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Metaphysics, Substitution *Salva Veritate* and the Slingshot Argument

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Metaphysics and Language: Facts, Propositions and 'MCT Operators'

There are lots of examples of metaphysical conclusions being drawn on the basis of linguistic phenomena. Philosophers have tried to prove the metaphysical conclusion that a benevolent all-powerful God exists on the basis of claims about what 'God' means. Others have looked at tense in language and drawn conclusions about the metaphysics of time. This article presents a more technical kind of linguistically based argument, about the metaphysics of facts, propositions and modal/causal/temporal properties – an argument whose claims are especially important in the present context because of their implications for linguistic semantics.

The article is structured as follows. In this section, I first introduce two key metaphysical views: about facts and about factlike propositions. I then introduce, also in this section, some seemingly plausible hypotheses about modality, causation, and temporal order. These are the metaphysical views which will be attacked on linguistic grounds. In the next section I explain what substitutivity principles are, and survey three different kinds of substitutivity and nonsubstitutivity. Such principles clarify the linguistic phenomena that will be used to attack the metaphysical views. The first two sections essentially introduce crucial background material for the argument. In the third section, I then describe the modest means deployed in attacking the metaphysical targets: the slingshot argument. I end by noting some standard replies to this language-based argument.

I begin with facts. It seems natural enough to think of the world as not being exhausted by the objects in it. That is, to list all the objects in the world is not to say all there is to say about it: one also wants to know what properties the objects have, and what relations they stand in, etc. And to say all that, is seemingly to describe **facts**. It's also tempting to think that facts consist of complexes of ordinary, everyday objects, properties, relations, etc.; to invent a label, it is tempting to think that facts are 'world bound.' The first view that the

slingshot calls into question, however, is precisely that there are such world-bound facts, in the plural. Instead, the argument seeks to show that, if facts are made up of commonplace worldly things, there can be at most one 'giant' one. To be clear about the metaphysical target, it is not the very idea of facts that would have to go, for there are alternative accounts of facts which, at first glance anyway, are not threatened by the slingshot. But those accounts of facts face difficulties of their own – difficulties which world-bound facts, facts as complexes of ordinary things, are not subject to. First, as will emerge below, a rose by any other name would smell as sweet. This suggests that the fact that the rose smells sweet has the rose itself in it, not some way of linguistically describing the rose. Second, part of the point of introducing facts and the like is to see how something distinct from a sentence can serve as the sentence's meaning, hence, we can't have every linguistic change in the sentence giving rise to a different fact (or factlike thing). (Strawson, 1950 made this point early on.) Third, we want the same fact (or factlike thing) to give the meaning of sentences in different languages, which again means that a mere change in the word used ought not change the proposition denoted – otherwise 'It's raining' and 'Está lloviendo' could end up denoting different things. (I'll return to this at the end of the article.) All of these points suggest that facts are world bound. But, as we shall see, reflection upon language – and especially upon substitutivity principles – makes it hard to see how they could be.

This takes us to a related point. Positing facts often goes along with the idea that factlike things can serve as the denotations of sentences. For instance, 'Ottawa is the capital of Canada' might be taken to stand for something like the fact that Ottawa is the capital of Canada. And 'Abe Lincoln was assassinated' might be taken to denote the fact that Abe Lincoln was assassinated. Of course, it can't really be facts *per se* that are sentence denotations, because false sentences are meaningful, and they cannot stand for facts. (For example, what fact could 'Toronto is the capital of Canada' stand for, given that Toronto is not the capital? There simply is no such fact.) Still, something factlike might do the trick: sentence denotations could be taken to be propositions. But the slingshot argument, in attacking facts in the plural, equally calls into question the idea that sentences stand for factlike things: if the argument succeeds, there are no such things, facts or propositions, in the plural, that sentences could denote. Again, there can be at most one thing denoted by all true sentences. And, patently, no one thing may serve as the meaning of such diverse sentences as 'Abe Lincoln was assassinated,' 'Ottawa is the capital of Canada,' 'Russia is bigger than Uruguay,' etc.

