

# Risk and Time Preferences

## 風險偏好與時間偏好

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# Individual Decision Making (個別決策實驗)

- Study Personal Preferences
  - Risk Aversion,
  - Time Discounting,
  - Ambiguity Aversion, etc.
    - 研究個人的偏好：風險趨避、時間折現、未知趨避等
- Measured Characteristics
  - 可以用實驗來測量個人特質
- Does this correlate with other behavior?
  - 這些特質是否跟受試者其他行為相關？

# Measuring Risk Preferences (測量風險偏好)

- Consider the following decision:
  - Originally from “Who wants to be a millionaire?”
- You have two choices, A and B:
  - One option gives you \$1 million
  - The other gives you \$10 million
- Problem: Don't know which is which...
  - 你有兩個選擇，選項A和選項B。一個會給你新台幣一百萬元，另一個會給你新台幣一千萬元，但是不曉得哪個是A，哪個是B
- Pick one of them, or fold for a sure \$5 million?
  - 如果「放棄」仍可獲得新台幣五百萬元，你會繼續賭下去、猜A,B選項當中的一個，還是比較保險地選擇「放棄」？

# Measuring Risk Preferences (測量風險偏好)

- What if the choices are:
  - Option A: 0 or \$30 million with  $(\frac{1}{2}, \frac{1}{2})$
  - Option B: \$10 million for sure
  - What would you choose?
    - 你會選擇哪一個選項？
    - 選項A：○元或三千萬元，機率一半一半
    - 選項B：確定拿一千萬元，
- Why would one take Option B?
  - 為什麼會有人選B呢？
- $U(x) = x^{1-r} = x^{0.5}$  (for  $r=0.5$ )
  - Diminishing Marginal Utility (邊際效用遞減)
- Are these too “hypothetical”? (假設性問題?)

# Hypothetical Bias (「桃色交易」假設性偏誤)

- [John](#): Suppose... I were to offer you one million dollars for one night with your wife.
- [David](#): I'd assume you're kidding.
- [John](#): Let's pretend I'm not. What would you say?
- [Diana](#): He'd tell you to go to hell.
- [John](#): I didn't hear him.
- [David](#): I'd tell you to go to hell.
- [John](#): That's a reflex answer because you view the question as hypothetical. But let's say that there was real money backing it up. I'm not kidding. A million dollars. The night would come and go but the money could last a lifetime. Think of it. A million dollars. A lifetime of security... for one night. Don't answer right away. Just consider it; seriously?

# Hypothetical Bias (「桃色交易」假設性偏誤)



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# Measuring Risk Preferences (測量風險偏好)

- Holt and Laury (AER 2002)
  - (See Handout for the 10 decisions)
- What would you choose?
- **Session 1**: Real 1x (Baseline)
- **Session 2**: Hypothetical 20x (or 50x, 90x)
- **Session 3**: Real 20x (or 50x, 90x)
- **Session 4**: Real 1x
  - 請看實驗說明裡面的十個問題，你會選擇什麼？
  - **實驗一**：玩真的，獎金1倍(基準實驗)
  - **實驗二**：假設性，獎金20倍(或 50倍, 90倍)
  - **實驗三**：玩真的，獎金20倍(或 50倍, 90倍)
  - **實驗四**：玩真的，獎金1倍(基準實驗)

# Real(玩真的1倍) vs. Hypothetical High Stakes(假設20+倍)

效用	$U(x) = x$		$U(x) = x^{0.5}$	
Prob	Safe	Risky	Safe	Risky
0.3	34.40	24.50	5.86	3.62
0.4	35.20	32.00	5.92	4.36
0.5	36.00	39.50	5.99	5.09
0.6	36.80	47.00	6.06	5.83
0.7	37.60	54.50	6.12	6.57
0.8	38.40	62.00	6.19	7.30
0.9	39.20	69.50	6.26	8.04
1.0	40.00	77.00	6.32	8.77

