

第14章

1、思维：决策



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1



2

思维的双重过程理论 Dual process theory

Dual Process Theory

(Stanovich & West 2001), (Evans, 2009), (Kahneman, 2011)

intuitive thinking

- Fast
- Unconscious
- Implicit/Tacit
- Automatic
- Experiential
- Associative
- Holistic
- Impulsive
- Stimulus Bound

System 1



deliberate thinking

- Slow
- Conscious
- Explicit
- Controlled
- Sequential
- Rule Based
- Analytic
- Reflective
- Higher Order

System 2



3

AlphaGo Zero

■ 自己和自己对弈，从白板开始，36小时后，就和打败李世石的AlphaGo一样好了

— AlphaGo，基于3000万步棋的数据库学习预测人类的走法

快思维

1. 对某个棋局有多好有一个直观判断
“价值网络”输出一个百分比，判断棋局有多大赢的可能性
2. 依靠直觉给出若干合理或有希望的走法
“策略网络”为每个候选走法输出0-100的百分比

慢推理

- “如果这样走，那么……”
- 对快思维推荐的最有可能性的一些走法，用蒙特卡罗树搜索 MCTS 对其推演，判断其胜率

4

决策

■ 演绎推理：三段论

- 如果前提为真并且形式正确，那么该段推理的结论是有效的
- 该结论为真的概率是百分之百

■ 归纳推理

- 其结论通常直接或间接地用概率来表示
- 在日常生活中广泛运用
- 决策建立在过去经验的基础上
- 结论是在许多可能选项中选择看似最优的一个

5

如果我在图书馆工作一个星期，星期六我将会有足够的钱去滑雪。
我将在图书馆工作一个星期。
因此，我将会有足够的钱去滑雪。

- 有效的演绎推理
- 在现实生活中结论未必为真
 - ◆ 如，你有钱的Harry叔叔给你寄了些钱，或你通过其他途径得到了资金

6

真实世界中的决策

接受现实吧!

“同意我吧——别管什么逻辑和事实。”

推理性对话Reasoning dialogues

辩论包含于谈话之中

“教授，我们想期末开卷考试。”

“因为在‘真实世界’里人们可以获得各种材料来帮助回答问题，比如网络、书籍、笔记本以及其他类似的东西。”

“为什么开卷考试比闭卷考试好?”

“但是，就是在‘真实世界’里也要求人们能运用储存的知识当场回答问题。我们期末还是闭卷考试吧。”

7

Rips and his associates (Rips, 1998; Rips, Brem, & Bailenson, 1999)

有一种解析辩论的方法是确定辩论背后的各个结构性成分

A. 摘录自美国有线新闻网 (1997)

KELLY先生：尊敬的法官阁下，这是谋杀发生的前四天，（拿起一本Nicole Simpson当时读的书作为证据，书名是《受尽折磨的女人》）这本书直接说明了她的——不仅是心境而且是……

法官：你有什么根据说这些带下划线的文字是她写的——就是你所说的被她划下划线的那些东西？

KELLY先生：她向她母亲提起过，她当时在读这本书并且做了标记，她让她母亲看到她所做的事情。同时，她说：“我才刚开始做这件事情；以后我会把它交给你。”她母亲能认出她的字迹。

法官：我认为根据352条，你的根据全然不充分。我将不予采信。

B. 两个儿童之间的争论 (采自Eisenberg & Garvey, 1981, 第151页)

儿童1：你是妈妈，我是爸爸。

儿童2：不，你是妈妈，我是爸爸。

儿童1：为什么我是妈妈？

儿童2：因为你是——你是女孩。

儿童1：我不是女孩。

8



9



10

Demonstration

How rational are your decisions?

Billy, a tall, slender, nonathletic 36-year-old has been described by a neighbor as being somewhat shy, intellectual, and withdrawn. He is helpful, tidy, and has a need for order and structure. Is it more likely that Billy is a salesperson or a librarian?
14 million — 0.2 million

Suppose you are in Las Vegas on a gambling junket.

(A) Last night you won \$1,000 on a hot slot machine. Will bet more tomorrow than you usually do? 3/4

(B) Last night you discovered you have \$1,000 more in your savings account than you thought. Will you bet more tomorrow than you usually do? 1/5

(A) You go into a store to buy a portable cassette/radio. It costs \$50. You notice an ad for the same item at a store ten blocks away that costs only \$25—such a deal! 3/4

(B) You go in to a store to buy a computer that cost \$2545. The same computer can be bought at a store ten blocks away for \$2520. 1/5

Do you bother to go to the other store?