So, one metaphysical idea is that facts are complexes built from commonplace objects, properties and relations. Another is that propositions exist independently of language, and are what sentences stand for. Each of these has been argued to fall prey to the 'slingshot.' Another metaphysical view under attack has to do with notions such as necessity, possibility, causation, and temporal order. (Call these 'MCT properties,' for modal-causal-temporal.) At first glance, it seems that whether an object has an MCT property does not depend upon what the object is called. Call this its 'first feature.' Just as the rose smells sweet under any name, the rose is **necessarily** a flower no matter what it's called; and its thorns **caused** this little cut on my hand, no matter what it's called; and it bloomed **before** July 1, no matter what it's called. MCT properties, that is, seem to be sensitive to the nature of the thing itself, not to how we speak about it. Even more obviously, just because one object has the property of being necessarily a flower, it doesn't follow that every object does. And just because something caused that cut on my hand doesn't mean that any old thing did. Similarly for temporal order: that the rose bloomed before July 1 doesn't entail that anything you wish to pick happened before July 1. Call that its 'second feature.' Curiously, the slingshot argument has been used to show that, given an added complication about logical equivalence that will be explained below, these two supposed features of MCT properties can't both apply. If we insist that not every truth is necessary, that not every event caused such-and-such, that not every event is temporally prior to so-and-so, then we must grant that whether something has an MCT property depends on what name is used for it. In this latter respect, MCT properties must be radically different from smelling sweet. (Terminological note: In what follows, I'll speak of 'operators' when I mean 'words that either modify one sentence, or connect two sentences.' Thus all of 'necessarily,' 'possibly,' 'because' and 'before' are operators in my sense. Note also that the results to be discussed do not merely apply to words that modify and connect sentences: the arguments presented could easily be extended to expressions that combine sentences with subsentences, e.g., '[s Juana died] before [NP the American Civil War]' combines a sentence with a noun phrase. To keep things simple, however, I will focus on operators combining or modifying sentences.)

Substitution *Salva Veritate*

I have quickly canvassed three targets of the slingshot: world-bound facts, the proposition as sentence

meaning, and the claim that MCT properties have the two features introduced just above. Eventually I will explain how technical points about substitutivity *salva veritate* – the second element in the article's title – can be used to call facts *et al.* into question. But I need to start with what substitution *salva veritate* is, the varieties of substitutional contexts (i.e., for singular terms and for sentences), constraints on such substitution, etc.

I will begin with substitutivity of singular terms. Shakespeare famously said that a rose by any other name would smell as sweet. This certainly seems right: you don't change the smell of a rose just by renaming it. We can put his point about roses less eloquently as: 'You may substitute any coreferential name for "This rose" in "This rose smells sweet" and preserve truth.' Though wordy, this also seems right, and for just the same reason: a name change doesn't yield an odor change. Nor is '—— smells sweet' an isolated example. A dog by any other name would weigh just as much, would have the same number of hairs, would have the same size ears, etc. This is substitution *salva veritate*: 'substitution while preserving truth.'

Interestingly, not all contexts are like '—— smells sweet' or '—— weighs 28lb.' Sometimes when you change the label of an object, you don't preserve the truth of the whole sentence. Consider an example adapted from W. V. O. Quine:

(1) Andre the Giant was so called because of his size

(2) André Roussimoff was so called because of his size

Sentence (1) is true: the famous wrestler adopted that name precisely because he was so big. But sentence (2) is false. Surprisingly, this is the case even though 'Andre the Giant' and 'André Roussimoff' refer to the very same person. So, unlike roses and being sweet smelling, a wrestler by any other name would not automatically be so called because of his size; if he happens to have the property of being so called because of his size under all of his names, that would be the merest coincidence.

Of course what's special and different about '—— was so called because of his size' is that it explicitly makes reference **to the name** of the person being discussed: this curious predicate applies to linguistic things, i.e., names, not (just) to the person herself. That's why you can't put in any name you like for Andre in (1): because the sentence talks about words, specifically about names. We can see this point still more clearly with quotation marks. As it happens, the city of Toronto is also known as Hog Town. These two names refer to the same place.

(Toronto used to be a major center for pork processing.) Yet (3) is true, while (4) is false:

(3) 'Toronto' contains exactly three vowels

(4) 'Hog Town' contains exactly three vowels

In this case it should be no surprise that you cannot substitute coreferring names in the context '"——" contains exactly three vowels,' because this predicate is obviously about the name, not about its referent. In contrast, '—— smells sweet' does not make reference to the linguistic item employed, but is instead wholly about the flower – that's why you can substitute whatever name you like. And '—— is so called because of his size' makes reference to both the denotation and the name: it's Andre the man who is being discussed, but 'so called' makes reference to his name as well. In sum, we have contexts which don't allow substitution of coreferring names *salva veritate* (both the kind which is just about words, as in quotation mark contexts, and the kind which is about words and nonwords, as in '—— was so called'), and contexts which do allow substitution *salva veritate* (the '—— smells sweet' and '—— weighs 28lb' kind).

