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Theories of Aboutness

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ABSTRACT
Our topic is the theory of topics (that is, the theory of subject matter). My goal is to clarify and evaluate three competing traditions: what I call the way-based approach, the atom-based approach, and the subject-predicate approach. I develop (defeasible) criteria for adequacy using robust linguistic intuitions that feature prominently in the literature. Then I evaluate the extent to which various existing theories satisfy these constraints. I conclude that recent theories due to Parry, Perry, Lewis, and Yablo do not meet the constraints in total. I then introduce the *issue-based theory*—a novel and natural entry in the atom-based tradition that meets our constraints. In a coda, I categorize a recent theory from Fine as atom-based, and contrast it to the issue-based theory, concluding that they are evenly matched, relative to our main criteria of adequacy. I offer tentative reasons to nevertheless favour the issue-based theory.

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1. Introduction

Descriptive language allows us to say true things about interesting topics. This points to three core semantic concepts: truth; aboutness; topic (that is, subject matter). Truth has attracted ample attention in the philosophy literature. Nominally, aboutness has also received extensive attention, in the guise of closely related notions: *reference* and *intentionality*.[1] In contrast, the notion of *topic*, and the sense in which a claim is *about its topic*, have until recently received only passing and sporadic attention.[2]

This new-found attention shadows efforts to model the *hyperintensionality* of natural language: the phenomenon of distinct indicative expressions that are true of exactly the same possible worlds, yet are not interchangeable in every linguistic context. A semantic theory overlooks significant dimensions of meaning, it seems, if it *merely* assigns a set of possible worlds (a *truth set*, an *intension*) to indicative expressions. Consider an example adapted from Perry [1989]. Presumably, the truth set of 'Jill tumbled down the hill' coincides with that of 'Jill tumbled down the hill and 2+2 = 4'. Now suppose that 'Jack brought it about that Jill tumbled down the hill' is true. Apparently, it needn't follow that 'Jack brought it about that Jill tumbled down the hill and 2+2 = 4' is

[1] As our discussion will intimate, the exact relationship between reference, intentionality, and subject matter is unlikely to be trivial.

[2] Ryle [1933], Putnam [1958], Goodman [1961], and Perry [1989] offer important entries in the pre-Lewis literature. Perry [1989] discusses insights due to Barbara Partee. Linguists have not neglected the topic of topics: see Roberts [2011]. How best to relate this tradition to our own discussion must be left for elsewhere.

true. A tempting explanation: first, there is a difference in topic between 'Jill tumbled down the hill' and 'Jill tumbled down the hill and 2+2 = 4.' Second, the truth of 'a brought it about that φ' depends on what φ is *about*, not only on its truth set. Thus, it seems that the operator 'a brought it about that' creates a topic-sensitive, hyperintensional, context for the operand φ.

A picture of subject matter due to Lewis [1988a, 1988b] has steadily grown in influence. Lewis identifies a subject matter with the set of possible ways for an associated subject to be. More precisely, a subject matter is understood as a set of (unstructured) propositions that *cover* (that is, jointly exhaust) logical space.[3] This closely relates subject matter to standard semantic theories of interrogative expressions, which likewise identify a *question* with a set of propositions—namely, the set of answers to that question.[4]

Call this broadly Lewisian picture the *way-based conception*. Applications of this approach are now rife, including theories positing that belief or knowledge are topic-sensitive[5] and theories of partial truth.[6] As a complement, an influential tradition in the pragmatics literature models discourse topics as *questions under discussion*.[7]

The Lewisian picture is not the only game in town, however. Two other approaches have found traction, with tendencies that are often at odds with the way-based conception.

In the first place, logicians in the 'relevantistic' tradition appeal to subject matter to explain why certain classical argument forms seem fallacious, despite preserving truth:[8] it is posited that these forms do not preserve the *subject matter* of the premises in the conclusion, and that such preservation is necessary for sound argumentation.[9] Putting aside the (de-)merits of this explanation,[10] consider the picture of subject matter that tends to inform the diagnosis: the leading idea is that the subject matter of φ can be identified, in some sense, with the set of atomic claims from which φ is composed. As a corollary, subject matter is treated as invariant under negation, while conjunction and disjunction merely *merge* the subject matters of their constituents. Call this the *atom-based conception*. In line with the relevantistic theme, this conception has been applied to topic-sensitive accounts of the logic of knowledge [Hawke 2016] and imagination [Berto forthcoming].

In the second place, philosophers have developed the view that the subject matter of φ is the set of objects *of which something is said* by stating φ—that is, those objects that count as *subjects* of which something is *predicated* by uttering φ. In general, a subject matter is a set of objects, with no constraints on what objects can so serve. Call this the *subject-predicate conception*. Perry [1989] sketches a sophisticated proposal along these lines.

[3] Or, at least, a covering of that set of worlds where the subject in question *exists*. We can put aside this subtlety for our discussion. The core Lewisian idea is, minimally, that topics are sets of propositions, conceived of as ways for a subject to be.

[4] Cross and Roelofsen [2016] give an overview.

[5] See Yalcin [2011], Yablo [2014: ch. 7], and Yalcin [forthcoming].

[6] See Yablo [2014: ch. 5].

[7] See Roberts [2012].

[8] For more, see Read [1988] and Burgess [2009: ch. 5].

[9] The standard examples are *ex quolibet verum* and *ex falso quodlibet*.

[10] Lewis [1988a] suggests a radically different take on 'relevant implication'.

The goal of the current paper is to contrast and evaluate the divergent conceptions that we have described, and then to defend a novel version of the atom-based approach: the *issue-based theory*. Put provocatively: the way-based conception enjoys the momentum in the literature, and I aim to bolster a persistent alternative.

Section 3 offers my instrument of evaluation: a set of constraints rooted in robust linguistic intuition. For the most part, noting these intuitions is not original to this paper, for they appear piecemeal in the literature.[11] The current contribution is to round them up, to support them with a *uniform* rationale, and to apply them *uniformly* to diverse theories. Section 3 grounds our set of constraints in ordinary judgments as to whether certain claims are *on-topic* or *off-topic* relative to a discourse topic. Section 4 argues that a prominent selection of subject-predicate, atom-based, and way-based theories violate our constraints. Section 5 argues that the issue-based theory succeeds in meeting them. This provides *prima facie* support for the issue-based theory.

The issue-based theory identifies a subject matter with a set of *distinctions* or *issues*.[12] While hopefully novel, this theory draws liberally from existing theories, across the traditions.[13] The goal is a *synthesis* that preserves strengths and discards weaknesses. The theory allows for the recovery, from an assertion, of a set of subjects of which something is thereby predicated, and a partition of ways that things can be with respect to the subject matter of the claim (its *resolution*). In short, a version of the subject-predicate and way-based approach can be *abstracted* from the issue-based theory. Thus, this paper does not advocate abandoning these conceptions altogether. The suggestion is that they are elegant abstractions that are sometimes illuminating, sometimes misleading.

To focus discussion, I concentrate on the austere setting of propositional logic, basic predications, and identity statements (putting aside quantification). Further, I do not engage with every theory of aboutness on offer.[14] A prominent selection must suffice. I also assume that the ordinary term 'topic' (and 'subject matter') is univocal, and that ordinary judgments about being *on-topic* are systematic. In contrast, others embrace the sentiment that 'topic' is too vague or ambiguous to license a unified theory.[15]

As a coda, section 6 addresses a subtle challenge posed by the theory of Fine [2016]. I argue that this theory is both atom-based and meets the criteria in section 3. Thus, my main tool of evaluation puts Fine's theory and the issue-based theory in a dead heat. I explore the extent to which they are not in competition, then I frame promising but inconclusive reasons for favouring the issue-based theory.

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[11] I draw mainly on Goodman [1961], Lewis [1988a], Perry [1989], and Yablo [2014].

[12] Compare Yablo [2014: 27]: 'A subject matter—I'll sometimes say topic, or matter, or issue—is a system of differences, a pattern of cross-world variation.'

[13] For instance, Epstein [1994] and Roberts [2012] share important features with the current approach.

[14] I pass over proposals in Ryle [1933], Putnam [1958], and Goodman [1961].

[15] The afterword of Perry [1989] discusses the worry, framed by Partee, that there is no robust pretheoretic account of aboutness. Ryle [1933] argues that 'about' has a multiplicity of meanings. Compare Fine [2017b: part II, sec. 2]:

> There is an intuitive notion of subject-matter or of what a statement is about. This notion may have a different focus in different contexts. Thus, it may be objectual and concern the objects talked about or it may be predicational and concern what is said about them. Our concern here will be with what one might call the 'factual' focus

2. Assumptions and Notation

We use $\mathbf{s}, \mathbf{t}, \ldots$ to denote subject matters and $\mathbf{s} + \mathbf{t}$ to denote their combination. For instance, the subject matter for a course in cognitive science might be this: connectionism + Bayesianism. We use $a, b, c, \ldots$ to denote individuals; $F, G, \ldots$ to denote properties; and R to denote a relation. We use standard set-theoretic notation: $\cup$ is set union; $\cap$ is set intersection; $\in$ indicates membership; $\subseteq$ is the subset relation; $\emptyset$ denotes the empty set; A^c indicates the complement of A (relative to a background set given by context).

Everyday talk apparently allows concrete individual objects to serve as subject matters. One might say that the topic of 'John is late' is John, or that 'John is late' is about John. However, we will not consider any theories that *literally* allow a concrete individual to be a subject matter.[16] Thus, we assume that the correct interpretation of ordinary talk is that, for every object a, there is an associated subject matter $\mathbf{a}$. The topic of 'John is late' is not John but, more accurately, **John**.

$\leq$ indicates the *inclusion relation* between topics. Hence, 'topology $\leq$ mathematics' says that topology is part of a larger subject matter: mathematics. We call a topic *degenerate* if it is included in every topic; otherwise, a topic is *proper*. We use $\bowtie$ to indicate *overlap*: 'mathematics $\bowtie$ philosophy' indicates that mathematics and philosophy overlap (with neither being inclusive). Overlap is defined: $\mathbf{s} \bowtie \mathbf{t}$ iff there exists proper subject matter $\mathbf{u}$ such that $\mathbf{u} \leq \mathbf{s}$ and $\mathbf{u} \leq \mathbf{t}$. That is, overlap amounts to having a common proper part.

We assume that every meaningful sentence φ is associated (in context) with a subject matter $\mathbf{s}_\varphi$: *the* subject matter of φ. We assume that φ is entirely about $\mathbf{t}$ just in case $\mathbf{s}_\varphi \leq \mathbf{t}$.[17] We assume that φ is partly about $\mathbf{t}$ just in case $\mathbf{s}_\varphi \bowtie \mathbf{t}$. If φ is associated with a degenerate topic, we can understand this in one of two ways. We can take it to represent that φ is about *everything*, emphasizing the definition of inclusion. Or we can take this to represent that φ has *no* subject matter, *properly speaking* (and so, properly speaking, is about nothing). Either way, φ is an odd beast.

All of this allows a ready explanation for subject matter's role in the guidance of discourse. Intuitively, conversation is regulated by a background discourse topic that determines which assertions count as (conversationally) *relevant* or *irrelevant*. If our topic is Jane's profession, then the claim 'Jane is a lawyer' is relevant (that is, on-topic), whether or not it is true. To say that a claim is *somewhat* on-topic is to say that its subject matter overlaps with the discourse topic (for example, 'Jane is a lawyer and loves to procrastinate', in our running example). On the other hand, 'John is a lawyer' or 'Jane loves to procrastinate' are *not* on-topic. An explanation: the subject matter of the latter two sentences is neither included in, nor even overlaps with, the discourse topic. We will often use intuitions concerning conversational relevance as evidence for the subject matter of a particular assertion.

