

Lesson 1

1. What is critical thinking and why is it important?
2. Identifying and representing arguments.

What is critical thinking
and why is it important?

What is critical thinking?

A universal toolkit for evaluating claims.

What are claims?

Statements that can be true or false.



Claims	Not Claims
Melbourne is in Australia.	Where is Melbourne?
The moon is made of cheese.	Stop thinking about whether the moon is made of cheese and pay attention!
Critical Thinking is the best unit at Monash.	Ouch!

What we are going to be doing.

Developing a set of tools for building, deconstructing, and evaluating **arguments**.

What is an argument?



argument

/ˈɑːɡjʊm(ə)nt/

See definitions in:

All

Mathematics

Logic

Linguistics

noun

1. an exchange of diverging or opposite views, typically a heated or angry one.
"I've had an **argument** with my father"

Similar:

quarrel

disagreement

squabble

fight

difference of opinion



2. a reason or set of reasons given in support of an idea, action or theory.
"there is a strong argument for submitting a formal appeal"

Similar:

reasoning

line of reasoning

logic

case

defence

justification

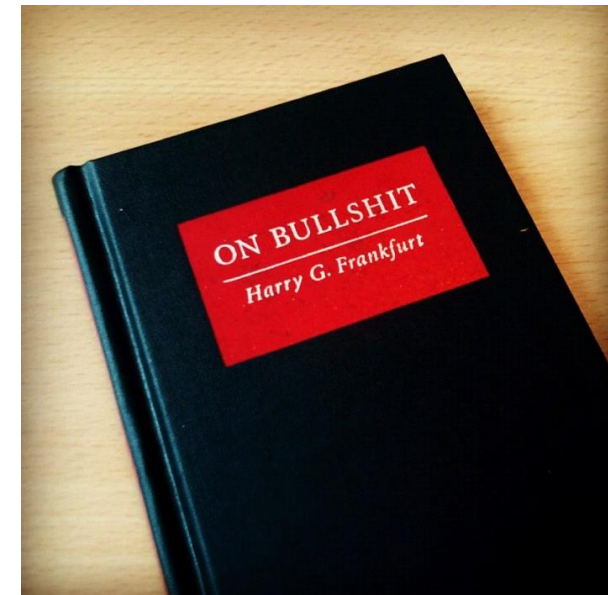
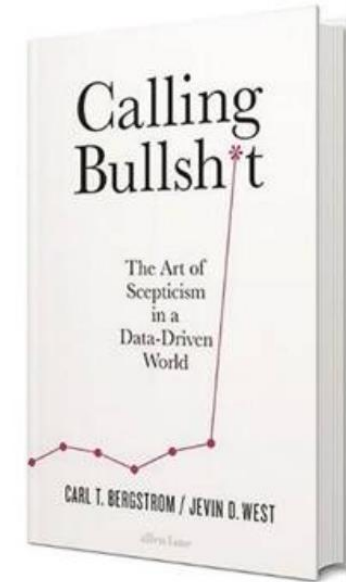


Why arguments?

Arguments are everywhere!

