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ON NOT BEING A DENTIST

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Abstract: Negative properties, like not flying, are controversial. I oppose Chateaubriand's view on these properties and offer semantic arguments against their inclusion in ontology. I distinguish predicate negation and sentential negation, and examine the syntactic and semantic behaviour of predicate negation. I contend that predicate negation is identical with sentential negation. If it is not, then we lose a lot of intuitive inferences found in natural languages and make no clear metaphysical gain. Other arguments based on Ockham's razor are offered.

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In Chapter 2 of *Logical Forms*, Chateaubriand accepts what I will call negative properties and negative relations. For example, the negative predicate “not sick” would express the negative property of *not being sick*, and the relation “not in love with” would express the negative relation of *not being in love with*. Chateaubriand calls negative properties and relations simply properties and relations. I add “negative” for clarification. This is a fascinating and underexplored topic. However, I do not share Chateaubriand's enthusiasm for negative properties.

Do expressions of the form “not F ” for example, where F is a predicate, express properties? Does “not F ” have a structure beyond the structure of F ? If so, what is the contribution of “not”? One must be careful here and avoid assuming, that predicate negation (hereafter NEG) behaves syntactically and semantically like sentential negation. Syntactically, the connective is reiterable. Is “NEG” reiterable? If it is, in what does it differ from sentential negation? If it is not, then what are its specific syntactic and semantic features? Semantically, sentential negation rule says that “If A is true (false), then “not A ” is false (true)”. The corresponding predicate negation’s semantic rule is plausibly

Semantic rule: If Fa is true (false), then NEG Fa is false (true)

If NEG is reiterable, are Fa and NEG NEG Fa equivalent? Suppose that one says yes. Then, semantically NEG cannot be distinguished from sentential negation. Suppose that one says no and contend that we do not have the equivalence. Then one must give the semantics of NEG. If it is reiterable and not equivalent, we have the means to create pointless negative properties at will. We must also explain why an object can not exemplify both F and NEG F or, for instance, both NEG NEG F and NEG NEG NEG F . This is a troublesome consequence, and lacking details on the nature of negative properties, it is hard to suggest an explanation.

What are the truth conditions of

- (1) Quine is not a dentist?

We have two options

- A “Quine is not a dentist” is true if and only if
Quine instantiates the property of not being a dentist

or, alternatively

Quine instantiates the property of being a non dentist

Chateaubriand endorses A. As I mentioned in the previous section, the idea that an object cannot exemplify both F and $\text{NEG } F$ is unclear to me unless one says more about the nature of negative properties. Alternatively, one can have

B “Quine is not a dentist” is true if and only if

Here, B introduces scope distinction, and we obtain two different but equivalent truth conditions

It is false that $((\exists x) x = \text{Quine} \cdot x \text{ is a dentist})$

$(\exists x) (x = \text{Quine} \cdot \text{it is false that } x \text{ is a dentist})$

Sentential negation is a syntactic ambiguity inducer. Scope ambiguities are truth conditionally relevant. Consider

Peter does not believe that Quine is a dentist

The latter is multiply syntactically ambiguous

- i) $(\exists x) (x = \text{Quine} \cdot \text{It is false that Peter believes that } x \text{ is a dentist})$
- ii) $(\exists x) (x = \text{Quine} \cdot \text{Peter believes that it is false that } x \text{ is a dentist})$
- iii) $\text{It is false that } (\exists x) (x = \text{Quine} \cdot \text{Peter believes that } x \text{ is a dentist})$

If we have predicate negations, we lose this ambiguity. The sentence would straightforwardly be read to assign to Peter the property of not believing that Quine is a dentist. This is an oversimplification, and does

not capture our semantic intuitions. A simple tool like sentential negation induces scope ambiguity and what looks like a negative property can be eliminated and accounted for in syntactic terms.

Now, suppose that we rely on NEG, lose syntactic ambiguity and try to capture what was captured by a reading of the sentence by introducing a new lexical item (the predicate negation).

