

Assertions, Denials Questions, Answers & the Common Ground

Greg Restall



THE UNIVERSITY OF
MELBOURNE

DIANOIA INSTITUTE (ONLINE) SEMINAR • 5 MAY 2020 • ACU

To Download the Handout or the Slides



<http://consequently.org/presentation>

To better understand the speech acts
of *assertion* and *denial*, their
relationships to *other* speech acts,
and connections between speech acts
and logical notions, including
the Gentzen's sequent calculus.

I want to revisit some themes
(and expand on some of the claims)
from my 2005 paper
“Multiple Conclusions.”

The behaviour of two kinds of speech acts:

(1) *polar* (yes/no) *questions*,
and (2) *justification requests*.

My Plan

Assertion and Denial

Polar Questions

Positions and Rules

Justification Requests

ASSERTION AND DENIAL

Multiple Conclusions

$$X \succ Y$$

Don't *assert* each member of X
and *deny* each member of Y.

Structural Rules

$$\begin{array}{c} X, A \succ A, Y \quad Id \\ \frac{X \succ A, Y \quad X, A \succ Y}{X \succ Y} \quad Cut \end{array}$$

These rules govern assertion and denial *as such*.

Defining Rules for Logical Concepts

$$\frac{\frac{X, A, B \succ Y}{X, A \wedge B \succ Y}}{\wedge Df} \quad \frac{\frac{X \succ A, B, Y}{X \succ A \vee B, Y}}{\vee Df} \quad \frac{\frac{X \succ A, Y}{X, \neg A \succ Y}}{\neg Df} \quad \frac{\frac{X, A \succ B, Y}{X \succ A \rightarrow B, Y}}{\rightarrow Df}$$

$$\frac{\frac{X \succ A(n), Y}{X \succ \forall x A(x), Y}}{\forall Df} \quad \frac{\frac{X, A(n) \succ Y}{X, \exists x A(x) \succ Y}}{\exists Df} \quad \frac{\frac{X, Fa \succ Fb, Y \quad X, Fb \succ Fa, Y}{X \succ a = b, Y}}{=Df}$$

Terms & conditions: the singular term n (in $\forall/\exists Df$) and the predicate F (in $=Df$) do not appear below the line in those rules.

These rules can be understood as *definitions* of the concepts they introduce (below the double line).

See (Scott 1974; Došen 1980, 1989; Restall 2019).

In appealing to norms governing assertion...

... I was wading into a pre-existing literature about assertion. A *very large* literature.

Norms for Assertion

It is fruitful to think of assertion
as an act governed by *norms*.

Aim to say what is *true*!

*For **me**: Production Norms*

Aim to say what is *true*!

Only say what you *know*!

For *me*: Production Norms

Aim to say what is *true*!

Only say what you *know*!

Be prepared to *back it up* when requested!

The hearer is entitled to re-assert.

For you: Consumption Norms

The hearer is entitled to re-assert.

You can refer back to the asserter
to *vouch for* the assertion.

To assert is to bid for the content asserted
to be added to the COMMON GROUND,
the body of information that
we (together) take for granted.

Stalnaker on Common Ground

To presuppose something is to take it for granted, or at least to act as if one takes it for granted, as background information as common ground among the participants in the conversation. What is most distinctive about this propositional attitude is that it is a social or public attitude: one presupposes that ϕ only if one presupposes that others presuppose it as well.

— “Common Ground” *LEP* (2002)

What is the relationship between Assertion and Denial?

In “Multiple Conclusions”, I said
little beyond the claim that
assertion and denial are incompatible

What is the relationship between Assertion and Denial?

In “Multiple Conclusions”, I said
little beyond the claim that
assertion and denial are incompatible
(in some sense).

What is the relationship between Assertion and Denial?

In “Multiple Conclusions”, I said
little beyond the claim that
assertion and denial are incompatible
(in some sense).

This does not help distinguish
denial from *retraction*, or
from other speech acts.

Let's address this issue...

... by examining polar questions,
and their answers,
in the light of our background
interest in assertion and its norms.

POLAR QUESTIONS

Is it the case that p?

This is a distinct speech act
with its own norms.

Is it the case that p?

This is a distinct speech act
with its own norms.

It raises an *issue*.

*There are two ways to **settle** the issue*

Yes

*There are two ways to **settle** the issue*

Yes

No

*The two ways **clash***

If I say *yes* and you say *no*
to some polar question $p?$,
then we DISAGREE.

That is, we take *different* positions on p .

*The two ways **clash***

If I say *yes* and you say *no*
to some polar question *p?*,
then we DISAGREE.

That is, we take *different* positions on *p*.

There is no *shared* position
incorporating both of our answers.

