

## Chapter 15 Interpretation and Clinical Significance in Quantitative Research

1

### Interpretation and Quantitative Results

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- The statistical **results** of a study, in and of themselves, do not communicate much meaning.
- Statistical results must be **interpreted** to be of use to clinicians and other researchers.



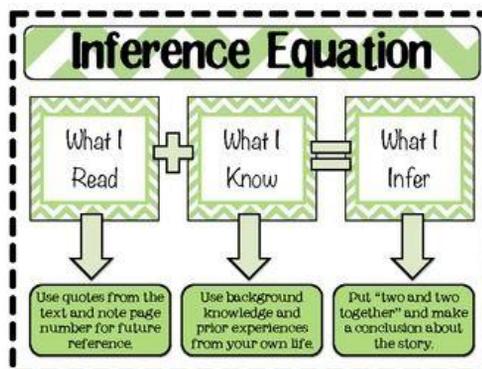
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## Interpretive Task: Six Considerations

- The **credibility** and accuracy of the results
- The **precision** of the estimate of effects
- The **magnitude** of effects and importance of results
- The **meaning** of the results; especially causality
- The **generalizability** of the results
- The **implications** of the results for practice, theory, further research

## Inference and Interpretation

- Interpreting research results involves making a series of inferences.
- An *inference* involves drawing conclusions based on limited information, using logical reasoning.
- We infer from study results “truth in the real world.”
- The findings are “stand-ins” the true state of affairs.



## Question

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Tell whether the following statement is True or False.

Statistical results provide the most meaningful means of communication about a study's results.

- a. True
- b. False

## Answer

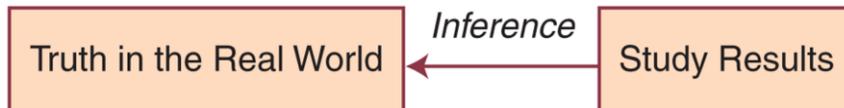
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- b. False

Rationale: Statistical results do not, in and of themselves, communicate much meaning. They must be interpreted to be of use to others.

## Inferences in Interpreting Research Results

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## The Interpretative Mindset

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- Evidence-based practice involves integrating research evidence into clinical decision making.
- Approach the task of interpretation with a critical—and even skeptical—mindset.
- Test the “null hypothesis” that the results are wrong against the “research hypothesis” that they are right.
- Show me!!! Expect researchers to provide strong evidence that their results are credible—i.e., that the “null hypothesis” has no merit.

## Credibility of Quantitative Results

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- Proxies and interpretation
- Credibility and validity
- Credibility and bias
- Credibility and corroboration

## CONSORT Guidelines

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- Reporting guidelines have been developed so that readers can better evaluate methodologic decisions and outcomes.
- The Consolidated Standards of Reporting Trials (CONSORT) include a flow chart for documenting participant flow in a study.

### FAQ

**What is CONSORT guideline?**  
-CONSORT stands for "Consolidated Standards of Reporting Trials"  
-An evidence-based minimum set of recommendations for reporting randomized controlled trials (RCTs)

**What is the purpose of CONSORT guideline??**  
-RCTs can give biased results if they lack appropriate methodology  
-CONSORT aims at improving the reporting of RCTs worldwide

## Question

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Tell whether the following statement is True or False.

A researcher supports inferences that he or she wishes others to make, based on the research results, by ensuring study validity.

- a. True
- b. False

## Answer

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- a. True

Rationale: Inferences of the type the researcher wishes people to make are supported by rigorous methodological decisions, minimization of threats to study validity, good proxies or stand-ins for abstract constructs, elimination or reduction of bias, and efforts to find corroborating evidence.

## Precision of the Results

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- Results should be interpreted in light of the precision of the estimates (often communicated through confidence intervals) and magnitude of effects (effect sizes).
  - Considered especially important to clinical decision making
- In quantitative studies, results that support the researcher's hypotheses are described as *significant*.
- A careful analysis of study results involves evaluating whether, in addition to being statistically significant, the effects are large and clinically important.

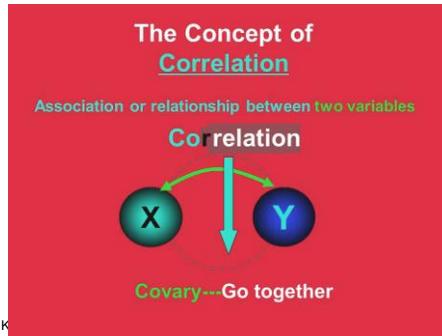
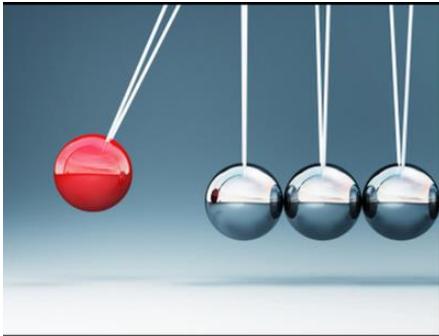
## The Meaning of Results

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- If the results are credible and of sufficient precision and importance, then inferences must be made about what they mean.
- An interpretation of meaning requires understanding not only methodological issues but also theoretical and substantive ones.
- Interpreting statistical results is easiest when hypotheses are supported, i.e., when there are *positive results*.

## Meaning and Causality

- Great caution is needed in drawing causal inferences—especially when the study is nonexperimental (and cross-sectional).
- Critical maxim:
  - **CORRELATION DOES NOT PROVE CAUSATION.**



15

## Interpreting Hypothesized Results

- Greatest challenges to interpreting the meaning of results:
  - Nonsignificant results
  - Serendipitous significant results
  - Mixed results
- Because statistical procedures are designed to provide support for research hypotheses through the rejection of the null hypothesis, testing a research hypothesis that is a null hypothesis is very difficult.

16

## Question

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Tell whether the following statement is True or False.

In a nonexperimental study, correlation and causation are the same.

- a. True
- b. False

## Answer

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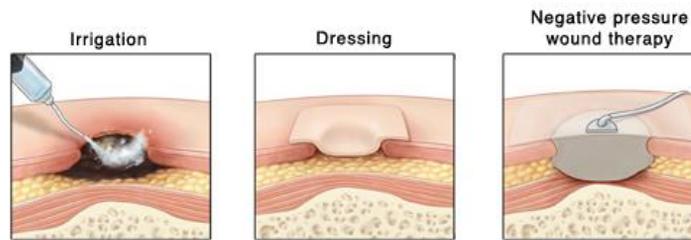
- b. False

Rationale: In a nonexperimental study, correlation does not prove causation.

## Clinical Significance

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- The practical importance of research results in terms of whether they have genuine, palpable effects on the daily lives of patients or on the health care decisions made on their behalf.



## Clinical Significance at the Group Level

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- Group-level clinical significance (which is sometimes called *practical significance*) typically involves using statistical information other than  $p$  values to draw conclusions about the usefulness of research findings.
- The most widely used statistics for this purpose are:
  - **Effect size (ES) indexes**
  - **Confidence intervals (Cis)**
  - **Number needed to treat (NNT)**

## Clinical Significance at the Individual Level

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- Involves establishing a **benchmark** (or *threshold*) that designates the score value on a measure (or the value of a change score) that would be considered clinically important
  - Conceptual definitions of clinical significance
  - Operationalizing clinical significance: establishing the MIC Benchmark
    - The focus is on individual change scores, not differences between groups.