The Selection Task

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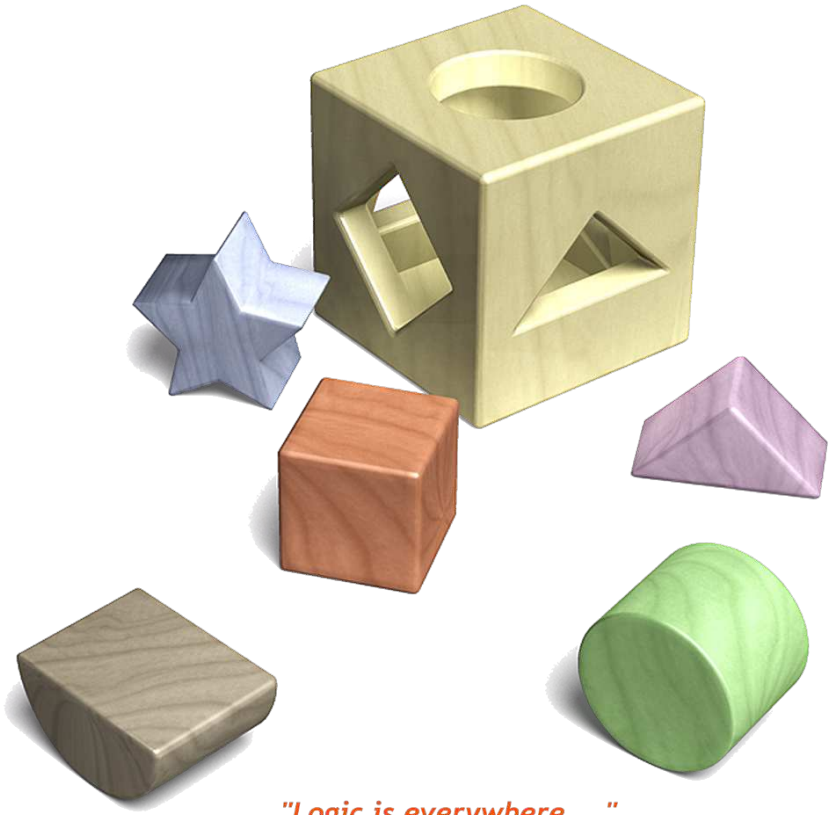
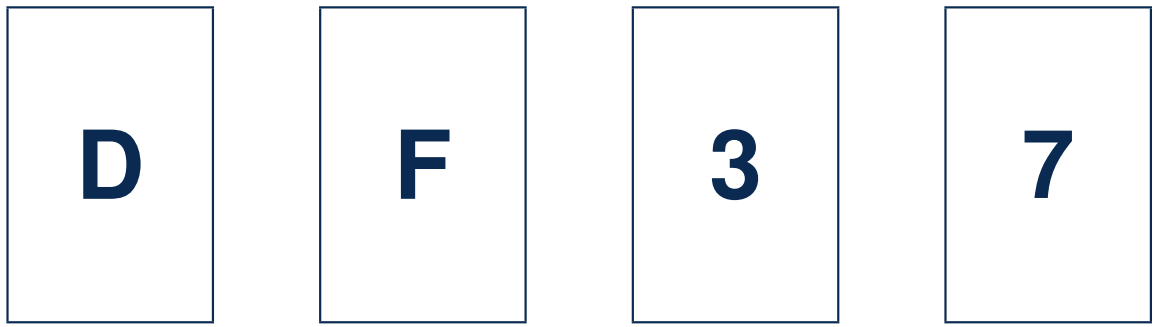
- The Abstract Case
- The Social Case
- A Formalization



"Logic is everywhere ..."

The Selection Task – The Abstract Case

- P. Wason: Reasoning about a Rule. The Quarterly Journal of Experimental Psychology. 20, 273-281: 1968.
- **Consider cards which have a letter on one side and a number on the other side.**



- **Consider the rule:**

  if there is a D on one side, then there is a 3 on the other side.