Other responses don't settle the issue

Other responses, like

Other responses don't settle the issue

Other responses, like
maybe

Other responses don't settle the issue

Other responses, like

maybe · I don't know

Other responses don't settle the issue

Other responses, like

maybe · I don't know · I think so

Other responses don't settle the issue

Other responses, like

maybe · I don't know · I think so

are acceptable responses to p?,

Other responses don't settle the issue

Other responses, like

maybe · I don't know · I think so

are acceptable responses to p ?,
but they don't answer the question.

They don't settle the issue of p .

Settling answers are assertions

A *yes* or a *no* to p ? counts as an assertion.

A *yes* or a *no* to p ? counts as an assertion.

(Either answer is governed by all of the assertion norms we've seen.)

*What does a “no” to p ? **assert**?*

Presumably $\neg p$.

What does a “no” to p? assert?

Presumably $\neg p$.

However, I prefer to think of
a *yes* to p? as ruling p *in*,
and a *no* to p? as ruling p *out*.

What does a “no” to p ? *assert*?

Presumably $\neg p$.

However, I prefer to think of
a *yes* to p ? as ruling p *in*,
and a *no* to p ? as ruling p *out*.

This way, we can distinguish practices
where the *issues* are closed under negation
and those with more limited expressive resources.

What does a “no” to p ? *assert*?

Presumably $\neg p$.

However, I prefer to think of
a *yes* to p ? as ruling p *in*,
and a *no* to p ? as ruling p *out*.

This way, we can distinguish practices
where the *issues* are closed under negation
and those with more limited expressive resources.

(Nothing important *here* hangs on this distinction.)

$[X : Y]$

a pair of sets of sentences

$$[X : Y]$$

a pair of sets of sentences

- We have ruled *in* everything in X, the POSITIVE COMMON GROUND.

$$[X : Y]$$

a pair of sets of sentences

- We have ruled *in* everything in X, the POSITIVE COMMON GROUND.
- We have ruled *out* everything in Y, the NEGATIVE COMMON GROUND.

$$[X : Y]$$

a pair of sets of sentences

- We have ruled *in* everything in X, the POSITIVE COMMON GROUND.
- We have ruled *out* everything in Y, the NEGATIVE COMMON GROUND.

Think of this as part of the *conversational scoreboard*.
There are also our public *individual* commitments,
the questions under discussion, and much more.

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

ABELARD: Astralabe is in the study.

ELOISE: No, he is *either* in the
kitchen *or* the study.

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

ABELARD: Is Astralabe in the study?

ELOISE: No, he is in the kitchen.

ABELARD: Astralabe is in the study.

ELOISE: No, he is *either* in the
kitchen *or* the study.

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

ABELARD: Is Astralabe in the study?

ELOISE: No, he is in the kitchen.

ABELARD: Astralabe is in the study.

ELOISE: No, he is *either* in the kitchen *or* the study.

ABELARD: Is Astralabe in the study?

ELOISE: *No, he is *either* in the kitchen *or* the study.

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

ABELARD: Is Astralabe in the study?

ELOISE: No, he is in the kitchen.

ABELARD: Astralabe is in the study.

ELOISE: No, he is *either* in the kitchen *or* the study.

ABELARD: Is Astralabe in the study?

ELOISE: *No, he is *either* in the kitchen *or* the study.

INAPPROPRIATE

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

ABELARD: Is Astralabe in the study?

ELOISE: No, he is in the kitchen.

ABELARD: Astralabe is in the study.

ELOISE: No, he is *either* in the kitchen *or* the study.

ABELARD: Is Astralabe in the study?

ELOISE: *No, he is *either* in the kitchen *or* the study.

INAPPROPRIATE

ELOISE: Maybe. He's *either* in the kitchen *or* the study.

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

ABELARD: Is Astralabe in the study?

ELOISE: No, he is in the kitchen.

STRONG DENIAL

ABELARD: Astralabe is in the study.

ELOISE: No, he is *either* in the kitchen *or* the study.

ABELARD: Is Astralabe in the study?

ELOISE: *No, he is *either* in the kitchen *or* the study.

INAPPROPRIATE

ELOISE: Maybe. He's *either* in the kitchen *or* the study.

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

STRONG DENIAL

ABELARD: Astralabe is in the study.

ELOISE: No, he is *either* in the kitchen *or* the study.

ABELARD: Is Astralabe in the study?

ELOISE: No, he is in the kitchen.

STRONG DENIAL

ABELARD: Is Astralabe in the study?

ELOISE: *No, he is *either* in the kitchen *or* the study.

INAPPROPRIATE

ELOISE: Maybe. He's *either* in the kitchen *or* the study.

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

STRONG DENIAL

ABELARD: Astralabe is in the study.

ELOISE: No, he is *either* in the kitchen *or* the study.

ABELARD: Is Astralabe in the study?

ELOISE: No, he is in the kitchen.