The excursus into substitution principles continues. I've considered one kind of thing that can be substituted, namely singular terms. And I've considered one constraint on truth-preserving substitution, namely that the predicate apply to the thing denoted, not to the words that denote. Another kind of substitution deals not with names (such as 'Andre' and 'Toronto'), but rather with sentences. In some linguistic contexts, you can preserve truth by substituting sentences that have the same truth value. This works, for instance, with 'and,' 'or,' and the other truth functional connectives familiar from classical logic. To take one example, sentence (5) is true because both of its conjuncts are true. And since (6) is true as well, sentence (7) must be true, precisely because (7) results merely from substituting the true sentence (6) in for the second conjunct of (5).

(5) Ottawa is the capital of Canada and Toronto is west of Ottawa

(6) Vancouver is west of Edmonton

(7) Ottawa is the capital of Canada and Vancouver is west of Edmonton

But many linguistic contexts don't preserve truth when one interchanges sentences that happen to have the same truth value. Take 'Just about everyone knows that ——.' Sentence (8), when embedded in this context, yields the true (9):

(8) Two plus two is four

(9) Just about everyone knows that two plus two
    is four

Now, sentences (6) and (8) have the same truth value: they are both true. Yet if we substitute (6) for (8), in 'Just about everyone knows that ——,' the result is (10), which is not true. Canada's geography just isn't that widely known.

(10) Just about everyone knows that Vancouver is
     west of Edmonton

So, unlike in the case of 'and,' we can go from the true (9) to the false (10) by substituting one true sentence for another. Thus, truth is **not** preserved under substitution, in the scope of 'Just about everyone knows that ——.' This provides an example of not being able to substitute material equivalents *salva veritate*.

One last substitution principle. There are some contexts which allow substitution of logically equivalent sentences *salva veritate*. One example is 'entails.' Any two sentences which are logically equivalent entail the same things. Thus given the truth of (11) and the logical equivalence of (12) and (13), one can derive (14) by substitution.

(11) That it's not the case that either Clinton is dead
     or Bush is dead entails that it's not the case
     that Clinton is dead

(12) It's not the case that either Clinton is dead or
     Bush is dead

(13) It's not the case that Clinton is dead and it's
     not the case that Bush is dead

(14) That it's not the case that Clinton is dead and
     it's not the case that Bush is dead entails that
     it's not the case that Clinton is dead

But not all verbs are like this. Consider words like 'know,' 'believe,' 'expect' and so on – so-called propositional attitude verbs. Not only can one not automatically substitute true-for-true sentences, while preserving the truth of the whole, one cannot even substitute a **logically equivalent** sentence while guaranteeing truth. One way to see this is to consider that there are extremely complicated, and also very simple, ways of expressing claims which are logically equivalent. Put in the simple way, a child might know that the claim is true; but put in the extremely complex way, he might not. For instance, little Billie, a five-year-old, might expect that it will snow in January. That's simple enough for a child that age. But (15) is logically equivalent to the very complex (16):

(15) It will snow in January

(16) $\{x: x = x \ \& \ \text{It will snow in January}\} = \{x: x = x\}$

Now, Billie might well expect the former, yet not at all expect the latter.