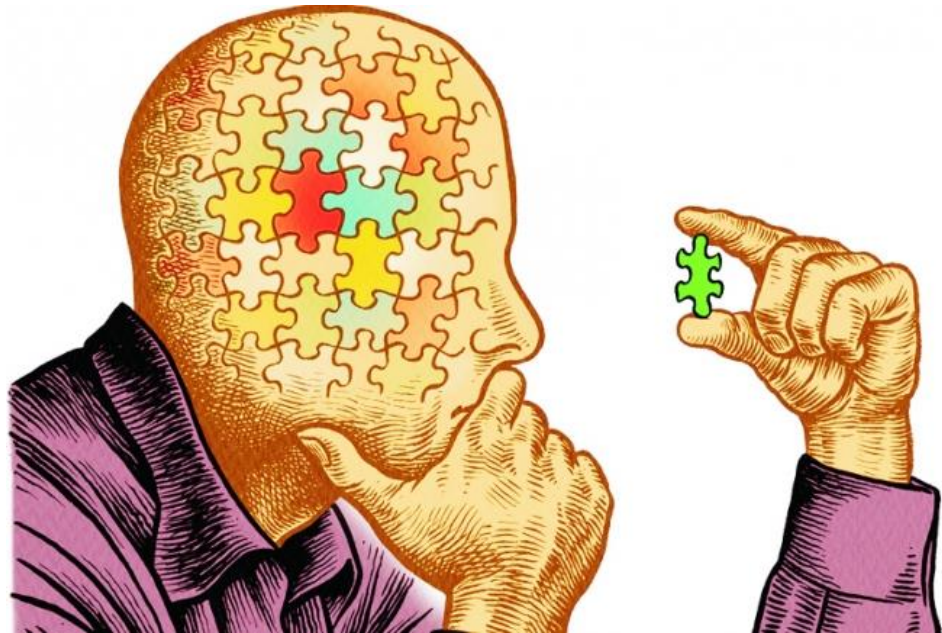
- Academia
- Politics
- Advertising
- Our own decision making
- ...

Many of them are bullshit!



Critical Thinking requires:

- Understanding the formal features of good reasoning... **AND**
- An open, curious mindset.



$$19 \times 25 = 445 \text{ (T/F)}$$



He is angry. (T/F)

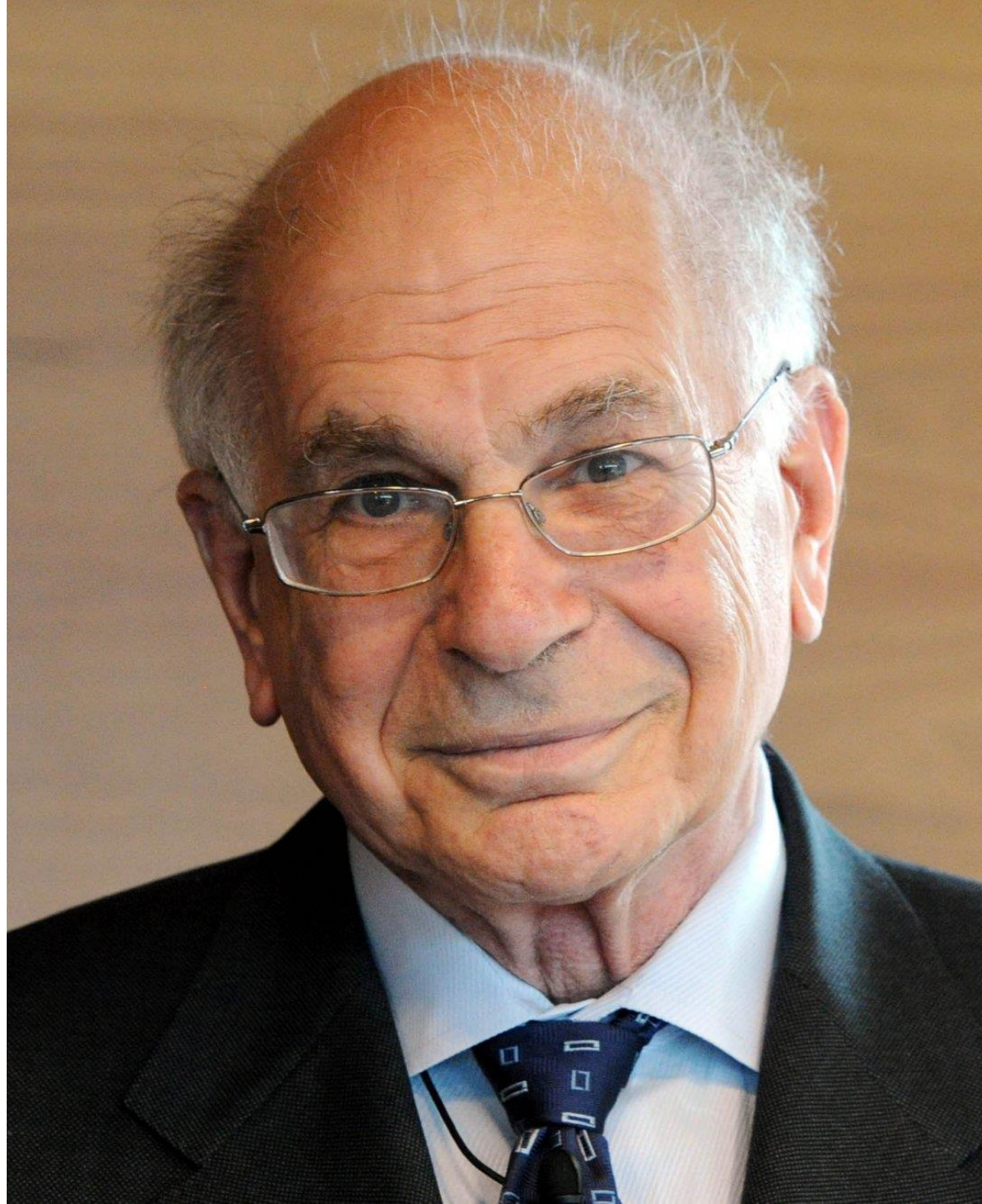
Did evaluating those claims *feel* different?