STRONG DENIAL

ABELARD: Is Astralabe in the study?

ELOISE: *No, he is *either* in the kitchen *or* the study.

INAPPROPRIATE

ELOISE: Maybe. He's *either* in the kitchen *or* the study.

PARTIAL ANSWER

Denial and Retraction

ABELARD: Astralabe is in the study.

ELOISE: No, he is in the kitchen.

STRONG DENIAL

ABELARD: Astralabe is in the study.

ELOISE: No, he is *either* in the kitchen *or* the study.

WEAK DENIAL

ABELARD: Is Astralabe in the study?

ELOISE: No, he is in the kitchen.

STRONG DENIAL

ABELARD: Is Astralabe in the study?

ELOISE: *No, he is *either* in the kitchen *or* the study.

INAPPROPRIATE

ELOISE: Maybe. He's *either* in the kitchen *or* the study.

PARTIAL ANSWER

Strong and Weak Denial

- To *strongly deny* p is to bid to add p to the *negative common ground*.

Strong and Weak Denial

- To *strongly deny* p is to bid to add p to the *negative common ground*.
- To *weakly deny* p is to *block* the addition of p to the *positive common ground*, or to bid for its *retraction* if it is already there.

Strong and Weak Denial, and the Common Ground

- Strong *or* weak denials of p are appropriate responses to an assertion of p , because the assertion of p is a bid to add p to the positive common ground.

Strong and Weak Denial, and the Common Ground

- Strong *or* weak denials of p are appropriate responses to an assertion of p , because the assertion of p is a bid to add p to the positive common ground.
- A strong denial of p is one way to settle the question p ? — to settle it negatively.

Strong and Weak Denial, and the Common Ground

- Strong *or* weak denials of p are appropriate responses to an assertion of p , because the assertion of p is a bid to add p to the positive common ground.
- A strong denial of p is one way to settle the question $p?$ — to settle it negatively.
- A weak denial of p is not generally an appropriate response to the polar question $p?$, as the polar question does not place p in the positive common ground, and the question is inappropriate if p is already in the positive common ground, so there is no p to block or retract.

*Strong and Weak Denials, and Strong and Weak **Assertions***

- **STRONG DENIAL:** add to the negative common ground.

*Strong and Weak Denials, and Strong and Weak **Assertions***

- **STRONG DENIAL:** add to the negative common ground.
- **STRONG ASSERTION:** add to the positive common ground.

*Strong and Weak Denials, and Strong and Weak **Assertions***

- **STRONG DENIAL:** add to the negative common ground.
- **STRONG ASSERTION:** add to the positive common ground.
- **WEAK DENIAL:** retract (or block) from the positive common ground.

*Strong and Weak Denials, and Strong and Weak **Assertions***

- **STRONG DENIAL:** add to the negative common ground.
- **STRONG ASSERTION:** add to the positive common ground.
- **WEAK DENIAL:** retract (or block) from the positive common ground.
- **WEAK ASSERTION:** retract (or block) from the negative common ground.

*Strong and Weak Denials, and Strong and Weak **Assertions***

- **STRONG DENIAL**: add to the negative common ground.
- **STRONG ASSERTION**: add to the positive common ground.
- **WEAK DENIAL**: retract (or block) from the positive common ground.
- **WEAK ASSERTION**: retract (or block) from the negative common ground. — “Perhaps p.”

That's one way to understand the relationship
between assertion and denial, and how to
distinguish strong denial
from other negative speech acts.

One Consequence

The common ground
(what we, together, *take for granted*)
seems to be *very* finely grained.

One Consequence

The common ground
(what we, together, *take for granted*)
seems to be *very* finely grained.

*Abelard is being tutored by
Eloise in geometry. He is
reasoning about a triangle
with interior angles of 40° ,
 60° and 80° . He adds up the
angles, and notices that they
sum to 180° ...*

One Consequence

The common ground
(what we, together, *take for granted*)
seems to be *very* finely grained.

*Abelard is being tutored by
Eloise in geometry. He is
reasoning about a triangle
with interior angles of 40° ,
 60° and 80° . He adds up the
angles, and notices that they
sum to 180° ...*

ABELARD: The interior angles of
triangles add up to 180° .

One Consequence

The common ground
(what we, together, *take for granted*)
seems to be *very* finely grained.

*Abelard is being tutored by
Eloise in geometry. He is
reasoning about a triangle
with interior angles of 40° ,
 60° and 80° . He adds up the
angles, and notices that they
sum to 180° ...*

ABELARD: The interior angles of
triangles add up to 180° .

ELOISE: No. The interior angles of *this*
triangle add up to 180° . Can you prove
the general case?

One Consequence

The common ground
(what we, together, *take for granted*)
seems to be *very* finely grained.

