

Symbolic Logic — Validity, Soundness, and the Anatomy of a Bad Argument

Part I: Key Symbolic Logic Notation

Concept	Symbol	Notes
All	$\forall$	Universal quantifier — "for all x"
Some / There exists	$\exists$	Existential quantifier — "there exists an x"
The set of	$\{ x \mid Sx \}$	"The set of all x such that x is S"
Is / are (element of)	$\in$	"is a member of"
Is not / are not	$\notin$	Negation of elementhood
Not	$\neg$	Negation
And	$\wedge$	Conjunction
Or	$\vee$	Disjunction
If...then	$\rightarrow$	Implication / Conditional
Therefore / Hence	$\therefore$	Conclusion marker
Entails / yields	$\models$	Semantic entailment

Part II: Formalising Propositions

Let the predicates be:

- **Tx** — x is transgender
- **Mx** — x is mentally ill
- **Wx** — x is a woman
- **Fx** — x is female (biologically)
- **Mx_man** — x is a man
- **Sx** — x is a man (male)
- **Ps** — s is a women’s single-sex space
- **Wsy** — x enters y
- **Wy** — x does wrong

English	Formalisation
All transgender people are mentally ill	$\forall x (Tx \rightarrow Mx)$
All transgender women are men	$\forall x (Tx \wedge Wx \rightarrow Mx_man)$
Men entering women's spaces is wrong	$\forall x \forall y (Sx \wedge Wy \wedge Ps(y) \wedge Wsy(x,y) \rightarrow Wy(x))$
Mentally ill men should not enter women's spaces	$\forall x \forall y ((Mx_man \wedge Mx) \wedge Ps(y) \wedge Wsy(x,y) \rightarrow Wy(x))$
Therefore: transgender women should not enter women's spaces	$\forall x \forall y ((Tx \wedge Wx) \wedge Ps(y) \wedge Wsy(x,y) \rightarrow Wy(x))$

Part III: The Argument in Standard Form

Premise 1: $\forall x (Tx \rightarrow Mx)$

All transgender people are mentally ill.

Premise 2: $\forall x (Tx \wedge Wx \rightarrow Mx_man)$

All transgender women are men.

Premise 3: $\forall x \forall y ((Sx \wedge Ps(y) \wedge Wsy(x,y)) \rightarrow Wy(x))$

Any man who enters a women's single-sex space does wrong.

Premise 4: $\forall x \forall y (((Mx_man \wedge Mx) \wedge Ps(y) \wedge Wsy(x,y)) \rightarrow Wy(x))$

Any mentally ill man who enters a women's single-sex space does wrong.

Conclusion: $\forall x \forall y ((Tx \wedge Wx) \wedge Ps(y) \wedge Wsy(x,y) \rightarrow Wy(x))$

Any transgender woman who enters a women's single-sex space does wrong.

Part IV: Testing Validity

An argument is **valid** if and only if: if all premises are true, the conclusion **must** be true. It is the form of the argument that determines validity — not the truth of the premises.

Derivation:

- From **P1** and **P2**:
 $\forall x (Tx \rightarrow Mx)$ and $\forall x (Tx \wedge Wx \rightarrow Mx_man)$
 We can combine these: $\forall x ((Tx \wedge Wx) \rightarrow (Mx \wedge Mx_man))$
- From the combined result and **P4**:
 Anything that is both mentally ill AND a man, entering a women's space, does wrong.
 So: $\forall x \forall y (((Tx \wedge Wx) \wedge Mx \wedge Mx_man \wedge Ps(y) \wedge Wsy(x,y)) \rightarrow Wy(x))$
- From **P3**: Any man entering a women's space does wrong — this already covers the ground without needing the mental illness premise. Adding P4 adds nothing logically new to the transgender woman case.
- Therefore: **the conclusion follows necessarily from the premises.**
 The argument form is **valid**.

