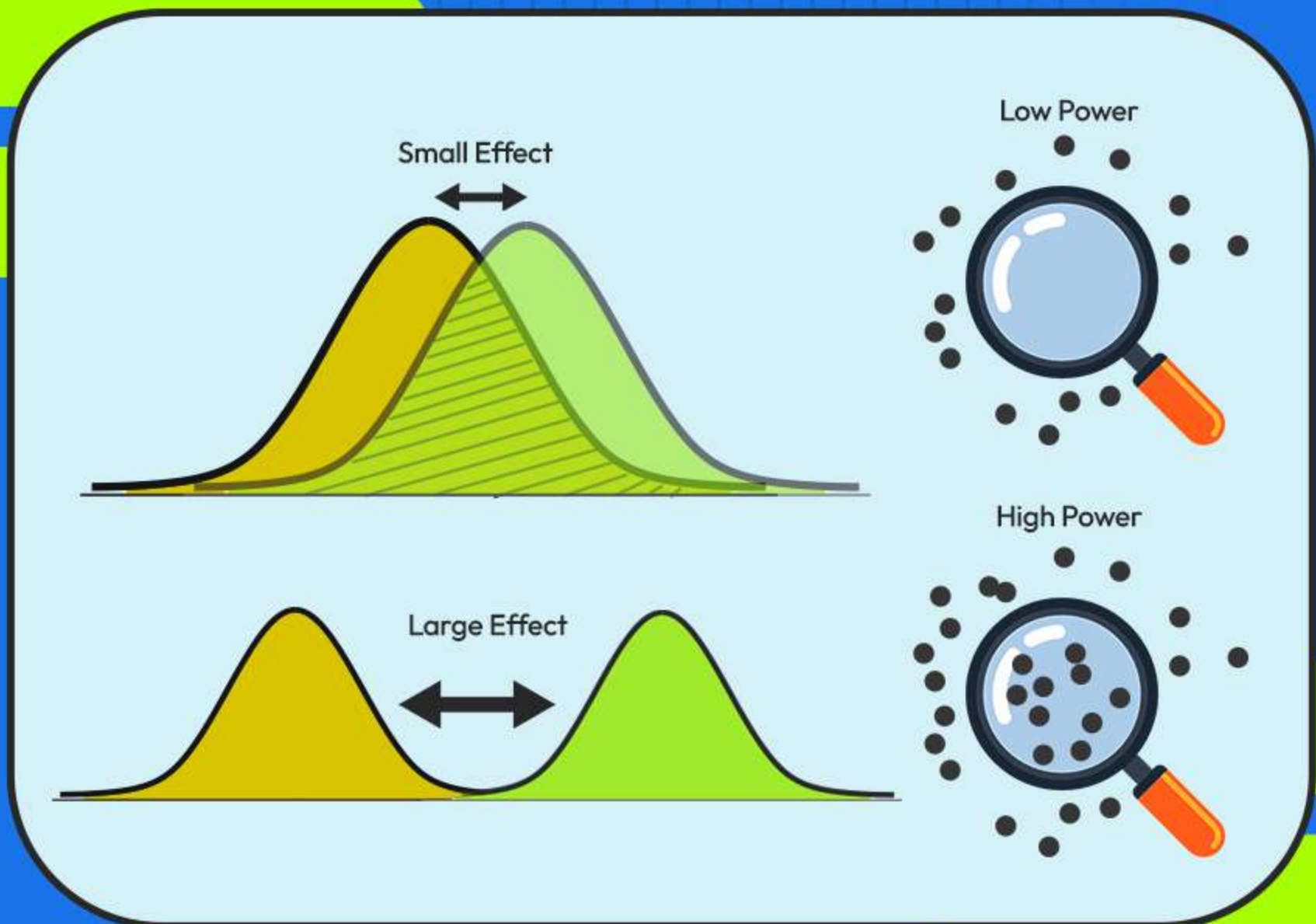


Effect Size & Statistical Power



Sample MCQs For Psychology Entrances

Q.1

Which of the following best describes effect size in psychological research?

A

Probability the
null is true

B

Strength of the
relationship/difference

C

Chance of
Type I error

D

Needed
sample size

Q.2

A researcher finds a small but statistically significant difference between two groups.

Which interpretation is most accurate?

A

Difference
is large

B

Significant but
small impact

C

Low power

D

Effect size
is large

What Is Effect Size?

Effect size tells us **how big or meaningful** a finding is—beyond just whether it's statistically significant.

