

The Shared Rational Form of Truth-Taking and Truth-Making



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Plan for Today

- 1 Introduction
- 2 The Isomorphism
- 3 Substructurality
- 4 Bi-Modal, Hylomorphic Conceptual Realism
- 5 Aristotelian Intentionality
- 6 Conclusion

Outline

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Aristotle's Three Principles of Noncontradiction

Logical PNC: “Opposite assertions cannot be true at the same time.” (Meta. IV.6 1011b13–20).

Metaphysical PNC

“It is impossible for the same thing to belong and not to belong at the same time to the same thing and in the same respect.” (Meta. IV.3 1005b19–20)

Psychological PNC

“It is impossible to hold (suppose) the same thing to be and not to be.” (Meta. IV.3 1005b24)

My Claim

We should think of reason-relations (including the special case of logical relations) as informing both kinds of matter: world (states) and mind (discursive acts).

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Goals

- 1 Explain isomorphism: normative bilateralism \simeq exact truth-maker theory
- 2 Substructurality: how these frameworks can codify open reason relations
- 3 Bi-model, hylomorphic conceptual realism: the same form in two kinds of matter
- 4 Aristotelian intentionality: how discursive acts picture reality

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Normative Bilateralism

● Restall / Ripley

- What it means for Γ to imply Δ is that it is out-of-bounds (violating a norms of coherence) to assert everything in Γ and deny everything in Δ .
- What follows from what is a matter of the discursive norms that govern speech acts (or mental acts).
- Since meaning is a matter of what follows from what: meanings are a matter of these discursive norms.
- Logic: what follows in virtue of logical form (if we hold just logical vocabulary constant).
- Immediately normative reading of sequent calculi.

● Brandom / Simonelli

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Fine's Truth-Maker Theory

● Basic Metaphysical Ideas

- There are states, and the obtaining states constitute the world.
- Some states are parts of other states.
- Some states are possible and other impossible.

● Basic Semantic Ideas

- Sentences are made true by some states and made false by some states.
- The meaning of a sentence are the states that make it true and those that make it false.
- Truth-makers and falsity-makers are wholly relevant (exact) to the sentence.

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Fine's Truth-Maker Theory

- A **modalized state space**: $\langle S, S^\diamond, \sqsubseteq \rangle$
 - S : a non-empty set of states,
 - $S^\diamond \subseteq S$: the possible states,
 - \sqsubseteq is a partial order on S (parthood), such that all subsets of S have a least upper bound.
 - \square is the empty state that is part of every state.
- The **fusion** $t_1 \sqcup t_2 \sqcup t_3 \dots$ of $T = \{t_1, t_2, t_3, \dots\}$: least upper bound of T .
- **Conditions** Fine often imposes:
 - **Downward-Closure**: if $s \in S^\diamond$ and $t \sqsubseteq s$, then $t \in S^\diamond$.
 - **Exclusivity**: if $s \in |p|^+$ and $t \in |p|^-$, then $\forall u (s \sqcup t \sqcup u \notin S^\diamond)$.
 - **Exhaustivity**: $\forall u \in S^\diamond$, either $\exists s \in |p|^+ (u \sqcup s \in S^\diamond)$ or $\exists t \in |p|^- (u \sqcup t \in S^\diamond)$.

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Fine's Truth-Maker Theory

- A **model** \mathcal{M} : $\langle S, S^\diamond, \sqsubseteq, |\cdot| \rangle$, with $|\cdot|$ a valuation function that assigns each atom p of \mathcal{L} its verifiers and falsifiers, $\langle |p|^+, |p|^- \rangle \in \mathcal{P}(S) \times \mathcal{P}(S)$.
- Semantic clauses: " $s \Vdash A$ " means state s verifies A ; " $s \dashv\vdash A$ " means s falsifies A .

(atom+) $s \Vdash p$ iff $s \in |p|^+$

(atom-) $s \dashv\vdash p$ iff $s \in |p|^-$

(neg+) $s \Vdash \neg B$ iff $s \dashv\vdash B$

(neg-) $s \dashv\vdash \neg B$ iff $s \Vdash B$

(and+) $s \Vdash B \wedge C$ iff $\exists u, t (u \Vdash B$ and $t \Vdash C$ and $s = u \sqcup t)$

(and-) $s \dashv\vdash B \wedge C$ iff $s \dashv\vdash B$ or $s \dashv\vdash C$

(or+) $s \Vdash B \vee C$ iff $s \Vdash B$ or $s \Vdash C$

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Fine's Truth-Maker Theory

- **Fine defines different notions of consequence:**
 - *Entailment:* P entails Q iff every verifier of P is a verifier of Q .
 - *Containment:* Q contains P iff (i) every verifier of Q includes as a part a verifier of P and (ii) every verifier of P is included as a part in a verifier of Q .
- **Truth-maker theory is hyperintensional:**
 - Logically equivalent and necessary propositions can differ from each other.

