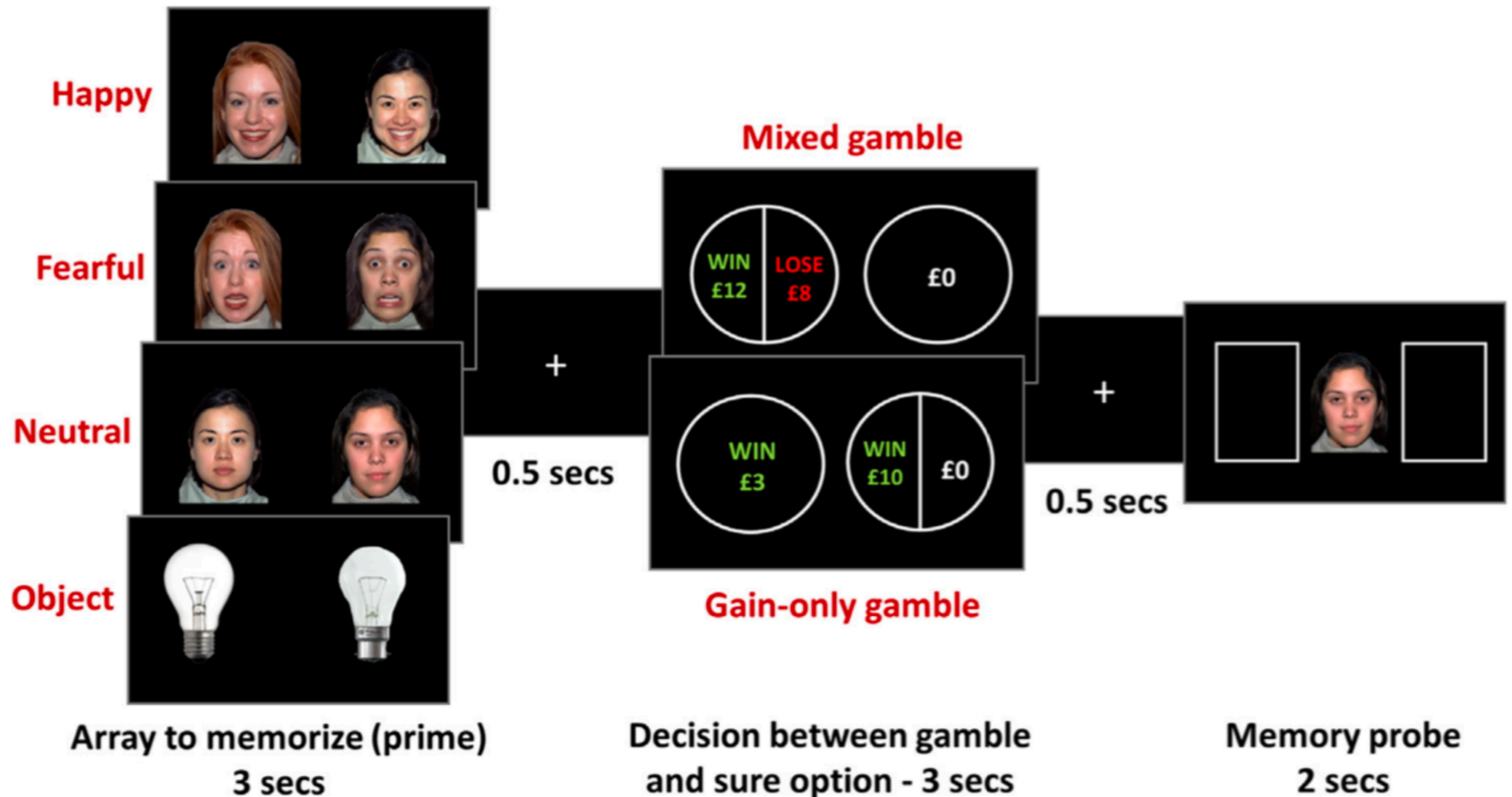
1. State-Trait Anxiety Inventory
2. Beck Depression Inventory



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

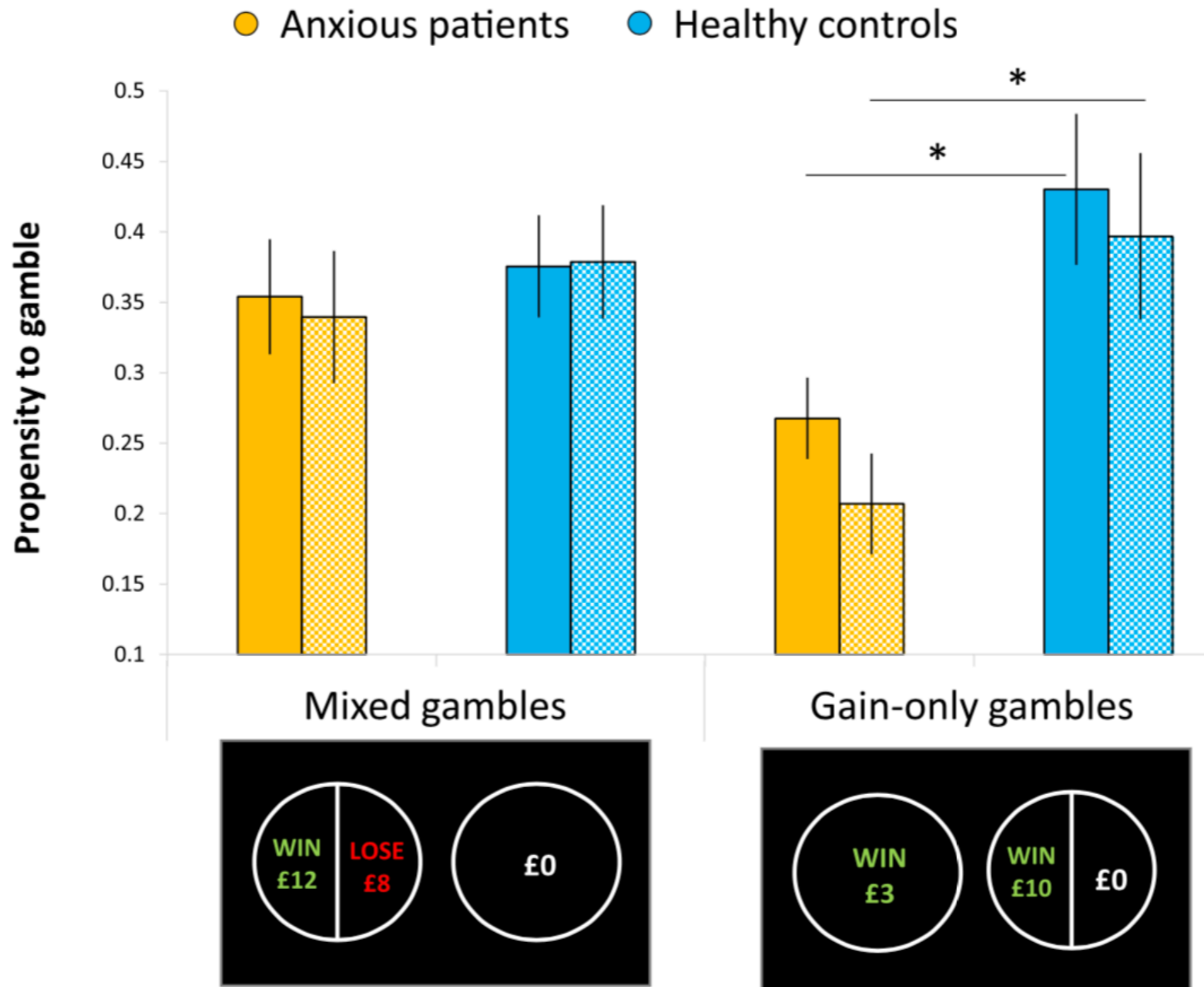
$$u(\textit{gamble}) = 0.5 \times \textit{gain}^\rho + 0.5 \times \lambda \times (-\textit{loss})^\rho$$

