

Agnostic Language Bias

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In this paper I show that Agnosticism of any kind has a language bias that can not use excluded middle and the Sesh axiom at the same time. It is fine to use either, but not both.

In the debate about Theism vs Atheism vs Agnosticism, I came across a discussion where a person used sets to clarify the positions why Atheism is distinct from Agnosticism^[1]:

- Theist: Anyone who believes it is more probable than not that a deity exists.
- Atheist: Anyone who is not in the set “theist”.
- Gnostic: Anyone who makes the positive claim that a deity does or does not exist.
- Agnostic: Anyone who is not in the set “gnostic”.

The problem is that Agnostics might agree with the proposition that a deity either exists or does not exists, given that the deity is well defined. The argument is clear for a debate, but formally I think it is ambiguous and upon exploring what this meant in logic, I came up with the following proof:

| | | |
|---|--|-----------------------|
| ∴ | $\neg(\text{Theism}^{\wedge}\text{true}) \ \& \ \neg(\text{false}^{\wedge}\text{Theism})$ | |
| ∴ | $\neg!(\text{Theism}^{\wedge}\text{true}) \ \& \ \neg(\text{false}^{\wedge}\text{Theism})$ | using Sesh |
| ∴ | $\neg(\text{false}^{\wedge}\text{Theism}) \ \& \ \neg(\text{false}^{\wedge}\text{Theism})$ | using excluded middle |
| ∴ | false | |

The result is that Agnosticism has a language bias built into it that can not allow use of excluded middle and the Sesh axiom at the same time.

The excluded middle is an axiom, which in HOOO EP^[2] is written as following:

$$(a \mid !a)^{\wedge}\text{true} \quad \text{for all } `a`$$

The Sesh axiom in HOOO EP (for more information, see “Overview of Path Semantical Logics”^[3]):

$$(!\sim a == \sim !a)^{\wedge}\text{true} \quad \text{for all } `a`$$

Most logicians know that when excluded middle is added to constructive logic, one gets classical logic. However, the Sesh axiom is much more mysterious. Here, the easiest way to think of it is that if you have some proposition $`a`$, there is a proposition $\sim`a`$ that hold all information about some set of people who believe $`a`$. We do not know in detail what the proposition $\sim`a`$ implies, but neither do we care as long we can prove the theorems we need to make progress.

The following is a tautology in HOOO EP: $(a \mid !a)^{\wedge}\text{true} \rightarrow (!a^{\wedge}\text{true}) == \text{false}^{\wedge}a)^{\wedge}\text{true} \quad \text{for all } `a`$
For proof, see Lemma 1 in Appendix A. It means, under excluded middle one can get tautological equality, which is needed for substituting the argument of the path semantical qubit operator $\sim`$.
Therefore, $\sim!(a^{\wedge}\text{true})`$ becomes $\sim\text{false}^{\wedge}a`$.

The Sesh axiom tells us that when we negate the proposition $\sim`a`$ to $!\sim`a`$, which might be thought of as inverting the set of people who believe $`a`$, this set is equal to a second set of people. This second set of people are those who believe $!\`a`$, described as $\sim!\`a`$. In standard Path Semantics, the Sesh axiom is assumed, so this means that Agnosticism in standard Path Semantics is constructive.

References:

- [1] “Comment on clarified definitions of Theism vs Atheism vs Agnosticism”
https://old.reddit.com/r/DebateAnAtheist/comments/1fdnsd4/new_atheist_epistemology/lmhkb3l/
- [2] “Hooo”
AdvancedResearch – Propositional logic with exponentials
<https://github.com/advancedresearch/hooo>
- [3] “Overview of Path Semantical Logics”
Sven Nilsen, 2024
https://github.com/advancedresearch/path_semantics/blob/master/papers-wip2/overview-of-path-semantical-logics.pdf