- Automatic & quick
- Little or no effort
- Involuntary
- Opaque

$$19 \times 25 = 445$$

- Slow
- Effortful
- Deliberate, agency, choice
- Transparent



THINKING,
FAST AND SLOW



DANIEL
KAHNEMAN

WINNER OF THE NOBEL PRIZE IN ECONOMICS

System 1

Intuitions and gut reactions



- Automatic & quick
- Little or no effort
- Involuntary
- Opaque

System 2

Reason and rational thought

$$19 \times 25 = 445$$

- Slow
- Effortful
- Deliberate
- Transparent

Strengths of intuition (system 1)

- Fast!
- Efficient!
- Sometimes '*knows*' things we don't! (e.g. disgust as intuitive microbiology)



Weakness of intuitions (system 1)

- Subject to systematic biases that are extremely hard to override.





Racism is a major problem in
Australia. (T/F)

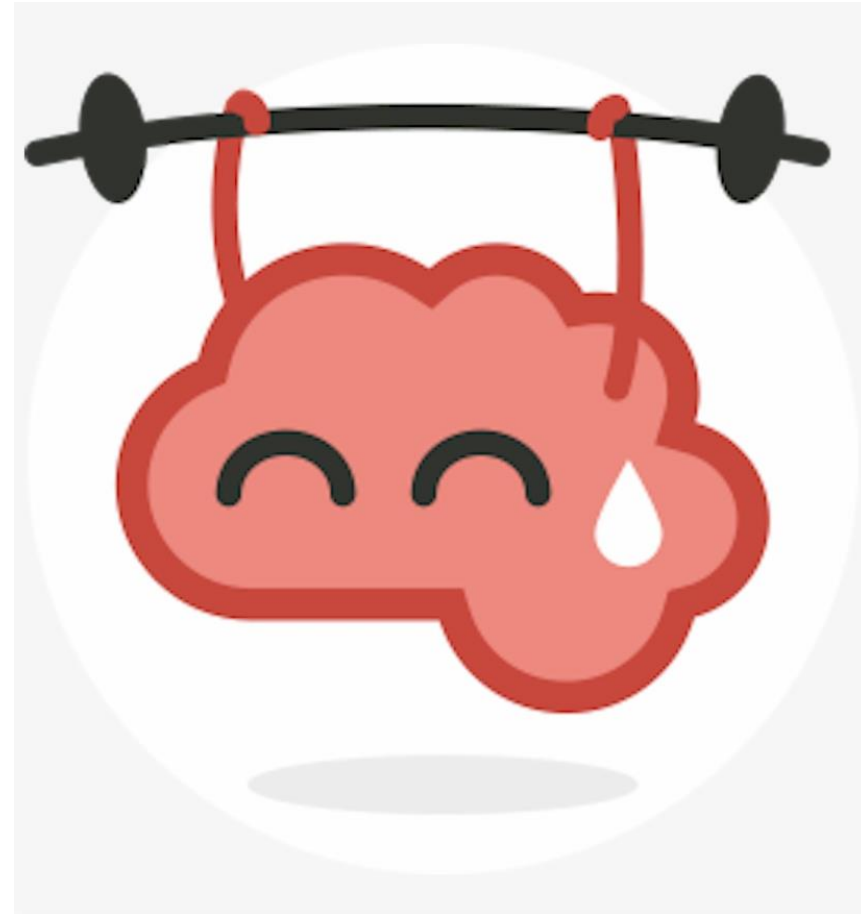
Did you use system 1 or system 2?