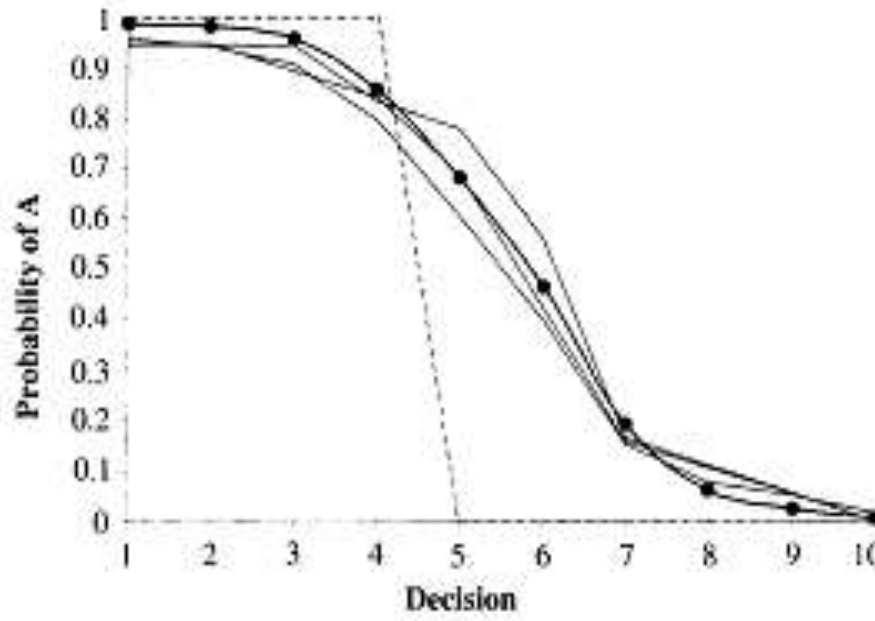


FIGURE 1. PROPORTION OF SAFE CHOICES IN EACH DECISION: DATA AVERAGES AND PREDICTIONS

Note: Data averages for low real payoffs [solid line with dots], 20x, 50x, and 90x hypothetical payoffs [thin lines] and risk-neutral prediction [dashed line].