Appendix A:

```
fn lemma_1 : (a | !a)^true -> !(a^true) == false^a ^true {
  use std::pow_transitivity;
  use std::tauto_hooo_or;

  x : (a | !a)^true;

  fn f1 : a^true | (!a)^true -> !(a^true) == false^a {
    use std::imply_lift;
    use std::refl;
    use std::tauto_not_to_para;
    use std::triv;

    x : a^true | (!a)^true;

    lam f : !(a^true) => false^a {

      y : !(a^true);

      lam f : a^true => false^a {
        z : a^true;
        let z2 = y(z) : false;
        let r = match z2 : false^a;
        return r;
      }
      lam g : (!a)^true => false^a {
        z : (!a)^true;
        let r = tauto_not_to_para(z) : false^a;
        return r;
      }
      let r = match x (f, g) : false^a;
      return r;
    }
    lam g : false^a => !(a^true) {
      y : false^a;

      lam f : a^true => !(a^true) {
        z : a^true;
        let z2 = triv(z) : a;
        let z3 = y(z2) : false;
        let r = match z3 : !(a^true);
        return r;
      }
      lam g : !(a^true) {
        z : a^true;
        let z2 = triv(z) : a;
        let r = y(z2) : false;
        return r;
      }
      let g2 = imply_lift(g) : (!a)^true => !(a^true);
      let r = match x (f, g2) : !(a^true);
      return r;
    }
    let r = refl(f, g) : !(a^true) == false^a;
    return r;
  }

  let x2 = tauto_hooo_or(x) : (a^true | (!a)^true)^true;
  let r = pow_transitivity(x2, f1) : !(a^true) == false^a ^true;
  return r;
}
```

```

fn lemma_2 : (a | !a)^true -> (a^true == a)^true {
  use std::pow_transitivity;
  use std::tauto_hooo_or;

  x : (a | !a)^true;

  fn f : (a^true | (!a)^true) -> (a^true == a) {
    use std::imply_lift;
    use std::refl;
    use std::triv;

    y : a^true | (!a)^true;

    lam f : a^true => (a^true == a) {
      z : a^true;
      let z2 = triv(z) : a;
      let f = imply_lift(z2) : a^true => a;
      let g = imply_lift(z) : a => a^true;
      let r = refl(f, g) : a^true == a;
      return r;
    }
    lam g : (!a)^true => (a^true == a) {
      z : (!a)^true;
      lam f : a^true => a {
        z2 : a^true;
        let r = triv(z2) : a;
        return r;
      }
      lam g : a => a^true {
        z2 : a;
        let z3 = triv(z) : !a;
        let z4 = z3(z2) : false;
        let r = match z4 : a^true;
        return r;
      }
      let r = refl(f, g) : a^true == a;
      return r;
    }
    let r = match y (f, g) : a^true == a;
    return r;
  }

  let x2 = tauto_hooo_or(x) : (a^true | (!a)^true)^true;
  let r = pow_transitivity(x2, f) : (a^true == a)^true;
  return r;
}

```

Appendix B

Under the excluded middle, there are only Theists and Atheists.
The Gnostic or Agnostic bias goes away.
Gnostic Theist becomes equal to Agnostic Theist.
Gnostic Atheist becomes equal to Agnostic Atheist.
However, this does not imply that Agnosticism is absurd.

One can prove this using the following theorem (for proof, see Lemma 2 in Appendix A):

$$(a \mid !a)^{\text{true}} \rightarrow (a^{\text{true}} == a)^{\text{true}} \quad \text{for all `a`}$$

Gnosticism $\sim(\text{Theism}^{\text{true}}) \mid \sim(\text{false}^{\text{Theism}})$

Agnosticism $!\sim(\text{Theism}^{\text{true}}) \ \& \ !\sim(\text{false}^{\text{Theism}})$

This is the same as $\sim!(\sim(\text{Theism}^{\text{true}}) \mid \sim(\text{false}^{\text{Theism}}))$.

Under excluded middle and the Sesh axiom, Agnosticism becomes absurd.

Gnostic Theist $\sim(\text{Theism}^{\text{true}})$

Gnostic Atheist $\sim(\text{false}^{\text{Theism}})$

This is the same as $\sim((!\text{Theism})^{\text{true}})$.

One can prove that under excluded middle and the Sesh axiom that all people who are not theists are atheists. If either axiom holds but not both, or neither, then one can no longer prove that people who are not theists are atheists. Since the Sesh axiom is assumed by default in standard Path Semantics, this means that Atheism is constructive in standard Path Semantics.

| Th = Theism | Exclusive | Inclusive examples (not exhaustive) |
|-------------------------|--|--|
| Agnostic Theist | $\sim\text{Th}$ | $\sim\text{Th} \ \& \ \sim!!\text{Th} \ \& \ !\sim!\text{Th}$ |
| Agnostic Atheist | $\sim!\text{Th}$ | $\sim!\text{Th} \ \& \ !\sim\text{Th} \ \& \ !\sim!!\text{Th}$ |
| Theist | $\sim\text{Th} \ \& \ \sim(\text{Th}^{\text{true}})$ | $\sim\text{Th} \ \& \ \sim!!\text{Th} \ \& \ !\sim!\text{Th} \ \& \ \sim(\text{Th}^{\text{true}}) \ \& \ \sim!!(\text{Th}^{\text{true}}) \ \& \ !\sim!(\text{Th}^{\text{true}})$ |

The set of theists is the union of the set of agnostic theists and gnostic theists.