Hyperintensionality

$p \vee (q \wedge r)$ and $(p \vee q) \wedge (p \vee r)$ are logically equivalent. But the fusion of exact truth-makers of p and of q is always an exact truth-maker for the second but not necessarily the first. And different necessary truths can have different truth-makers.

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Truth-Maker Bilateralism

Idea: Take normative bilateralism and translate it into truth-maker theory.

Normative Bilateralism

$\Gamma \vdash \Delta$ iff it is out-of-bounds to assert all the members of Γ and also deny all the members of Δ .

TM-Bilateralism

$\Gamma \overset{TM}{\Vdash} \Delta$ iff any fusion of verifiers of all the members of Γ and falsifiers of all members of Δ is an impossible state; i.e., for all $s = u \sqcup t$ such that $u \Vdash \bigwedge \Gamma$ and $t \dashv\vdash \bigvee \Delta$, $s \notin S^\diamond$.

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The Isomorphism Emerges

- **Structural Rules:** weakening \approx downward-closure; cut \approx exhaustivity; identity \approx inclusivity
- **Operational Rules:** right-rules \approx truth-maker clauses; left-rules \approx falsity-maker clauses
- **Norms-to-truth-makers:** take the sequent calculus that you take to encode the norms of discourse, and choose the corresponding conditions on possible states and semantic clauses to get your truth-maker theory.
- **Truth-makers-to-norms:** take your favorite truth-maker theory, and choose the corresponding sequent rules to get a statement of the matching norms of discourse.

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Nontransitive and Nonreflexive Logics

Examples of how this works for different logics. If we look only at what holds in all models:

- **CL**: If we impose Exclusivity, Exhaustivity, and Downward-Closure, then $\Gamma \Vdash_{TM} \Delta$ iff $\Gamma \Vdash_{CL} \Delta$.
- **ST**: If we impose Exclusivity, and Downward-Closure, then $\Gamma \Vdash_{TM} \Delta$ iff $\Gamma \Vdash_{ST} \Delta$.
- **TS**: If we impose Exhaustivity, and Downward-Closure, then $\Gamma \Vdash_{TM} \Delta$ iff $\Gamma \Vdash_{TS} \Delta$.
- Add a transparent truth-predicate, and you get the results familiar in the literature. (The usual three-valued semantics for these logics then look rather inflexible.)

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Open, Material Reason-Relations

Isomorphism works with material and nonmonotonic implications:

- **Normative-Bilateralist Theory:** Take a base set, \mathfrak{B} , of atomic sequents $p, q \vdash r, s, t \dots$ etc. Close this set under Ketonen-style sequent rules. And if \mathfrak{B} obey containment ($\Gamma \vdash \Delta$ if $\Gamma \cap \Delta \neq \emptyset$), your resulting consequence relation is supra-classical.
- **Truth-Maker Version:** Require of all models that for any sequent in the base, any fusion of verifiers of its premises and falsifiers of its conclusions is an impossible state. Then compute the truth- and falsity-makers of complex sentences by applying the semantic clauses. And if \mathfrak{B} obey containment (aka exclusivity), your resulting consequence relation is supra-classical.
- **Open Reason-Relations:** $\Gamma \vdash_{\substack{\mathfrak{B} \\ NM}} \Delta$ iff $\Gamma \vdash_{\substack{NM_{\mathfrak{B}} \\ TM}} \Delta$.

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Modal Functionalism about Content

● **Functionalism about Content**

- To have a particular content is to play a certain role with respect to other contentful items.
- Such contentful items can be realized in different ways: as speech acts, as thoughts, as inscriptions, ... and as worldly states!

● *Why Modal Functionalism?*

- The role that is content is one of ruling-out other contents: To be contentful an item must clash (be-incompatible) with some other such items.
- Such a potential for clashes must be essential and built into the nature of having content.
- This incompatibility or clash comes in different flavors: deontic-normative and alethic-modal.

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Hylomorphic Conceptual Realism

- **Similar but different from Brandom's original version**

- Brandom: content is matter. We now: content is form.
- The same content can occur in different matter, governed by different kinds of modality: discursive acts (normative modality) and worldly states (alethic modality).