Since logical equivalence of sentences of the form (15) and (16) will play a key role below, let me say rather more about it. Take '$\{x: x$ is an odd number less than 27$\}$' as an example. It refers to a set – specifically, a certain set of odd numbers. For what follows, it's helpful to think of belonging to a set as involving meeting, or failing to meet, one or more conditions. For instance, an object belongs to $\{x: x$ is an odd number less than 27$\}$ if it is both an odd number, and less than 27. An object fails to belong to the set if it fails to meet either of these. Taking membership to involve meeting or failing to meet conditions, consider now the set $\{x:$ Ottawa is the capital of Canada$\}$. At first glance this looks like an odd set, but the general rule still applies: an object belongs to this set if it meets the condition that Ottawa is the capital of Canada. Now, since every object meets that condition, every object belongs to that set. With this in mind, consider the first half of (16). This phrase stands for the set of xs such that x is self-identical and it will snow in January. So, there are two conditions that must be met by an object, in order for it to be in the set: the object must be self-identical, and it must be the case that it will snow in January. The first condition is trivially satisfied by every object, however. So, in a way parallel to $\{x:$ Ottawa is the capital of Canada$\}$, whether an object gets into the set depends wholly upon whether it will snow in January: if it will snow in January, every object meets the two conditions for inclusion; if it will not snow in January, no object meets them. In this way, '$\{x: x = x \ \& \ \text{It will snow in January}\}$' comes to denote the set of all individuals, if it will snow in January. Now, the set of all individuals is also, of course, what '$\{x: x = x\}$' denotes. So the statement of their numerical identity, i.e., (16), is true if it will snow in January. On the other hand, if it won't snow in January, then '$\{x: x = x \ \& \ \text{It will snow in January}\}$' denotes the null set: no object satisfies the two conditions for inclusion in this set, viz., that it be self-identical and that it will snow in January. Hence, if it won't snow in January, the statement of identity between '$\{x: x = x \ \& \ \text{It will snow in January}\}$' and '$\{x: x = x\}$' is false: the empty set, which is what the left-hand side of the equation would denote, does not equal the set of all objects, which is what the right-hand side denotes.

In short, the two sentences (16) and 'It will snow in January' are true and false together in every circumstance. So, they are logically equivalent. Nevertheless, Little Billie, I said, may well expect that it will snow in January; but, surely, it's not the case that little Billie expects that the set whose members are such that they are self-identical and it

will snow in January is identical with the set whose members are self-identical! So, substitution of (16) for the logically equivalent (15), in the scope of 'expects that ——,' does not necessarily preserve truth. If truth is preserved, it's because of a mere coincidence, namely that the person just happens to expect both things.

So, we have sentence operators like 'and' that allow substitution *salva veritate* of merely materially equivalent sentences – i.e., of sentences which just happen to have the same truth value. And we have sentence operators like 'know' and 'expect' that don't allow that kind of substitution, and don't even allow substitution of logically equivalent sentences. This completes my explanation of substitution *salva veritate* of sentences. We also surveyed substitution of singular terms. Many contexts allow this: '—— weighs 28 lb' and '—— smells sweet.' Some do not: '—— was so called because of his size.' The next step is to put the notion of substitution *salva veritate* to work.

The Argument: The Slingshot Itself

Let's take stock. In the first section we encountered three metaphysical views. The first two involved facts and factlike propositions: that facts are made up of objects, properties, and relations, that factlike propositions exist and serve as the meanings of natural language sentences. The third involved MCT properties having two features: of applying to objects themselves, and not applying to all truths.

Given the concepts introduced above, we can now rephrase this third metaphysical view, and add a third presumption about logical equivalence:

  i. Coreferential singular terms may be substituted one for another within the scope of MCT words without altering the truth of the whole sentence;
 ii. Logically equivalent sentences may be substituted one for another within the scope of MCT words without altering the truth of the whole sentences.

But

iii. Sentences which are merely materially equivalent – i.e., which just happen to have the same truth value – may not be so substituted.

To introduce one last piece of terminology, this is to say that MCT words aren't hyperintensional (i.e., they meet both (i) and (ii)) but they also aren't transparent (i.e., they meet (iii)).

Before providing the language-based argument that none of these metaphysical views are really true, let's quickly recall why it matters. What is attractive about the first two metaphysical views? Why worry about giving them up? First, as stressed above, a rose by any other name would smell as sweet. Second, we can't have every linguistic change in the sentence giving rise to a different proposition. Third, and related to the second, we want the same proposition to give the meaning of sentences in different languages. And why is it attractive to say that MCT words satisfy (i)–(iii)? Well, it would seem that 'necessarily,' 'possibly,' and other modal modifiers would allow substitution fairly freely, since, as noted, they don't (seem to) apply to linguistic items. Like '—— smells sweet,' these terms seem to be entirely about things, not at all about words. It's Shakespeare's rose point once again. For example, starting with modal operators, if Andre the Giant was necessarily a human being (and it seems that he was), then André Roussimoff was necessarily a human being too: it doesn't matter what name we use for him, **he** is just as necessarily human. Similarly for causal operators: if Andre the Giant died because he had a heart attack, then André Roussimoff died because he had a heart attack. The phrase '—— died because he had a heart attack' is about the person alone, regardless of how that person is denoted. Nor, turning to the temporal 'before,' could Andre the Giant die before Clinton was president, while André Roussimoff did not. As with 'because,' 'before' just doesn't seem to work like '—— was so called because of his size' and '"——" contains exactly three vowels.' It seems to work like '—— smells sweet' and '—— weighs 28lb.' It is this kind of reasoning which supports the claim that 'necessary,' 'possibly,' 'before,' and 'because' meet condition (i): coreferring singular terms may be substituted one for another, within the scope of **these** words, without altering the truth of the whole sentence. Moreover, unlike 'know,' 'expect,' and 'believe,' logically equivalent facts are either both necessary, or both not necessary, either both possible, or both not possible, either both before a certain event, or not. Thus, MCT words meet (ii) as well. So, these operators do allow substitution of the first two kinds – they are not hyperintensional. Yet, or so it would seem, you can't substitute any old true sentence for 'Andre the Giant is human' in 'It is necessary that Andre the Giant is human': substitution of material equivalents is not sanctioned in the scope of modal modifiers. Nor can you substitute any old true sentence for 'André Roussimoff died of a heart attack' in 'André Roussimoff died of a heart attack before Clinton was president'; nor in 'Little Billie cried because André Roussimoff died of a heart attack.' So MCT words meet (iii) too. (One might sum up by saying that MCT words are a mite