*Abelard is being tutored by
Eloise in geometry. He is
reasoning about a triangle
with interior angles of 40° ,
 60° and 80° . He adds up the
angles, and notices that they
sum to 180° ...*

ABELARD: The interior angles of
triangles add up to 180° .

ELOISE: No. The interior angles of *this*
triangle add up to 180° . Can you prove
the general case?

Eloise here seems to block from the common ground (weakly deny)
a *logical consequence* of claims in the common ground (the axioms of geometry),
for the same kind of reason we accept for other weak denials.

This would be impossible if the common ground was simply a set of worlds.

Logical Consequence and Strong or Weak Denial

If $X \succ Y$ is derivable,
then it's out of bounds
to *strongly assert* each member of X
and *strongly deny* each member of Y .

Logical Consequence and Strong or Weak Denial

If $X \succ Y$ is derivable,
then it's out of bounds
to *strongly assert* each member of X
and *strongly deny* each member of Y .

But this example shows that
it *need not* be out of bounds to
strongly assert each member of X
and *weakly deny* each member of Y .

Any position $[X, A : A, Y]$
in which A has been
strongly asserted and
strongly denied,
is out of bounds.

Any position $[X, A : A, Y]$
in which A has been
strongly asserted and
strongly denied,
is out of bounds.

$$X, A \succ A, Y$$

Any position $[X, A : A, Y]$
in which A has been
strongly asserted and
strongly denied,
is out of bounds.

$$X, A \succ A, Y$$

If $X \succ Y$ is not derivable then $[X : Y]$ is *available*.

*A Word on **Cut***

$$\frac{X \succ A, Y \quad X, A \succ Y}{X \succ Y} \textit{Cut}$$

*A Word on **Cut***

$$\frac{X \succ A, Y \quad X, A \succ Y}{X \succ Y} \textit{Cut}$$

In any available position $[X : Y]$, if one way to settle $A?$ is *not* available, then the other way to settle it *is* available.

*A Word on **Cut***

$$\frac{X \succ A, Y \quad X, A \succ Y}{X \succ Y} \textit{Cut}$$

In any available position $[X : Y]$, if one way to settle $A?$ is *not* available, then the other way to settle it *is* available.

(After all, isn't the issue $A?$ thereby *implicitly* settled by $[X : Y]?$)

POSITIONS AND RULES

Defining Rules

$$\frac{X, A, B \succ Y}{X, A \wedge B \succ Y} \wedge Df$$

$$\frac{X \succ A, B, Y}{X \succ A \vee B, Y} \vee Df$$

$$\frac{X \succ A, Y}{X, \neg A \succ Y} \neg Df$$

$$\frac{X, A \succ B, Y}{X \succ A \rightarrow B, Y} \rightarrow Df$$

Defining Rules

$$\frac{X, A, B \succ Y}{X, A \wedge B \succ Y} \wedge Df$$

$$\frac{X \succ A, B, Y}{X \succ A \vee B, Y} \vee Df$$

$$\frac{X \succ A, Y}{X, \neg A \succ Y} \neg Df$$

$$\frac{X, A \succ B, Y}{X \succ A \rightarrow B, Y} \rightarrow Df$$

These are kinds of *definitions*, showing how to treat assertions or denials of the *defined* concept in terms of the assertions or denials of their components.

Derivations

$$\frac{\neg p \succ \neg p}{\succ p, \neg p} \neg Df$$
$$\frac{\succ p, \neg p}{\succ p \vee \neg p} \vee Df$$

Derivations

$$\frac{\neg p \succ \neg p}{\succ p, \neg p} \neg Df$$
$$\frac{\succ p, \neg p}{\succ p \vee \neg p} \vee Df$$

$$\frac{p \succ p}{p, \neg p \succ} \neg Df$$
$$\frac{p, \neg p \succ}{p \wedge \neg p \succ} \wedge Df$$

Derivations

$$\begin{array}{c} \neg p \succ \neg p \\ \hline \succ p, \neg p \quad \neg Df \\ \hline \succ p \vee \neg p \quad \vee Df \end{array} \qquad \begin{array}{c} p \succ p \\ \hline \succ p, \neg p \succ \quad \neg Df \\ \hline p \wedge \neg p \succ \quad \wedge Df \end{array}$$

$$\begin{array}{c} \frac{p, q \vee r \succ p \wedge q, q \vee r}{p, q \vee r \succ p \wedge q, r, q} \vee Df \qquad \frac{p \wedge q, q \vee r \succ p \wedge q, r}{q, p, q \vee r \succ p \wedge q, r} \wedge Df \\ \hline \qquad \qquad \qquad \frac{p, q \vee r \succ p \wedge q, r}{p, q \vee r \succ (p \wedge q) \vee r} \vee Df \\ \hline \qquad \qquad \qquad \frac{p, q \vee r \succ (p \wedge q) \vee r}{p \wedge (q \vee r) \succ (p \wedge q) \vee r} \wedge Df \end{array} \quad \text{Cut}$$

*Sequent Derivations aren't exactly **Proofs***

- They don't have the same *shape* as proofs.