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

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

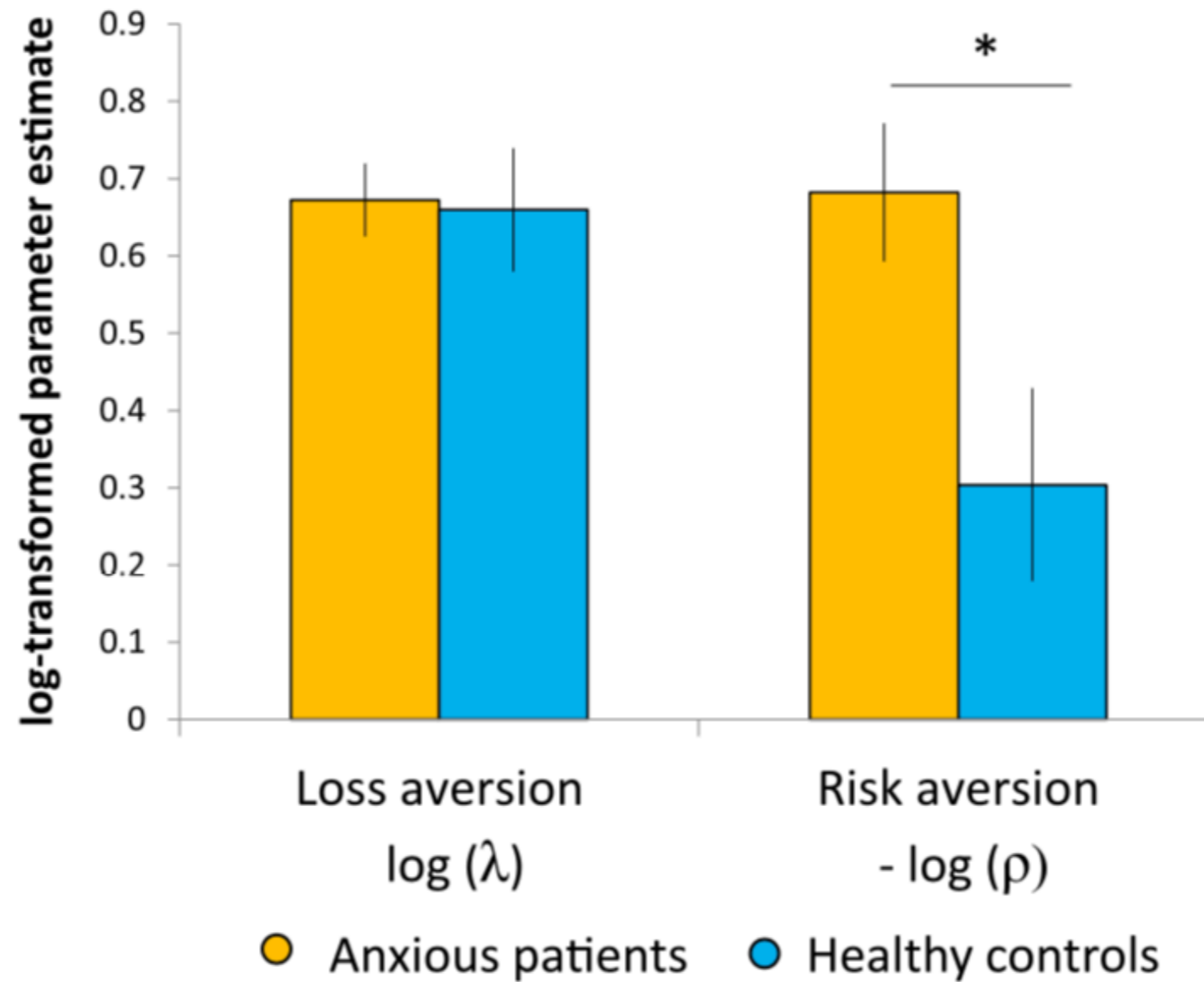