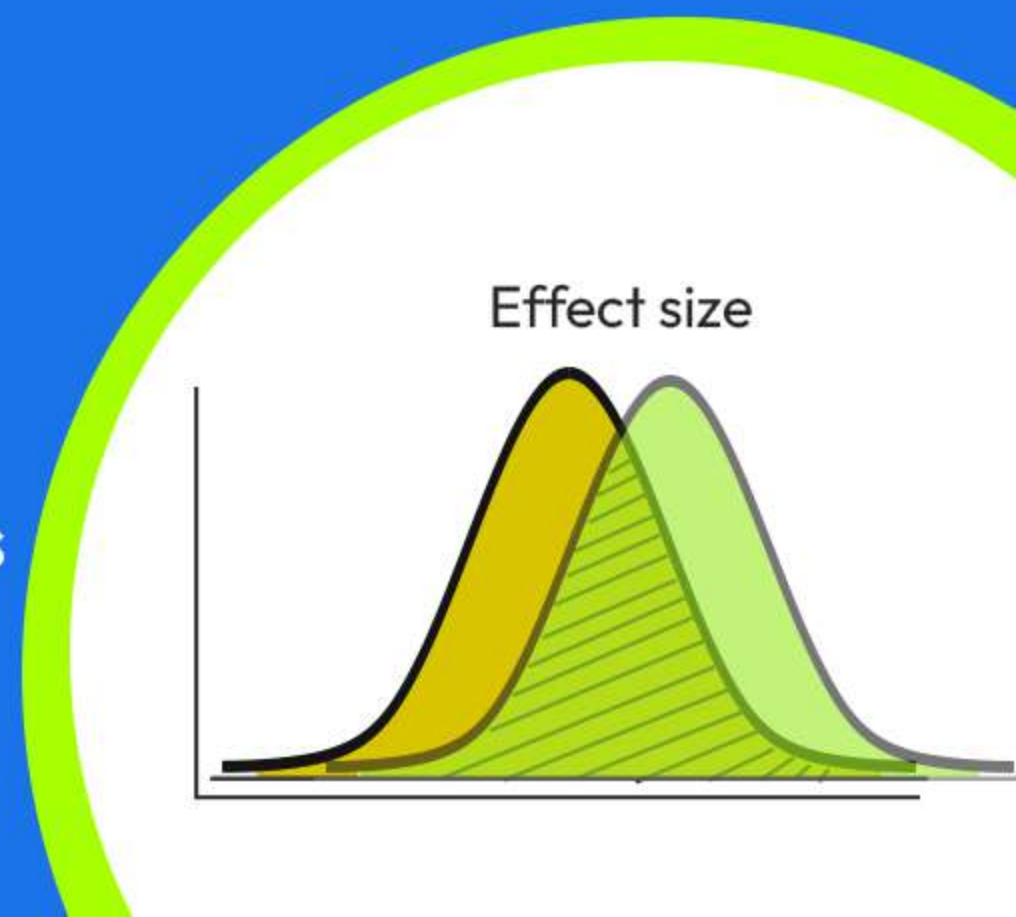
It moves us from “*Does it exist?*” to “How much does it matter?”

Common Effect Size Measures:

- **Cohen's d:** Difference between two means
- **Pearson's r:** Strength of correlation
- **Eta squared (η^2):** Proportion of variance explained
- **Odds Ratio:** Risk comparisons in categorical outcomes

Why It Matters

- Helps judge practical significance
- Required for meta-analyses
- Influences sample size planning





What Is Statistical Power?

Statistical power is the probability of detecting a true effect when it actually exists.

Typically, researchers aim for 80% power.

Power Depends On:

- **Effect Size:** Larger effects → higher power
- **Sample Size:** Bigger samples → higher power
- **Alpha Level:** Higher significance threshold → higher power
- **Variance:** More noise → lower power

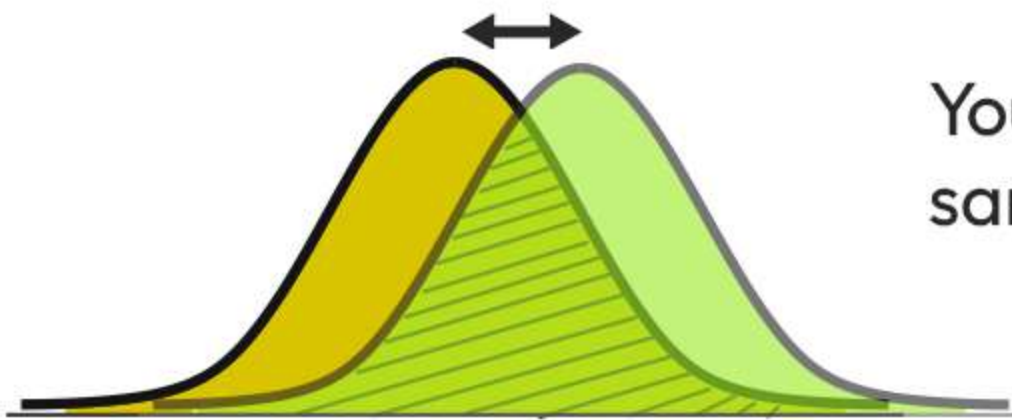
Low Power Risks:

- Failing to detect real effects (Type II errors)
- Inflated effect sizes in published studies

Effect Size & Power: The Relationship

Effect size and power are tightly linked.

