Cognitive Biases

The Defense Mechanisms of Worldviews

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June 2, 2023

Introduction

Handout
randyridenour.net/cognitive-biases.pdf

Who am I?
Professor of Philosophy
Oklahoma Baptist University

- Army chaplain, now retired from the US Army Reserve
- Ft. Hood, Iraq, Afghanistan
- OBU, 23 years
- Professor of logic and critical thinking

What do we do at OBU?
As a Christian liberal arts university, OBU transforms lives by equipping students to pursue academic excellence, integrate faith with all areas of knowledge, *engage a diverse world*, and live worthy of the high calling of God in Christ.

- OBU's mission is to produce graduates that do the four things listed in the mission statement.
- My focus today is on that third goal: to engage a diverse world.
- Biblical mandate: Matthew 28:19–20; 1 Peter 3:15b

Diversity on our doorstep

- Christianity in America
  - 1976: 91%
  - 2016: 73.7%
  - 2022: 64%

- These are percentages of the total population that reported being Christian
- Data from "Decline of Christianity Shows no Signs of Stopping." *Christianity Today*, September 13, 2022.
- The PEW Research Center estimates that Christians will make up less than one-half of the American population by 2070.

Worldview shift

- Two conceptions of worldview
  - Cognitive faculties determine our experience of the world (Kant).
  - Fundamental philosophical commitments which shape our attitude toward ourselves,the world, and our place in it. (Kuyper)

- I'm primarily focused here on the latter.

The problem

How do we engage people with very different worldviews?

How do you get someone to change their mind about a belief?

Rational approach

1. Gather all information needed to refute their belief.
2. Present it in a compelling, understandable, logical way.

Expected outcome

- They thank you for correcting them.

Actual outcome

- Failure

- The rational approach is almost guaranteed to fail.
- It hardly ever results in the other person being persuaded that they were wrong.

- It often results in their being even *more* committed to the false belief.
- If the rational approach rarely works with respect to ordinary, run-of-the-mill beliefs, imagine what happens when the beliefs in question are at the core of a person's worldview.

Why?

Why does the rational approach fail?

- The rational approach fails because it assumes that humans are perfectly rational beings.
- When we begin with a false assumption, it's no surprise that we fail.
- The same false assumption is often found in our critical thinking curricula.

Critical Thinking

Thinking

- We should be good at it.
- Are we?

- We are almost always thinking.
- So, a 20 year-old student has thought about something for just over 7 million minutes (117,000 hours).
  - Assuming 8 hours of sleep at night.
- So, plenty of practice.

Pretest

1

Are there more 6 letter English words (a) ending in 'ing' or (b) with 'n' as their fifth letter?

1. More ending in 'ing'
2. More with 'n' as their fifth letter
3. There are the same number of each sort of word.
4. It is impossible to tell without counting all of the words in English.

Since every six letter English word that ends in 'ing' is a six letter English word that has 'n' as its fifth letter the answer is guaranteed to be 2.

2
Which is the more likely cause of death?

1. Murder
2. Suicide

There are roughly twice as many suicides as murders.

3
Some playing cards are face down on the table. Some have red backs and others have blue backs. Which cards do you turn over to test the following claim? "If a card has an even number on front, then it has a red back."

1. The blue cards
2. The red cards
3. All the cards

One only need turn over the blue cards.

4
There are three doors. Nothing is behind two of them, but 50,000 dollars behind the the remaining one. You choose a door. The host opens another door which he knows does not have the prize. He then asks if you want to stay with your original choice or switch. What should you do?

1. Stay
2. Switch
3. It doesn't matter.

Switch.

5
Consider the following argument: All colas are soft drinks. All colas are beverages. Therefore, all soft drinks are beverages. Does the conclusion necessarily follow from the premises?

1. Yes
2. No
3. It is impossible to tell.

No, the conclusion does not necessarily follow from the premises.

Results

- Students generally fail the pretest.

- These were just a few sample questions, we'll talk about some others later.
- These were college freshmen taking the course, surely older professionals are better, aren't they?

Doctors

1% of women at age forty who participate in routine screening have breast cancer. 80% of women with breast cancer will get positive mammographies. 9.6% of women without breast cancer will also get positive mammographies. A woman in this age group had a positive mammography in a routine screening. What is the probability that she actually has breast cancer?

- Doctors were asked this question.
- Consequences for wrong estimate.
  - Too low: patient doesn't get treatment she needs.
  - Too high: patient gets radical, unnecessary treatments.

Results

- Most estimated 70–80%
- Correct answer: 7.8%
- Only 15% of doctors were correct.

- The most common answer was ten times too high.
- Professionals are no more likely to be right than my freshmen students in the first week of the semester.