Results

Propensity to gamble



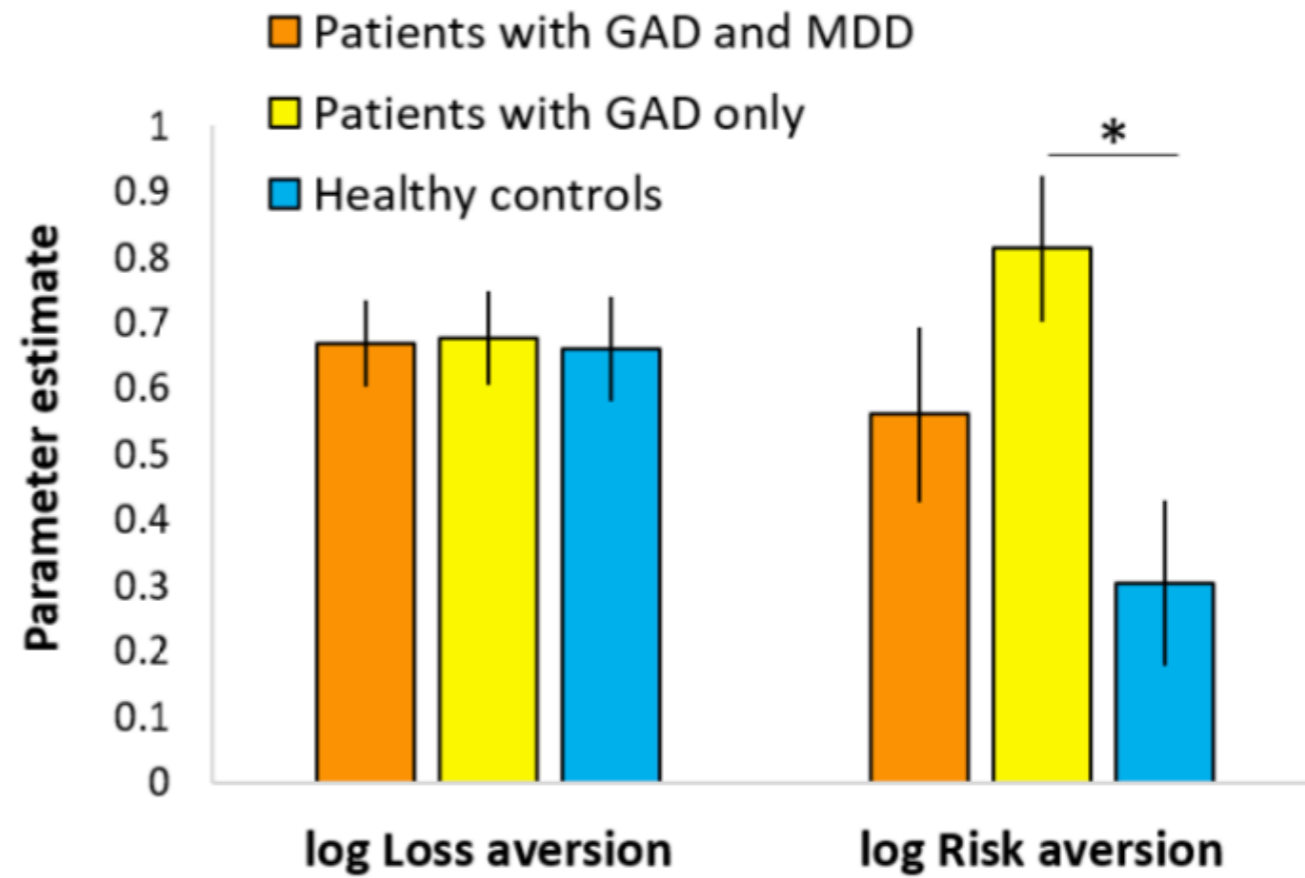
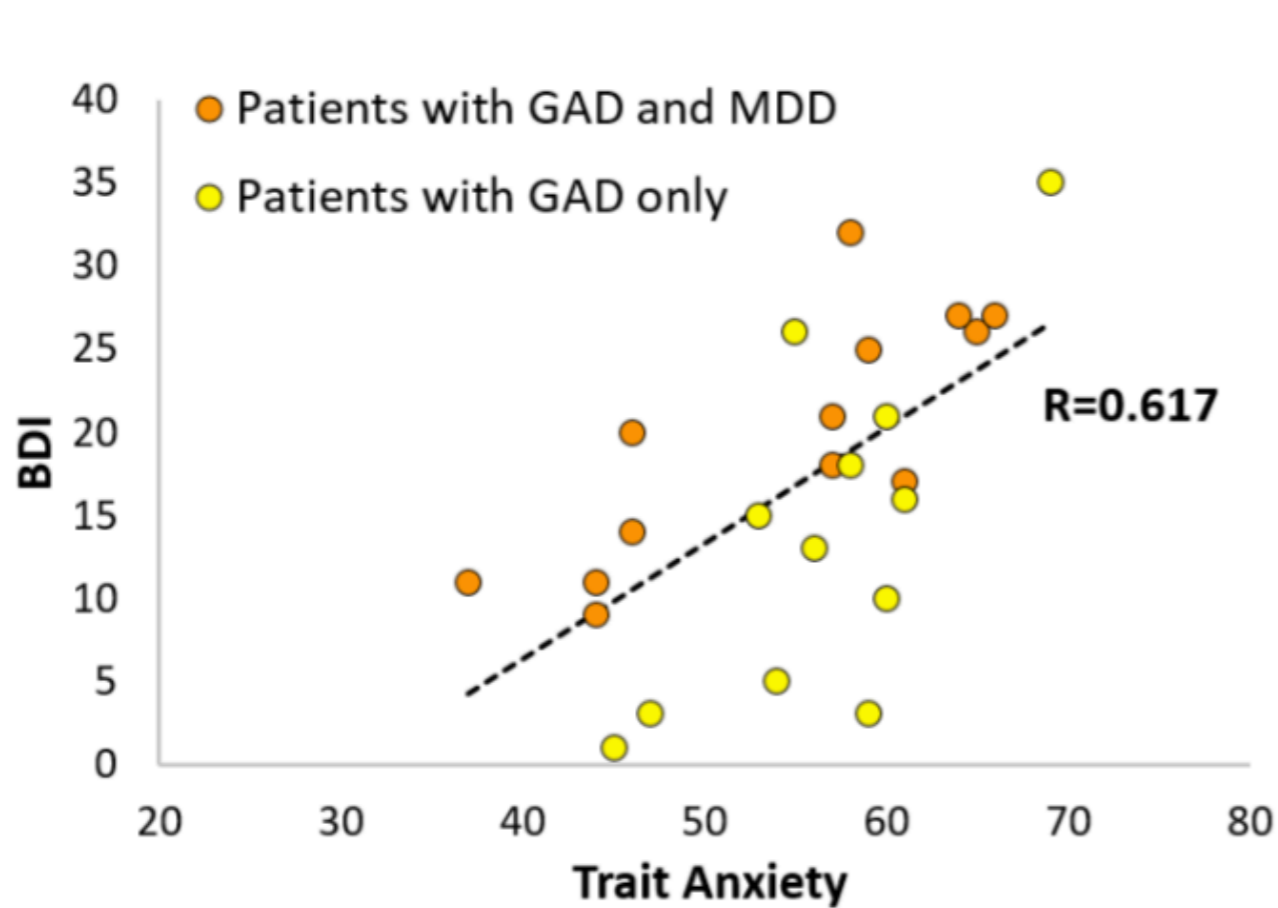
Results