11

Decision-making

1 Heuristics 启发式

足够满意、逐步消除、代表性/典型性、可得性、锚定-调整、决策框架、心理账户

2 Bias 偏差

相关错觉、过度自信、后见偏差

3 Fallacy 谬误

赌徒谬误、热手效应、合取谬误、沉没成本谬误、物化谬误、对人对事&个人经验、……

4 Bayes's Theorem 贝叶斯定理

12

日常决策—启发式

1. 足够满意 (Satisficing; Simon, 1957)

- 我们逐一考虑各个选项，一旦找到一个令人满意的就做出选择，从而得到一个满意的或达到最低可接受水平的结果
- 当工作记忆资源有限时，人们偏向使用此方法 (Chen & Sun, 2003)
- 因为过多的信息反而会损害决策质量 (Chamodrakas, et al., 2010)
- 并非总是有效：适用于买口香糖，不适用于疾病诊断



赫伯特·西蒙 (Herbert A. Simon)
又名司马贺

1978年诺贝尔经济学奖

13

2. 逐步消除 (Elimination by aspects; Tversky, 1972)

- If some alternatives do not meet the minimum criterion, then those alternatives are eliminated from the choice set

	University S	College T	University N	University A
1. Instruction	9	7	6	7
2. Cost	2	3	9	7
3. Proximity	4	7	8	3
4. Social life	8	7	3	5
5. Prestige	9	10	3	4
Totals	32	34	29	26

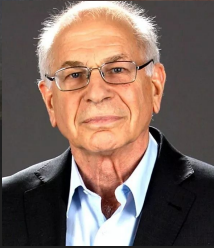
- Factors are equally important
- Values are accurately assigned

14

the probability of an event:

- can be calculated on the basis of mathematics
- may be determined only by our previous experience

People's intuition is generally wrong.



丹尼尔·卡尼曼 (Daniel Kahneman)
2002年诺贝尔经济学奖

Amos Tversky

Born: 16-Mar-1937
Birthplace: Tel-Aviv, Israel
Died: 2-Jun-1996
Location of death: Stanford, CA
Cause of death: Cancer - Skin

Gender: Male
Religion: Jewish
Race or ethnicity: White
Sexual orientation: Straight
Occupation: Psychologist

Executive summary: Cognitive psychologist, studied risk

Military service: Israeli Army (paratrooper, "Talpiot")

Lied from metastatic melanoma.

Father: Yosef (metastatic)

Mother: Gonda (d. 1964, Knesset member, 1949-64)


Sister: Ruth (died)

Wife: Barbara Gura (psychologist at Stanford, until his death, two sons, one daughter)

Son: Owen

Son: Tali

Daughter: Dana



15

3. 代表性/典型性 (Representativeness)

- 是指人们倾向于根据样本是否代表或类似总体来判断其出现的概率，愈有代表性的，被判断为出现的概率愈大，愈少代表性的被判断为出现的概率愈小 (Kahneman & Tversky, 1972)

1. 对总体的代表性或相似性
2. 反映了其产生过程（如随机过程）的显著特征

• If a family has three boys (B) and three girls (G), which sequence of births is more likely BBBGGG or BGGBGB?

=

16

人们常常依赖代表性启发法

- 根据这一天的特征（所在月份、地区、空中云量）像不像下雨天来做估计
- 易犯错误：高估小样本（事件、人、特征等）对其总体的代表性，做出“我朋友的朋友”的论证 (Nisbett & Ross, 1980)
- 犯错原因在于没有理解基础概率 (base rate)
 - ◆ 指一个事件或特征的发生数占其总体发生数的比例
 - ◆ 10岁男孩 vs. 60岁男性胸痛，医生认为后者是早期心脏病发作的可能性更高

17

利用代表性狡辩

抽烟又喝酒，活到99

林彪，不抽烟不喝酒，享年64
周恩来，只喝酒不抽烟，享年78
毛泽东，只抽烟不喝酒，享年83
邓小平，又抽烟又喝酒，享年93
张学良，吃喝嫖赌抽五毒俱全，享年101

18

Whether finding 600 boys in a sample of 1,000 children was as likely as finding 60 boys in a sample of 100 children?

- In fact, the first statistic is far less likely than the second.
- People tend to ignore sample size when estimating probabilities.

19

4. 可得性启发法 (availability heuristic)

— 是指人们倾向于根据某现象在知觉或记忆中容易得到的事例来估计其出现是概率 (Tversky & Kahneman, 1973, 1981)

- Are there more words in the English language that start with the letter K or that have a **K** as their third letter?
- Which is the more likely cause of death—breast cancer or **diabetes**?