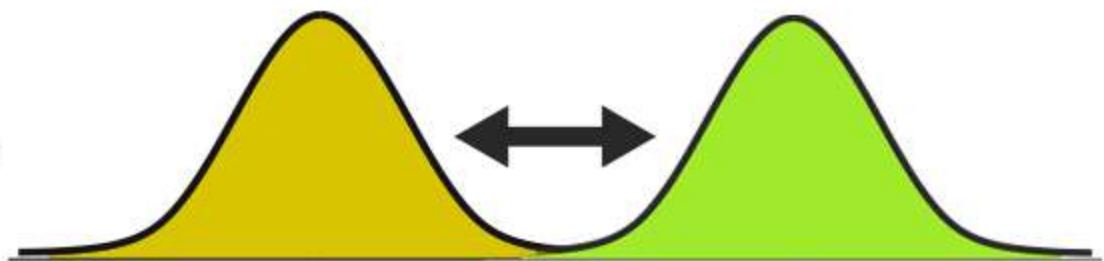
If effect size is small:



You need a larger sample to detect it

If effect size is large:

You can detect it even with a smaller sample



Formula-Level Awareness:

Power $\uparrow$ when:

- Sample size $\uparrow$
- Effect size $\uparrow$
- Variability $\downarrow$

Why Statistical Significance Alone Is Not Enough

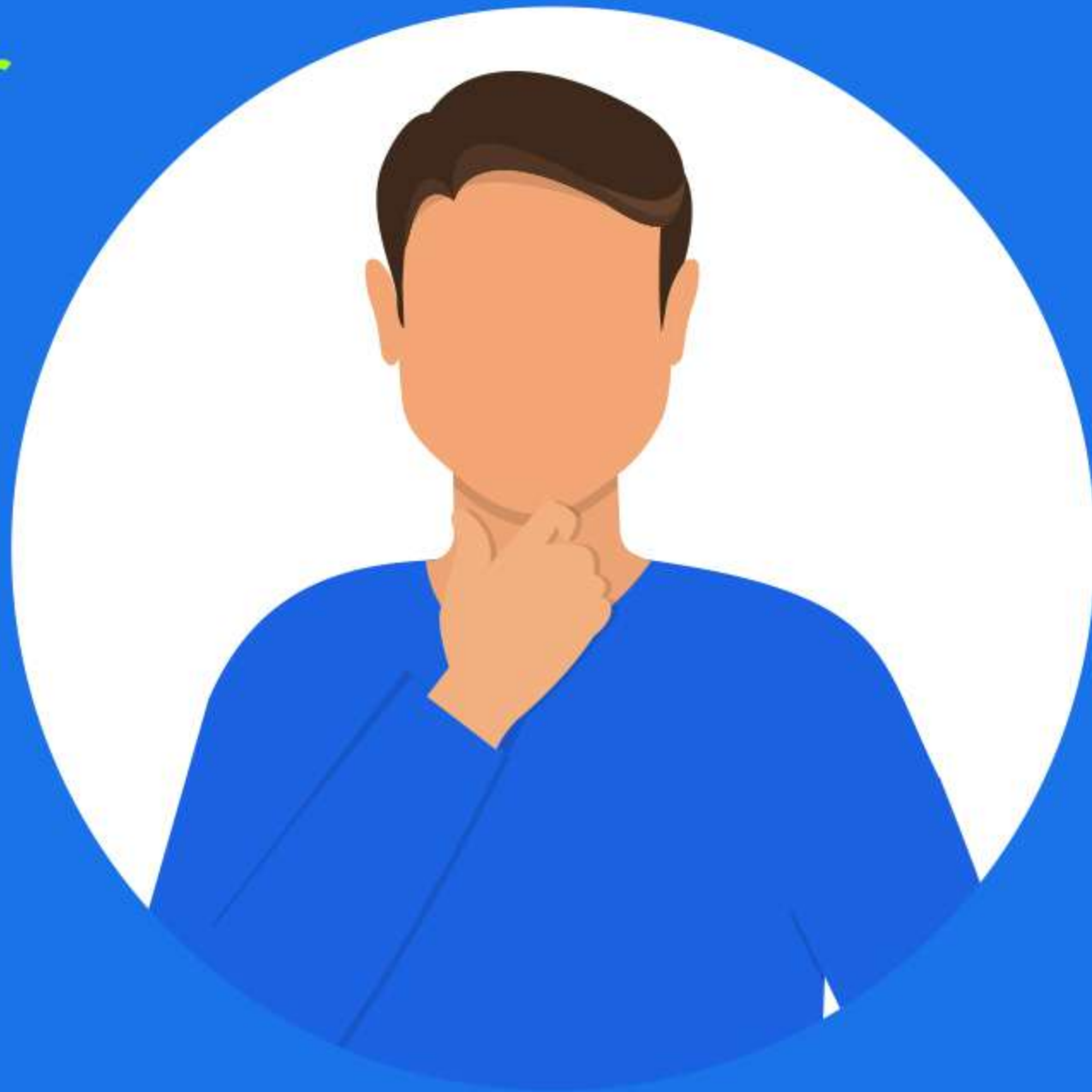
A study can be statistically significant but still practically useless.