# Real(玩真的1倍) vs. Real High Stakes(玩真的20+倍)

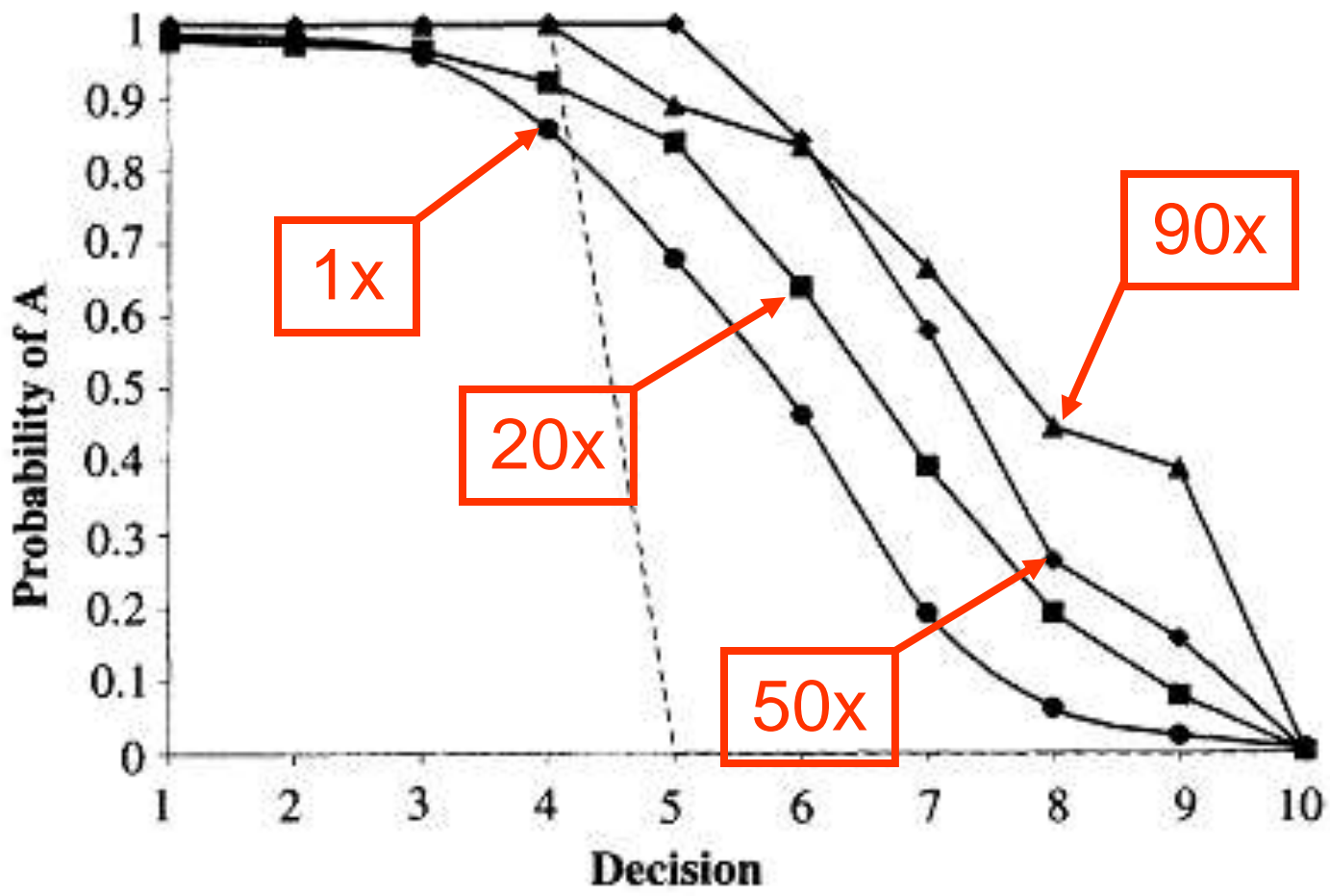


FIGURE 2. PROPORTION OF SAFE CHOICES IN EACH

# Risk Aversion at Very High Stakes

Lottery A 福袋	Lottery B 福袋
\$200 if throw of die is 1-9	\$336.5 if throw of die is 1-9
\$160 if throw of die is 10	\$9 if throw of die is 10
Chosen by 38%	Chosen by 62%

- 高倍金額下的風險厭惡
- Even though Lottery B gave \$100 more in expected value, 38% still chose Lottery A!
  - 即使樂透 B 的期望值高出美金 \$100，還是有 38% 的受試者選擇樂透 A！

# # of Safe Choices: Order and Incentive Effects

Experiment	Incentives	1x	10x	20x	50x	90x
Holt and Laury (2002) 208 subjects	Real	5.2		6.0	6.8	7.2
	Hypothetical	5.3		4.9	5.1	5.3
Harrison et al. (2005) 178 subjects	Real	5.3	6.4			
	Hypothetical		6.0			
Holt and Laury (2005) 168 subjects	Real	5.7		6.7		
	Hypothetical	5.6		5.7		

Between  
Subject

比較不同受試者

# Order(順序) & Incentive Effects (誘因): Conclusion

- Participants are risk averse
- Risk aversion increases with “real” higher payoffs
- High hypothetical payoffs are misleading
- Demographics?
  - High income people slightly less risk averse
  - Women are more risk averse **ONLY FOR 1x**
    - 受試者的確厭惡風險，且厭惡程度會隨著玩真的倍數愈高上升
    - 高倍數的假設性報酬沒意義(跟低倍數一樣)
    - 人口特質如何影響風險偏好？
      - » 高所得人士稍微比較「不」厭惡風險
      - » 女生厭惡風險的程度**只有在1倍金額**(基準實驗)時比男生高

## Follow-up Studies (後續研究)

- Harrison, Johnson, McInnes, Rutstrom (AER05)
- Harrison, Lau and Rutstrom (SJE 2005)
  - Representative sample of Denmark (~16x)
  - Denes are risk averse ( $r=0.67$ )
  - Middle-age and educated are less risk averse
    - 使用丹麥的代表性樣本 (金額大約為16倍)
    - 普通的丹麥人厭惡風險( $r=0.67$ )
    - 中年人和教育程度高的人比較不厭惡風險
- Dohmen, Falk, Huffman, Sunde, Schupp, Wagner (JEEA 2011) (Large German survey)
  - Men, youth, tall, educated are less risk aversion
    - 德國大型調查：身高和教育程度較高的年輕男性較不厭惡風險