Risk Aversion & Loss Aversion



Results

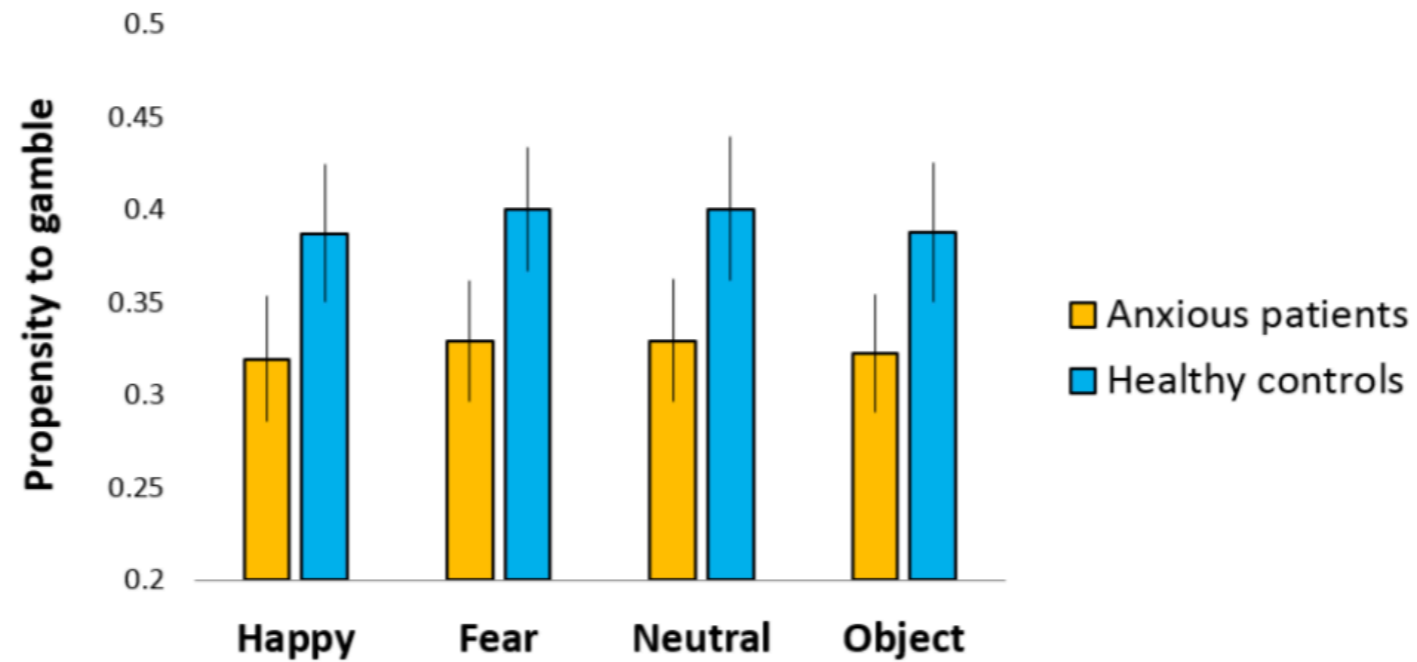
Risk Aversion & Loss Aversion



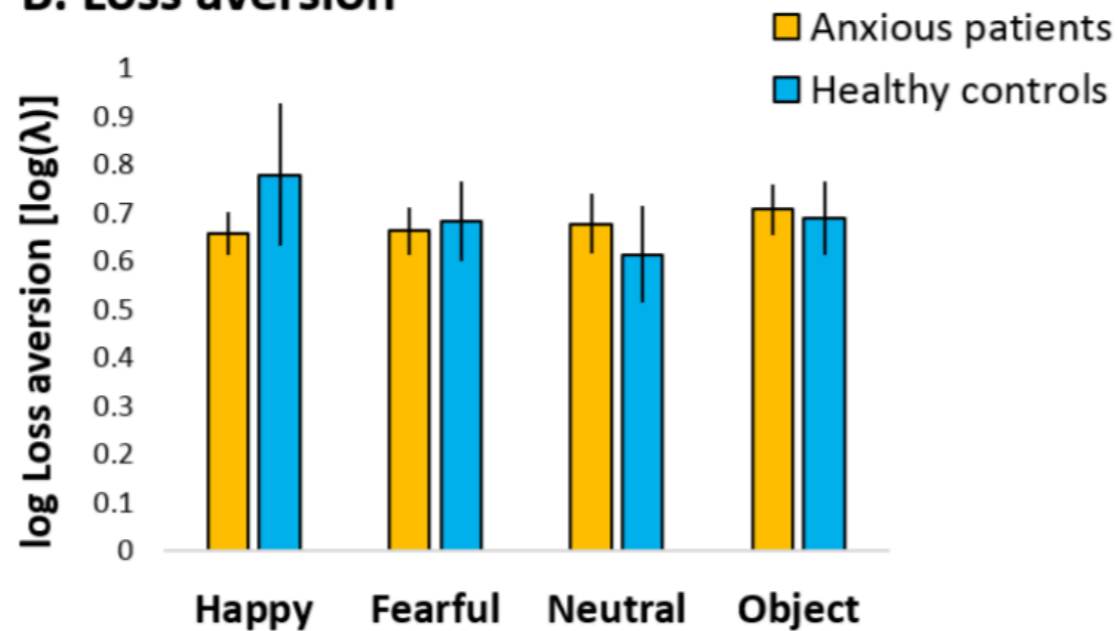
Results

Impact of Emotion

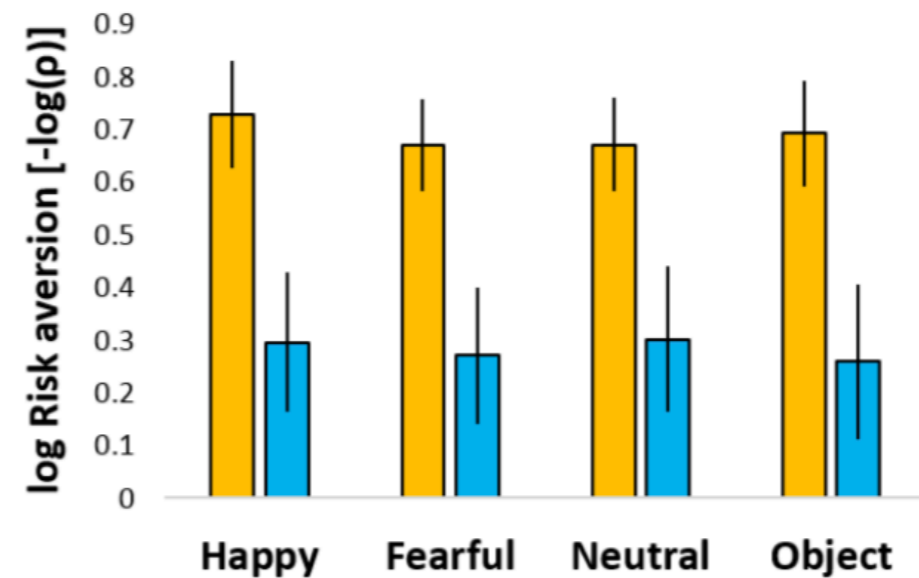