You are not the king of your brain. You are the creepy guy standing next to the king going "a most judicious choice, sire."

- Steven Kaas

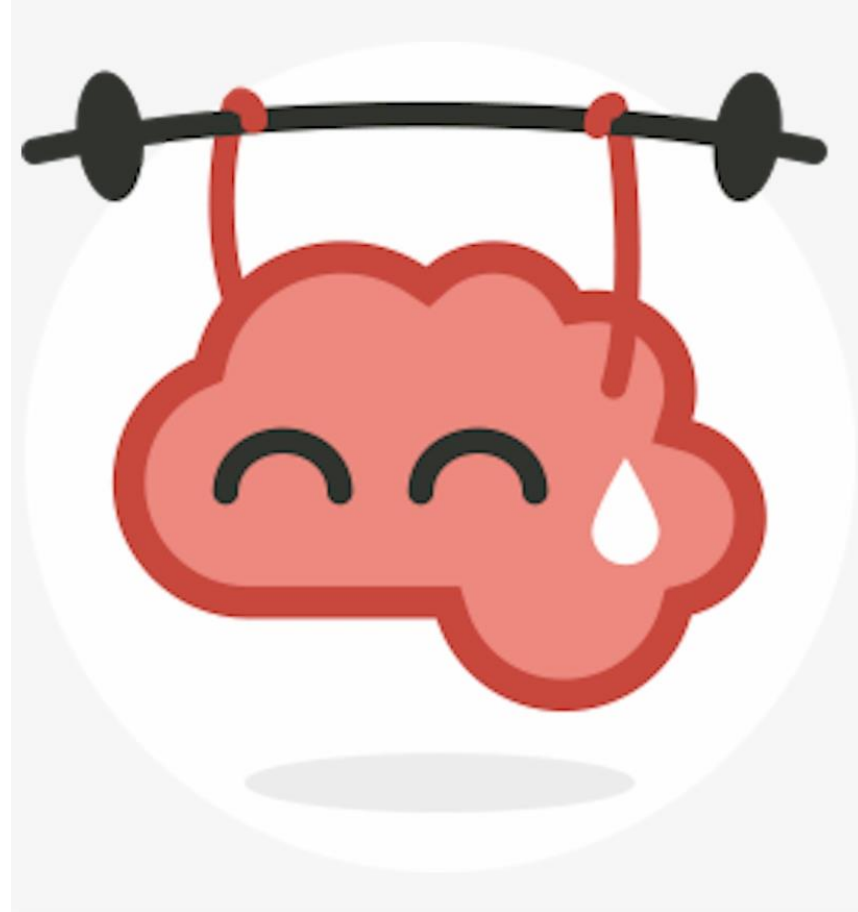
What is Critical Thinking?

Critical Thinking = A weights program for system 2.



What is Critical Thinking?

- Understanding the formal features of good reasoning.
- Cultivating an open, curious mindset – *using our reasoning skills to interrogate rather than justify our intuitions and prior beliefs.*



Identifying and representing arguments

What's an argument again?

An argument is a reason or a set of reasons that support a claim.