[16] The subject-predicate approach faces the least difficulty in identifying subject matters with concrete objects. On this conception, subject matters are *sets* of objects. A variation uses *mereological sums*.

[17] It is possible to theorize in the opposite direction, by first explicating what it is for φ to be entirely about $\mathbf{s}$, then by defining a notion of *exact* subject matter on this basis. For instance, one might define $\mathbf{s}_\varphi$ as the least subject matter that φ is entirely about. Compare Lewis [1988a: 163–4] and Yablo [2014: 38–9].

3. Criteria of Adequacy

We now develop some constraints on a theory of subject matter: we note apparently unequivocal linguistic intuitions generated by particular examples, and generalize away apparently arbitrary features. Section 3.6 reflects on this methodology.

3.1 The Connectives

We first build on observations in Perry [1989] of various interactions between subject matter and the connectives. Suppose that our discourse topic is **Jane's profession**. Clearly, assertions of 'Jane is a lawyer' or 'Jane is an accountant' are on-topic (and, more broadly, about **Jane**). Now, note that 'Jane is *not* a lawyer' seems equally on-topic and entirely about **Jane's profession** (and, more broadly, **Jane**). Negation apparently preserves subject matter.

Likewise, an assertion of 'Jane is a lawyer or Jane is an accountant' is on-topic, and so is still about **Jane's profession** (and **Jane**). Shared subject matter is apparently preserved under disjunction. We can also note evidence that the preservation of subject matter under negation is not limited to atomic claims: 'Jane is neither a lawyer nor an accountant' is also intuitively entirely on-topic. To generalize:

1. If φ is entirely about **s**, then $\neg\varphi$ is entirely about **s**
2. If Fa is entirely about **s** and Gb is entirely about **s**, then $Fa \vee Gb$ is entirely about **s**

Next, suppose that 'Jane is a lawyer and John is a lawyer' is asserted. Intuitively, this assertion is partly on-topic, since it is partly about **Jane's profession**. (One might add: 'Jane is a lawyer *and* an accountant' is *wholly* on-topic.) To generalize:

3. If Fa is entirely about **s**, then $Fa \wedge Gb$ is partly about **s**

Next, note that it is difficult to think of a discourse context where a claim of the form $Fa \wedge Gb$ is relevant to the topic at issue, but where the claim $Fa \vee Gb$ is not (although the second can be *less informative*). Suppose that our topic is that of whether Frankie is a bachelor. Obviously, 'Frankie is both a man and unmarried' is entirely on-topic. But it is also hard to deny that 'Frankie is not a married woman' (that is, 'Frankie is either a man or unmarried') is on-topic—although not maximally informative.

Now reason as follows: suppose that **s** and **t** are such that, for every topic **u**, we have that if $\mathbf{s} \leq \mathbf{u}$ then $\mathbf{t} \leq \mathbf{u}$. Then $\mathbf{t} \leq \mathbf{s}$, as the special case where $\mathbf{u} = \mathbf{s}$. Substituting the topic of $Fa \wedge Gb$ for **s** and the topic of $Fa \vee Gb$ for **t**, we get this:

4. The subject matter of $Fa \wedge Gb$ includes that of $Fa \vee Gb$

(The other direction is less clear. If the topic is that of whether Jane has a sibling, it is exactly on-topic to say 'Jane has either a brother or a sister.' Further, 'Jane has both a brother and a sister' is undeniably on-topic *to some extent*. But does it include irrelevant information?)

Finally, note that the statement 'either Julia Robinson is an expert in diophantine equations or Raphael Robinson is' is relevant to the discourse topic **experts in**

diophantine equations. On the other hand, if our topic is that of which philosophers are experts in semantics, then this statement is irrelevant and off-topic. To generalize:

5. Expressions of the form $Fa \vee Fb$ are about something but not necessarily about everything

3.2 Validities, Contradictions, and Necessities

Drawing again on Perry [1989], suppose that 'Caesar brought it about that Tully fell out of bed' is true. Intuitively, the following need *not* be true: 'Caesar brought it about that *both* Tully fell out of bed *and* 2 is even'; 'Caesar brought it about that *both* Tully fell out of bed *and* either Trump fell out of bed or he didn't'; 'Caesar brought it about that *both* Tully fell out of bed *and* Tully is self-identical'; 'Caesar brought it about that *both* Tully fell out of bed *and* everything is self-identical'; 'Caesar brought it about that *either* Tully fell out of bed *or* 2 is odd.' The claim 'a brought it about that φ' reports a relation between an actor and a particular (actual) state of affairs. Our examples suggest that the state of affairs expressed by φ depends on more than its truth conditions. An explanatory appeal to subject matter seems natural, provoking the generalization:

6. If Fa and Gb have different subject matter and Fa is contingent, then Fa differs in topic to $Fa \wedge (b = b)$ and $Fa \wedge (Gb \vee \neg Gb)$
7. If Fa and Gb have different subject matter and Fa is contingent, then Fa differs in topic to $Fa \vee (b \neq b)$ and $Fa \vee (Gb \wedge \neg Gb)$

Further, necessities such as 'Jones is Jones', 'Trump won the election or he didn't win', and '2 is even' (and the impossibilities that result from their denials) must be about *something*. For if they were not about anything, then the subject matter of their conjunction with 'Tully fell out of bed' would presumably be confined to that of 'Tully fell out of bed.'

Intuition also suggests that validities, contradictories, and necessities are not about *every* subject matter. Intuitively, '2+2 = 4' is about arithmetic (and partly about **2**), not about topology. 'Jones is not Jones' is about **Jones**, but not about **Jane**, or about arithmetic. 'Either Trump won or he didn't' is about **Trump**, but not about **Abraham Lincoln**, and not about geometry. Such intuitions manifest in logic students and relevant logicians, when struck that the inference to 'Jane is a lawyer' from 'Trump both won and did not' involves a departure in subject matter. To generalize:

8. A claim of the form $Fa \vee \neg Fa$ is about something (for example, **a**) but not about everything (at least if Fa is about something but not everything). Likewise for $a = a$ and most cases of Fa where Fa is necessary
9. A claim of the form $Fa \wedge \neg Fa$ is about something (for example, **a**) but not about everything (at least if Fa is about something but not everything). Likewise for $a \neq a$ and most cases of $\neg Fa$ where Fa is necessary

3.3 Denotations

Consider an amusing example from Yablo [2014: 24]: 'Man bites dog' is a more interesting headline than 'Dog bites man,' since it speaks to a more interesting topic.

Similarly, suppose that our discourse topic is **men who have bitten animals**. Then 'Joe bit Rex' is on-topic, but 'Rex bit Joe' is not. Thus, the subject matter of these claims diverges. Or suppose that our topic is **Jane's children**. Then 'Jane is the mother of Beth' is on-topic, while 'Beth is the mother of Jane' is not.

Further, suppose that our topic is, once again, **Jane's profession**. Then an assertion of 'Jane is a lawyer' is on-topic, while 'Jane is a serial procrastinator' is not.

10. Expressions of the form aRb and bRa are not necessarily about the same topic. Nor is the subject matter of Fa necessarily identical to that of an expression of the form Ga.

3.4 Parts and Wholes

Goodman [1961] notes that, since Maine is part of New England, 'Maine experiences cold winters' is intuitively about **New England**. In general, talking about a part is apparently a way of talking about the whole:

11. If a is part of b, then: if φ is entirely about **a**, then φ is entirely about **b**

Goodman [ibid.] notes a second intuition: 'New England experiences cold winters' seems to be about **Maine** (as well as the other parts of New England). However, as Goodman points out, if we generalize straightforwardly (a claim about a whole is also about its parts) and combine this with constraint 11, then absurdities follow. For instance, since Maine is part of the world, constraint 11 delivers that 'Maine experiences cold winters' is about **the whole world**. Now, if a claim about a whole is also about its parts, then 'Maine experiences cold winters' is not only about **the whole world**, but also about **Hawaii**, since Hawaii is part of the world. This sounds absurd. In response, we should reject the principle that a claim about a whole is also about its parts. Further counter-examples spring to mind: I say 'it is illegal to drive over 65 miles per hour on the highway.' My claim is entirely about **the law**. One part of the law deals in copyright infringement. But I did not say anything about **copyright law**.

3.5 Questions

Interrogative utterances seem not only to *have* a subject matter, but to *express* a subject matter. One fixes the discourse topic as **the number of stars** by fixing a certain question—'how many stars are there?'—for discussion [Lewis 1988a]. To discuss **Jane's profession** is to discuss *what Jane's profession is*. It is to focus on all and only (complete or partial) possible answers to 'what is Jane's profession?'

12. A question **Q** serves (in some sense) as a subject matter

It is not obvious that every subject matter serves as a question, however. 'Jane is a lawyer' is about **Jane**. Can we think of **Jane** as a question? This issue veers into overtly theoretical territory.

3.6 Methodological Remarks

Our constraints are generalizations based on intuitive judgments concerning ordinary discourse. Treating these constraints as our sole criteria for adequacy loads the die against certain approaches. So, three caveats are worth mentioning.

First, I do not claim to have exhausted the linguistic intuitions concerning subject matter.

Second, I do not claim that linguistic intuition provides the *only* relevant evidence for a theory of subject matter. Rational theory selection maximizes (expected) theoretical utility. Accommodating linguistic intuition exhibits utility along one dimension: the *explanatory power* of a theory. But one ought not to ignore theoretical virtues such as elegance, parsimony, and systematicity. Further, explanatory power manifests in diverse ways: a theory might offer little over competitors in accounting for ordinary linguistic data, but have wide applicability for resolving philosophical puzzles. Trade-offs must be weighed.

Third, accommodating linguistic data does not necessitate vindicating straightforward generalizations. Another strategy is to argue that our intuitions are misleading, or that the data are more parochial than is first apparent.

In short, the criteria for adequacy that I deploy are best viewed as defeasible but with *prima facie* force.

4. Evaluation of Existing Approaches

We now examine a slew of theories of subject matter, each classified under either the subject-predicate conception, the atom-based conception, or the way-based conception. Each provides an account of subject matter, inclusion ($\leq$), overlap ($\bowtie$), and combination ($+$). Each also provides, for arbitrary φ, an account of *the* subject matter of φ ($\mathbf{s}_\varphi$), and so of what φ is about, entirely or partly. For every theory, we identify a constraint from section 3 that is violated.

4.1 The Subject-Predicate Conception

On the subject-predicate conception, a subject matter is merely a set of entities, and any set of entities can serve as a subject matter. Thus, the class of subject matters is just the class of sets. Read $\mathbf{s} \leq \mathbf{t}$ as $\mathbf{s} \subseteq \mathbf{t}$; $\mathbf{s} \bowtie \mathbf{t}$ as $\mathbf{s} \cap \mathbf{t} \neq \emptyset$; and take $\mathbf{s} + \mathbf{t} = \mathbf{s} \cup \mathbf{t}$. The empty set is the degenerate topic.

Consider atomic claim p. On the subject-predicate conception, $\mathbf{s}_p$ is the set of objects that serve as *subjects* in p—that is, those objects of which a property or relation is predicated. For example, the subject matter of 'John helped Jack' is $\{\text{John}, \text{Jack}\}$. Since John and Jack both live in Maine, 'John helped Jack' is entirely about **the citizens of Maine**, since $\{\text{John}, \text{Jack}\} \subseteq \{x : x \text{ is a citizen of Maine}\}$. On the natural proposal that **John** = $\{\text{John}\}$, 'John helped Jack' is partly about **John**, since $\{\text{John}\} \subseteq \{\text{John}, \text{Jack}\}$.