Good news

- Can be taught

- Critical thinking is a skill that can be taught.
- Students can learn how to solve problems like this.

Bad news

- It doesn't matter.

Bat and ball

A ball and bat together cost $1.10, and the bat costs $1.00 more than the ball does. How much does the ball cost?

Answer

- Answers
  - Most common: 10 cents
  - Correct: 5 cents
    - $.05 + 1.05 = 1.10$

- Easy problem, solvable by primary school students.
- Why do most people get it wrong?
- Maybe because it *is* an easy problem.
  - So easy we don't think about it.

CT: old model

- Students need to learn
  - Basic logic
  - Fallacies

- Critical thinking texts generally cover
  - Tools of basic logic
    - Venn diagrams for categorical logic
    - Truth tables for propositional logic
    - Maybe some simple derivations
  - Fallacies
    - Appeal to force
    - Appeal to pity
    - Slippery slope
    - Ad hominem
    - Others

Assumptions

- Humans reason well, unless…
  - We don't know how, or
  - Emotions get in the way.

- These assumptions are not altogether false.
- Almost everyone can see that modus ponens and modus tollens are valid.
- Emotions quite often hamper good reasoning.

More to the story

- Ball and bat example
- We know how to solve it.
- No strong emotions
- What goes wrong?

Thinking systems

- Kahneman: two systems
  - System 1: fast
  - System 2: slow

- Both systems have advantages and disadvantages.
- System 1
  - Automatic
  - Easy
  - Often wrong
- System 2
  - Careful
  - Often right
  - Slow and hard

System 1 example

- Look at the child's face.
- Complete the sentence, "This child is…."
- This is what psychologists call "the angry face."
  - Lowered brow
  - Thinned lips
  - Flared nostrils
- Cross-culturally universal — something we're not taught.
  - Even congenitally blind children make the same face.

System 2 example

$$17 \times 24$$

- Fast thinking can tell us something
  - 127 is not right.
  - Neither is 11,462
  - What about 428?
  - Correct answer: 408

- Slow thinking is hard, tough cognitive load, requires attention.
  - Muscles tense.
  - Blood pressure and heart rate increase.
  - Pupils dilate.
  - Stop doing other things.

System 1
- Wonderful when it works
- Disaster when it doesn't

- Some uses of system 1:
  - Judging relative distances
  - Locating sources of sounds
  - Detecting emotions in others
  - Solving simple math problems
  - Driving on empty roads
  - Social skills
- Some are innate.
- Others are learned.

Good thinking
- Requires
  - Knowing how to use system 2.
  - Knowing when to *not* use system 1.

- When system 1 fails in systematic ways, we call it a cognitive bias.
- Critical thinking requires recognizing those situations and knowing not to trust our intuitions in those cases.

Cognitive Biases

Availability heuristic
- Judging probabilities using what is available to memory

- A heuristic is a rule-of-thumb for reasoning.
- Work very well at times.
- Reasoning from sample to population
  - Sample is in our memory.

Example

- Which is more common?
  - Fords or Jeeps?
  - Murder or suicide?

- We reason like this:
  - Have I see more Fords or more Jeeps?
  - Have I heard about more murders or more suicides?
- Good samples are
  - Large enough
  - Not biased
- Need to ask: why is this available to memory?
  - If because it is frequent, then fine.
  - Other possible reasons for availability.
- We tend to remember things that are unusual, uncommon, etc.

Danger of availability heuristic

- Bad decisions about risk

- What's the danger of a terrorist attack?
- Driving on the highway?
- Heart attack or stroke?
- How likely is winning the lottery?
- Ease of recall affects probability judgments.

Representativeness heuristic

- Concluding that something is of a type because it resembles the typical example of that type.

Example

Joe is very physically fit, over six-feet tall, 250 pounds, and played football in college. Which of the following is more likely?

1. Joe is an NFL linebacker.
2. Joe works in the insurance industry.

- Sometimes the heuristic works well.
  - Concluding that a snake is dangerous because it has a triangular head, vertical slits for eyes, rough scales, and distinct fangs.
- Representativeness heuristic tends to fail when it causes us to ignore base rates.

- Base rate: frequency of characteristic in the overall population.
- Base rates are very important when making judgments about probabilities.

Confirmation bias
- Tendency to see or favor only information that supports our beliefs.

- Select information supporting our views
- Ignore disconfirming evidence
- Interpret ambiguous evidence as supporting.