1. Wearing a mask can prevent the spread of germs that make people sick.

2. We should try to avoid making people sick.

Therefore,

C: If you are sick you should wear a mask when in public.

Premises

Conclusion

Claims
(truth
evaluable
statements)

What is an argument?

An argument is a premise or a set of premises that support a conclusion.

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Premises

Conclusion

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(truth
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Is this an argument?

Wearing sunscreen decreases your risk of skin cancer and helps prevent premature skin aging caused by the sun.



Wearing sunscreen decreases your risk of skin cancer and helps prevent premature skin aging. Therefore you should put sunscreen on before going into the sun.



Identifying arguments: Signposting

Conclusion indicators

Therefore

So

It follows that

Hence

Thus

For this reason ...

It must / cannot (be true that)...

Premise indicators

Since

Because

For

The reason is

There are several reasons ... first ...
second ...

The evidence for this is ...



A lot has changed since I was an undergrad.

Identifying arguments: Signposting

Conclusion indicators

Therefore

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It follows that

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For this reason ...

It must / cannot (be true that)...

Premise indicators

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There are several reasons ... first ...
second ...

The evidence for this is ...



There are soooo many weird examples in Andy's lectures.

Is this an argument?

Andy says he can't answer emails until he's had 3 pints of coffee. Anyone who needs 3 pints of coffee to answer emails seriously needs a holiday. Therefore Andy needs a holiday.



Is this an argument?

Research has shown that wearing a mask can prevent the spread of germs that make people sick. Because we should try to avoid making other people sick, if we have to go out in public when we are sick, we should wear a mask.



Is this an argument?

The U.S. Army has awarded Microsoft \$479.2 million dollars for augmented reality systems helping soldiers in training and in combat missions.

The Army posted the contract award on its website.

“Augmented reality technology will provide troops with more and better information to make decisions,” a Microsoft spokesperson said in an emailed statement.

Bloomberg reported the deal and said the contract was the result of a bidding process.



Is this an argument?

Andy got a sunburn because he forgot to wear sunscreen. ❌

Andy got a sunburn *therefore* he forgot to wear sunscreen. ✅



This is an **explanation**!

What's the difference?

- An **argument** provides a reason for thinking a claim is true.
- An **explanation** provides a reason for why something happened.

Is this an argument?

There is a great deal we don't know about the brain. But we do know that the commonly repeated myth that we only use 10% of it is just that: a myth. The brain is incredibly energetically demanding, requiring about 20% of all of the oxygen and glucose brought into the body. It is extremely unlikely that the brain would have evolved as it did if it were mostly useless. Moreover, trauma to the brain would rarely have devastating results if it were mostly unused, but very few survive gunshot wounds to the head.



Is this an argument?

