The role of overconfidence on problem gambling
Overview

- Gambling in the judgement and decision making literature
- Decision from description vs. Decision from experience
- Illusion of expertise and overconfidence in gambling
- A study of illusion of expertise and overconfidence
“Overweighting of low probabilities may contribute to the attractiveness of both insurance and gambling.” (Tversky & Kahneman, 1979)
Gambling choices in decision making research

Choose between:

- A: winning $5,000 with probability 0.001, 72%

- B: winning $5 with certainty, 28%

Tversky & Kahneman (1979)
Choose between:

- A: losing $5,000 with probability .001, 17%
- B: losing $5 with certainty 83%

Tversky & Kahneman (1979)
Gambling choices in decision making research

- **Expected Value (Pascal, Fermat, XVII century)**
  - \(EV = \sum p_i x_i\)
  - \(p\) is probability
  - \(x\) is money
  - \(i\) is each possible outcome of that option

- **Expected Utility (Bernoulli, 1738; von Neumann & Morgenstern, 1947)**
  - \(EU = \sum p_i u(x_i)\)
  - \(p\) is probability
  - \(x\) is money
  - \(i\) is each possible outcome of that option
  - \(u(x_i)\) is a positive but decelerating function of the monetary amount \(x_i\).

- **Prospect Theory (Tversky & Kahneman, 1979)**
  - \(V (x, p; y, q) = \pi(p) u(x) + \pi(q) u(y)\)
  - \(V\) is value of a prospect
  - \(x\) is money in option 1
  - \(p\) is probability for option 1
  - \(y\) is money in option 2
  - \(q\) is probability for option 2
  - \(\pi\) is a weighting function given to each probability
  - \(u\) is a value function given to each amount of money

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Decisions by description vs. Decisions by experience

Hertwig & Erev (2009)

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Decisions by description vs. Decisions by experience

- Decisions by experience (Hertwig et al., 2004)
  - When people are allowed to play draws, the biases found by Tversky & Kahneman diminish
Problem gambling

- Why extended exposure to outcomes in gambles do not diminish harmful gambling behaviour?
  - Hypothesis: Problem gamblers develop an illusion of expertise that maintains their overconfidence
Illusion of expertise:
- The tendency to prefer own choices much more than objectively justifiable (Fellner, G., Güth, W., & Maciejovsky, B., 2004).

Illusion of control:
- Expectancy of a personal success probability inappropriately higher than the objective probability would warrant (Langer, 1975).

Overconfidence:
- Overestimation of one's performance, ability, level of control, or rate of work (Moore & Healy, 2008).
Illusion of expertise

- Unjustifiable belief that the knowledge acquired by experience in a field modifies the probability of success.
  - Example 1: situations in which extended experience cannot modify such probability (e.g., lottery)
  - Example 2: situations in which the extended experience modifies such a probability to a lesser degree than expected (e.g., experts in some fields)
- Knowledge (mostly irrelevant) acquired by experience in a field maintains overconfidence.
Overconfidence in experts

- **DOMAINS IN WHICH GOOD EXPERT PERFORMANCE HAVE BEEN OBSERVED**
  - Weather forecasters
  - Livestock judges
  - Astronomers
  - Test pilots
  - Soil judges
  - Chess masters
  - Physicists
  - Mathematicians
  - Accountants
  - Grain inspectors
  - Photo interpreters
  - Insurance analysts
  - Nurses
  - Physicians
  - Auditors

- **DOMAINS IN WHICH POOR EXPERT PERFORMANCE HAVE BEEN OBSERVED**
  - Clinical psychologists
  - Psychiatrists
  - Astrologers
  - Student admissions
  - Court judges
  - Behavioral researchers
  - Counselors
  - Personnel selectors
  - Parole officers
  - Polygraph (lie detector) judges
  - Intelligence analysts
  - Stock brokers
  - Nurses
  - Physicians
  - Auditors

Shanteau (1992)

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Overconfidence in experts

- Stock brokers (Gervais & Odean, 2001)
- CEOs (Malmendier & Tate, 2005)
Overconfidence in gambling

- Problem gamblers are more overconfident and accept more bets in the Georgia Gambling Task (Goodie, 2005)
A paradigm of illusion of expertise: Overconfidence and task difficulty

- Studies on overconfidence
  - Confidence judgements
    - Which city has the larger population: Oxford or York?
    - Please indicate your confidence on that you answered this question correctly (50%-100%)
  - Frequency judgements
    - How many questions do you believe you answered correctly?
Typical results

- Tendency to overconfidence (Lichtenstein, Fischhoff & Phillips, 1982)
- Hard/Easy effect:
  - overconfidence in difficult tasks and items, including “impossible tasks”
  - less overconfidence or underconfidence in easy tasks and items (Lichtenstein & Fischhoff, 1977)
Method

- Participants
  - 157 volunteers from the Buenos Aires metropolitan area

- Independent Variables
  - Domain: geography (intermediate) vs. Chess ("impossible")
  - Type of task: location (intermediate) vs. Estimation (difficult)
  - Familiarity of items: local (intermediate) vs. World (difficult)
  - Type of design: representative vs. Selected

- Dependent Variables
  - Number of correct items
  - Frequency judgements
  - Bias
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**Methods**

<table>
<thead>
<tr>
<th>¿La conoce? SI o NO</th>
<th>País</th>
<th>Categorías de Habitantes</th>
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<th>Cantidad de Habitantes (en número)</th>
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Porcentaje de respuestas correctas en cada columna: % % %
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<th>¿Lo conoce? SI o NO</th>
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<th>Ranking ELO</th>
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Porcentaje de respuestas correctas en cada columna

Categorías de ranking ajedrecístico Elo

a) menos de 2350 puntos Elo
b) 2350-2400 puntos Elo
c) 2400-2450 puntos Elo
d) 2450-2500 puntos Elo
e) 2500-2550 puntos Elo
f) 2550-2600 puntos Elo
g) 2600-2650 puntos Elo
h) 2650-2700 puntos Elo
i) 2700-2750 puntos Elo
j) más de 2750 puntos Elo
Illusion of expertise hypothesis:

- The overconfidence effect will be found only when participants construe a situation as one in which they have some degree of expertise:
  - Overconfidence in the domain of geography
  - No overconfidence in the “impossible domain” (i.e., chess)
  - Hard/Easy effect in the domain of geography
    - More overconfidence in estimation than in location
    - More overconfidence in world than in local
Results. Geography domain

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Results. Geography vs. chess

- Bias in geography: $M = 2\%$
- Bias in chess: $M = -1.4\%$
A necessary condition to develop overconfidence is the construal of a situation as one in which one has some degree of expertise.

One of the variables that contributes to have such a construal is the experience in a domain.

Participants did not have experience in chess, thus they were not overconfident.

Participants had experience in geography, thus they showed the hard/easy effect.
Reduction of overconfidence

- Reduction of overconfidence
  - Information on typical biases
    - Hot hand
    - Gambler’s fallacy
  - Problem:
    - Illusion of expertise may not disappear

- Reduction of illusion of expertise
  - Comparison of problem gambling with fields in which experts make biased judgements

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