A. Gambling decisions



B. Loss aversion

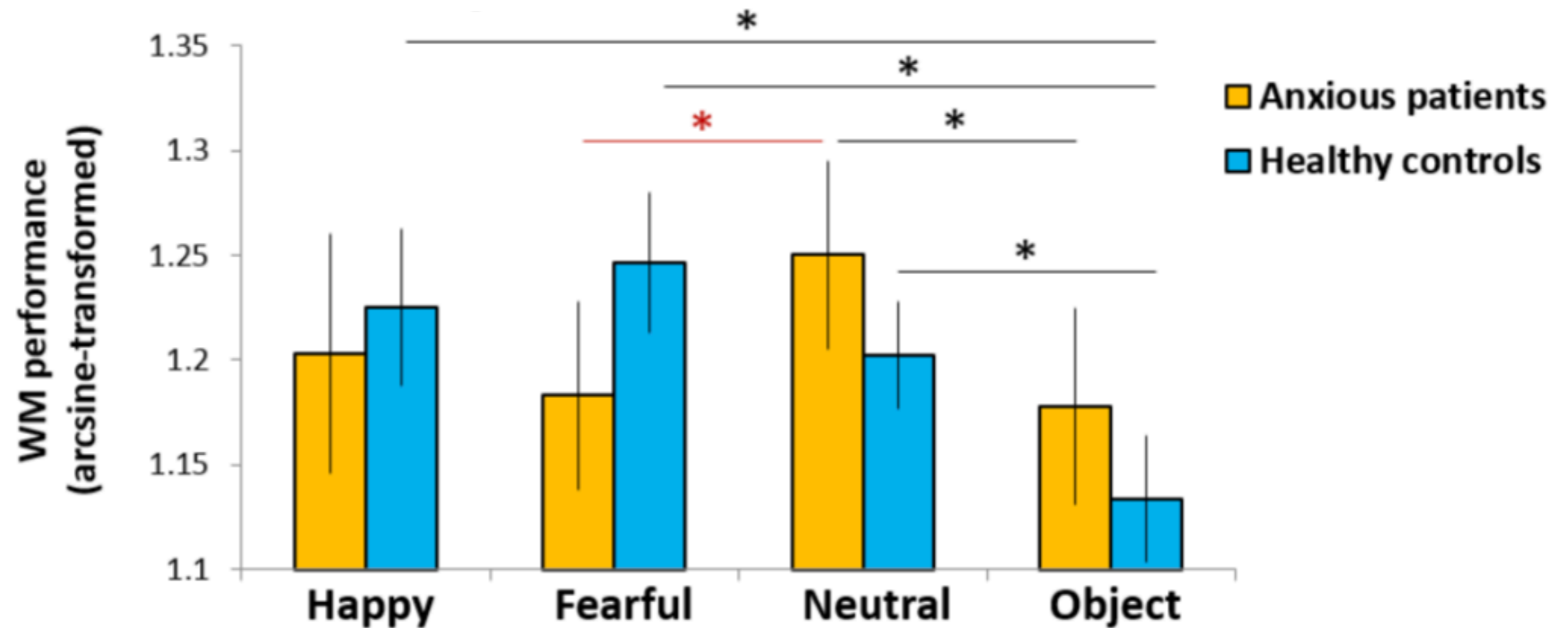


C. Risk aversion



Results

Working Memory

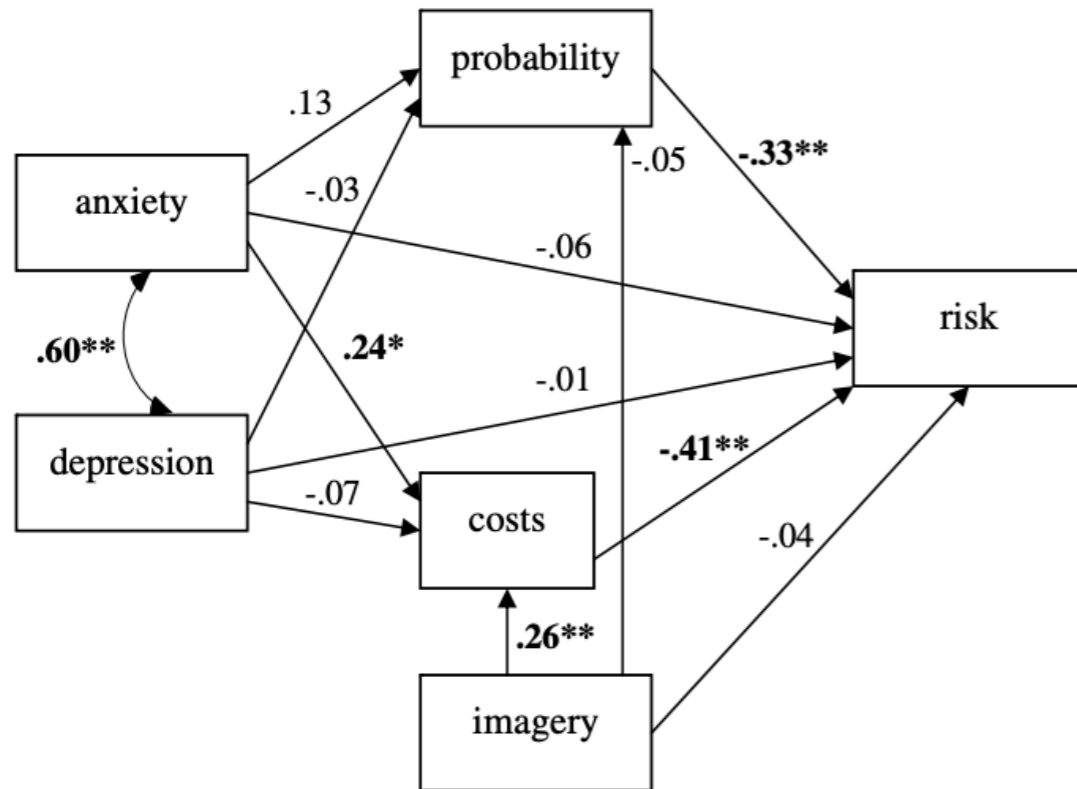
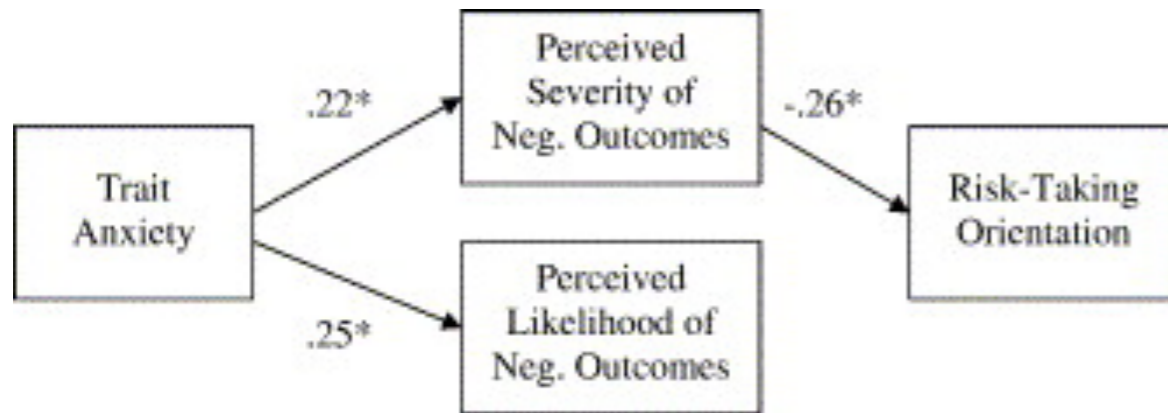