Consider:

- Large samples can make tiny effects significant
- Small samples may miss important effects

Effect size + power together answer:

- Is it real?
- Is it meaningful?
- Can we trust the result?



Reporting in Modern Psychology

Psychology now emphasizes **effect size and power reporting** to improve transparency.

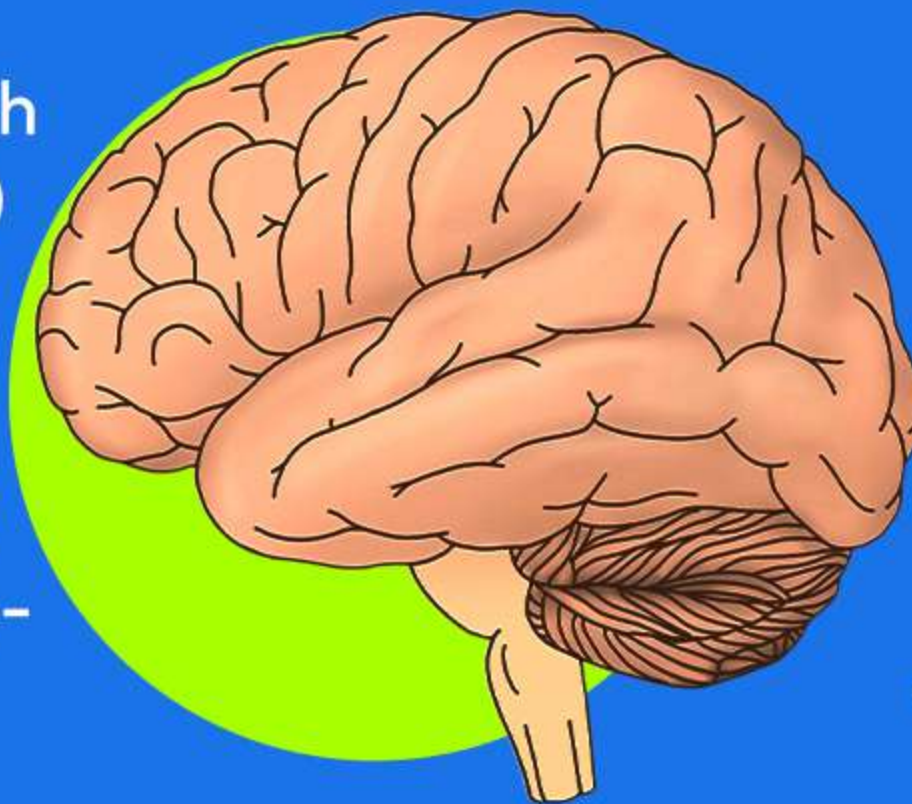
Researchers are urged to include:

Effect size (with interpretation)

Confidence intervals

Power analysis (preferably pre-registered)

Sample size justification



This shift improves replicability & reduces false positives in research.

Historical & Research Insights



- **Jacob Cohen (1988):**

Introduced standardized interpretation benchmarks for effect sizes (small, medium, large).

- **Replication Crisis Era (2010s–2020s):**

Highlighted how low statistical power led to unreliable findings across psychology.

- **Open Science Movement:**

Mandated pre-registration, effect size reporting, and power analysis to ensure quality.

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The correct answers are:

Q.1 B. Strength of the relationship/difference

Q.2 B. Significant but small impact