

ANALYZING STATISTICS AS EVIDENCE IN AN ARTICLE

CRITICAL THINKING

1. Is there a statistical association (A): two-group comparison or two-factor covariation?
If not, are there separate statistics that can be used to create a statistical association?
2. What does the association compare: amounts (counts) or ratios (rates or percentages)?
3. Disputable 'causation' claim or an association claim that implies causation (between)?

State the statistical association that gives strongest support for causation – in a single sentence.

STATISTICAL LITERACY: *Statistics – everyday statistics – are different from numbers!*

- *Statistics are numbers in context.*
- *Statistics are socially constructed – just like words. So, statistics can be influenced.*
- *All the influences on a statistic can be classified into four categories.*
- *The four categories are **Confounding**, **Assembly**, **Randomness** and **Error/bias**.*
- *The first letters of the four categories spell CARE – as in “Take CARE”! Good advice!!*

Confounding

1. What factors (if any) were listed as having been taken into account in the study?
2. What other confounders could influence the observed association? Hypothetical thinking.
3. Is the effect size omitted or small?
4. Is the study uncontrolled?
5. What kind of study is it: experiment vs. observational study?
Experiment: ideal, random or quasi-exp? Observational: longitudinal or cross sectional?
6. What plausible confounders are blocked by effect size, controlled study or study design?

Assembly

1. How were statistics defined, counted, measured, summarized and presented?
2. How could statistics have been defined, counted, measured, summarized and presented?

Randomness:

1. Could the withdrawal from extremes be due to coincidence in creating the extremes?
2. Could the unlikely pattern be explained by the Law of Very Large Numbers
3. How big was the sample? Could the result be due to randomness in small samples?
Was the result statistically-significant? Could the statistical significance be influenced?

Error/bias

1. Could the statistical association be influenced by subject (respondent) bias?
2. Could the statistical association be influenced by measurement (researcher) bias?
3. Could the statistical association be influenced by selection (sampling) bias?
4. Was the study single-blinded? 'double-blinded'? Was the sample randomly selected?
5. Error in describing or comparing amounts or ratios (percentages, rates or probabilities).
6. Is there any other kind of error?

How strong is the resulting statistical association as evidence for causation – in this context?