

Evidence-Based Reasoning and Confirmation Bias

What is the Claim-Evidence-Reasoning (CER) method?

CER is a method of organizing scientific evidence and explanations

- Claim - Answers a scientific question
- Evidence - Data to support the claim, collected by person making the claim or scientific explanation
- Reasoning - Rule or scientific principle that describes why the evidence is valid

Let's look at a couple of examples, one is experiment based and the other research based

Experiment Example: Is air matter?

What is needed to answer this question?

Claim - air is matter

Evidence - the weight of the ball increases as more air is pumped into it

Reasoning - this shows that air has weight, which is one of the characteristics of matter

Explanations can have multiple pieces of evidence each supported with their own reasoning. (i.e. air also takes up space, an additional property of matter)

Research Example: Are cell phones unhealthy for kids

Claim: Cell phones are unhealthy for kids

Evidence: According to research published in the journal of behavior addition, overuse of smartphones is associated with various mental health concerns such as anxiety, depression, stress, and low self-esteem.

Reasoning: Kids are on their smartphones for several hours a day and evidence states that it can lead to major health issues

Your turn: Is homework worth it?

Practice the claim, evidence, reasoning method by answering the question “Is homework worth it”.

On a sheet of paper, fill out the claim, evidence and reasoning for your side of the argument.

Link to research on homework: <https://bit.ly/3eZc0Cm>

Let's switch gears for a moment...

Time for a short puzzle!

Get into pairs and try out a puzzle.

Confirmation Bias

- Confirmation bias is the tendency to allow your previous ideas about a subject to influence your reasoning.
- You search for, interpret, recall or utilize information that confirms what you already think.
- Thinking back to the “Is homework worth it assignment”. How many of you had a preconceived idea about whether homework was worth it or not before you started researching? Did that influence which column you choose your evidence from?
- Knowing what you know now, how could you strengthen your argument?

Scientific Method to Combat Confirmation Bias

The scientific method can combat biases with a process in which you actively try to disprove your hypothesis (or look for evidence that you are wrong).

In science we are never truly “right”, the best we can hope for is “not wrong ...yet

Be truth-seeking, not victory-seeking

Even with the scientific method though, confirmation bias affects what you look for and how you interpret it, so you are unlikely to really evaluate the conflicting evidence rigorously.

We must always be on guard and realize we are at risk of our own confirmation biases.

Revisit the “Is Homework Worth It”

Using what we just learned, how can you improve your argument from earlier?

Take a few minutes and think, pair, share on improvements