On the Decision to Explore

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Insufficient Exploration:
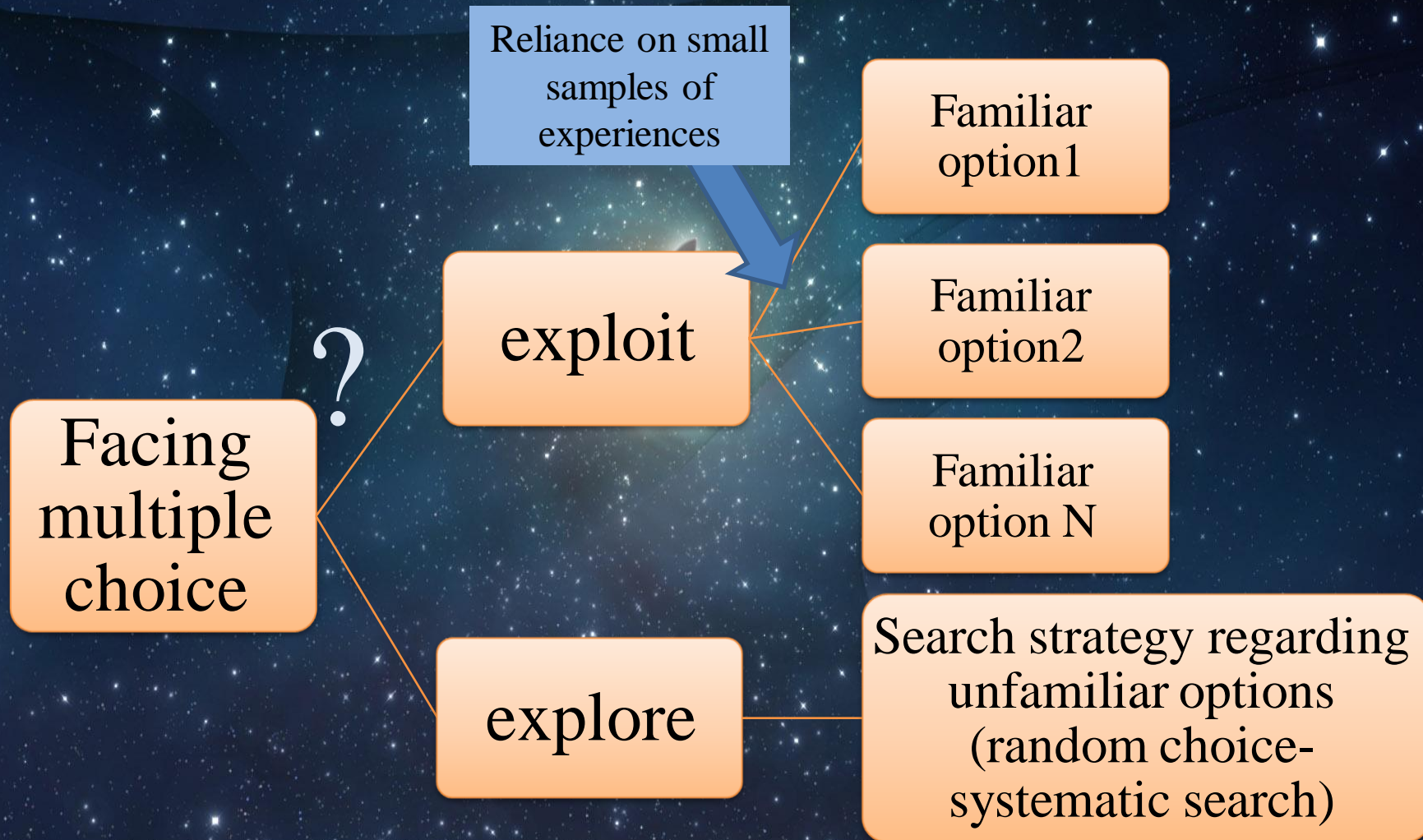
- Learned helplessness & depression (Seligman, 1972; Jacobson & Dobson, 1996)

- Inefficient usage of technology (Seagull & Gopher, 1997; Yeciam, Erev & Gopher, 2001)

- Negotiation failure & social conflicts (Bazerman & Neal, 1993)

➤ Sunk cost effect (Arkes &Blumer, 1985)

  [once you invested in one option, you stick to it even if it is better for you to let it go and invest in something else]

➤ Status quo bias (Samuelson & Zeckhauser, 1988)

  [people prefer a familiar strategy over a new one]

"Curiosity killed the cat"

- **Excessive exploration**?

- Pandora, Eve and Lot's wife (Loewenstein, 1994)
- Experiencing drugs (Green, 1990)
- Starting too many projects (McGrath & Macmillan, 2000)

➤ These observations appear to reflect over-exploration, and/or reversed status-quo/sunk-cost effects.

➤ The current paper explores this possibility. In particular we try to improve our understanding of the environmental factors that effect the tendency to explore.

Multiple-Choice Decision Making Model*:

Reliance on small samples of experiences

Facing multiple choice

?

exploit

Familiar option1

Familiar option2

Familiar option N

explore

Search strategy regarding unfamiliar options (random choice-systematic search)

Examine the hypothesis that the decision whether to explore or exploit is driven by the most common experiences

|		The optimal strategy	
		Explore	Exploit
Common experience with exploration	**Good**	**Minimum deviation from optimal strategy**	**Over-exploration** **Exploit – 0** **Explore - (+1, .9; -10)**
	Bad	**Under-exploration** **Exploit – 0** **Explore - (-1, .9; +10)**	**Minimum deviation from optimal strategy**

A simplified task:

- 144 buttons,100 trials per game.