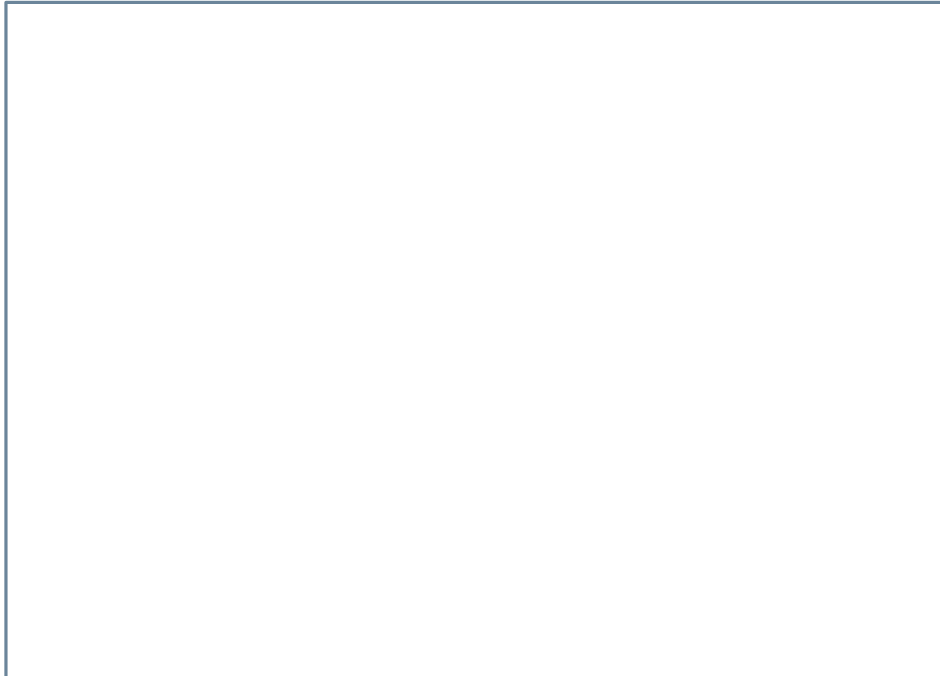
There is a great deal we don't know about the brain. But we do know that **the commonly repeated myth that we only use 10% of it is just that: a myth.** The brain is incredibly energetically demanding, requiring about 20% of all of the oxygen and glucose brought into the body. It is extremely unlikely that the brain would have evolved as it did if it were mostly useless. Moreover, trauma to the brain would rarely have devastating results if it were mostly unused, but very few survive gunshot wounds to the head.



Extracting arguments

Step 1: Is it an argument?

Step 2: What is the conclusion?
What are the premises?



Because it is a democratic principle that laws should have the consent of those affected by them, liquor laws should be formulated not by politicians but by club and restaurant owners, since such laws directly affect the profitability of their businesses.

Extracting arguments

Step 1: Is it an argument?

Step 2: What is the conclusion?
What are the premises?

C. Liquor laws should be formulated not by politicians but by club and restaurant owners.

Because it is a democratic principle that laws should have the consent of those affected by them, liquor laws should be formulated not by politicians but by club and restaurant owners, since such laws directly affect the profitability of their businesses.

Extracting arguments

Step 1: Is it an argument?

Step 2: What is the conclusion?
What are the premises?

1. It is a democratic principle that laws should have the consent of those affected by them.

2. Liquor laws directly affect the profitability of clubs and restaurants.

Therefore,

C. Liquor laws should be formulated not by politicians but by club and restaurant owners.

Because it is a democratic principle that laws should have the consent of those affected by them, liquor laws should be formulated not by politicians but by club and restaurant owners, since such laws directly affect the profitability of their businesses.

Dos and Don'ts of Standard Form

1. It is a democratic principle that laws should have the consent of those affected by them.

2. Liquor laws directly affect the profitability of clubs and restaurants.

Therefore,

C. Liquor laws should be formulated not by politicians but by club and restaurant owners.

- Label premises and conclusion.
- Place a 'therefore' separating the premises from the conclusion.
- Premises and conclusions are:
 - stated as complete sentences;
 - contain a single statement each, and;
 - make sense as standalone claims.
- Reword or paraphrase if this is necessary.

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- Label premises and conclusion.
- Place a 'therefore' separating the premises from the conclusion.
- Premises and conclusions are stated as complete sentences, contain a single statement each, and make sense as standalone claims.
- Reword or paraphrase if this is necessary.
- Remove contextual information that is not directly relevant.
- When finished, reread the standardized argument and to make sure it accurately captures what is in the text.

Extracting arguments can get tricky!

1. Everything with a beginning has a cause.

2. What else could have caused the universe except God?

Therefore,

C. God must be the cause of the universe.

God must be the cause of the universe. After all, everything with a beginning has a cause. And what else could have caused the universe except God?

Extracting arguments can get tricky!

1. Everything with a beginning has a cause.

2. **Nothing could have caused the universe except God.**

Therefore,

C. God must be the cause of the universe.

God must be the cause of the universe. After all, everything with a beginning has a cause. And what else could have caused the universe except God?

Extracting arguments can get tricky!

Checkmate, Flat Earthers!