*Sequent Derivations aren't exactly **Proofs***

- They don't have the same *shape* as proofs.
- (Where is the *conclusion* in $p \vee q \succ p, q$?)

*Sequent Derivations aren't exactly **Proofs***

- They don't have the same *shape* as proofs.
- (Where is the *conclusion* in $p \vee q \succ p, q$?)
- A endsequent $X \succ A$ doesn't tell you to *infer A from X* — it merely tells you to not assert all members of X and deny A.

Let's make this problem *sharp*

“Well, now, let's take a little bit of the argument in that First Proposition—just *two* steps, and the conclusion drawn from them. Kindly enter them in your note-book. And in order to refer to them conveniently, let's call them *A*, *B*, and *Z*:—

(*A*) Things that are equal to the same are equal to each other.

(*B*) The two sides of this Triangle are things that are equal to the same.

(*Z*) The two sides of this Triangle are equal to each other.

Readers of Euclid will grant, I suppose, that *Z* follows logically from *A* and *B*, so that any one who accepts *A* and *B* as true, *must* accept *Z* as true?”

“Undoubtedly! The youngest child in a High School—as soon as High Schools are invented, which will not be till some two thousand years later—will grant *that*.”

“And if some reader had *not* yet accepted *A* and *B* as true, he might still accept the *sequence* as a *valid* one, I suppose?”

Let's make this problem *sharp*

“Well, now, let's take a little bit of the argument in that First Proposition—just *two* steps, and the conclusion drawn from them. Kindly enter them in your note-book. And in order to refer to them conveniently, let's call them *A*, *B*, and *Z* :—

(*A*) Things that are equal to the same are equal to each other.

(*B*) The two sides of this Triangle are things that are equal to the same.

(*Z*) The two sides of this Triangle are equal to each other.

Readers of Euclid will grant, I suppose, that *Z* follows logically from *A* and *B*, so that any one who accepts *A* and *B* as true, *must* accept *Z* as true?”

“Undoubtedly! The youngest child in a High School—as soon as High Schools are invented, which will not be till some two thousand years later—will grant *that*.”

“And if some reader had *not* yet accepted *A* and *B* as true, he might still accept the *sequence* as a *valid* one, I suppose?”

The Tortoise never asserts *A* and $A \rightarrow Z$ while denying *Z*,
but he doesn't accept *A* and $A \rightarrow Z$ as a *reason* for *Z*.

JUSTIFICATION REQUESTS

What is a justification request?

ABELARD: Astralabe is in the kitchen.

ELOISE: *Really?*

ABELARD: I saw him there five minutes ago.

ELOISE: OK.

What is a justification request?

ABELARD: Astralabe is in the kitchen.

ELOISE: *Really?*

ABELARD: I saw him there five minutes ago.

ELOISE: OK.

ABELARD: Astralabe is in the kitchen.

ELOISE: *Really?*

ABELARD: I saw him there five minutes ago.

ELOISE: *Are you sure?* He's been in the study with me for the last half hour.

What is a justification request?

ABELARD: Astralabe is in the kitchen.

ELOISE: *Really?*

ABELARD: I saw him there five minutes ago.

ELOISE: OK.

ABELARD: Astralabe is in the kitchen.

ELOISE: *Really?*

ABELARD: I saw him there five minutes ago.

ELOISE: *Are you sure?* He's been in the study with me for the last half hour.

ABELARD: Astralabe is in the kitchen.

ELOISE: *Really?*

ABELARD: I saw him there five minutes ago.

ELOISE: Yes, but he was in the study two minutes ago.

We should *expect* the need for justification requests
given the commitments and entitlements
involved in assertion.

Justification Requests and Norms for Assertion

We should *expect* the need for justification requests
given the commitments and entitlements
involved in assertion.

If I give you permission to
ask *me* to vouch for my assertion
you should to be able to call me on it.

Justification Requests and Norms for Assertion

We should *expect* the need for justification requests
given the commitments and entitlements
involved in assertion.

If I give you permission to
ask *me* to vouch for my assertion
you should to be able to call me on it.

That's a JUSTIFICATION REQUEST.

What is a justification request?

A justification request for a strong assertion [or strong denial] is an attempt to block the addition to the common ground, until a *reason* is given.

What is a justification request?

A justification request for a strong assertion [or strong denial] is an attempt to block the addition to the common ground, until a *reason* is given.

This reason is another assertion [or denial] which must be *granted*, (added to the common ground) in order for the request to be met.

What is a justification request?