4.1.1 Perry

Perry [1989] uses situation theory to elaborate on the subject-predicate conception.[18] For situation s to be the case is for certain objects to stand in certain relations and cer-

[18] See Barwise and Perry [1981] for a classic study of situation theory.

tain objects to fail to stand in certain relations (at a certain space-time location, one might add). Thus, s may be represented by a *partial valuation* ρ_{s}, assigning 1 (true), 0 (false), or nothing (undetermined) to every atomic claim, in accord with s. An arbitrary claim is then *verified* or *falsified* by s, as follows:

- s verifies atomic p iff $\rho_{\mathsf{s}}(p) = 1$. s falsifies atomic p iff $\rho_{\mathsf{s}}(p) = 0$.
- s verifies $\neg\varphi$ iff s falsifies φ. s falsifies $\neg\varphi$ iff s verifies φ.
- s verifies $\varphi \wedge \psi$ iff s verifies φ and verifies ψ. s falsifies $\varphi \wedge \psi$ iff s falsifies φ or falsifies ψ.
- s verifies $\varphi \vee \psi$ iff s either verifies φ or verifies ψ. s falsifies $\varphi \vee \psi$ iff s falsifies φ and falsifies ψ.

A key proposal from Perry [ibid.] is then that object x is in $\mathbf{s}_\varphi$ just in case x is part of every situation that verifies φ. This delivers intuitive consequences for complex claims. $\mathbf{s}_{Fa \wedge Ga}$ is $\{a\}$. $\mathbf{s}_{Fa \wedge Gb}$ is $\{a, b\}$. This meets constraint 3. Thus, 'Jane is a lawyer and John is an accountant' is partly about **Jane**. Further, $\neg Fa$ has the same subject matter as Fa, largely meeting constraint 1.

Does this theory violate constraint 11? Yes, on a flat-footed reading where $\mathbf{a} = \{a\}$ for every object a. Consider 'Maine experiences cold winters.' Perry says that the subject matter of this claim is the set of those objects that are part of every situation that verifies that Maine has cold winters. If this set is {Maine}, then it follows that the claim is entirely about **Maine**, as desired. However, it is then not entirely about **New England**, for {Maine} $\nsubseteq$ {New England}.

However, a Perry supporter has room to manoeuvre: she can insist that, for any subject matter $\mathbf{s}$, if b is an essential part of a, then $a \in \mathbf{s}$ only if $b \in \mathbf{s}$. This aligns with Perry's core idea: $\mathbf{s}_{Fa}$ plausibly includes the essential parts of a, for it is plausible that these objects are part of any situation of which a is a part. In this case, so long as Maine is an essential part of New England, we have it that **Maine** $\subseteq$ **New England** and 'Maine experiences cold winters' is entirely about New England.

However, more serious objections are lurking.

Objection. Constraint 5 is violated. Suppose that $a \neq b$ (and a is not an essential part of b, or vice versa). On Perry's theory, $Fa \vee Fb$ is associated with $\emptyset$, the degenerate topic. To see this, note that $Fa \vee Fb$ is verified by a minimal situation where a has property F, but such a situation does not have b as a part. Similarly, $Fa \vee Fb$ is verified by a minimal situation where b has property F. Thus, no object is part of every situation that verifies $Fa \vee Fb$. So, the Perry supporter faces a dilemma: either take $Fa \vee Fb$ to be about everything, or take it to have no subject matter (properly speaking). Either way, constraint 5 is violated.

Objection. Constraint 6 is violated. On Perry's view, 'Tully fell out of bed and Tully is Tully' has the same subject matter as 'Tully fell out of bed'—namely, {Tully}.

Objection. Constraint 9 is violated. There is no situation that verifies $Fa \wedge \neg Fa$, and so it is vacuously true that a is part of every situation that verifies $Fa \wedge \neg Fa$. This leaves a dilemma. If it is allowed that proper classes are subject matters, then $\mathbf{s}_{Fa \wedge \neg Fa}$ is the proper class of all objects, and so $Fa \wedge \neg Fa$ is (partly) about everything. On the other hand, if proper classes are excluded, then there is no such thing as $\mathbf{s}_{Fa \wedge \neg Fa}$, and so $Fa \wedge \neg Fa$ is about nothing.

Objection. Constraint 1 is violated. On Perry's theory, $Fa \vee \neg Fa$ is entirely about **a**, but $\neg(Fa \vee \neg Fa)$ is not entirely about **a** (as in the previous objection, it is either about everything, and so only partly about **a**, or about nothing).

Objection. Constraint 10 is violated. On the subject-predicate conception, the subject matter of aRb is identical to that of bRa—namely, $\{a, b\}$.

4.2 The Atom-Based Conception

In general, a theory within the atom-based conception proceeds as follows: fix a set (or class) **u** of distinguished objects (the *universe*). Then a subject matter **s** is any subset of **u** (with the empty set being the degenerate case). Inclusion $\leq$ is the subset relation and $\bowtie$ is non-empty intersection. In general, we leave the combination operation $+$ unspecified. Let **T** be a *topic function* that assigns a subject matter to every atomic claim p. Then, for an arbitrary sentence φ, the subject matter of φ is just the combination of the subject matters of the atoms in φ, relative to **T**.

A *particular* theory along this line depends on **u**, an account of $+$ and any additional constraints on **T**. This section considers two theories that take $+$ as set union. (Section 6 presents an atom-based theory with a different account of $+$.)

4.2.1 A Basic Version

A simple atom-based theory is as follows (I resist attributing it to anyone in particular). The universe **u** is the class of all sets of possible worlds. A member of **u** can be viewed as an *unstructured proposition* or a *truth set* or a *piece of information*. Thus, a subject matter **s** is a set of pieces of information. Then we refine **T**: each atom p is assigned $\{P\}$, where P is the truth set of p—those worlds at which p is true. (This assumes that a truth relation is already defined, in the usual manner.) Then, for instance, the subject matter for $p \wedge (q \vee r)$ is just $\{P, Q, R\}$, and that for $p \vee (\neg p \wedge q)$ is $\{P, Q\}$.

There is also a natural account of **a**, the subject matter associated with object a. Say that an unstructured proposition P *concerns* a if there are no two worlds w_1 and w_2 such that a is exactly alike in those two worlds but $w_1 \in P$ and $w_2 \notin P$. Then let **a** be the set of all unstructured propositions that concern a.[19]

This goes a long way towards meeting our constraints. Since subject matter is invariant under $\neg$ and treats $\vee$ and $\wedge$ equivalently (as applications of combination), the current account satisfies strong compositionality principles, and so meets constraints 1 through 5. Further, it contributes a hyperintensional dimension to meaning, partly satisfying constraints 6 through 9. For instance, the subject matter of $p \wedge (q \wedge \neg q)$ differs from that for p if p and q have different truth sets. Further, since the truth sets for aRb and bRa can differ, their subject matters can differ, satisfying constraint 10. Further, the account captures basic part-whole intuitions: presumably, any difference in how things are for Maine constitutes a difference in how things are for New England. Thus, the set of unstructured propositions that concern New England contains those

[19] Compare the notion of *pw-aboutness*, attributed to Barbara Partee by Perry [1989]. An anonymous reviewer notes that, if circularity objections are to be forestalled, then 'exactly alike' is best explicated in terms other than *agreement on the facts about a*—potentially a tall order. One proposal, which can be extracted from Lewis [1988a: 163–4], is that two worlds are exactly alike with respect to object a when a has exactly the same intrinsic properties in those worlds.

that concern Maine. Hence, **Maine** $\leq$ **New England**, and so any claim about **Maine** is also about **New England**. Thus, constraints 11 and 12 are accommodated. Finally, since a question can be identified (in many contexts) with a set of unstructured propositions (namely, the truth sets for the possible answers), there is a ready relationship between questions and subject matters on the current view. Constraint 12 is satisfied.

> *Objection*. Constraints 8 and 9 are violated. To see this, note that the truth set of '2 is even' is W, the set of all possible worlds. Likewise, the truth set of 'Jones is Jones' is W. Next, note that W concerns every object a, since it is vacuously true that there are no two worlds w_1 and w_2 such that a is exactly alike in those two worlds but $w_1 \in W$ and $w_2 \notin W$. But, in this case, the subject matter for '2 is even' and 'Jones is Jones' is included in that associated with, say, Abraham Lincoln. Thus, the current view has the consequence that '2 is even' and 'Jones is Jones' are about **Abraham Lincoln**. Similar remarks apply to necessary falsehoods, such as '2 is odd.'

4.2.2 Parry

Parry [1968] offers another development of the atom-based theme.[20] Take the universe to be the set of all *concepts*. For precision, we understand concepts in an intensional, Carnapian way—as partial functions from possible worlds to individuals that exist in those worlds. We distinguish between *individual concepts*, which map worlds to singletons, and *general concepts*, which map at least one world on which the concept is defined to a set containing at least two objects. Individual concepts may be associated with individual objects, and with linguistic items that denote individual objects. General concepts may be associated with properties, and with predicates that denote properties. (For simplicity, we ignore relations. The more general picture is predictable: the concept $\mathfrak{R}$ associated with n-ary relation R is a partial function from worlds to *n-tuples* of objects.)

It is natural to think of a subject matter as a set of concepts. Mathematical subject matter, one might think, is usefully identified with the set of all mathematical concepts—the concept of the number 2, the concept of being even, and so on. What of the subject matter **a** associated with object a? The natural proposal is that $\mathbf{a} = \{\mathfrak{a}\}$, where $\mathfrak{a}$ rigidly designates a. On this view, Fa is only *partly* about **a**, since $\{\mathfrak{a}, \mathfrak{F}\}$ merely overlaps with $\{\mathfrak{a}\}$. This is as it should be: the current theorist cheerfully proclaims that 'Rex is a dog' is partly about **Rex** and partly about **doghood**.

As for topic assignment **T**: given atom Fa, $\mathbf{T}(Fa)$ is the set that contains the individual concept associated with the denotation of a, and the general concept associated with the denotation of F. The subject matter of $Fa \vee (\neg Fa \wedge Gb)$ is then $\{\mathfrak{a}, \mathfrak{b}, \mathfrak{F}, \mathfrak{G}\}$.

The current theory shares many of the previous one's advantages, but is better positioned to meet constraints 8 and 9. On the current view, the subject matter of '2 is even' is $\{2, \mathfrak{even}\}$, and that of 'Jones is Jones' is $\{\mathfrak{Jones}, \mathfrak{ID}\}$. Neither seems to be included in **Abraham Lincoln**, although the former is presumably included in **2** and the latter in **Jones**.

> *Objection*. Constraint 10 is violated. On the current view, aRb and bRa have the same subject matter: $\{\mathfrak{a}, \mathfrak{b}, \mathfrak{R}\}$.[21]

[20] Ryle [1933] suggests a theory along similar lines. Also see Fine [1986], Parry [1989], and Burgess [2009: ch. 5].
[21] Compare the criticism of Ryle [1933] in Yablo [2014: ch. 2].

> *Objection.* Constraint 11 is violated. (And how to recover it without *ad hoc*ery or artificiality?) Since Maine is not identical to New England, the concept $\mathfrak{m}$ that rigidly designates Maine is not identical to the concept $\mathfrak{ne}$ that rigidly designates New England. Thus, 'Maine experiences cold winters' has the subject matter $\{\mathfrak{C}, \mathfrak{m}\}$, which is partly about **Maine** but not partly about **New England**.

Combining the strengths of our two atom-based variations might seem to be a simple matter: replace the unstructured propositions in the first theory with structures of concepts, echoing the second theory. To foreshadow, this is *exactly* the move that the issue-based theory exploits.

