Believing That a Claim is True

1. Arguments (reasoning)
   - Inductive Logic
   - Deductive Logic

2. Rhetoric (psychology / emotions)
   - Persuasive Language
   - Pseudoreasoning (Fallacies)

3. Credibility
   - Believability of the Claim itself
   - Credibility of the Source
Deductive Logic
Deductive Arguments

Are these valid arguments?

• $2 + x = 7$. Therefore, ‘$x$’ must equal 5.
• John is seven years old and Sarah is six years old. So Sarah is younger than John.
• Grace owns a LeBlanc Saxophone. All LeBlanc saxophones are made in France. Hence, Grace owns a Saxophone made in France.
• Juan is rich. Everyone who is rich took Javy’s class in Critical Thinking and Juan took Javy’s class in Critical Thinking.
• Everything that Pete won at the carnival must be junk. I know that Pete won everything that Bob won, and all the stuff that Bob won is junk.
Deductive Arguments

Making it Easier to Check for Validity

1. Would be easier if we could “rephrase” each claim into a form that is easier to understand.
   – Standard-Form Categorical Claim

2. Would be easier if we then reformatted the argument into a form that is easier to understand
   – Syllogism
Categorical Claim:
Says something about classes or “categories” of things.

Standard-form Categorical Claims

**A-Claim**: All ____ are ____.
(Example: All De Anza students are human)

**E-Claim**: No ____ are ____.
(Example: No De Anza students are Martian)

**I-Claim**: Some ____ are ____.
(Example: Some De Anza students are Asian)

**O-Claim**: Some ____ are not ____.
(Example: Some De Anza students are not Asian)
John is seven years old and Sarah is six years old. So Sarah is younger than John.

\[
P(1): \text{John is seven years old} \\
P(2): \text{Sarah is six years old} \\
C: \text{So Sarah is younger than John}
\]

A syllogism is a very common form of deductive argument.
Deductive Arguments

A-Claim: All ___ are ____.
E-Claim: No ___ are ____.
I-Claim: Some ___ are ____.
O-Claim: Some ___ are not ____.

What we really want!

Special Type Syllogism: Categorical Syllogisms

Example #1

P(1): All logicians are critical thinkers.
P(2): All philosophers are logicians.
C: All philosophers are critical thinkers

Categorical syllogism:
A syllogism whose every claim is a standard-form categorical claim and in which three terms each occur exactly twice in exactly two of the claims.
What we really want!

Special Type Syllogism: Categorical Syllogisms

Example #2

**P(1):** Some lizards are reptiles.

**P(2):** All reptiles are beautiful beasts.

**C:** Some lizards are beautiful beasts.

| A-Claim: All ___ are ____.
| E-Claim: No ___ are ____.
| I-Claim: Some ___ are ____.
| O-Claim: Some ___ are not ____.

8
Why do we want *categorical syllogisms*?

1. Often easier to intuitively see validity of logic.

2. Places argument into form where we can use deductive tools:
   - Venn Diagrams
   - Validity Rules
Deductive Arguments

Big Idea:

DONT BE FOOLED
Cats are colorblind!
Deductive Logic Day II

What are we going to do?

Critical Thinking
Ninjas!
Deductive Arguments

Training Exercise #1:
"Every salamander (s) is a lizard (p)."

_Becomes_...
"All salamanders are lizards."

**A-Claim**: All ___ are ____.
**E-Claim**: No ___ are ____.
**I-Claim**: Some ___ are ____.
**O-Claim**: Some ___ are not ____.
Training Exercise #1:

Turning a claim into a “standard-form categorical claim.”

“None of the burrowing snakes are poisonous.”

Becomes...

“No burrowing snakes are poisonous snakes.”

A-Claim: All ___ are ____.

E-Claim: No ___ are ____.

I-Claim: Some ___ are ____.

O-Claim: Some ___ are not ____.
Deductive Arguments

Training Exercise #1:
Turning a claim into a “standard-form categorical claim.”

“There are allergies that can kill you.”

Becomes...

“There are allergies that can kill you.”

“A-Claim: All ___ are ____.
E-Claim: No ___ are ____.
I-Claim: Some ___ are ___.
O-Claim: Some ___ are not ____.”
Training Exercise #1:

"Not every lizard is a salamander."

Becomes...

"Some lizards are not salamanders."

A-Claim: All ___ are ____.
E-Claim: No ___ are ____.
I-Claim: Some ___ are ___.
O-Claim: Some ___ are not ____.
Critical Thinking Ninjas!

Training Exercise #1:  
*Turning a claim into a “standard-form categorical claim.”*

“Only reptiles can be lizards.”

*Becomes...*

“All lizards are reptiles.”

| A-Claim: All ___ are ____. |
| E-Claim: No ___ are ____. |
| I-Claim: Some ___ are ____. |
| O-Claim: Some ___ are not _____. |

Can draw a Venn Diagram to make it easier.
Deductive Arguments

Quick Guide to Venn Diagrams

A-Claim:
All $S$ are $P$.
All humans are mammals.

E-Claim:
No $S$ are $P$.
No cats are dogs.

I-Claim:
Some $S$ are $P$.
Some citizens are voters.

O-Claim:
Some $S$ are not $P$.
Some contestants are not winners.

Grey out what does not exist.
When you can’t grey anything out, place “x” where you know there’s at least one member in the group.
Training Exercise #1: Turning a claim into a “standard-form categorical claim.”

“Every salamander (s) is a lizard (p).”

*Becomes*...

“All salamanders are lizards.”

---

**A-Claim**: All ___ are ____.

**E-Claim**: No ___ are ____.

**I-Claim**: Some ___ are ___.

**O-Claim**: Some ___ are not ____.
Deductive Arguments

Training Exercise #1:

Turning a claim into a “standard-form categorical claim.”

“None of the burrowing snakes are poisonous.”

Becomes...

“No burrowing snakes are poisonous snakes.”

**A-Claim:** All ___ are ____.

**E-Claim:** No ___ are ____.

**I-Claim:** Some ___ are ___.

**O-Claim:** Some ___ are not ____.
Deductive Arguments

Training Exercise #1:
Turning a claim into a “standard-form categorical claim.”

“Only reptiles can be lizards.”

Becomes...

“All lizards are reptiles.”

A-Claim: All \( S \) are \( P \).

<table>
<thead>
<tr>
<th>A-Claim</th>
<th>E-Claim</th>
<th>I-Claim</th>
<th>O-Claim</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ___ are ____.</td>
<td>No ___ are ____.</td>
<td>Some ___ are ____.</td>
<td>Some ___ are not _____.</td>
</tr>
</tbody>
</table>