A justification request for a strong assertion [or strong denial] is an attempt to block the addition to the common ground, until a *reason* is given.

This reason is another assertion [or denial] which must be *granted*, (added to the common ground) in order for the request to be met.

Granting the given reason is *necessary* but not *sufficient* for satisfying the justification request.

Definitions and Justification Requests

ACHILLES So ... this is an *equilateral* triangle.

TORTOISE I'm sorry, I don't follow, my heroic friend. I've not heard that word before: what does '*equilateral*' mean?

ACHILLES Oh, that's easy to explain. '*Equilateral*' means having sides of the same length. An *equilateral* triangle is a triangle with all three sides the same length.

TORTOISE OK. That sounds good. You may continue with your reasoning.

ACHILLES Well, as I was saying, the sides of this triangle are all one cubit in length, so it is an equilateral triangle.

TORTOISE Perhaps you will forgive me, Achilles, but I still don't follow. I grant to you that the sides of this triangle all have the same length. I fail to see, however, that it *follows* that it is an equilateral triangle. Could you explain why it is?

Definitions and Justification Requests

If I accept the definition $A =_{df} B$,
then I should accept granting A as meeting
a justification request for the assertion of B
and ruling out A as meeting a justification
request for B 's denial and *vice versa*.

A failure to accept this is a sign
that I have not mastered the definition.

What goes for a definition of the form $A =_{df} B$
can also go for *defining rules*:

$$\frac{X, A, B \succ Y}{X, A \wedge B, \succ Y} \wedge Df$$

What goes for a definition of the form $A =_{df} B$
can also go for *defining rules*:

$$\frac{X, A, B \succ Y}{X, A \wedge B, \succ Y} \wedge Df$$

It is a mistake to grant A and grant B
and to look for something more to discharge
a justification request for an assertion of $A \wedge B$,
if you take $\wedge Df$ as a *definition*.

Justification Requests and Defining Rules

$$\frac{X, A \succ B, Y}{X \succ A \rightarrow B, Y} \rightarrow^{Df}$$

Justification Requests and Defining Rules

$$\frac{X, A \succ B, Y}{X \succ A \rightarrow B, Y} \rightarrow Df$$

It is a mistake to rule A in and rule B out
and to look for something more to discharge
a justification request for a denial of $A \rightarrow B$
if you accept $\rightarrow Df$ as a definition.

Justification Requests, Defining Rules and Derivations

A little more work is required to show why granting A and $A \rightarrow Z$ is enough to meet a justification request for Z 's assertion.

Justification Requests, Defining Rules and Derivations

A *little* more work is required to show why granting A and $A \rightarrow Z$ is enough to meet a justification request for Z 's assertion.

Consider this *focussed* derivation:

$$\frac{A \rightarrow Z \succ A \rightarrow Z}{A \rightarrow Z, A \succ Z} \rightarrow Df$$

- Read the *premise* as telling us that in a position in which $A \rightarrow Z$ is already ruled in, we have an answer to the justification request for $A \rightarrow Z$'s assertion.

Justification Requests, Defining Rules and Derivations

A *little* more work is required to show why granting A and $A \rightarrow Z$ is enough to meet a justification request for Z 's assertion.

Consider this *focussed* derivation:

$$\frac{A \rightarrow Z \succ A \rightarrow Z}{A \rightarrow Z, A \succ Z} \rightarrow Df$$

- Read the *premise* as telling us that in a position in which $A \rightarrow Z$ is already ruled in, we have an answer to the justification request for $A \rightarrow Z$'s assertion.
- Then applying $\rightarrow Df$ we see why we have an answer to the request concerning Z 's assertion, in a context in which $A \rightarrow Z$ and A have both been ruled in. (In granting $A \rightarrow Z$ and A we have settled Z positively. Its denial is ruled out, since to assert A and deny Z amounts to denying $A \rightarrow Z$.)

Focussed Derivations and Justification Requests

SLOGAN: A *derivation* of $X \succ A$, Y shows us how to meet a justification request for the assertion of A in any available position extending $[X : Y]$.

SLOGAN: A *derivation* of $X \succ A$, Y shows us how to meet a justification request for the assertion of A in any available position extending $[X : Y]$.

A derivation of X , $A \succ Y$ shows us how to meet a justification request for the denial of A in any available position extending $[X : Y]$.

SLOGAN: A *derivation* of $X \succ A$, Y shows us how to meet a justification request for the assertion of A in any available position extending $[X : Y]$.

A derivation of X , $A \succ Y$ shows us how to meet a justification request for the denial of A in any available position extending $[X : Y]$.

(Note: it's the *derivation* that shows how to meet the justification request, not the mere validity of the sequent.)