20

■ Tversky & Kahneman (1973)

— Ps read a list of 39 names of well-known people (19 men 20 women)

- The women were more famous than the men
- The men were more famous than the women

— “Whether the list contained more men or women?”

— Ps greatly overestimated the frequency of the gender that was more famous.

• The names of the famous people were more available.

21

■ 使用可得性假设来解释“日常”知识估计中的错误 (Slovic, Fischhoff, & Lichtenstein, 1977)

— 被试估计41种死因的相对概率

- ◆ 两种死因哪一种更可能导致死亡

— 最严重的错误选择是被广为宣传的死因

- ◆ 事故、癌症、肉毒杆菌中毒、龙卷风

— 媒体报道

22

5. 锚定-调整启发式 (anchoring-and-adjustment heuristic)

— 是指人们根据某些参照点来调整自己对事物的评价 (Tversky & Kahneman, 1974)

请在2S内估算以下题目的运算结果

(1) $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = ?$

(2) $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 = ?$

40320

■ 许多人认为第一题应为2250，第二题应为512。你知道为什么吗？

23

应用

- 一种新饮料面世，如果它被放在货架上与我们目光平视的高度上，它的左边是可口可乐，右边是百事可乐，那么，十有八九它的高价政策可能会被消费者接受。
- 如果它被放在一个不起眼的位置，与价格低廉的商品摆在一起，则即使质量超群，功能强大，也很难被判定为是一个好的产品。

24

促销

■ 越早交钱，收费越低

■ 早报多打折

laoluoluo老罗英语培训



3月	4月	5月	6月	7月
1200	1400	1600	1800	2000

3月	4月	5月	6月	7月
六折	七折	八折	九折	2000

25

■ 父亲从女儿房门前经过时，发现女儿的房间收拾的异常整齐。这太奇怪了。

女儿15岁，追求时尚却不爱整洁，房间一向凌乱不堪。今天，不但被子叠得有棱有角，其他物品也摆的整整齐齐，被擦拭的一尘不染。

接着，他看到枕头上放着一封信。他走进房间，拿起信，信的开头写着“亲爱的爸爸”几个字。

父亲心中顿时升起一种不祥的预感，他用颤抖的手拆开信，念起来：

26

亲爱的爸爸：

我在写这封信时，心中充满内疚和不安，但是，我还是得告诉你，我就要离家出走了。

为了避免你和母亲的阻挠，我和男友兰迪必须这样私奔。我和兰迪已经是一体的了，谁也不能把我们分开。

我相信，你们见到兰迪也会喜欢他的。他身上文刺了各种图案，他的服装另类、前卫，他的发型独一无二。我和他之间不但难舍难分，而且，我已经有了身孕。

兰迪说，他要这个孩子，以后我们三个人幸福地生活在一起。我想，我们肯定会幸福的，虽然兰迪的年龄比我稍大一点（男人42岁，在现今这个社会不算太老，是吧？），也没有什么钱，但是，这些不应该成为我们感情的障碍，你们说对吗？

我们打算到深山老林里去，搭一间小木屋。我们已经在那儿准备好了过冬需要的木柴。当然，兰迪还有好几位女友，但是，我知道他会以他的方式对我表示忠诚的。他说，他要和我生好多好多孩子，这也是我的梦想。

兰迪认为，大麻不会对任何人造成伤害，我将和他一起种植大麻，然后出售给我们的朋友。

同时，我们还要向上帝祈祷，希望科学家早日找到治愈艾滋病的方法，这样，兰迪就可以康复了。他应该能得到这样的好报。

爱你的女儿 罗丝

27

■ 读到这儿，父亲差点昏厥。这时，他看到另外几个字，“未完，见反面”。

他慌忙把信翻过来，那里有几行字：

“另：爸爸，你刚才读到的文字都不是真事。真实情况是，我在隔壁邻居的家中，并想让你知道，生活中有好多事情比我的成绩单要糟糕得多。我的成绩放在书桌中间的抽屉里，请你签上名，然后给我打电话，让我确信我可以平安回家了。”

28

6. Decision Frames (决策框架)

■ 决策者对与特定选择有关的行动、结果以及意外事件的总体设想 A decision maker's "conception of the acts, outcomes, and contingencies associated with a particular choice."

■ 受问题的表达方式，以及个体的准则、习惯和个性特点控制 Controlled by the formulation of the problem as well as by the norms, habits, and personal characteristics of the individual

■ 不同的框架可以导致不同的结果 Different frames can lead to different outcomes, even when the exact same information is used

29

Imaging that the United States is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

Program A: 200 people will be saved. 72%

Program B: There is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no people will be saved. 28%

Program C: 400 people will die. 22%

Program D: There is a one-third probability that nobody will die, and a two-thirds probability that 600 people will die. 78%

■ Choices involving gains (获利) are frequently seen as risk averse (风险回避), whereas choices involving losses (损失) are perceived as risk taking (冒险).