- **Content as Form**

- What matters for the content of an item is not its matter (shape, sound, color, weight, ... unless relevant for incompatibilities) but which other items of its kind it rules out.
- This is a good thing to mean by the item's (rational) form: **(i)** it gives the item unity (same-saying), **(ii)** makes it an item of a kind (assertion, thought, state that p), **(iii)** specifies the intrinsic powers of the item: rule-out such-and-such similar items.

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Back to Aristotle

Parallel relations of rule-out (incompatibility) among affirmation/negation and states.

Categories 12b5-16

[W]hat underlies an affirmation or negation [is not] itself an affirmation or negation. For an affirmation is an affirmative statement and a negation a negative statement, whereas none of the things underlying an affirmation or negation is a statement. These are, however, said to be opposed to one another as affirmation and negation are; for in these cases, too, the manner of opposition is the same. For in the way an affirmation is opposed to a negation, for example “he is sitting”—“he is not sitting”, so are opposed also the actual things underlying each, his sitting—his not sitting.

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“*S* thinks *O* if and only if: (i) *S* has the capacity requisite for receiving *O*’s intelligible form; (ii) *O* acts upon that capacity by enforming it; and, as a result, (iii) *S*’s relevant capacity becomes isomorphic with that form.” (Shields 2020, sec 7)

De Anima, 431b25-432a31

Within the soul the faculties of knowledge and sensation are potentially these objects, the one what is knowable, the other what is sensible. They must be either the things themselves or their forms. The former alternative is of course impossible: it is not the stone which is present in the soul but its form. It follows that the soul is analogous to the hand; for as the hand is a tool of tools, so thought is the form of forms and sense the form of sensible things.

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This is why the soul cannot be material (while, e.g., imagination can be material).

De Anima, 429a18-24

[S]ince everything is a possible object of thought, mind in order [...] to know, must be pure from all admixture; for the co-presence of what is alien to its nature is a hindrance and a block: it follows that it can have no nature of its own, other than that of having a certain capacity. Thus that in the soul which is called thought (by thought I mean that whereby the soul thinks and judges) is, before it thinks, not actually any real thing.

Cf. TLP, 2.171-2: "The picture can represent every reality whose form it has. [...] The picture, however, cannot represent its form of representation; it shows it forth." (W: determinable form (colored), A: determinate form (blue).)

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How Aristotelian are we?

- Rational form of assertion (denial) that p = rational form of state that makes “ p ” true (false)
- To think that p is to engage in a mental act with the rational form of the worldly states that make “ p ” true.
- Just as an obtaining state is part of the world, so a thought is part of one’s overall position (state of mind).

Differences

(i) Forms of states, not forms of objects. (ii) The “subject-side” matter isn’t necessarily the “thought” but may be (primarily social) discursive acts. (iii) Aristotle’s immateriality of the soul corresponds to our requirement that the structure that takes on the forms must allow for open reason relations.

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- Rational form of assertion (denial) that $p =$ rational form of state that makes “ p ” true (false)
- To think that p is to engage in a mental act with the rational form of the worldly states that make “ p ” true.
- Just as an obtaining state is part of the world, so a thought is part of one’s overall position (state of mind).

Differences

(i) Forms of states, not forms of objects. **(ii)** The “subject-side” matter isn’t necessarily the “thought” but may be (primarily social) discursive acts. **(iii)** Aristotle’s immateriality of the soul corresponds to our requirement that the structure that takes on the forms must allow for open reason relations.

Outline

- 1 Introduction
- 2 The Isomorphism
- 3 Substructurality
- 4 Bi-Modal, Hylomorphic Conceptual Realism
- 5 Aristotelian Intentionality
- 6 Conclusion**

Conclusion

- Normative bilateralism and truth-maker theory are isomorphic.
- We can recover many well known logics in strictly parallel ways in both frameworks.
- Both frameworks can encode open (nonmonotonic, nontransitive) reason relations, including suitably expressive logical vocabulary.
- What differs between the frameworks are (a) the items that stand in such reason relations, and (b) which kind of modality (deontic or alethic) is in play.
- The content of an item is its role in a reason relation. This role is its form (*qua* contentful item).

Conclusion

- We can thus view these frameworks as theories of the same forms, as occurring in two different matters (discursive acts and worldly states), relative to different modalities.
- We thus have a bi-modal, hylomorphic conceptual realism: contents are forms that can be emmattered (hence real) in different ways, namely as roles relative to different kinds of modality.
- This allows us to recover the Aristotelian insight that to think that p is for one's thought (discursive act) to take on the form of the worldly item that we thus think to be the case.
- We have thus an account of what mind and world share when they meet in cognition.

Thank You

Thank You!