Focussed Structural Rules

$$X, A \succ \boxed{A}, Y \quad X, \boxed{A} \succ A, Y$$

Focussed Structural Rules

$X, A \succ \boxed{A}, Y$ $X, \boxed{A} \succ A, Y$

$X, A \succ A, \boxed{B}, Y$ $X, A, \boxed{B} \succ A, Y$

Focussed Structural Rules

$$X, A \succ \boxed{A}, Y \qquad X, \boxed{A} \succ A, Y$$

$$X, A \succ A, \boxed{B}, Y \qquad X, A, \boxed{B} \succ A, Y$$

$$\frac{X \succ \boxed{A}, Y \quad X, A \succ \boxed{B}, Y}{X \succ \boxed{B}, Y} \textit{Cut}$$

$$\frac{X \succ \boxed{A}, Y \quad X, A, \boxed{B} \succ Y}{X, \boxed{B} \succ Y} \textit{Cut}$$

Focussed Structural Rules

$$X, A \succ \boxed{A}, Y \qquad X, \boxed{A} \succ A, Y$$

$$X, A \succ A, \boxed{B}, Y \qquad X, A, \boxed{B} \succ A, Y$$

$$\frac{X \succ \boxed{A}, Y \quad X, A \succ \boxed{B}, Y}{X \succ \boxed{B}, Y} \textit{Cut}$$

$$\frac{X \succ \boxed{A}, Y \quad X, A, \boxed{B} \succ Y}{X, \boxed{B} \succ Y} \textit{Cut}$$

$$\frac{X, A, \boxed{A} \succ Y}{X, \boxed{A} \succ Y} \textit{W}$$

$$\frac{X \succ A, \boxed{A}, Y}{X \succ \boxed{A}, Y} \textit{W}$$

Swap

$$\frac{\frac{X \succ A, B, Y \quad X, A \succ A, B, Y}{X \succ A, B, B, Y} \text{Cut}}{X \succ A, B, Y} W$$

Swap

$$\frac{X \succ \boxed{A}, B, Y \quad X, A \succ A, \boxed{B}, Y}{X \succ A, B, \boxed{B}, Y} \text{Cut}$$
$$\frac{X \succ A, B, \boxed{B}, Y}{X \succ A, \boxed{B}, Y} W$$

$$\frac{X \succ \boxed{A}, B, Y}{X \succ A, \boxed{B}, Y} \text{Swap}$$

Focussed Defining Rules

$$\frac{X, A, B \succ Y}{X, A \wedge B \succ Y} \wedge Df$$

$$\frac{X, A, B \succ Y}{X, A \wedge B \succ Y} \wedge Df$$

$$\frac{X \succ A, B, Y}{X \succ A \vee B, Y} \vee Df$$

$$\frac{X \succ A, B, Y}{X \succ A \vee B, Y} \vee Df$$

$$\frac{X \succ A, Y}{X, \neg A \succ Y} \neg Df$$

$$\frac{X, A \succ B, Y}{X \succ A \rightarrow B, Y} \rightarrow Df$$

$$\frac{X, A \succ B, Y}{X \succ A \rightarrow B, Y} \rightarrow Df$$

Proof and Supposition

$$\frac{X, A \succ B, Y}{X \succ A \rightarrow B, Y} \rightarrow Df \qquad \frac{X, A \succ B, Y}{X \succ A \rightarrow B, Y} \rightarrow Df$$

To prove $A \rightarrow B$, *rule A in* (suppose it) and prove B.

Or, *rule B out* (suppose it), and refute A.

A Focussed Derivation

$$\begin{array}{c}
 \frac{p \succ p, q}{p \succ p, p \rightarrow q} \rightarrow Df \quad \frac{(p \rightarrow q) \rightarrow p \succ (p \rightarrow q) \rightarrow p}{(p \rightarrow q) \rightarrow p, p \rightarrow q \succ p} \rightarrow Df \\
 \hline
 \frac{ \quad (p \rightarrow q) \rightarrow p, p \rightarrow q \succ p}{(p \rightarrow q) \rightarrow p \succ p, p} \text{Cut} \\
 \hline
 \frac{(p \rightarrow q) \rightarrow p \succ p, p}{(p \rightarrow q) \rightarrow p \succ p} W \\
 \hline
 \frac{(p \rightarrow q) \rightarrow p \succ p}{p \succ ((p \rightarrow q) \rightarrow p) \rightarrow p} \rightarrow Df
 \end{array}$$

This can be represented as a *dialogue*,
 meeting a justification request for
 an assertion of $((p \rightarrow q) \rightarrow p) \rightarrow p$.