30


5

7. **mental accounting** (心理账户)

Imaging that you have decided to see a play for which admission is \$10 per ticket. As you enter the theater, you discover that you have lost a \$10 bill.
Would you still pay \$10 for a ticket for the play? **88%**

Imaging that you have decided to see a play and paid the admission price of \$10 per ticket. As you enter the theater, you discover that you have lost the ticket. The seat was not marked, and the ticket cannot be recovered.
Would you pay \$10 for another ticket? **46%**

理查德·塞勒 (Richard Thaler)
2017年诺贝尔经济学奖



31

日常决策—偏差

- **相关错觉 (illusory correlation)**
 - 误以为特定的事件或属性与其类别同时出现
 - 认为妄想症患者画人时，眼睛比其他人的画得大(其实不是) (Chapman, 1967, 1969, 1975)
- **过度自信 (overconfidence)**
 - 个体过于高估自己的知识、技能或判断
 - Absinthe是一种: (a)利口酒, (b)宝石。人们对自己的答案100%有信心时，正确率只有80%
 - 原因: 不知道自己所知甚少，没意识到信息来源不可靠
 - 对自己控制话费、流量过度自信，选低值套餐

32

■ **后见偏差 (hindsight bias)**

- 当回顾一个情境时，我们相信自己能够轻易地发现导致特定结果的所有迹象和事件
- 会阻碍学习，损害人比较期望与结果的能力
- 如果投资银行家有强烈的后见偏差，其业绩就会受到严重的影响；经验不会减少后见偏差 (Biais & Weber, 2009)

33

日常决策—谬误

- **赌徒谬误&热手效应**
 - 赌徒谬误 (Gambler's fallacy): 一个给定随机事件的概论 (比如游戏中输赢的概率) 受到之前发生的随机事件的影响
 - ◆ E.g., 一个连续输了5局的赌徒相信自己第6局的赢面会增加
 - 热手效应 (the "hot hand" effect): 相信某一事件的过程将继续下去
 - ◆ E.g., 球迷和职业/业余球员都相信球员前次投篮成功后再次成功的概率会高于前次投篮失败后再次投篮的成功概率，但实际记录并非如此 (Gilovich, Vallone, & Tversky, 1985)


34

■ **合取谬误 (Conjunction Fallacy)**

Linda is 31, single, outspoken, and very bright. She majored in philosophy in college. As a student, she was deeply concerned with racial discrimination and other social issues, and participated in antinuclear demonstrations. Now, which statement about Linda is more likely?

A. Linda is a bank teller
B. Linda is a bank teller and active in the feminist movement

■ about 90% of the people who are asked this question believe that Linda is more likely to be a feminist bank teller than to be a bank teller.



35

■ **沉没成本谬误 (Sunk-Cost Fallacy)**

- 对于某件事，仅仅因为过去有投入，而决定继续投入，以期收回成本 (Dupuy, 1998, 1999; Strough et al., 2008)

■ **物化谬误 (The fallacy of reification)**

- To assume that an idea is real when it may be hypothetical or metaphorical
 - ◆ E.g., "This university does not want to give me a degree."
 - ◆ Demagogic politicians, rabble-rousers, anarchists, petit paranoids: the government, the newspapers, the unions, big business, nature, the gods

36

南京大学社会学院心理学系 肖承阳

- Ad Hominem 对人不对事
 - Attack a person's character rather than the substance of the argument
- Personal Arguments 个人经验
 - Validation of an argument because of personal experience or knowledge of someone else's personal experience
 - ◆ E.g., "it must be true because it happened to me . . . or to my great-uncle Oliver . . ."

37

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- Arguments that Appeal to Force and Power (权力)
 - Appealing to virtues that may have nothing to do with the argument
 - ◆ E.g., "The USA was justified in entering the Vietnam War because we are mighty and moral nation."
- Appeal to Authority and/or Fame (权威)
 - Referring generally or specifically to authority or famous people to justify your argument.
 - Advertisements

38

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- 多数人一定是对的 (The Majority Must Be Right Argument)
 - If most people do something it must be right (but they may all just be stupid!)
- 假想对手 (The Straw Man Argument)
 - Set up a weak argument and attribute it to someone else so you can knock it down
 - ◆ E.g. foreign aid to Philippines—a multitude of socioeconomic forces—a minor point: the need to save wild animals in the mountains ⇔ your opponent then attacks the entire argument: the Luzon tree squirrel actually is in abundant supply

39