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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

Gambling choices in decision making research

- **“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 .001, 72%
 - B: winning \$5 with certainty 28%

Tversky & Kahneman (1979)

Gambling choices in decision making research

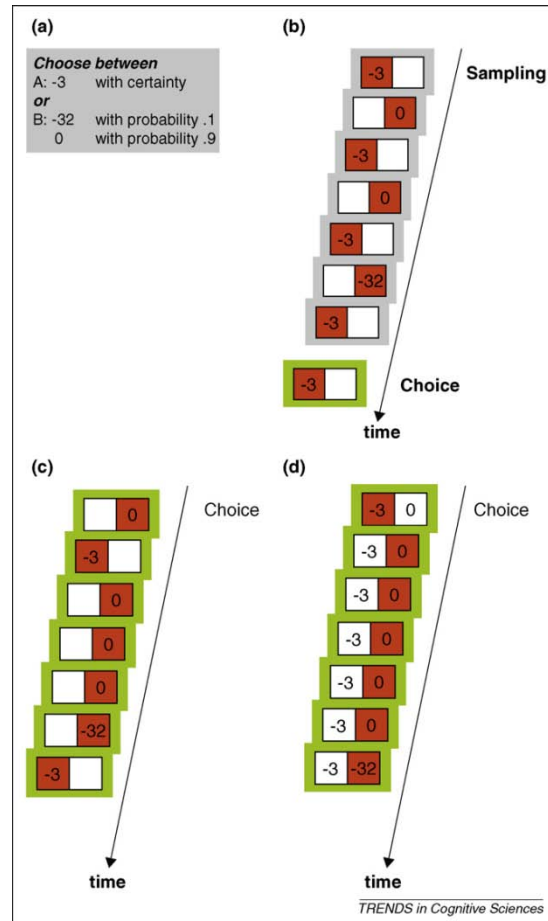
- Choose between:
 - A: losing \$5,000 with probability .001, 17%
 - B: losing \$5 with certainty 83%

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
 - π is a weighting function given to each probability
 - u is a value function given to each amount of money

Decisions by description vs. Decisions by experience



Hertwig & Erev (2009)

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

- 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

Shanteau (1992)

■ 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

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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?

A paradigm of illusion of expertise: Overconfidence and task difficulty

- 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)

Experiment

- 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

Methods

Categorías

- a) menos de 50.000 habitantes b) entre 50.000 y 100.000 hab.
 c) entre 100.000 y 250.000 hab. d) entre 250.000 y 500.000 hab.
 e) entre 500.000 y 1.000.000 hab. f) entre 1.000.000 y 2.500.000 hab.
 g) entre 2.500.000 y 5.000.000 hab h) más de 5.000.000 hab.

	¿La conoce? SI o NO	País	Cantidad de Habitantes	
			(categoría)	(en número)
Gladstone				
Luxemburgo				
Roma				
París				
Kwinana				
Honolulu				
Osaka				
Ciudad del Vaticano				
Livingston				
Bagdad				
Kaga Bandoro				
Guantanamo				
Dhaka				
Adis Abeba				
Kiev				
Minsk				
Porcentaje de respuestas correctas en cada columna		%	%	%

Methods

	¿Lo conoce? SI o NO	País	Ranking ELO	
			(categoría)	(en número)
Van Welly				
Nielsen				
Bareev				
Gustafsson				
Jakovenko				
Wang				
Karpov				
Malakhov				
Gashimov				
Aleksandrov				
Tregubov				
Dominguez				
Topalov				
Carlsen				
Adams				
Ponomariov				
Timman				
Porcentaje de respuestas correctas en cada columna		%	%	%