If predicate negation's syntax and/or semantics differ from those of sentential negation, then, one must distinguish "Not Fa " and "Neg Fa ", and such a distinction is erased in " $\neg Fa$ ". So, let me distinguish between

Fa and the corresponding $\neg Fa$ for sentential negation

and

$*Fa$ and the corresponding $\neg *Fa$ for predicate negation

For example, and normally, "It is false that Quine is a dentist" and "Quine is not a dentist" have the form $\neg Fa$. The predicate negation's advocate would have two forms: "It is false that Quine is a dentist" would have the form $\neg Fa$, while "Quine is not a dentist" would have the form $\neg *Fa$. The distinction shows up when one considers the scope of negation and the Quantifier Negation and Complex Quantifier Negation rules for first-order predicate calculus. The QN and CQN rules are inferences rules

Quantifier Negation Rules

$$(a) \neg(x) Fx :: (\exists x) \neg Fx$$

$$(b) \neg(\exists x) Fx :: (x) \neg Fx$$

$$(c) \neg(x) \neg Fx :: (\exists x) Fx$$

$$(d) \neg(\exists x) \neg Fx :: (x) Fx$$

Complex Quantifier Negation Rule

$$(a) \neg(x) (Fx \rightarrow Gx) :: (\exists x) (Fx \rightarrow \neg Gx)$$

$$(b) \neg(\exists x) (Fx \cdot Gx) :: (x) (Fx \rightarrow \neg Gx)$$

$$(c) \neg(x) (Fx \rightarrow \neg Gx) :: (\exists x) (Fx \cdot Gx)$$

$$(d) \neg(\exists x) (Fx \cdot \neg Gx) :: (x) (Fx \rightarrow Gx)$$

Reading the negation sign in a predicate as a sentential negation, one obtains (i) the usual logical form, (ii) the usual scope of negation and (iii) the QN and CQN rules. Reading the negation sign in a predicate as predicate negation rather than sentential negation, we lose (i) / (iii). First, the predicate negation does not give the sentence its usual logical form. Second, the predicate negation cannot have a closed or open formula in its scope, and much less two closed or open formulas. Third, from the second reason, it follows that we lose or cannot apply QN and CQN rules since they rely essentially on sentential negation, negation's scope and interaction between formulas. Consider (1). Let us follow the standard rules. From (1), by existential generalization, one gets

$$(\exists x) \neg Fx$$

or

There is an x such that it is false that x is a dentist

or, in a more familiar language

Someone is not a dentist

and by a quantifier negation rule, one can obtain

$$\neg(x) Fx$$

or

It is false for every x that x is a dentist

Or, in a more familiar language

It is false that everyone is a dentist

However, if one reads (1) as containing a predication negation, by existential generalization, one gets

$$(\exists x) \neg^*Fx$$

or

Someone is not a dentist

but cannot move to

$$\neg^*(x) Fx$$

The relevant QN rule applies to sentential negation, and there is none in the first formula, and in the second formula the predicate negation applies not to a predicate but to a sentence, and by definition it does not apply to open or closed sentences. In fact, the second formula does not even make sense. For the first reason, one cannot even move from (1) to

$$\neg(x) Fx$$

by using QN Rules. This is very counterintuitive, and makes it that we lose a lot of rather natural inferences. I invite the reader to consider examples using different QN and CQN rules. Going back Chapter 2 of *Logical Forms*, one can ask what is the inference rule used by the author to infer from “nothing is an elephant in my study right now” or, in standard first-order predicate language

$$(x) (x \text{ is an elephant} \rightarrow \neg x \text{ is in my study right now})$$

or, by a complex quantifier negation rule

$$\neg(\exists x) (x \text{ is an elephant} \cdot x \text{ is in my study right now})$$

that “Everything is not an elephant in my study right now” since QN and CQN rules do not apply.

Now, what would motivate favouring A over B?

- A “Quine is not a dentist” is true if and only if
 Quine instantiates the property of not being a dentist
- B “Quine is not a dentist” is true if and only if
 It is false that $(\exists x) (x = \text{Quine} \cdot x \text{ is a dentist})$, or
 $(\exists x) (x = \text{Quine} \cdot \text{it is false that } x \text{ is a dentist})$

B is standard, well known and fits logic; A is not standard and is not required by logic. It also raises murky issues. As Aristotle mentions “The expression ‘not-man’ is not a noun. There is indeed no recognized term by which we may denote such an expression, for it is not a sentence or a denial. Let it then be called an indefinite noun”. In the actual context, “non dentist” would not be a well formed-formula. In addition, it is not required by any decent ontology. Negative properties lack specificity. “Black” is a colour term, but “not black” or “non black” is not; “dentist” names a job, and “non dentist” does not. Arguably, whatever negative properties are, they lack causal power. More cautiously, one can argue that science can explain all there is to explain without invoking negative properties. From a semantic, logical point of view, A seems unmotivated if not totally wrong. From an ontological point of view, A introduces properties we do not know and, probably, do not need.