4.3 The Way-Based Conception

On the way-based conception, a subject matter is a comprehensive set of *ways things can be*. We represent a 'way things can be' as an unstructured proposition—the set of possible worlds that exemplify the way in question. Thus, a singleton $\{w\}$ may be described as a *total* ways things can be. Thus, *way* is, for us, just an alternative term for *unstructured proposition*, *truth set*, or *piece of information*. A set of ways $\mathbf{W}$ is *comprehensive* if it covers logical space: the union of the members in $\mathbf{W}$ is equal to W, the set of all possible worlds. Thus, a comprehensive set of ways classifies every possible world as being some way or other. (For technical convenience, we take the empty set $\emptyset$ as a member of every covering. We will not bother to list this element in examples.) Consider an example from Lewis [1988a]: **the 17$^{\text{th}}$ century**. Intuitively, a proposition is a member of **the 17$^{\text{th}}$ century** just in case it captures a particular way for the 17$^{\text{th}}$ century to be. What of the set of worlds where the 17$^{\text{th}}$ century does not exist? The simplest manoeuvre is to count these as constituting one way for the 17$^{\text{th}}$ century to be, although this is an awkward usage of the terminology.

The way-based conception is motivated by specific intuitions: one can classify possible worlds according to any number of distinctions. A subject matter is a system of such distinctions—a way of focusing on certain distinctions, and of ignoring others. Thus, one may speak of a way things are *relative to a subject matter* (as in, relative to the distinctions at issue, and ignoring other possible distinctions that could be drawn). The critical move of the way-based conception is to *identify* a subject matter with its associated set of ways.

Inclusion is *not* defined as the subset relation on the way-based conception. Rather, the intuitive idea is that $\mathbf{s} \leq \mathbf{t}$ just in case $\mathbf{t}$ *refines* $\mathbf{s}$, by offering a refined system for dividing the possibilities. Here are two important options for making this precise. One might define $\mathbf{s} \leq \mathbf{t}$ thus: every way P in $\mathbf{t}$ is a refinement of some way Q in $\mathbf{s}$, in the sense that P entails (that is, is a subset of) Q. Or one might define $\mathbf{s} \leq \mathbf{t}$ thus: every way Q in $\mathbf{s}$ is refined by some way P in $\mathbf{t}$, in the sense that P entails Q. The degenerate covering thus serves as the degenerate subject matter.[22] For note that $\{W\}$ is refined by *every* subject matter, on both definitions.

As for the subject matter $\mathbf{a}$, associated with an object a, we think of this, again, as the set of ways that things can be for a. There are different possible ways that Abraham

[22] Lewis [1988a] excludes the degenerate covering from the class of subject matters. However [ibid.: 164], he regards it as a merely verbal question whether to exclude it completely or to treat it as a degenerate case.

Lincoln could be (including a degenerate case: not existing). **Abraham Lincoln** is the set of all such ways.

As usual, a sentence φ is (somehow) associated with a subject matter $\mathbf{s}_\varphi$. Thus, φ is entirely about **s** just in case $\mathbf{s}_\varphi$ is refined by **s**. This neatly captures constraint 11. Clearly, every way for New England to be entails a way for Maine to be, and every way for Maine to be is entailed by a way for New England to be. Hence, **New England** refines **Maine**. Thus, **Maine** $\leq$ **New England**.

Constraint 12 is also neatly met. On standard theoretical developments, a question is associated with its set of answers, represented by a set of unstructured propositions. This is exactly the sort of entity that a subject matter is, on the current view.[23]

4.3.1 Lewis

Lewis [1988a] develops the way-based conception as follows: a subject matter is taken to be a *partition* on the space of possible worlds—a set of mutually disjoint and exhaustive unstructured propositions. **s** includes **t** just in case **s** refines **t**, where this means that every $P \in \mathbf{t}$ is equal to a union of members of **s** (it suffices for Lewis, then, to use the first definition of inclusion mentioned above). $\mathbf{s}_\varphi$ is the binary partition consisting of the truth set of φ and its complement.[24] This satisfies constraint 10: aRb and bRa have distinct truth sets, and so have distinct subject matters, on the current view.

> *Objection.* Constraints 3 and 4 are violated. The root problem is that Lewis's theory entails that the subject matter of φ has no proper part that is a proper subject matter: the subject matter of a sentence is a binary partition, which refines only itself and the degenerate partition $\{W\}$. So $Fa \wedge Gb$, for instance, need not be partly about the subject matter of Fa.
>
> *Objection.* Constraints 6 and 7 are violated. For instance, on Lewis's view, $Fa \wedge (Gb \vee \neg Gb)$ has the same subject matter as Fa, since their truth sets are identical.
>
> *Objection.* Constraints 8 and 9 are violated. For instance, on Lewis's view, the topic of $Fa \vee \neg Fa$ is the degenerate topic $\{W\}$, and so $Fa \vee \neg Fa$ is (technically) about everything.

Lewis [1988b] is aware of these difficulties, and explores different conceptions of 'partial aboutness' in an effort to land on something fully satisfactory. His proposals encounter many difficulties. Further, he is uneasy [1988a] about his theory's implication that necessities are about every subject matter, and he develops, in response, a modification that extends logical space to include *impossible worlds*. He acknowledges

[23] Care is needed. A comprehensive set of answers is presumably *downward closed*, i.e. if P entails Q, and Q is an answer to question $\mathbf{Q}$, then P is also an answer to $\mathbf{Q}$. However, we should *not* insist on this for a set of unstructured propositions that captures ways things can be, relative to a system of distinctions. For, in this case, if P entails Q, then P may be a region of logical space that can only be captured with distinctions that go beyond what is needed to mark off region Q. 'John is a bachelor' entails 'John is a man.' The region of logical space where the latter is true can be marked off with the distinction between John being a man and his not being one. Marking off the region where the former is true requires that we also focus on the distinction between John being married and his not being so.

[24] More accurately, Lewis [1988a: 164] denies that we can, strictly speaking, identify *the* subject matter of φ; he holds merely that the least subject matter is the 'closest we can come'. Our objections to his theory stand, regardless.

that this manoeuvre raises difficult and subtle issues. As we shall see, the issue-based theory makes no use of impossible situations or worlds.

4.3.2 Yablo

Lewis divides $\mathbf{s}_\varphi$ into two ways things can be—that way according to which φ is true, and that way according to which φ is false. For Yablo [2014], this subject matter is not fine-grained enough. Rather, we should identify $\mathbf{s}_\varphi$ with the basic ways in which φ can be true, and the basic ways in which φ can be false—the set of *minimal truthmakers*, and of *minimal falsemakers*, for φ.

More technically, a semantic truthmaker (falsemaker) for φ is associated with a *minimal model* that verifies (falsifies) φ. We can here think of a model as a state description λ—a conjunction of unique literals (a literal being either an atom or the negation of an atom). Thus, $Fa \wedge \neg Fb \wedge Gb$ is a state description, and so a model on the present conception. (More generally, a model in the classical setting is a partial valuation. Compare section 4.1.1.) Then λ verifies (falsifies) φ just in case φ ($\neg\varphi$) is a logical implication of λ. A verifier (falsifier) is *minimal* just in case there is no verifier for φ ($\neg\varphi$) that is implied by λ but doesn't imply λ. A truthmaker (falsemaker) for φ is an unstructured proposition that is expressed by a verifier (falsifier) for φ. A minimal truthmaker (minimal falsemaker) is expressed by a minimal verifier (minimal falsifier).

For example, consider $p \wedge q$, where p and q are atoms. This is itself a state description, and so its sole minimal truthmaker is expressed by itself. On the other hand, two minimal models falsify our formula: $\neg p$ and $\neg q$. Thus, our formula has (at most) two minimal falsemakers.

For example, consider $p \vee q$. This formula is verified by two minimal models: p and q. Hence, it has (at most) two minimal truthmakers. On the other hand, it is falsified by a unique minimal model $(\neg p \wedge \neg q)$, and so has one minimal falsemaker.

Call the set of minimal truthmakers for φ its *matter*, denoted $\mathbf{m}(\varphi)$, and the set of minimal falsemakers its *anti-matter*, denoted $\mathbf{a}(\varphi)$. We then take $\mathbf{s}_\varphi$ to be $\mathbf{m}(\varphi) \cup \mathbf{a}(\varphi)$, on the Yablovian view.[25]

Yablo [ibid.: ch. 3] seems to prefer our second definition of inclusion: $\mathbf{s} \leq \mathbf{t}$ just in case every member of $\mathbf{s}$ is entailed by some member of $\mathbf{t}$. This buys an advantage over Lewis in satisfying constraint 3: $p \wedge q$ has the subject matter $\{P \cap Q, P^c, Q^c\}$, where P is the truth set for p and Q is the truth set for q. p has the subject matter $\{P, P^c\}$. Hence, $\mathbf{s}_p$ is included in $\mathbf{s}_{p \wedge q}$, on Yablo's view. Further, if p is entirely about $\mathbf{a}$, it follows that $p \wedge q$ is partly about $\mathbf{a}$, as desired.

Nevertheless, Yablo's theory does not meet all of our constraints.

Objection. Constraint 2 is violated. On the Yablovian theory, we have $\mathbf{s}_p = \{P, P^c\}$ and $\mathbf{s}_q = \{Q, Q^c\}$. Consider the subject matter $\mathbf{s} = \{P, Q, P^c, Q^c\}$. Since every member of $\mathbf{s}_p$ and every member of $\mathbf{s}_q$ is entailed by some member of $\mathbf{s}$, we have it that $\mathbf{s}_p \leq \mathbf{s}$ and $\mathbf{s}_q \leq \mathbf{s}$. But we also have $\mathbf{s}_{p \vee q} = \{P, Q, P^c \cap Q^c\}$. Since $P^c \cap Q^c$ is not entailed by any member of $\mathbf{s}$, we have $\mathbf{s}_{p \vee q} \not\leq \mathbf{s}$.

Objection. Constraint 4 is violated. Above, we noted that Yablo's view entails that $\mathbf{s}_{p \wedge q} = \{P \cap Q, P^c, Q^c\}$. On the other hand, $\mathbf{s}_{p \vee q} = \{P, Q, P^c \cap Q^c\}$. But it is

[25] An alternative is to take the *ordered pair* of the matter and the anti-matter of φ. This has an apparent disadvantage: p and $\neg p$ will have different subject matter: $\mathbf{s}_p = \langle \mathrm{p}, \neg \mathrm{p} \rangle$ and $\mathbf{s}_{\neg p} = \langle \neg \mathrm{p}, \mathrm{p} \rangle$.

thus evident that the former does not refine the latter: $P^c \cap Q^c$ is not entailed by any member of $\{P \cap Q, P^c, Q^c\}$.[26]

Objection. Constraints 6 and 7 are violated. On Yablo's view, the subject matter of logically equivalent claims is identical. Thus, in particular, $p \wedge (q \vee \neg q)$ has the same subject matter as p.

Objection. Constraint 8 is violated. Let a be an arbitrary object. On Yablo's view, every atom and its negation is a minimal verifier for $p \vee \neg p$. Thus, $\mathbf{s}_{Fa}$ is refined by the topic of $p \vee \neg p$ (Fa and $\neg Fa$ both verify $p \vee \neg p$, and so every minimal truthmaker and falsemaker for Fa is trivially entailed by a member of $\mathbf{s}_{p \vee \neg p}$). On the assumption that Fa is entirely about $\mathbf{a}$, it follows that $p \vee \neg p$ is partly about $\mathbf{a}$.