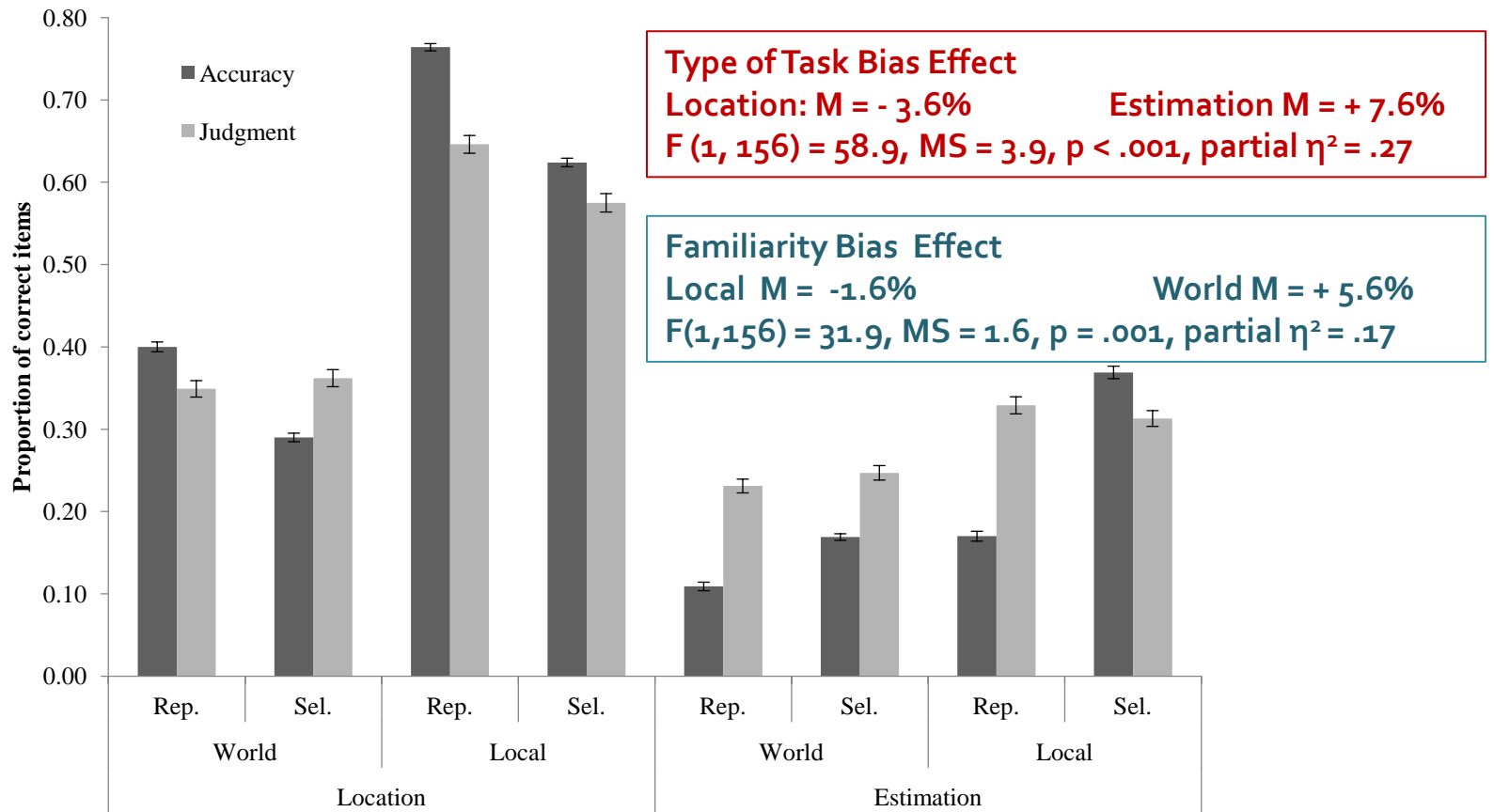
Categorías de ranking ajedrecístico Elo

- Maestros Nacionales a) menos de 2350 puntos Elo
- Maestros Nacionales b) 2350-2400 puntos Elo
- Maestros Nacionales c) 2400-2450 puntos Elo
- Maestros Internacionales d) 2450-2500 puntos Elo
- Maestros Internacionales e) 2500-2550 puntos Elo
- Grandes Maestros Internacionales f) 2550-2600 puntos Elo
- Grandes Maestros Internacionales g) 2600-2650 puntos Elo
- Mejores 80 jugadores del mundo h) 2650-2700 puntos Elo
- Mejores 30 jugadores del mundo i) 2700-2750 puntos Elo
- Mejores 10 jugadores del mundo j) más de 2750 puntos Elo

Hypotheses

- 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



Results. Geography vs. chess

- Bias in geography: $M = 2\%$
- Bias in chess: $M = -1.4\%$

Discussion

- 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