ISS 305
Evaluating Evidence:
Becoming a Smart Research Consumer

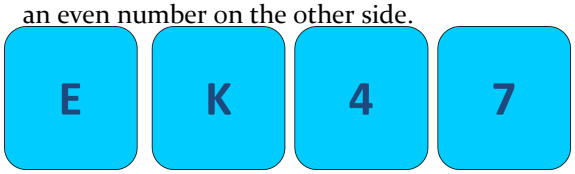
3. Empirical vs. non-empirical statements

Reminder: Turn on your I<CLICKER

Base is A or AA

Positive test bias (example)

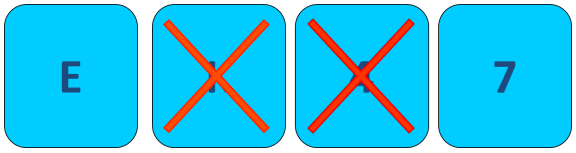
- Fact: Every card has a letter on one side and a number on the other.
- Theory: Every card containing a vowel must have an even number on the other side.



What TWO cards do you turn over to test this theory adequately? (You need to turn over 2 cards only)

Answer

- Pick These Cards:



Let's get logical

- *If a card has a vowel on one side, then it has an even number on the other side*
- If P then Q
- **This becomes a problem in deductive logic…**

Answers – Recall the Rule: If Vowel then Even Number

- **Flip E card: Checking if P then Q**
  - **Affirming the antecedent (Modus Ponens)**
- **Flip 7 card: If P then Q means…if NOT Q then NOT P. GOAL: Make Sure There is NO VOWEL on the other side!**
  - **Denying the consequent (Modus Tollens)**
- **Flip K card: Error – Irrelevant to Argument**
- **Flip 4 card: Error – Rule doesn't say that Q cannot occur in the absence of P.**
  - **Affirming the consequent, which is invalid**
- **Only About 10% of participants opt for both E and 7.**

Positive test bias (example)

- Fact: Every card has a letter on one side and a number on the other.
- Theory: Every card containing a vowel must have an even number on the other side.
- **If card has a vowel on one side (P), then it has an even number on the other side (Q).**
- **K = X below**

Affirming the antecedent (Modus Ponens) **Valid**	Invalid (irrelevant)	Invalid (Affirming the consequent) **P (vowel) never asserted as the only sufficient condition for Q (even #)**	Denying the consequent (Modus Tollens) **Valid Falsification**
If P, then Q P Therefore, Q	If P, then Q X Therefore, Q	If P, then Q Q Therefore, P	If P, then Q Not Q Therefore, not P
Yes	No	No	Yes
E	K	4	7