Atheist $\sim!\text{Th} \ \& \ \sim(\text{false}^{\text{Th}})$ $\sim!\text{Th} \ \& \ !\sim\text{Th} \ \& \ !\sim!!\text{Th} \ \& \ \sim(\text{false}^{\text{Th}})$

The set of atheists is the union of the set of agnostic atheists and gnostic atheists.

In principle, a person can be both agnostic theist or gnostic theist . Two or more sets can overlap and the intersection(s) can be assigned some additional meaning, such as a person holding some agnostic theist beliefs and some gnostic theist beliefs. The same principle holds for atheists. Agnostics can be both theistic and atheistic, or neither, depending on old vs modern definition.

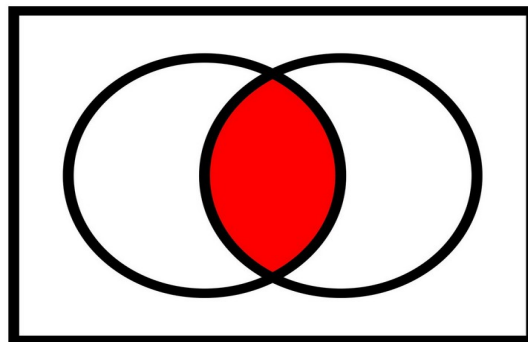
Appendix C

Under the Sesh axiom, one has the following relation, that contracts inclusivity with exclusivity:

$$\begin{array}{ccc} \textbf{Inclusive} & & \textbf{Exclusive} \\ \neg(\text{Theism} \wedge \text{true}) & \Leftrightarrow & \neg(\text{Theism} \wedge \text{true}) \end{array}$$

Negation on the outside of \neg is inclusive because it usually includes more sets. It is often assumed that the exclusive set with negation on the inside is a subset of inclusive negation of the outside. The Sesh axiom makes the inclusive and exclusive sets equal to each other.

To present Gnosticism vs Agnosticism as a Venn diagram, the trick is to think of each circle as a negations $\neg(\text{Theism} \wedge \text{true})$ and $\neg(\text{false} \wedge \text{Theism})$. Agnosticism is the inclusive overlap between the circles and hence one can view it as being in neither set. It is outside both Gnostic Theism and Gnostic Atheism, yet inside both inclusive Agnostic Theism and Agnostic Atheism at the same time.

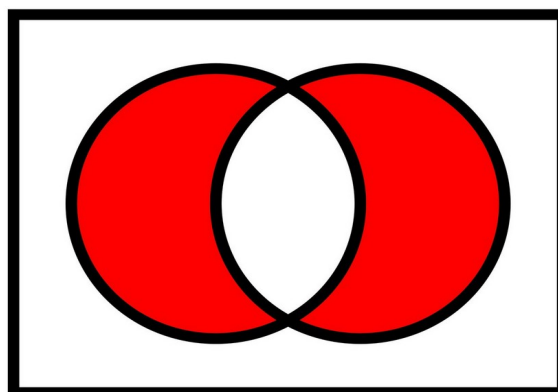


Notice that Agnosticism is not inside exclusive Agnostic Theism and Agnostic Atheism:

$$\begin{array}{ccc} \textbf{Exclusive} & & \textbf{Inclusive} \\ \neg(\text{Th} \wedge \neg \text{Th}) & \neq & \neg(\text{Th} \wedge \text{true}) \ \& \ \neg(\text{false} \wedge \text{Th}) \end{array}$$

Here, $\text{Th} = \text{Theism}$.

Now, to picture Gnosticism as the area inside the circles, but outside Agnosticism. These two parts are mutually exclusive. There is no “outside” outside the circles in the background, so we must stay inside the circles for it to make sense. We can take each piece away from each other and add the missing “bite” to get a full circle against. However, this is far from trivial and not well defined.



Constructively, since $p \Rightarrow \neg\neg p$ it follows that $\neg p \Rightarrow \neg\neg\neg p$, which is a start, but not satisfactory. The Sesh axiom implies that $\neg\neg\neg p \Rightarrow \neg\neg p$ which almost gets us to $\neg\neg(\text{false} \wedge p)$, but not quite.