- **Which cards do you have to turn in order to show that the rule holds?**
  - **Only 10% of the subjects give the logically correct solutions.**

A First Analysis

- Almost everyone (89%) correctly selects D.
  - Corresponds to modus ponens in classical logic.
- Almost everyone (84%) correctly does not select F.
  - *Because the condition does not mention F.*
- Many (62%) incorrectly select 3.
  - *If there is a 3 on one side, then there is a D on the other side*.
  - Converse of the given conditional.
- Only a small percentage of subjects (25%) correctly selects 7.
  - *If the number on one side is not 3, then the letter on the other side is not D.*
  - Contrapositive of the given conditional.

The Selection Task – The Social Case

- P. Wason: Reasoning about a Rule. The Quarterly Journal of Experimental Psychology. 20, 273-281: 1968.
- **Consider a bar with people drinking.**
- **Consider the rule:**

  If a person is drinking alcohol in a bar,
  then the person is at least eighteen years old.

- **Consider the following four people in the bar:**
  - **Tony, drinking beer,**
  - **Emily, a senior citizen, obviously over eighteen years old,**
  - **Fritz, drinking milk,**
  - **Suzie, a primary school child, obviously under eighteen years old.**
- **Which person do you have to check in order to show that the rule is obeyed?**
  - **Most people solve this variant correctly.**

Formalizing the Social Case

- The conditional is viewed as a goal.
- Let o and a be propositional variables denoting that the person is older than eighteen years and is drinking alcohol, respectively.
- The rule is encoded by $\mathcal{G} = \{o \leftarrow a \wedge \sim ab\}$.
- Consider the four cases:

case	$\mathcal{P}$	$\mathrm{lm}_{3Ł}\ \mathrm{wc}\ \mathcal{P}$				
Tony	$\{a \leftarrow \top, ab \leftarrow \bot\}$	$\langle\{a\},\{ab\}\rangle$	$\not\models_{3Ł}$	$\mathcal{G}$	$\leadsto$	check
Emily	$\{o \leftarrow \top, ab \leftarrow \bot\}$	$\langle\{o\},\{ab\}\rangle$	$\models_{3Ł}$	$\mathcal{G}$	$\leadsto$	no check
Fritz	$\{a \leftarrow \bot, ab \leftarrow \bot\}$	$\langle\emptyset,\{a,ab\}\rangle$	$\models_{3Ł}$	$\mathcal{G}$	$\leadsto$	no check
Suzie	$\{o \leftarrow \bot, ab \leftarrow \bot\}$	$\langle\emptyset,\{o,ab\}\rangle$	$\not\models_{3Ł}$	$\mathcal{G}$	$\leadsto$	check

Formalizing the Abstract Case

- The conditional is viewed as a belief.
- Let $D, F, 3, 7$ be propositional variables denoting that the corresponding symbol is on one side.
- Consider $\mathcal{P} = \{3 \leftarrow D \wedge \sim ab,\ ab \leftarrow \bot\}$ with $\mathrm{Im}_{3Ł}\ \mathrm{wc}\ \mathcal{P} = \langle \emptyset, \{ab\} \rangle$.
- $\langle \emptyset, \{ab\} \rangle$ does not explain any letter on a card.
- The set of abducibles is $\{D \leftarrow \top, D \leftarrow \bot, F \leftarrow \top, F \leftarrow \bot, 7 \leftarrow \top, 7 \leftarrow \bot\}$.
- Consider the four cases:

$\mathcal{O}$	$\mathcal{E}$	$\mathrm{Im}_{3Ł}\ \mathrm{wc}\ (\mathcal{P} \cup \mathcal{E})$		
D	$\{D \leftarrow \top\}$	$\langle \{D, 3\}, \{ab\} \rangle$	$\rightsquigarrow$	turn,
F	$\{F \leftarrow \top\}$	$\langle \{F\}, \{ab\} \rangle$	$\rightsquigarrow$	no turn,
3	$\{D \leftarrow \top\}$	$\langle \{D, 3\}, \{ab\} \rangle$	$\rightsquigarrow$	turn,
7	$\{7 \leftarrow \top\}$	$\langle \{7\}, \{ab\} \rangle$	$\rightsquigarrow$	no turn.