This is the uncomfortable truth Bea wants to face squarely: **the reasoning is valid**. The logical structure is coherent. If you accept all four premises, you *must* accept the conclusion.

Part V: Testing Soundness — and Where the Argument Collapses

An argument is **sound** if and only if: it is **valid AND all premises are actually true**.

We have established validity. Now we test each premise against reality:

P1: $\forall x (Tx \rightarrow Mx)$ — "All transgender people are mentally ill."

This is FALSE.

The World Health Organization removed transgender identity from the ICD-11 list of mental disorders in 2019. Major professional bodies including the American Psychological Association, the Royal College of Psychiatrists, and the NHS concur: gender dysphoria is a medical condition (where clinically relevant), but *being transgender is not a mental illness*.

Furthermore, the premise commits a category error: conflating a state of being with a clinical diagnosis. Being left-handed is not a mental illness. Being tall is not a mental illness. Being transgender is not a mental illness.

Verdict: P1 is factually false.

P2: $\forall x (Tx \wedge Wx \rightarrow Mx_man)$ — "All transgender women are men."

This is FALSE.

This premise is not merely false — it is definitionally contested. The argument *assumes* that transgender women are men as a foundational axiom. But this is precisely what is at issue. A transgender woman is a woman. Her gender identity is female. She is not a "man who identifies as a woman" in any meaningful sense beyond the circular: "she is a man because she was assigned male at birth, and I define her that way."

The premise begs the question — it assumes what it needs to prove. It treats social/legal categorization (what the state or society calls her) as ontologically decisive, overriding self-identification.

Verdict: P2 is factually and philosophically false.

P3: $\forall x \forall y ((Sx \wedge Ps(y) \wedge Wsy(x,y)) \rightarrow Wy(x))$ — "Men entering women's spaces is wrong."

This is question-begging.

The premise assumes that "manhood" is the operative criterion for exclusion from women's spaces. But why should biological sex alone determine access to a space? The argument has not established *why* men (as opposed to others) should not enter. It simply asserts it.

Moreover, if P2 is false — if transgender women are women, not men — then this premise does not even apply to them.

Verdict: P3 is question-begging and incomplete.

P4: $\forall x \forall y (((Mx_man \wedge Mx) \wedge Ps(y) \wedge Wsy(x,y)) \rightarrow Wy(x))$ —

"Mentally ill men should not enter women's spaces."

This is discriminatory.

This premise endorses exclusion of mentally ill people from public spaces on the basis of mental illness alone. This is a principle that would also exclude people with depression, anxiety, bipolar disorder, or any other mental health condition — which, by the way, encompasses a substantial proportion of the population at some point in their lives.

It is also worth noting the logical sleight of hand: P1 has already been used to classify transgender people as mentally ill. P4 then uses that classification to justify exclusion. This is circular reasoning combined with discrimination.

Verdict: P4 is discriminatory and logically derivative of a false premise.

Part VI: The Verdict

	Validity	Truth of Premises	Soundness
The argument	✓ Valid	✗ All premises are false	✗ Unsound

The argument has null truth value — not because the logic is broken, but because every premise collapses under scrutiny.

This is precisely what Bea identified: **the structure of the proposition is valid, but the truth value is null** — because the premises are not merely unproven, they are demonstrably false.

Part VII: The Hidden Trick — Question-Begging and Category Confusion

The argument's real flaw is not just false premises. It is a **compound question-begging syllogism**:

1. It defines transgender women as men (P2) — which is the very point in dispute.
2. It uses that definition to construct a class ("mentally ill men") from which transgender women are to be excluded (P1 + P2).
3. It then uses the exclusion of that manufactured class as grounds for the conclusion.

This is a sophisticated-seeming but logically fallacious move: **define your opponent out of existence, then claim victory.**

Summary

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Validity concerns whether the conclusion follows from the premises.

Soundness concerns whether the premises are actually true.

*An argument can be valid but entirely without truth value if its premises are false.
The argument above is valid. But every premise is false. Therefore: **null truth value.***

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