Our third objection indicates that the current theory cannot deliver the hyperintensional consequences of subject matter. Yablo himself seems to consider this a cost and wavers between accepting the above theory and the below variation [ibid.: secs 4.4–4.6].

4.3.3 Van Fraassen-Yablo

Finally, we consider a variation of Yablo's ideas.[27] Recall that he identifies the subject matter of φ with a distinguished subset of truthmakers and falsemakers. He uses *minimality* as the criterion for membership. There are alternatives, however. One, following van Fraassen [1969], builds up a set of distinguished truthmakers $\mathbf{m}(\varphi)$ and falsemakers $\mathbf{a}(\varphi)$ in a *recursive* fashion:[28]

- $\mathbf{m}(p) = \{P, \emptyset\}$ and $\mathbf{a}(p) = \{P^c, \emptyset\}$, where P is the truth set for p
- $\mathbf{m}(\neg\varphi) = \mathbf{a}(\varphi)$ and $\mathbf{a}(\neg\varphi) = \mathbf{m}(\varphi)$
- $\mathbf{m}(\varphi \wedge \psi) = \{Q \cap R : Q \in \mathbf{m}(\varphi) \text{ and } R \in \mathbf{m}(\psi)\}$ and $\mathbf{a}(\varphi \wedge \psi) = \mathbf{a}(\varphi) \cup \mathbf{a}(\psi)$
- $\mathbf{m}(\varphi \vee \psi) = \mathbf{m}(\varphi) \cup \mathbf{m}(\psi)$ and $\mathbf{a}(\varphi \vee \psi) = \{Q \cap R : Q \in \mathbf{a}(\varphi) \text{ and } R \in \mathbf{a}(\psi)\}$

As with Yablo, we use the following definition for inclusion: $\mathbf{s} \leq \mathbf{t}$ just in case every member of $\mathbf{s}$ is entailed by some member of $\mathbf{t}$. Again, we use $\mathbf{s}_\varphi = \mathbf{m}(\varphi) \cup \mathbf{a}(\varphi)$.

The resulting account has an advantage over Yablo's in terms of accounting for hyperintensionality, and so in meeting constraints 6 and 7. For, on the current theory, p and $p \wedge (q \vee \neg q)$ have different subject matter: $\mathbf{s}_p = \{P, P^c\}$ and $\mathbf{s}_{p \wedge (q \vee \neg q)} = \{P \cap Q, P \cap Q^c, P^c\}$. Further, $\mathbf{s}_p$ is included in $\mathbf{s}_{p \wedge (q \vee \neg q)}$, so $p \wedge (q \vee \neg q)$ is partly about the subject matter of p, as desired.

Further, the current account better observes constraint 8: Yablo's theory had the consequence that the truth set for every atom and its negation was part of the subject matter of $p \vee \neg p$. On the current account, $\mathbf{s}_{p \vee \neg p} = \{P, P^c\} = \mathbf{s}_p$.

However, once again, the proposal does not meet all of our desiderata.

[26] Yablo effectively notices this [2014: sec. 12 of Appendix: available at http://www.mit.edu/ ~yablo.] The same fact is directed at his theory as a criticism, by Holliday [2013: sec. 6.2.1].

[27] See Yablo [2014: sec. 4.2].

[28] This involves a departure from van Fraassen [1969]. There, truthmakers are represented as structured objects called *complexes*, which are formally reminiscent of *distinctions* (as we explicate these in section 5.1). The resulting theory evades the second objection below, but not the first (we omit the details). Thanks to an anonymous referee for pressing this point.

Objection. Constraints 2 and 4 are violated: see the counter-examples to Yablo's earlier theory.

Objection. Constraint 6 is violated. On the current account, $\mathbf{s}_{p \wedge (b = b)} = \{P, P^c\} = \mathbf{s}_p$, since $\mathbf{s}_{b = b} = \{W\}$ where W is the set of all worlds.

5. Positive Proposal: The Issue-Based Theory

I now propose a version of the atom-based approach—the issue-based theory—that meets all of our constraints. It tweaks, without majorly departing from the form of, the basic atom-based theories in section 4.2. Its intuitive rationale is effectively that of the way-based conception (although I propose that it elaborates this more straightforwardly). Since these features have proved appealing to various authors, I consider this to be promising.

I describe the main tenets of the theory, and then offer a simplistic but precise and illustrative elaboration.

5.1 The Basic Proposal

We first revisit some intuitive claims. A subject matter is a system of *distinctions*. For instance, the purpose of a discourse topic is to focus conversation on certain distinctions, and to allow others to recede from view. On this picture, a relationship between questions and topics is evident. A distinction is associated with a basic *issue*: is the world that way, or not? Thus, a system of distinctions is associated with a system of issues. To resolve each distinction is to answer each associated question, allowing for a *complete* answer to the questions in focus. Hence we have the notion of a *way things can be relative to a subject matter:* each such way is a complete answer that decides every distinction at issue.

A high-level technical elaboration of this picture now follows. We understand *concepts* as in section 4.2.2—as Carnapian intensions. For simplicity, we assume that every object exists at every world, and ignore the necessity of dividing objects into types. An *individual concept* maps each world to an object. An individual concept that maps each world to the same object is a *rigid designator*. Otherwise, it is a *role*. An n-ary *general concept* maps each world to a set of tuples of length n. We take 1-ary general concepts to simply map to sets of objects.

Think of a rigid designator as the semantic value of a name; a role as the semantic value of a definite description; and a general concept as the semantic value of a predicate.

A *distinction* (or *issue*) is a tuple of concepts, $\langle \mathfrak{R}, \mathfrak{o}_1, \ldots, \mathfrak{o}_n \rangle$, where $\mathfrak{R}$ is an n-ary general concept and each $\mathfrak{o}_i$ is an individual concept.[29] Note that possible worlds *decide* distinctions: given world w and issue $\langle \mathfrak{R}, \mathfrak{o}_1, \ldots, \mathfrak{o}_n \rangle$, it is either the case that $\langle \mathfrak{o}_1(w), \ldots, \mathfrak{o}_n(w) \rangle \in \mathfrak{R}(w)$ or that $\langle \mathfrak{o}_1(w), \ldots, \mathfrak{o}_n(w) \notin \mathfrak{R}(w) \rangle$. Thus, a distinction divides logical space into those worlds where a certain set of objects stand in a certain relation to each other, and those where those same objects do not.

[29] Compare the discussion of issues in Perry [1989], and the notion of a *complex* in van Fraassen [1969].

A *subject matter* is a set of distinctions/issues. The empty set is the degenerate subject matter. Subject matter $\mathbf{s}$ is included in $\mathbf{t}$ when $\mathbf{s} \subseteq \mathbf{t}$. That is, $\mathbf{t}$ involves the same distinctions as $\mathbf{s}$ and possibly more. Thus, $\mathbf{s} \bowtie \mathbf{t}$ means that $\mathbf{s}$ and $\mathbf{t}$ have a non-empty intersection.

Given object a, we say that an issue $\langle \mathfrak{R}, \mathfrak{o}_1, \ldots, \mathfrak{o}_n \rangle$ *concerns a* exactly when there is an i such that $\mathfrak{o}_i$ is a rigid designator that maps to a part of a (possibly a itself). Then $\mathbf{a}$ is the set of all distinctions that concern a.

Subject matter combination $+$ is set union.

5.2 Resolution, Truth, and Subject Predication

A set of issues $\mathbf{s}$ generates a partition of unstructured propositions on logical space. As in the way-based conception, these propositions are best thought of as *ways things can be with respect to* $\mathbf{s}$. Call this partition the *resolution generated by* $\mathbf{s}$. Metaphorically, a resolution divides logical space into contrasting basic possibilities at a certain grain of detail.

We fix our partition with an equivalence relation. Two worlds u and v are equivalent with respect to $\mathbf{s}$ just in case: for every issue $\langle \mathfrak{R}, \mathfrak{o}_1, \ldots, \mathfrak{o}_n \rangle$ in $\mathbf{s}$ we have either both

$$\langle \mathfrak{o}_1(\mathrm{u}), \ldots, \mathfrak{o}_n(\mathrm{u}) \rangle \in \mathfrak{R}(\mathrm{u}) \text{ and } \langle \mathfrak{o}_1(\mathrm{v}), \ldots, \mathfrak{o}_n(\mathrm{v}) \rangle \in \mathfrak{R}(\mathrm{v})$$

or both

$$\langle \mathfrak{o}_1(\mathrm{u}), \ldots, \mathfrak{o}_n(\mathrm{u}) \rangle \notin \mathfrak{R}(\mathrm{u}) \text{ and } \langle \mathfrak{o}_1(\mathrm{v}), \ldots, \mathfrak{o}_n(\mathrm{v}) \rangle \notin \mathfrak{R}(\mathrm{v})$$

That is, u and v decide every issue in $\mathbf{s}$ in exactly the same way.

Thus, our issue-based theory generates a way-based theory, as a convenient abstraction. A way-based theory generated in this manner will satisfy certain constraints, and so some way-based theories cannot be generated in this way.

As usual, we assume that every well-formed descriptive sentence φ is associated with a subject matter $\mathbf{s}_\varphi$ as part of its meaning in discourse. In particular, we allow that an atomic claim p can be associated with a complex subject matter (and so potentially with more than one distinction). We leave open to what extent the subject matter of atoms is a semantic or pragmatic fact.[30]

In line with the atom-based conception, the subject matter of logically complex expressions is constrained:

- $\mathbf{s}_{\neg\varphi} = \mathbf{s}_\varphi$
- $\mathbf{s}_{\varphi \wedge \psi} = \mathbf{s}_{\varphi \vee \psi} = \mathbf{s}_\varphi + \mathbf{s}_\psi$

Unlike the way-based theories that we surveyed, we do not assume that the subject matter of φ is determined by its truth conditions. Rather, the subject matter of $\mathbf{s}$ *constrains* the truth conditions of φ as follows. We say that an unstructured proposition P is *at the resolution of* $\mathbf{s}$ just in case P is identical to a union of members of the resolution gener-

[30] For preliminary discussion of this issue, see Yablo [2014: sec. 4.7].

ated by $\mathbf{s}$. Likewise, we say that an interpreted sentence φ is at the resolution of φ just in case its truth set is at that resolution. Now, we impose the constraint that the truth set of φ must always be at the resolution of $\mathbf{s}_\varphi$. Informally, what a claim *says* must be *about its subject matter.*

The following is simple to prove, using induction on the structure of formulas.

Proposition 1. *Given the above constraints on* $\neg$, $\wedge$, *and* $\vee$, *the property of* φ *being at the resolution of its subject matter is preserved under the application of the operations of propositional logic.*

Finally, note that there is a natural way to generate a subject-predicate theory from our issue-based theory. Consider claim φ and its associated set of distinctions $\mathbf{s}_\varphi$. Now, we say that φ *predicates relation* R *of objects* $o_1, \ldots, o_n$ just in case (i) the distinction $\langle \mathfrak{R}, \mathfrak{o}_1, \ldots, \mathfrak{o}_n \rangle$ is in $\mathbf{s}_\varphi$, with $\mathfrak{R}$ the general concept associated with R and $\mathfrak{o}_i$ the individual concept associated with o_i, and (ii) $\langle \mathfrak{o}_1(\mathrm{w}), \ldots, \mathfrak{o}_n(\mathrm{w}) \rangle \in \mathfrak{R}(\mathrm{w})$, for every w in the truth set of φ.

This accommodates various intuitions. For instance, φ might fail to predicate any property/relation, yet say something non-trivial about a non-trivial subject matter. For instance, $Fa \vee Gb$ does not predicate any property. This has appeal: the claim 'Jane is a lawyer or Joe is an accountant' says something informative about non-trivial topics (for example, the professionals whom we've met), but one might disagree that it predicates any property of Jane or of Joe. It is intuitively *non-committal* about Jane's status and Joe's status.