Results

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**

Research Plan

Research Plan



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



The Role of Risk Avoidance in Anxiety ☆

Jon K. Maner , Norman B. Schmidt

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Research Plan

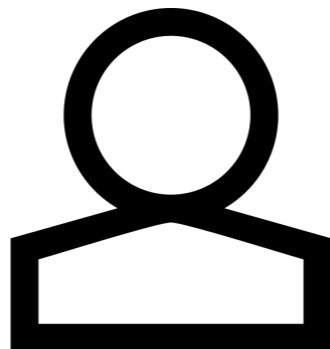
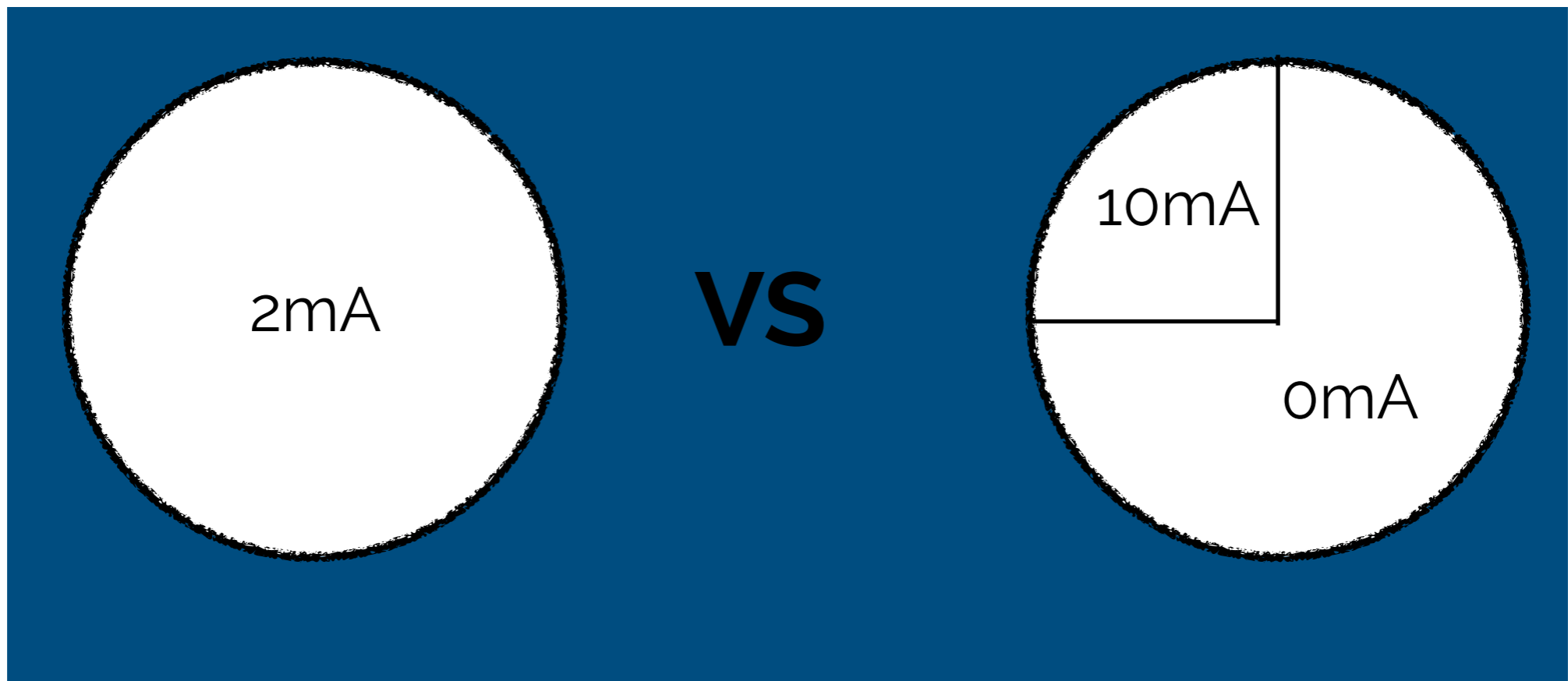
Hypotheses

- Different probability weighting function between anxiety patients and healthy control
- Effect of illusion of control

Research Plan

Task

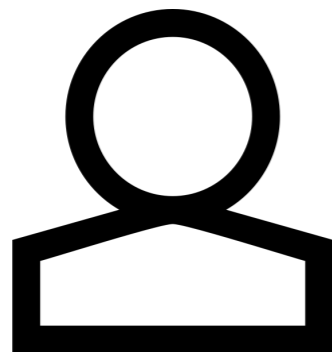
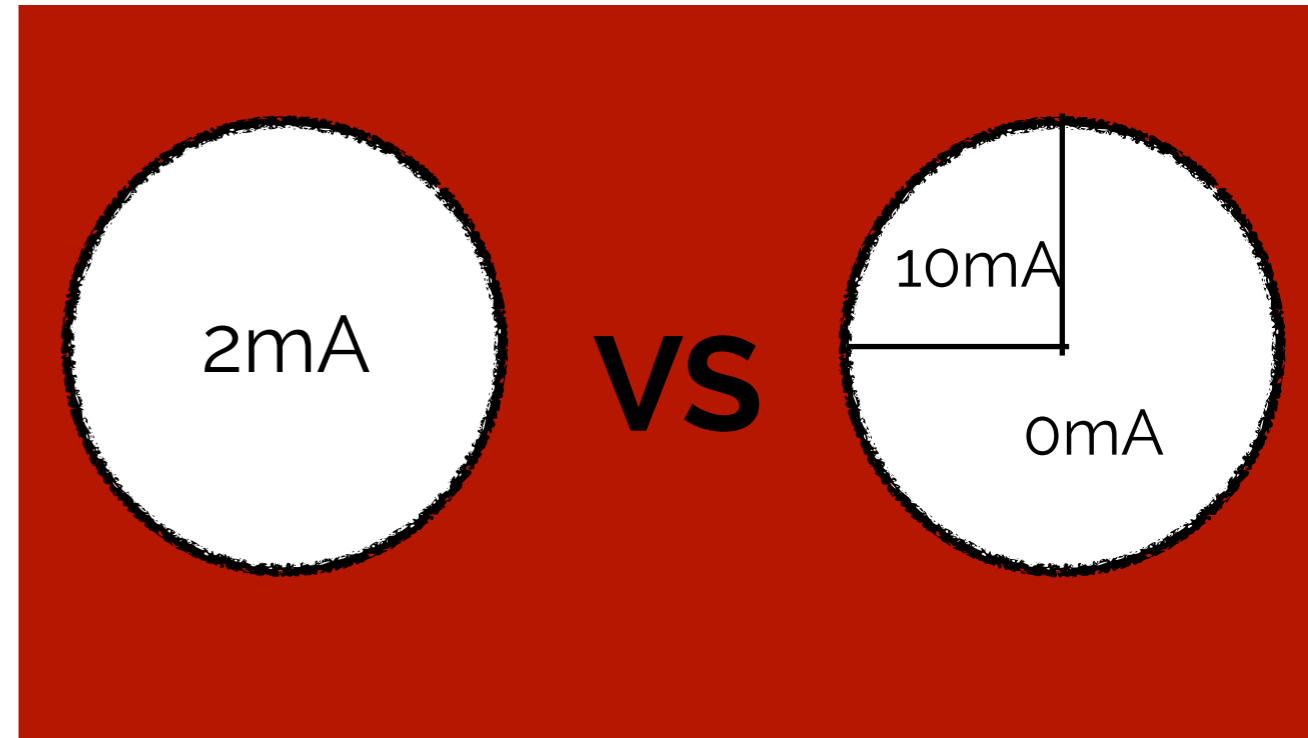
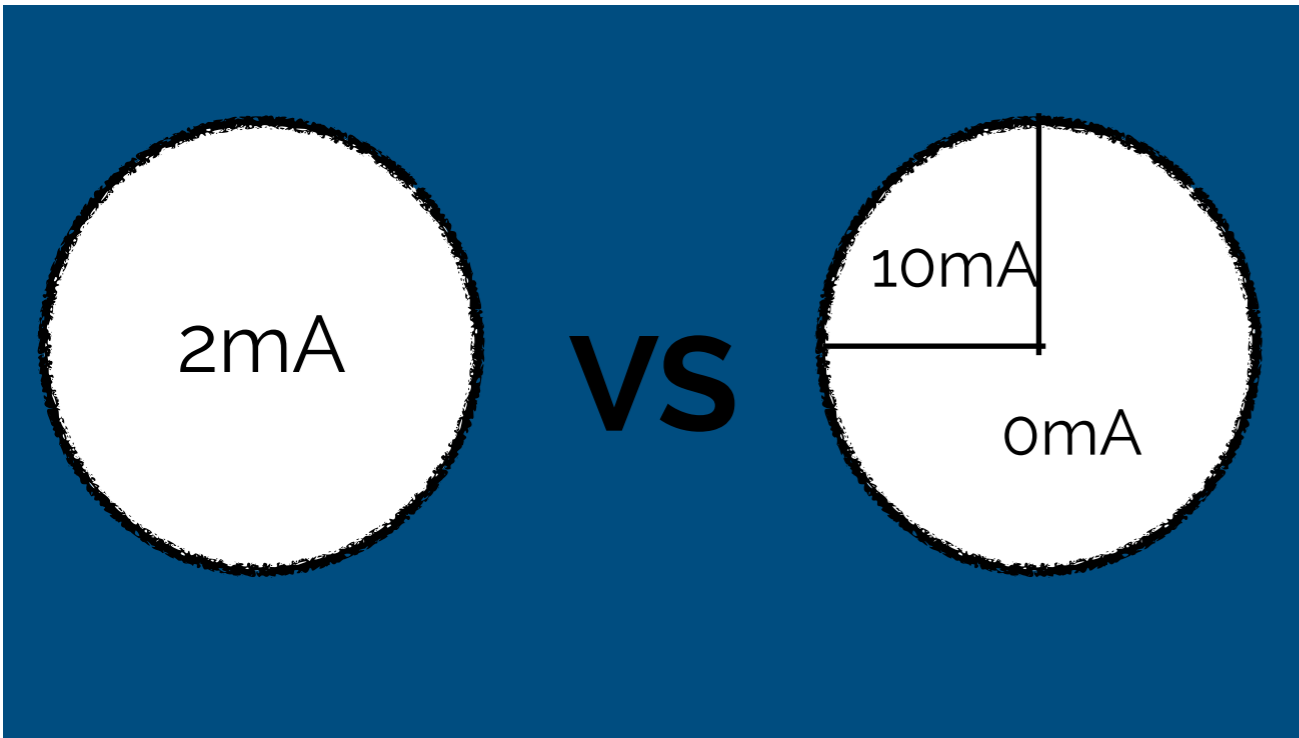
[Phase 1]