A Focussed Derivation

$$\begin{array}{c}
 \frac{p \succ p, q}{\succ p, p \rightarrow q} \rightarrow Df \quad \frac{(p \rightarrow q) \rightarrow p \succ (p \rightarrow q) \rightarrow p}{(p \rightarrow q) \rightarrow p, p \rightarrow q \succ p} \rightarrow Df \\
 \hline
 \frac{\quad}{(p \rightarrow q) \rightarrow p \succ p, p} \text{Cut} \\
 \frac{\quad}{(p \rightarrow q) \rightarrow p \succ p} W \\
 \frac{\quad}{\succ ((p \rightarrow q) \rightarrow p) \rightarrow p} \rightarrow Df
 \end{array}$$

This can be represented as a *dialogue*,
 meeting a justification request for
 an assertion of $((p \rightarrow q) \rightarrow p) \rightarrow p$.

(See the handout for a bad rendering of how such a dialogue could go.)

Answers!

Now we have answers to those concerns about the sequent calculus.

Answers!

Now we have answers to those concerns about the sequent calculus.

- If we understand a *conclusion* of a *proof* as a formula requiring a justification request, and the proof as the procedure meeting that request, we can see why this kind of conclusion is *single*.

Answers!

Now we have answers to those concerns about the sequent calculus.

- If we understand a *conclusion* of a *proof* as a formula requiring a justification request, and the proof as the procedure meeting that request, we can see why this kind of conclusion is *single*.

Answers!

Now we have answers to those concerns about the sequent calculus.

- If we understand a *conclusion* of a *proof* as a formula requiring a justification request, and the proof as the procedure meeting that request, we can see why this kind of conclusion is *single*.
- However, since both assertions and denials can be the target of a justification request, this single conclusion can occur in the *right* or the *left* of a sequent.

Answers!

Now we have answers to those concerns about the sequent calculus.

- If we understand a *conclusion* of a *proof* as a formula requiring a justification request, and the proof as the procedure meeting that request, we can see why this kind of conclusion is *single*.
- However, since both assertions and denials can be the target of a justification request, this single conclusion can occur in the *right* or the *left* of a sequent.
- Since the common ground from which the request is met can contain assertions and denials, we derive sequents of the form $X \succ A, Y$ and $X, A \succ Y$.

Answers!

Now we have answers to those concerns about the sequent calculus.

- If we understand a *conclusion* of a *proof* as a formula requiring a justification request, and the proof as the procedure meeting that request, we can see why this kind of conclusion is *single*.
- However, since both assertions and denials can be the target of a justification request, this single conclusion can occur in the *right* or the *left* of a sequent.
- Since the common ground from which the request is met can contain assertions and denials, we derive sequents of the form $X \succ A, Y$ and $X, A \succ Y$.
- The making of an *inference* is a (possibly preemptive) answer to a justification request.

Answers!

Now we have answers to those concerns about the sequent calculus.

- If we understand a *conclusion* of a *proof* as a formula requiring a justification request, and the proof as the procedure meeting that request, we can see why this kind of conclusion is *single*.
- However, since both assertions and denials can be the target of a justification request, this single conclusion can occur in the *right* or the *left* of a sequent.
- Since the common ground from which the request is met can contain assertions and denials, we derive sequents of the form $X \succ A, Y$ and $X, A \succ Y$.
- The making of an *inference* is a (possibly preemptive) answer to a justification request.
- A derivation of a sequent $X \succ A, Y$ [$X, A \succ Y$] can be transformed into a *procedure* for meeting a justification request for an assertion of A [denial of A] in any available position, appealing only what is granted in $[X : Y]$, and to the defining rules used in that derivation.

The value of derivations

- The bounds, by themselves, can transcend our grasp.

The value of derivations

- The bounds, by themselves, can transcend our grasp.
- Is $[PA : GC]$ out of bounds? Who knows?

The value of derivations

- The bounds, by themselves, can transcend our grasp.
- Is $[PA : GC]$ out of bounds? Who knows?
- Derivations are one way we can *grasp* complex bounds and *enforce* them.

The value of derivations

- The bounds, by themselves, can transcend our grasp.
- Is $[PA : GC]$ out of bounds? Who knows?
- Derivations are one way we can *grasp* complex bounds and *enforce* them.
- The *negative* view of the bounds is seen in the clash between assertion and denial, and the *positive* view is found in the answers we can give to justification requests.

The value of derivations

- The bounds, by themselves, can transcend our grasp.
- Is [PA : GC] out of bounds? Who knows?
- Derivations are one way we can *grasp* complex bounds and *enforce* them.
- The *negative* view of the bounds is seen in the clash between assertion and denial, and the *positive* view is found in the answers we can give to justification requests.
- Adopting *defining rules* is one way to be *very* precise about the norms governing the concepts so defined, combining *safety*, *univocity* and *expressive power*.

THANK YOU!

[http://consequently.org/presentation/2020/
assertion-denial-qa-common-ground-acu](http://consequently.org/presentation/2020/assertion-denial-qa-common-ground-acu)