5.3 A Toy Framework

We now develop an explicit theory, allowing ourselves the luxury of a simplified framework.

Consider a language $\mathcal{L}$ constructed from one-place predications (for example, Fa), two-place predications (for example, aRb), and identity statements ($a = a$), using the logical connectives $\wedge$, $\vee$, and $\neg$.

As a model $\mathcal{M}$ for this language, we fix a set of worlds W called *logical space*; a domain of objects O (considered invariant across worlds) equipped with a transitive, reflexive, anti-symmetric part-hood relation ; an assignment function α that a maps each constant symbol a in the language to an individual concept $\mathfrak{a}$, each predicate symbol F to a general concept $\mathfrak{F}$, and $=$ to the general concept $\mathfrak{Id}$ that maps each world to the set of all identical pairs of objects; and a topic assignment T that assigns a set of issues to each sentence φ. For simplicity, we assume that no two constants or predicates map to the same concept.

(Note that this model associates a distinction $\langle \mathfrak{F}, \mathfrak{a} \rangle$ with each one-place predication Fa. Likewise for two-place predications and identity statements.)

Then the truth set $|\varphi|$ (relative to $\mathcal{M}$) for each φ is as follows:

- $w \in |Fa|$ iff $\mathfrak{a}(w) \in \mathfrak{F}(w)$
- $w \in |aRb|$ iff $\langle \mathfrak{a}(\mathrm{w}), \mathfrak{b}(\mathrm{w}) \rangle \in \mathfrak{R}(\mathrm{w})$
- $w \in |a = b|$ iff $\langle \mathfrak{a}(\mathrm{w}), \mathfrak{b}(\mathrm{w}) \rangle \in \mathfrak{Id}(\mathrm{w})$
- $w \in |\neg\varphi|$ iff $w \notin |\varphi|$
- $|\varphi \wedge \psi| = |\varphi| \cap |\psi|$
- $|\varphi \vee \psi| = |\varphi| \cup |\psi|$

Further, T obeys these:

- $\mathsf{T}(Fa) = \{\langle \mathfrak{F}, \mathfrak{a} \rangle\}$
- $\mathsf{T}(aRb) = \{\langle \mathfrak{R}, \mathfrak{a}, \mathfrak{b} \rangle\}$
- $\mathsf{T}(a = b) = \{\langle \mathfrak{Id}, \mathfrak{a}, \mathfrak{b} \rangle\}$
- $\mathsf{T}(\neg\varphi) = \mathsf{T}(\varphi)$
- $\mathsf{T}(\varphi \wedge \psi) = \mathsf{T}(\varphi \vee \psi) = \mathsf{T}(\varphi) \cup \mathsf{T}(\psi)$

Since each atomic predication corresponds to a unique issue (via assignment function α), we might as well have represented things as follows: T maps from a sentence φ to a set of atomic predications (or an identity statement). For example: $\mathsf{T}(Fa) = \{Fa\}$; $\mathsf{T}(aRb) = \{aRb\}$; $\mathsf{T}(\neg Fa \vee a = c) = \{Fa, a = c\}$; $\mathsf{T}(\neg(aRb \wedge bRa)) = \{aRb, bRa\}$.

For every constant a, the subject matter $\mathbf{a}$ is the set of all distinctions that have a component $\mathfrak{b}$ that designates a part of the object designated by a.

The following is again easy to prove.

Proposition 2. *For every $\varphi \in \mathcal{L}$, the truth set $|\varphi|$ is at the resolution of* $\mathsf{T}(\varphi)$.

As for an example of a resolution of a subject matter, consider subject matter $\mathbf{s} = \{Fa, Ga, Gb\}$. The resolution of $\mathbf{s}$ is expressed by the Carnapian state descriptions built from $\mathbf{s}$. That is, each cell in the resolution is expressed by one of these: $Fa \wedge Ga \wedge Gb$; $Fa \wedge Ga \wedge \neg Gb$; $Fa \wedge \neg Ga \wedge Gb$; $Fa \wedge \neg Ga \wedge \neg Gb$; $\neg Fa \wedge Ga \wedge Gb$; $\neg Fa \wedge Ga \wedge \neg Gb$; $\neg Fa \wedge \neg Ga \wedge Gb$; $\neg Fa \wedge \neg Ga \wedge \neg Gb$.

5.4 Constraints Met

I now argue that the issue-based theory meets our criteria of adequacy.

The roots of this success can be appreciated without the details. Since the issue-based theory ensures that negation does not affect subject matter, and that $\wedge$ and $\vee$ combine subject matter in a uniform manner, the theory preserves the intuitive interaction between the connectives and subject matter. Since the theory treats subject matters as composed from *structured* tuples of concepts, it captures the intuition that the structure of a claim affects its subject matter (not only what its parts denote). Since the theory provides a straightforward (set theoretic) account of inclusion and overlap, and an intuitive account of the subject matter $\mathbf{a}$ relative to object a, it neatly captures the intuition that claims about a part are also about the whole. Finally, since there is both a close connection between the notion of a distinction and that of a basic, binary, question (both are naturally described with the term 'issue'), the theory draws a close connection between questions and topics.

Now for details. For definiteness, we work with our toy framework. We demonstrate that each constraint is met (in order).

The connectives:

1. *Proof.* Suppose that $\mathbf{s}_\varphi \subseteq \mathbf{s}$. We know that $\mathbf{s}_{\neg\varphi} = \mathbf{s}_\varphi$. Hence, $\mathbf{s}_{\neg\varphi} \subseteq \mathbf{s}$.
2. *Proof.* Suppose that $\mathbf{s}_\varphi \subseteq \mathbf{s}$ and $\mathbf{s}_\psi \subseteq \mathbf{s}$. Now, $\mathbf{s}_{\varphi \vee \psi} = \mathbf{s}_\varphi + \mathbf{s}_\psi = \mathbf{s}_\varphi \cup \mathbf{s}_\psi$. Hence, $\mathbf{s}_{\varphi \vee \psi} \subseteq \mathbf{s}$.
3. *Proof.* Assume $\mathbf{s}_\varphi \subseteq \mathbf{s}$. Now, $\mathbf{s}_{\varphi \wedge \psi} = \mathbf{s}_\varphi \cup \mathbf{s}_\psi$. Since $\mathbf{s}_\varphi$ is non-empty, it follows that $\mathbf{s}_{\varphi \wedge \psi} \cap \mathbf{s} \neq \emptyset$.

4. *Proof.* $\mathbf{s}_{Fa \wedge Gb} = \mathbf{s}_{Fa \vee Gb}$.
5. *Proof.* $\mathbf{s}_{Fa} = \{Fa\}$ and $\mathbf{s}_{Gb} = \{Gb\}$. Thus, $\mathbf{s}_{Fa \vee Gb} = \{Fa, Gb\} \neq \emptyset$. Further, $\{Fa, Gb\} \nsubseteq \{Fb\}$.

Validities, contradictions, and necessities:

6. *Proof.* In the setting of our toy model, the qualification of contingency is not necessary. At any rate, $\mathbf{s}_{Fa} = \{Fa\}$. Contrast this to the following: $\mathbf{s}_{Fa \wedge (b = b)} = \{Fa, b = b\}$ and $\mathbf{s}_{Fa \wedge (Gb \vee \neg Gb)} = \{Fa, Gb\}$.
7. *Proof.* Similar to the last constraint.
8. *Proof.* Suppose that *Fa* is about something but not about everything. In the context of our toy model, this amounts to the assumption that *a* is not a part of every object *b* (for otherwise it would follow that $\mathbf{a} \leq \mathbf{b}$, for every object *b*; thus, if $\mathbf{s}_{Fa} \leq \mathbf{a}$, then $\mathbf{s}_{Fa} \leq \mathbf{b}$). Thus, suppose that *b* is such that *a* is not a part of it. It follows that $Fa \notin \mathbf{b}$. Thus, $\mathbf{s}_{Fa \vee \neg Fa} = \{Fa\} \nsubseteq \mathbf{b}$.
9. *Proof.* Similar to the previous constraint.

Denotations:

10. *Proof.* According to our toy model, $\mathbf{s}_{aRb} = \{aRb\} \neq \{bRa\} = \mathbf{s}_{bRa}$, if $a \neq b$.

Parts and wholes:

11. *Proof.* This follows from our definition of **a** and **b**: since **b** contains every distinction concerning a part of *b*, and the parthood relation is transitive, it follows that $\mathbf{a} \subseteq \mathbf{b}$.

Questions:

12. *Rationale.* Intuitively, a question sets up a system of distinctions/issues. One asks: ‘How many stars are there?’ This generates a set of distinctions: there are no stars (or some stars); there is exactly one star (or not); there are exactly two stars (or not); and so on. Or consider ‘Who came to the party?’ This generates the distinctions: Joe came to the party (or didn't); Jane came to the party (or didn't); and so on. To settle some of these issues is to provide a *partial answer* to the question. A *complete answer* decides every issue and corresponds to a cell in the resolution of the associated subject matter.[31]

6. Coda: Fine's State-Based Theory

A recent contribution from Kit Fine presents a special challenge for the issue-based theory. I now outline the theory of subject matter presented by Fine [2016, manuscript],[32] then I note that it, too, meets the constraints in section 3. We observe that it can be formulated as atom-based and that, on relatively mild assumptions, a version of the issue-

[31] Compare the account of questions in Roberts [2012].
[32] Also see Fine [2014].

based theory can be recovered from it. Hence, to some extent, both can be embraced. Nevertheless, I offer tentative reasons to favour the issue-based theory.

6.1 Fine's Theory

Fine's theory embeds into his *truthmaker semantics*. Like Perry [1989], he offers a formal account of when a situation verifies or falsifies a sentence, but with two crucial differences: he allows *impossible situations*, and he provides clauses in the style of van Fraassen [1969]. Following Fine, we label the associated relations *exact verification* (denoted $\vdash$) and *exact falsification* (denoted $\dashv$).

Let Σ be a set of *states* partially ordered by (transitive, reflexive, anti-symmetric) part-hood relation $\sqsubseteq$. We leave open the possibility that some such states are properly described as *possible* and some as *impossible*. We assume that every subset of states $A \subseteq \Sigma$ has a *fusion*, denoted by $\sqcup A$ (or $\sigma \sqcup \tau$, when $A = \{\sigma, \tau\}$). Mathematically, $\sqcup A$ is the lowest upper bound for A, relative to $\sqsubseteq$. Conceptually, think of $\sqcup A$ as that 'chunk of reality' that has exactly the members of A as its parts. This might be an impossible situation: fusing a situation where John is a cat with one where John is not a cat produces an impossible situation in which John is both a cat and not.

We again work with a simplified propositional language $\mathcal{L}$: in particular, we restrict the atomic claims to one-place predications Fa. Our semantic primitives are a *truthmaker assignment* $\mathfrak{t}$ and *falsemaker assignment* $\mathfrak{f}$, each mapping each atomic claim to a set of states in Σ. The semantic clauses are then as follows:

- $\sigma \vdash Fa$ iff $\sigma \in \mathfrak{t}(Fa)$.
- $\sigma \dashv Fa$ iff $\sigma \in \mathfrak{f}(Fa)$.
- $\sigma \vdash \neg\varphi$ iff $\sigma \dashv \varphi$.
- $\sigma \dashv \neg\varphi$ iff $\sigma \vdash \varphi$.
- $\sigma \vdash \varphi \wedge \psi$ iff there exist states τ, υ such that $\sigma = \tau \sqcup \upsilon$ and $\tau \vdash \varphi$ and $\upsilon \vdash \psi$
- $\sigma \dashv \varphi \wedge \psi$ iff either $\sigma \dashv \varphi$ or $\sigma \dashv \psi$.
- $\sigma \vdash \varphi \vee \psi$ iff either $\sigma \vdash \varphi$ or $\sigma \vdash \psi$.
- $\sigma \dashv \varphi \vee \psi$ iff there exist states τ, υ such that $\sigma = \tau \sqcup \upsilon$ and $\tau \dashv \varphi$ and $\upsilon \dashv \psi$

Let $[\varphi]$ denote the union of the set of exact verifiers and set of exact falsifiers for φ.