Research Plan

Task

[Phase 2]

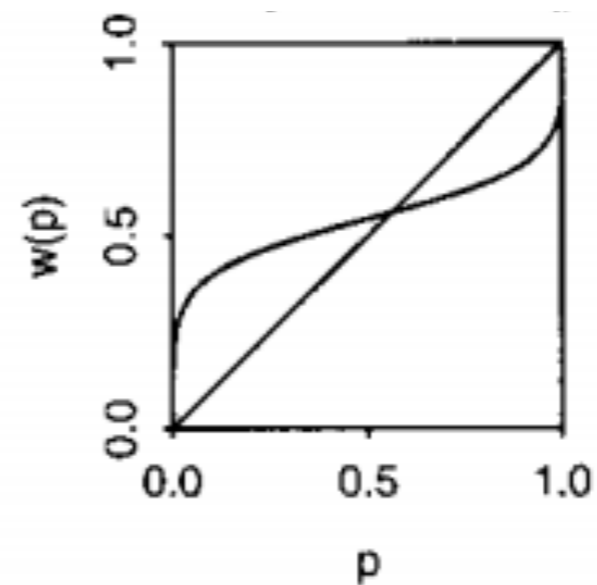
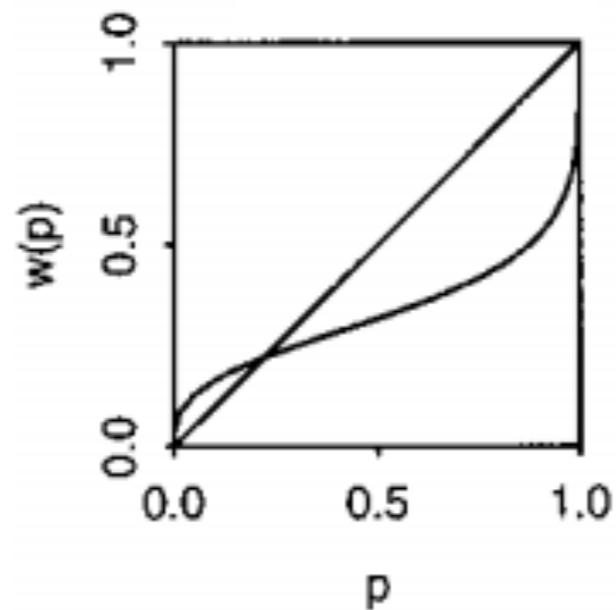


Research Plan

Model

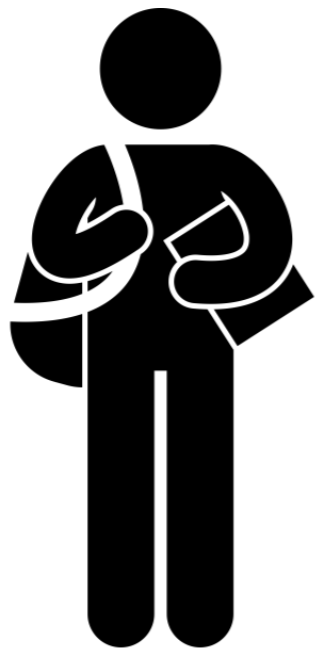
$$U(\text{gamble}) = w(p) \times \lambda \times \text{shock}^\rho$$

$$w(p) = \frac{p^\delta}{(p^\delta + (1-p)^\delta)^{1/\delta}} \quad \text{OR} \quad w(p) = \frac{\delta p^\gamma}{\delta p^\gamma + (1-p)^\gamma}$$