Studies
- Watson
- Stanford
- Librarian/Real Estate
- Fake personality test

- What rule was used to form this series?
  - 2,4,6
- Subjects asked to test hypothesis with a new series.
- Once people have an idea about the rule, they only asked for evidence that would confirm their idea.
- So, it is very difficult to get evidence against something already believed.
- Subjects asked to evaluate studies on capital punishment.
- Studies were fictional.
- Subjects told that one supported capital punishment, another did not.
- Evaluated the study that purportedly supported their view as good, and the other as bad.
- Biased recall of information.
- Subjects read profile of woman who had mixture of introverted and extroverted tendencies.
- Asked to evaluate her for a position as a librarian or real estate agent.
- Remembered only the tendencies that fit the position they were asked to evaluate.

Real world
- Social media
- Evaluating scientific studies
- Jury trials

- Confirmation bias amplified by filter bubbles in social media.
  - Creates feedback loops
- Interpret studies as good or bad depending on how they support our views.
- Doctors interpret data to fit initial diagnosis.

- Jurors tend to make judgment early in the case, then filter the later testimony accordingly.

Loss aversion
- Losses seem bigger than corresponding gains
- Explains
  - Status quo bias
  - Endowment effect

- Status quo bias is a bias in favor of the way things are.
- Endowment effect says that we value what we own more than we would if we didn't own it.
- Example: how much would you pay for something at a garage sale vs. how much you would sell it for?
- Explains why negotiations often fail.

Framing effect
- Attitude determined by how something is described.

- Attitude determined by how something is described
- Dollars off of MSRP
- California gas stations
- Guaranteed loss vs. insurance policy
  - Give students two different choices:
    * $50 dollar loss or 25% chance of losing $200.
    * Insurance policy with $50 premium protecting against 50 dollar loss or 25% chance of losing $200.

Sunk costs
- Refusing to abandon something because of past investments of time, money, etc.

- Movie examples
- Ski trip study.
- Concorde jet project
- 1996 Everest expedition
- Intel

Cognitive dissonance
- Uncomfortable feeling when beliefs and actions conflict.

Pretest question

- Who reported liking eating the grasshoppers?
    1. Group with rude experimenter
    2. Group with friendly experimenter

- A number of college students participated in an experiment. Some were asked by a very nice person to eat fried grasshoppers. Others were pressured by a rude person to eat the grasshoppers. Which group reported liking the grasshoppers?
- Boring task experiment
- Occurs when we do something bad without sufficient justification.

Post-decisional dissonance

- Unwise purchase
- Belief disconfirmation and dissonance

- Dissonance is greatest when
    - Choice is difficult to reverse
    - Cost is high
    - Responsibility for making the choice is on the agent
- Disconfirmation
    - Group believed world would end on 12/21/54
    - Very committed — had given away all possessions
    - World did not end (obviously).
    - Strong dissonance
    - Result - increased commitment to belief.

Two more

- Dunning-Kruger effect
- Lake Wobegone syndrome

- People with less ability at a task tend to believe that they have high levels of ability
- Studies
    - Grammar and logic test (12% vs. 62%)
    - Made-up terms (90%)
- Tendency to think that we are above average.
    - 70% of a million HS students rated themselves as above average in leadership, only 2% below.
    - 90% of drivers think they are above average

Conclusion

Good

- Everything that God created is good.
- Including the human mind.

- Many sins involve using good things that God created in ways that God didn't intend.
- It's the same for cognitive biases.
- Consider what is good about
  - Heuristics
  - Confirmation bias
  - Loss aversion
  - Sunk costs
  - Cognitive dissonance
  - Lake Wobegone syndrome

Bad

- All of these (and more) can be used to
  - Produce false beliefs
  - Justify wrong actions
  - Rationalize irrational behavior

- Good news: knowing about them really does help!
- Example of student Good Samaritan.

Ugly

- Perfect world: beliefs would be proportional to evidence.
- Actual world: evidence against a belief *strengthens* the belief.
  - Backfire effect

- Giving people evidence which proves them wrong often makes them hold the belief even more strongly.

Why?

- Feel threatened
- Fight or flight

- Cognitive scientists scanned subjects' brains while they were being presented with information contrary to deeply held beliefs.
- Triggered response in the amygdala.
  - Same reaction as when attacked by a predator.
- Especially likely when the beliefs form the core of our identity

- Our worldview

What should we do?

- Learn about biases
- Remember how is just as important as what
- Use simpler explanations
- Increase people's involvement
- Have people first clearly state their beliefs
- Be kind

- The more we know about cognitive biases, the more we can recognize the situations where they are common.
- How we present information is just as important as what we present.
  - Don't forget 1 Peter 3:16a
- Simpler explanations tend to be more convincing than more complex ones.
- The more that people feel that they play a part in coming to believe, the more they will accept the change in belief.
- Listen before responding, ask questions before giving answers.
- Exemplify the fruits of the Spirit.

Questions?