Controversial Topics in Gambling: Alberta Gambling Research Institute's 13th Annual Conference

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http://hdl.handle.net/1880/49991
conference proceedings

Downloaded from PRISM: https://prism.ucalgary.ca
The Deciding Hand: How an analysis of human reach movements reveals choice biases

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13th Annual AGRI Conference
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Conventional view of behaviour

Input: Sensory stimulation

The brain

- Stimulus identification (Perception)
- Response selection (Cognition)
- Response programming (Action)

Output: Motor behaviour
Actual behaviour

Perception $\rightarrow$ Cognition $\rightarrow$ Action
Objective

Cognition = Action
Objective

Decision making = Action

The movements made to enact a decision are part of, and directly reflect the decision process.
Decision making
Decision making

Bias / Evidence

Cognition

Decision threshold

Action

Perception?

Time
Decision making

Decision threshold

Bias / Evidence

Time

What happens to bias toward non-chosen option?
Effect of non-chosen item

Optitrak motion tracking cameras

Projector

Reflective marker

Projected Image
Effect of non-chosen item
Effect of non-chosen item

Rank these from most to least favorite

On a scale from 1 to 9, how much do you like each of these
Effect of non-chosen item

“I love it!”

“Mmm ...good”

“I hate it!”
Effect of non-chosen item

![Diagram showing the effect of non-chosen item with reach distance and lateral deviation axes. The diagram includes images of food items labeled as EASY and HARD.]
Effect of non-chosen item

Preference is predicted by reach area

Preference difference

Reach area

P < 0.001
Effect of non-chosen item

- Evidence
- Decision threshold
- Time
- Fastest RTs
- Slowest RTs
Effect of non-chosen item

Reach area prediction changes with reaction time

- Fastest RTs $d = 1.25^*$
- Average RTs $d = 0.66^*$
- Slowest RTs $d = 0.068$
What you choose tells you about the “winner”, but how you choose tells you about the “loser”
Reach bias in economic decision making

Free effect

From Shampanier et al, 2007

With Wispinski, Truong & Handy
Reach bias in economic decision making

Free effect: In reaching

Pair 1: X
Pair 2: Star
Pair 3: Diamond
Pair 4: Circle
Pair 5: Square

$0.00 $0.05 $0.10 $0.15 $0.20 $0.25

With Wispinski, Truong & Handy
Reach bias in economic decision making

Free effect: In reaching

With Wispinski, Truong & Handy
Reach bias in economic decision making

Free effect: In reaching – choice frequency

With Wispinski, Truong & Handy
Reach bias in economic decision making

Free effect: In reaching - trajectories

With Wispinski, Truong & Handy
Reach bias in economic decision making

Value of information

With Wispinski & Madan
Reach bias in economic decision making

Value of information

With Wispinski & Madan
Reach bias in economic decision making

Value of information – frequency judgments

![Bar chart showing estimated percentages for different categories in Phase 1.](chart.png)

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Reach bias in economic decision making

Value of information – choice behaviour

% Described chosen

VS. 75% Exp’d

25% Exp’d

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Value of information – reaction time

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Reach bias in economic decision making

**Frequency judgment:** Follows expected value

**Choice behaviour:** Affected by information format

**Reaction time:** Driven by high reward
Reach bias in economic decision making

Value of information – future work - trajectories

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Reach bias in economic decision making

Value of information – future work – personality traits

Administered 34 item questionnaire:

Gambling related cognitions (GRCS)

*Gambling expectancies*: “Gambling makes me happier”

*Illusion of control*: “I have specific rituals and behaviours that increase my chances of winning”

UPPS-P – Impulsive behaviour scale

*Positive urgency*: “I tend to act without thinking when I am really excited”.

*Negative urgency*: “When I am upset I often act without thinking.”

With Wispinski & Madan
Gambling is decision making

Personality traits $\rightarrow$ Revealed by reaching

Problem gambling $\rightarrow$ Personality traits

Problem gambling $\rightarrow$ Revealed by reaching
Gambling is decision making

Why measuring movement is important

Decision making

Options

- Reaction Time (some studies)
- Movement Trajectories

Outcome

- Explicit Choice (most studies)
Thanks!

Alan Kingstone
Jim Enns
Todd Handy
Grace Truong

http://www.per.ualberta.ca/acelab/

Nathan Wispinski
Chris Madan

You! – Questions?