Now for Fine's basic account of subject matter: the set of subject matters is the set of states. That is, possible or impossible 'chunks of reality' serve as subject matters. The subject matter of expression φ—as usual, denoted $\mathbf{s}_\varphi$—is the fusion of (all of) the exact verifiers and exact falsifers of φ. In particular, $\mathbf{s}_{Fa}$ is the fusion of the truthmakers and falsemakers for Fa: that is, $\sqcup[Fa]$. Subject matter combination $+$ is defined thus: $\mathbf{s} + \mathbf{t} = \mathbf{s} \sqcup \mathbf{t}$. Finally, inclusion is defined thus: $\mathbf{s} \leq \mathbf{t}$ iff $\mathbf{s} \sqsubseteq \mathbf{t}$.[33]

Fine does not, as far as I know, provide an account of $\mathbf{a}$, the subject matter associated with object a. Here is one natural proposal, echoing section 5.1. Take situations to be concrete particulars. Then it is natural to treat the set of individual objects as a distinguished subset of situations, denoted O (assume that O is non-empty and downward-

[33] Fine [2016: sec. 5] calls this the *bi-lateral* subject matter of φ. In contrast, the *positive subject matter* of φ is the fusion of its exact verifiers; its *negative subject matter* is the fusion of its exact falsifiers. While useful technical notions, these will not do as general accounts of subject matter, by our lights, for they potentially assign different subject matter to φ and $\neg\varphi$, violating constraint 1.

closed, relative to $\sqsubseteq$). The relation $\sqsubseteq$ then serves additional conceptual roles: for objects a and b, $a \sqsubseteq b$ represents that a is a part of b, and $a \sqsubseteq \sigma$ represents that a is a part of situation σ. Then

$$\mathbf{a} := \sqcup\{\sigma \in \Sigma \ : \ \text{there exists } b \in \mathrm{O} \text{ such that } b \sqsubseteq \mathrm{a} \text{ and } b \sqsubseteq \sigma\}$$

Topic **a** is thus the fusion of the situations that overlap with a. So, if b is part of a then $\mathbf{b} \sqsubseteq \mathbf{a}$.

6.2 Fine's Theory as Atom-Based

This raises two questions. Can we classify Fine's theory under one of the three conceptions that we have explored? Second, does it meet our criteria of adequacy? We answer the first question by using three simple results.

Proposition 3. *On Fine's theory,*

$$\mathbf{s}_\varphi = \bigsqcup_{Fa \text{ in } \varphi} [\, Fa]$$

That is, on Fine's theory, the subject matter of φ is the fusion of the truthmakers and falsemakers of the atoms that appear in φ. The proof is by induction on the structure of φ.

Next, call $A \subseteq \Sigma$ an *ideal* just in case it is closed under parts and fusions. We use A^* to denote the smallest ideal that contains set A. Now, note that every $\sigma \in \Sigma$ can be associated with a unique ideal, called the *principal ideal generated by* σ and denoted $\mathbb{I}[\sigma]$: namely,

$$\mathbb{I}[\sigma] := \{\sigma\}^* = \{\tau \in \Sigma : \tau \sqsubseteq \sigma\}$$

Furthermore, let I be an arbitrary ideal. Note that $\sqcup I$ exists and is a member of I. Thus, $I = \mathbb{I}[\sqcup I]$. Hence, there is a one-to-one correspondence between the set of ideals for the state space and Σ. Now, consider a standard result:

Proposition 4. *Let $\langle \Sigma, \sqsubseteq, \mathfrak{t}, \mathfrak{f}\rangle$ be a state space, such that every subset of Σ has a fusion. Consider $\sigma, \tau, \mu \in \Sigma$. Then*

- $\sigma \sqsubseteq \tau$ iff $\mathbb{I}[\sigma] \subseteq \mathbb{I}[\tau]$
- $\sigma \sqcup \tau = \mu$ iff $(\mathbb{I}[\sigma] \cup \mathbb{I}[\tau])^* = \mathbb{I}[\mu]$

Putting our results together, we get this:

Proposition 5. *Let $\langle \Sigma, \sqsubseteq, \mathfrak{t}, \mathfrak{f}\rangle$ be a state space, such that every subset of Σ has a fusion. Then*

- $\mathbf{s}_\varphi \leq \mathbf{s}_\psi$ iff

$$\text{if } \sigma \sqsubseteq \bigsqcup_{\mathrm{Fa \ in } \varphi} [Fa] \text{ then } \sigma \sqsubseteq \bigsqcup_{\mathrm{Fa \ in } \psi} [Fa]$$

- $\mathbf{s}_\varphi + \mathbf{s}_\psi = \mathbf{s}_\chi$ iff

$$\sigma \sqsubseteq \bigsqcup_{\text{Fa in } \varphi \text{ or } \psi} [Fa] \text{ iff } \sigma \sqsubseteq \bigsqcup_{\text{Fa in } \chi} [Fa]$$

As Fine [2016: sec. 5] notes, this yields a second, equivalent, formulation of Fine's theory: relative to $\langle \Sigma, \sqsubseteq, \mathfrak{t}, \mathfrak{f} \rangle$, the set of subject matters is the set of ideals. Subject matter inclusion $\leq$ is set inclusion. Combination $+$ is set union followed by closure under parts and fusions. $\mathbf{s}_\varphi$ is the smallest ideal that includes all truthmakers and falsemakers for atoms in φ. Altogether: an atom-based theory.

6.3 Constraints Met

Fine's theory meets our criteria of adequacy. Here is the thrust. Fusing together verifiers and falsifiers washes out the difference between the verification/falsification conditions for φ and $\neg\varphi$, as well as between $\varphi \wedge \psi$ and $\varphi \vee \psi$. Thus, constraints 1 through 5 are met. Next, the current theory largely accommodates hyperintensional phenomena, since necessary claims like $1+1 = 2$, $1 = 1$, and $Fa \vee \neg Fa$ are intuitively verified by different facts. Likewise, impossibilities like $1+1 = 3$ and $Fa \wedge \neg Fa$ are falsified by different facts. Thus, constraints 6 through 9 are met. Next, the claims aRb and bRa are intuitively verified (and falsified) by different situations, so their subject matter diverges, meeting constraint 10. Since a is part of b only if $\mathbf{a} \sqsubseteq \mathbf{b}$, constraint 11 is observed: a statement about a part is also about the whole. Finally, Fine has a neat (although artificial) way to generate a subject matter from a question, and a question from a subject matter. Consider a subject matter $\mathbf{s}$, and consider its *maximal possible parts*.[34] If we understand (naturally enough, in the current setting) a question to be a set of possible situations (understood as possible answers), then our subject matter thereby generates a question. Further, one can generate a subject matter from a question by fusing its possible answers.

6.4 Breaking the Tie

The issue-based theory and Fine's theory are evenly matched, relative to the criteria of section 3. Are they competitors? Not if the only theoretical goal for a semantics is to accommodate robust linguistic intuitions. In this case, the theories stand as equally serviceable tools, until we find discriminating linguistic data.

Indeed, whether the theories substantially differ *formally* depends on one's theoretical commitments. For, given relatively mild assumptions, an issue-based theory can be generated from Fine's theory. Consider an *atomistic* state space $\langle \Sigma, \sqsubseteq, \mathfrak{t}, \mathfrak{f} \rangle$: every situation in Σ is the fusion of a subset of *atomic states*, where σ is atomic just in case σ has no proper parts (besides the degenerate fusion of the empty set of states). For simplicity, we also insist that every atomic expression Fa be assigned a *unique* atomic state as its sole truthmaker (denoted $+\mathtt{Fa}$) and a unique complementary atomic state as its sole falsemaker (denoted $-\mathtt{Fa}$). Then, on the Finean picture,

[34] See 'factoring' in the appendix of Fine [manuscript].

- $[Fa] = \{+\mathtt{Fa}, -\mathtt{Fa}\}$
- $\mathbf{s}_{Fa} = \mathbf{s}_{\neg Fa} = +\mathtt{Fa} \sqcup -\mathtt{Fa}$
- $\mathbf{s}_{Fa \wedge Gb} = \mathbf{s}_{Fa \vee Gb} = +\mathtt{Fa} \sqcup -\mathtt{Fa} \sqcup +\mathtt{Gb} \sqcup -\mathtt{Gb}$

More generally, if φ is composed from all and only the atoms $F_1a_1, \ldots, F_na_n$, then $\mathbf{s}_{\varphi} = +\mathtt{F}_1\mathtt{a}_1 \sqcup -\mathtt{F}_1\mathtt{a}_1 \ldots + \mathtt{F}_\mathtt{n}\mathtt{a}_\mathtt{n} \sqcup -\mathtt{F}_\mathtt{n}\mathtt{a}_\mathtt{n}$. Now, the pair $+\mathtt{Fa}$ and $-\mathtt{Fa}$ provide a serviceable representation of a basic distinction (between a certain property holding of a certain object, or not), and the following is easily shown (by induction) in the current setting:

- $\mathbf{s}_{\varphi} \leq \mathbf{s}_{\psi}$ iff $[\mathbf{s}_{\varphi}] \subseteq [\mathbf{s}_{\psi}]$
- $\mathbf{s}_{\varphi} + \mathbf{s}_{\psi} = \mathbf{s}_{\chi}$ iff $[\mathbf{s}_{\varphi}] \cup [\mathbf{s}_{\psi}] = [\mathbf{s}_{\chi}]$

Hence, in the current setting, subject matters may equivalently be defined as sets of atomic states; the subject matter $\mathbf{s}_{\varphi}$ as $[\varphi]$; combination as $\cup$; and inclusion as $\subseteq$. Altogether: an issue-based theory.

At any rate, my view is that accommodating ordinary linguistic data is *not* the only worthwhile goal for semantic theory. In this spirit, I offer two suggestive, but inconclusive, reasons to prefer the issue-based theory over Fine's theory. First, it is hard to identify a pre-theoretic rationale for Fine's account that meshes with its details. Fine himself hints at a rationale that seems an ill fit. Second, Fine's insistence that the subject matter of a claim be determined by its verification conditions robs his theory of useful explanatory power. In particular, it seems ill-placed to account for various hyperintensional contexts.

On the first point, an account of a fundamental semantic notion should gel with our pretheoretic views on its nature. This goes beyond accommodating our *use* of that notion in discourse; rather, the desideratum is to avoid departing dramatically from 'folk theory'. It is unreasonable to expect a folk theory to be comprehensive, precise, or confusion-free. But it is reasonable to ask our precise theory to explicate an existing notion, not to invent a new one.

By this measure, the issue-based theory is attractive. Again, it is guided by intuitively appealing ideas: a subject matter acts as a system of distinctions or issues, with claims in discourse judged as relevant exactly when they are sensitive to the distinctions that the discourse topic brings into focus.

Compare that with the core idea that, it seems, underpins Fine's approach [2016: 209]:

> This is a 'fact'-based conception of subject-matter; the subject-matter of a statement is given, in effect, by those parts of a possible world which the statement is about.