- In each trial, the subject is asked to choose one button.

- Immediately after pressing it, the subject sees the trial's payoff on the selected button.

- Exploration – trying a new button.

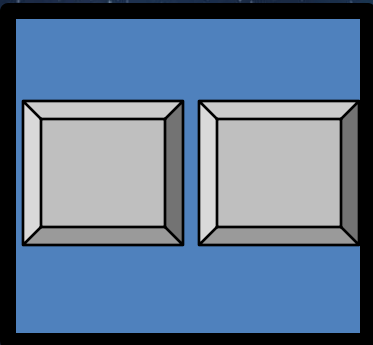- Exploitation – pressing a familiar button.
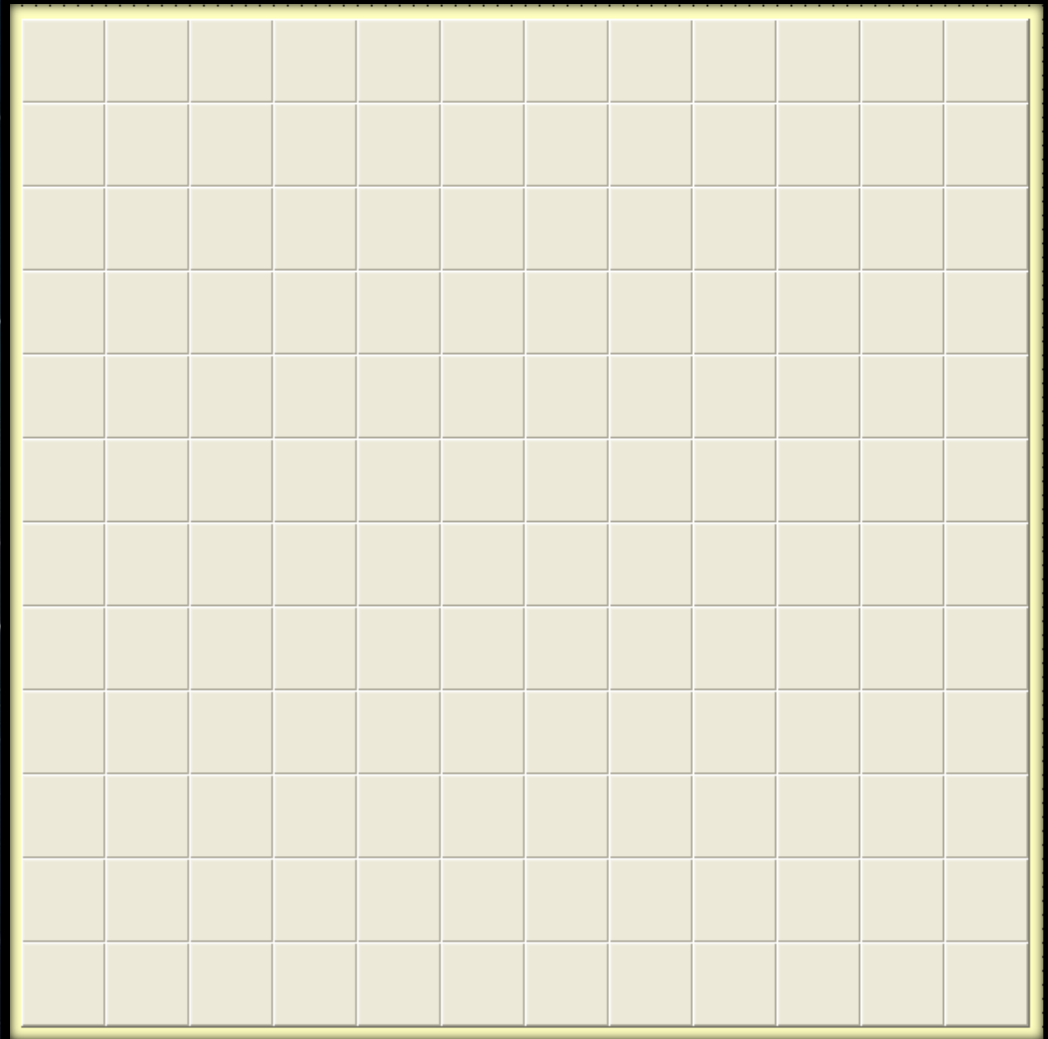
Payoff structure – 2 games:

Multiple choice – payoff structure depends on exploration
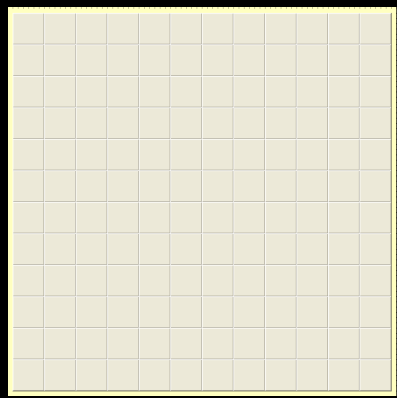
	exploit	explore	EV(explore)	P(explore)
1	**0**	(+1, .9; -10)	-0.1	74%
2	0	**(-1, .9;+10)**	+0.1	49%

An equivalent binary choice

	S	R	EV(R)	P(R)
1	**0**	(+1, .9; -10)	-0.1	56%
2	0	**(-1, .9;+10)**	+0.1	29%

To conclude:

- The coexistence of under- and over- exploration can be captured with the assertion that when implicitly deciding whether to explore or exploit people rely on small samples of experiences, which usually consists of the common outcomes.

- The decision whether to explore appears to have similar basic mechanism as in explicit binary choice. However, in multiple-choice, there is some propensity toward exploration.

The end

Thank you for listening ☺