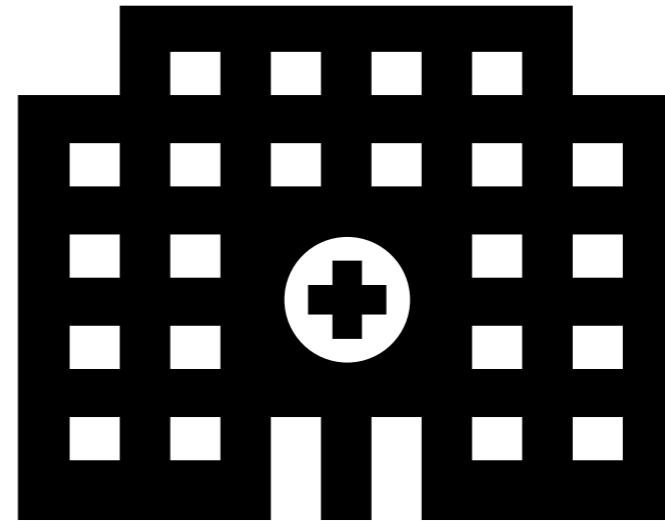


Research Plan

Procedure

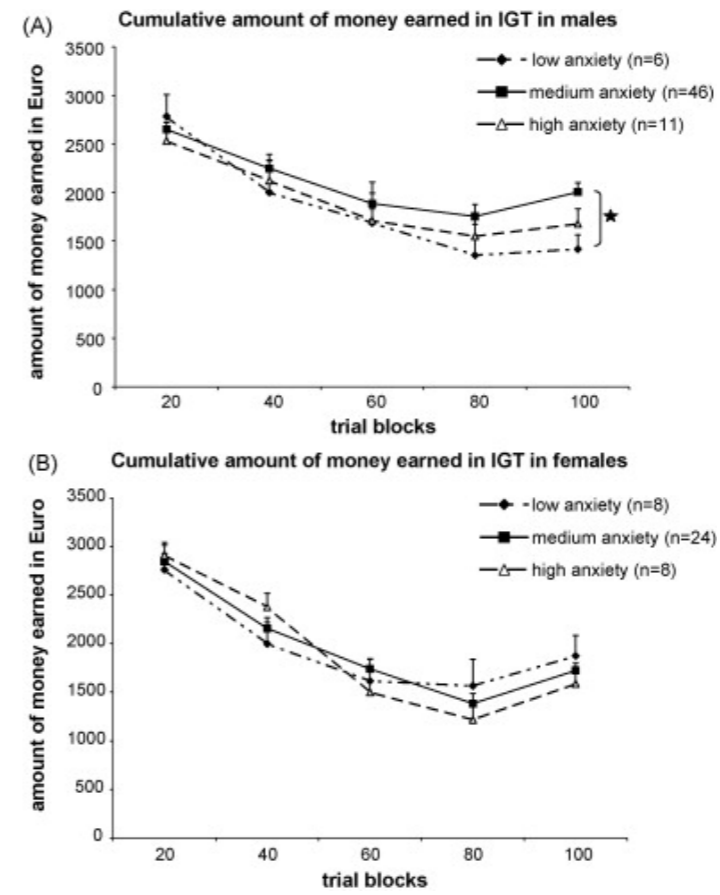
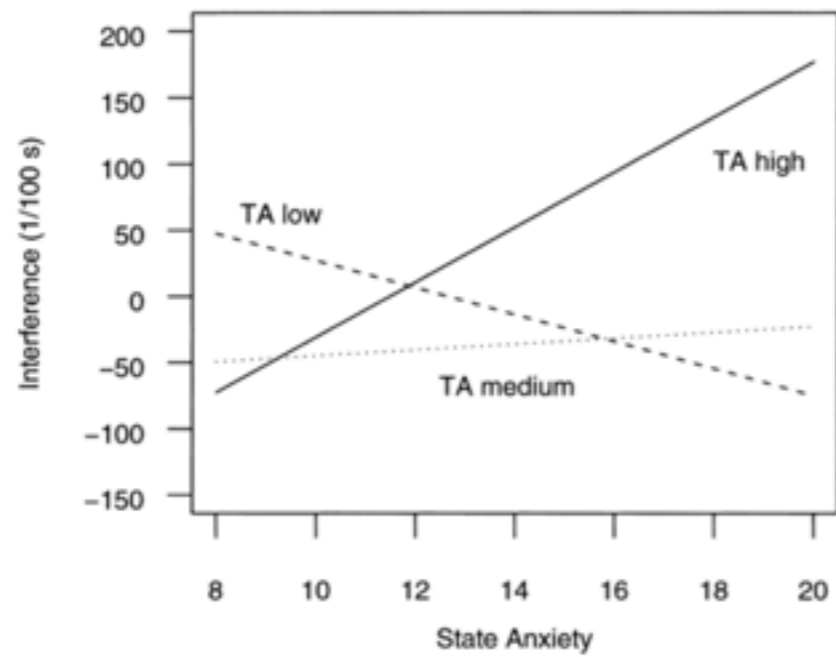


Study 1



Study 2

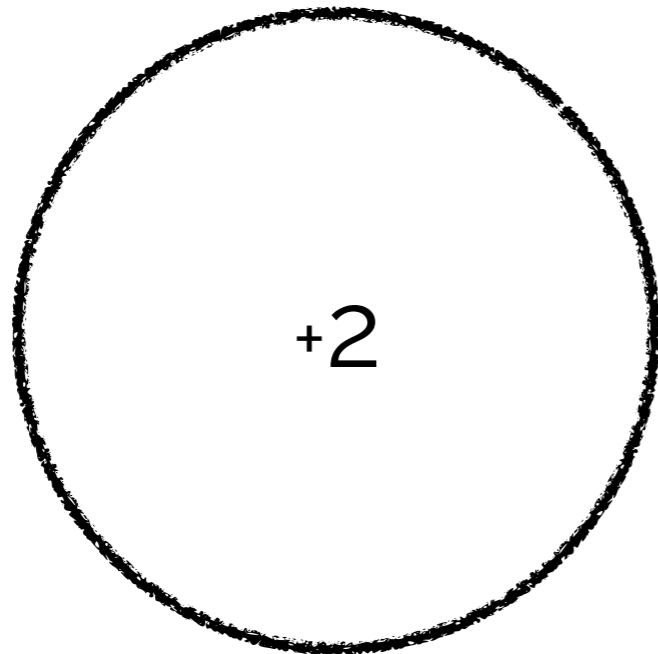
Thank You 😊



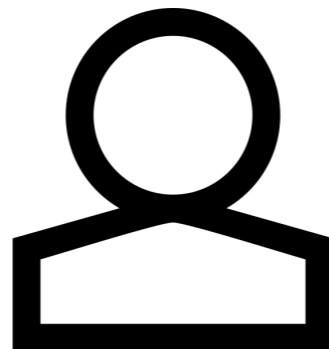
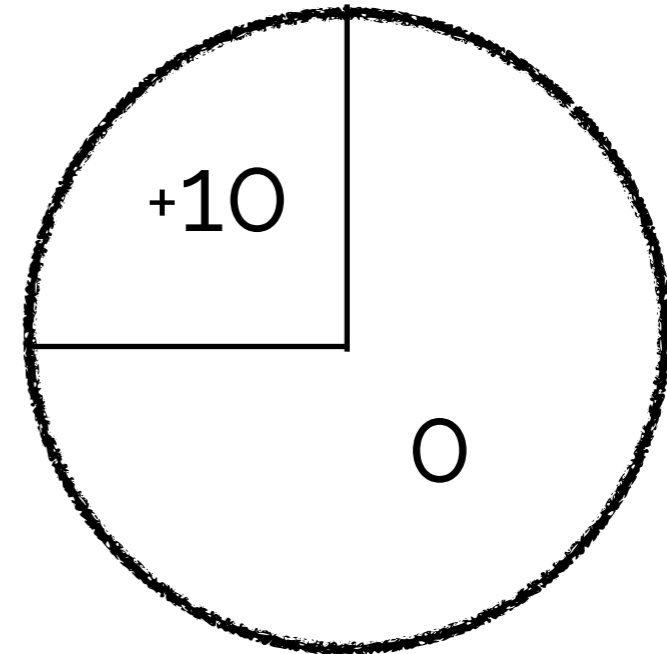
Research Plan

Task

[Phase 1]



VS



Research Plan

Task

[Phase 2]