This has appeal: it is natural to take meaningful claims as making pronouncements, accurate or inaccurate, about an actual situation (a *fact*). To address the subject matter **Jane's profession** is to pronounce on the facts concerning Jane's profession. To discuss mathematics is to pronounce on the facts of the natural numbers, or the measurable spaces, or whatever.[35] (This echoes the advocacy of *Austinian topic situations* in Austin

[35] The issue-based theory accommodates this, but only indirectly: an actual situation corresponds to a distinction—that situation obtaining, or not—and it is this *distinction* that is, strictly speaking, the subject matter.

[1950/1970] and Barwise and Etchemendy [1987], positing that the hallmark of a meaningful claim is to ascribe a property to a particular situation.)[36]

But how to reconcile this starting point with the surface details of Fine's account? On one presentation of his theory, the subject matter of φ is the fusion of its verifiers and falsifiers. For many innocuous claims, this fusion is an impossible situation. But it defies intuition to claim that, say, 'Jane is a lawyer' is about the impossible situation in which Jane is both a lawyer and not, in every conceivable way. And since impossible situations cannot be actualized, so much for the guiding rationale that meaningful claims are directed at *facts*.

According to the second presentation, the subject matter of φ is the ideal $\mathtt{I}[\varphi]$—the set of exact verifiers and falsifiers for φ, closed under fusions and parts. Again, this is counter-intuitive when applied to innocuous cases. Observing your new car, I utter a truth: 'It has plush leather seats.' It is natural to say that this utterance is about a certain state of affairs: a particular car has seats with a particular quality. It is *less* natural to add that the utterance is (equally) about merely possible situations in which that same car has, say, fabric seats, or no seats. Further, it offends the idea that a claim's topic is an actual state of affairs (a concrete particular) to take topics as, fundamentally, *sets* of situations (an abstraction, or *type* of situation, at best).

Now, the second point. Beyond straightforward linguistic data, we can contrast the scope of two theories for illuminating *puzzle cases*. So, consider a crucial distinction between Fine and the issue-based theory: according to the former, the subject matter of a claim is a function of its (exact) verification and falsification conditions. With this in mind, we now survey some controversial cases from the philosophical literature. In each case, we observe (i) a claim φ that apparently showcases aspects of meaning beyond truth/verification conditions (apparently highlighting the hyperintensionality of ordinary language), and (ii) that the issue-based theory can accommodate this by positing that φ's subject matter involves distinctions that are independent of what makes φ true or false. I do not here claim that this is the *only possible* apparatus for accounting for these puzzle cases, or that it is the best. My point is modest: in contrast to theories that tightly link subject matter and verification, the issue-based theory accommodates these cases without additional resources. Failure on this front seems especially egregious if the aim of a theory of subject matter is to ground the hyperintensionality of language.[37]

The key resource for an issue-based framework is that it can assimilate Fregean thinking. In what follows, I adopt an essentially Fregean perspective: the meaning of a name n is associated (somehow) with a pair $\langle \mathfrak{o}, \mathfrak{r} \rangle$, where $\mathfrak{o}$ is a rigid designator that picks out a certain object o and $\mathfrak{r}$ is a role that is associated with that object (a *guise*). A standard running example is that 'Clark Kent' rigidly designates Kal El in the guise of the mild-mannered reporter: $\langle \mathfrak{c}, \mathfrak{m} \rangle$. This contrasts with 'Superman', which rigidly designates Kal El in the guise of the super-powered hero: $\langle \mathfrak{c}, \mathfrak{s} \rangle$.

Frege. Compare 'Clark Kent is late' and 'Superman is late.' These seem to have the same truth set and verification conditions, but nevertheless differ in meaning: the first is keyed to the distinction between the mild-mannered reporter being late or not, while the second is keyed to the distinction between the super-powered hero

[36] Compare this with the subject-predicate conception.

[37] To explicitly discern a connection to issues of hyperintensionality, embed the contrasted sentences in our coming examples in contexts such as '*a* believes that . . .' and '*a* brought it about that . . .'.

being late or not. The issue-based theory easily accommodates this, by positing that the subject matter of the first is $\{\langle \mathfrak{L}, \mathfrak{c}\rangle, \langle \mathfrak{L}, \mathfrak{m}\rangle\}$, and that of the second is $\{\langle \mathfrak{L}, \mathfrak{c}\rangle, \langle \mathfrak{L}, \mathfrak{s}\rangle\}$.

Austin.[38] I say 'Clark Kent is having a good night at the poker table,' gesturing at Jimmy Olsen. If Jimmy is actually having a bad night, but, unbeknownst to me, Clark Kent is having a good night at a different poker table across town, then my claim seems to be false. Thus, it seems to be about Jimmy Olsen, and verified if *Jimmy* is having a good night. But presumably its meaning is different to that of 'Jimmy Olsen is having a good night.' An explanation: the subject matter of the claim is $\{\langle \mathfrak{G}, \mathfrak{j}\rangle, \langle \mathfrak{G}, \mathfrak{m}\rangle\}$, where $\mathfrak{j}$ rigidly designates Jimmy Olsen, and $\mathfrak{m}$ is the role of the mild-mannered reporter.

Dretske.[39] I say 'Clark Kent is an *award-winning* reporter' (focus on 'award-winning'). This seems to have the same truth set and verification conditions as 'Clark Kent is an award-winning *reporter*.' But the meanings of the claims seem to differ. The first seems keyed to, say, the distinction between Clark Kent being a lousy reporter, or not. The second seems keyed to, say, the distinction between Clark Kent being an award-winning novelist, or not. The issue-based theory can capture this difference: roughly, the subject matter of the first claim is $\{\langle \mathfrak{A}, \mathfrak{c}\rangle, \langle \mathfrak{L}, \mathfrak{c}\rangle\}$, where $\mathfrak{A}$ corresponds to being an award-winning reporter and $\mathfrak{L}$ corresponds to being a lousy reporter; the subject matter of the second is $\{\langle \mathfrak{A}, \mathfrak{c}\rangle, \langle \mathfrak{N}, \mathfrak{c}\rangle\}$, where $\mathfrak{N}$ corresponds to being an award-winning novelist.

Donnellan.[40] Mistaking Jimmy Olsen, the boorish reporter from the New York Times, for Clark Kent, I gesture at him and say 'The mild-mannered reporter from the Daily Planet is working hard tonight'. This is a referential use of a definite description, so it is true just in case Jimmy is working hard. Nevertheless, its meaning presumably differs from a referential use of 'The boorish reporter from the New York Times is working hard tonight.' The issue-based theory can capture the difference: the subject matter of this last claim is $\{\langle \mathfrak{W}, \mathfrak{j}\rangle, \langle \mathfrak{W}, \mathfrak{b}\rangle\}$ (where $\mathfrak{j}$ rigidly designates Jimmy Olsen and $\mathfrak{b}$ is the role of being the boorish reporter for the New York Times), while that of our original claim is $\{\langle \mathfrak{W}, \mathfrak{j}\rangle, \langle \mathfrak{W}, \mathfrak{m}\rangle\}$.[41]

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References

Austin, J.L. 1950/1970. Truth, in *Philosophical Papers*, ed. J.O. Urmson and G.J. Warnock, Oxford: Clarendon Press: 117–33.

[38] See Austin [1950/1970] and its development in Barwise and Etchemendy [1987].
[39] See Dretske [1972].
[40] See Donnellan [1966].
[41] The paper was substantially improved by comments from two anonymous referees. For useful discussion, thanks to Franz Berto, Jorge Ferreira, Manuel Gustavo Isaac, Martin Lipman, and Tom Schoonen. The current paper is based on a chapter from my Ph.D. dissertation. Special thanks to my advisors—Johan van Benthem and Krista Lawlor—for their guidance in preparing that chapter, and the dissertation as a whole.

Barwise, J. and J. Etchemendy 1987. *The Liar: An Essay on Truth and Circularity*, New York: Oxford University Press.

Barwise, J. and J. Perry 1981. Situations and Attitudes, *The Journal of Philosophy* 78/11: 668–91.

Berto, F. forthcoming. Aboutness in Imagination, *Philosophical Studies*.

Burgess, J.P. 2009. *Philosophical Logic*, Princeton: Princeton University Press.

Cross, C. and F. Roelofsen. 2016. Questions, *The Stanford Encyclopedia of Philosophy (Spring 2016 Edition)*, ed. Edward N. Zalta, URL = https://plato.stanford.edu/archives/spr2016/entries/questions/

Donnellan, K.S. 1966. Reference and Definite Descriptions, *The Philosophical Review* 75/3: 281–304.

Dretske, F.I. 1972. Contrastive Statements, *The Philosophical Review* 81/4: 411–37.

Epstein, R.L. 1994. *The Semantic Foundations of Logic Volume 1: Propositional Logics, 2nd edn*, New York: Oxford University Press.

Fine, K. 1986. Analytic Implication, *Notre Dame Journal of Formal Logic* 27/2: 169–79.

Fine, K. 2014. Truth-maker Semantics for Intuitionistic Logic, *Journal of Philosophical Logic* 43/2–3: 549–77.

Fine, K. 2016. Angellic Content, *Journal of Philosophical Logic* 45/2: 199–226.

Fine, K. manuscript. Constructing the Impossible, URL = https://www.academia.edu/11339241/Constructing{_}the{_}Impossible

Goodman, N. 1961. About, *Mind* 70/277: 1–24.

Hawke, P. 2016. Questions, Topics and Restricted Closure, *Philosophical Studies* 73/10: 2759–84.

Holliday, W.H. 2013. *Knowing What Follows: Epistemic Closure and Epistemic Logic*, Ph.D. dissertation, Stanford University.

Lewis, D. 1988a. Relevant Implication, *Theoria* 54/3: 161–74.

Lewis, D. 1988b. Statements Partly About Observation, *Philosophical Papers* 17/1: 1–31.

Parry, W.T. 1968. The Logic of C.I. Lewis, in *The Philosophy of C.I. Lewis*, ed. Paul Arthur Schlipp, LaSalle, IL: Open Court: 115–54.

Parry, W.T. 1989. Analytic Implication: its History, Justification and Varieties, in *Directions in Relevant Logic*, ed. Jean Norman and Richard Sylvan, Dordrecht: Kluwer Academic: 101–18.

Perry, J. 1989. Possible Worlds and Subject Matter, in *The Problem of the Essential Indexical and Other Essays*, Palo Alto, CA: CSLI Publications: 145–60.

Putnam, H. 1958. Formalization of the Concept 'About', *Philosophy of Science* 25/2: 125–30.

Read, S. 1988. *Relevant Logic: A Philosophical Examination of Inference*, Oxford: Basil Blackwell.

Roberts, C. 2011. Topics, in *Semantics: An International Handbook of Natural Language Meaning Vol. 2*, ed. Klaus von Heusinger, Claudia Maienborn, and Paul Portner, Berlin: De Gruyter Mouton: 1908–34.

Roberts, C. 2012. Information Structure: Towards an Integrated Formal Theory of Pragmatics, *Semantics and Pragmatics* 5: 1–69.

Ryle, G. 1933. About, *Analysis* 1/1: 10–12.

van Fraassen, B.C. 1969. Facts and Tautological Entailment, *The Journal of Philosophy* 66/15: 477–87.

Yablo, S. 2014. *Aboutness*, Princeton: Princeton University Press.

Yalcin, S. 2011. Nonfactualism about Epistemic Modality, in *Epistemic Modality*, ed. Andy Egan and Brian Weatherson, Oxford: Oxford University Press: 295–332.

Yalcin, S. forthcoming. Belief as Question-Sensitive, *Philosophy and Phenomenological Research*.