promiscuous in terms of what substitutions they'll allow, but it's not a free-for-all either.)

Despite their attractiveness, however, and contrary to a once widely assumed semantics, if the slingshot argument works, MCT words either must not allow substitution of coreferring names or logically equivalent sentences, or they must allow substitution of sentences that just happen to be true together. And, despite the attractions of the metaphysical views, there can be at most one world-bound fact, and it patently cannot serve as the meaning of all sentences!

The argument, at last. As the title of this article suggests, the 'slingshot' in question is not a Y-shaped frame spanned by an elastic; it is, instead, an argument. It was dubbed 'the slingshot' by Jon Barwise and John Perry, because it "is so small, seldom encompassing more than half a page, and employs such a minimum of ammunition" (Barwise and Perry, 1981: 398). Moreover, like the eponymous Y-shaped frame, it can, despite its modest make-up, be used to attack some very significant foes.

I will present the argument in two stages. First, I will give it in the abbreviated format one often encounters in journal articles and such. Second, I will offer a more extended version of the argument.

As Barwise and Perry (1981) and Neale (1995) both note, variations on the argument, in its very brief form, seem to have been first formulated independently by Alonzo Church (1943: 299–300, 1956: 24–25) and Kurt Gödel (1944: 128–129). But I will focus on the best-known variant of the argument, that due to Donald Davidson (1967a: 19). Since his presentation of the argument is especially condensed, and has left so many readers puzzled, I will cite it in full, and then try to explain it. (NB: I have altered Davidson's numbering, and his logicomathematical notation, to bring it in line with what appears above.)

Davidson writes:

> The difficulty follows upon making two reasonable assumptions: that logically equivalent singular terms have the same reference, and that a singular term does not change its reference if a contained singular term is replaced by another with the same reference. But now suppose that '*R*' and '*S*' abbreviate any two sentences alike in truth value. Then the following four sentences have the same reference:
>
> (a) *R*
> (b) $\{x: x = x \ \& \ R\} = \{x: x = x\}$
> (c) $\{x: x = x \ \& \ S\} = \{x: x = x\}$
> (d) *S*
>
> For (a) and (b) are logically equivalent, as are (c) and (d), while (c) differs from (b) only in containing the singular term '$\{x: x = x \ \& \ S\}$' where (b) contains '$\{x: x = x \ \& \ R\}$' and these refer to the same thing if *S* and *R* are alike in truth value (Davidson, 1967a: 19).

As two generations of students can attest, this argument goes by very quickly. It is the 'slingshot' in its purest form. The first two sentences of the quotation essentially lay out, though in rather different terminology, conditions (i) and (ii) above. This is obscured by two things. First, because of the context in which he is writing, Davidson doesn't explicitly limit his claims to sentences occurring within the scope of words like 'necessarily,' 'possibly,' 'before,' and 'because.' (For a variant of the argument which is more explicitly restrictive along those lines, see Davidson, 1967b: 152–153, and also Davidson, 1969: 42.) Second, the relation between these first two sentences and conditions (i) and (ii) is obscured by the fact that Davidson is here assuming, for the sake of argument, that **sentences refer,** and hence just are a special kind of singular term; and that they refer specifically to **truth values.** Thus, when he says "a singular term does not change its reference if a contained singular term is replaced by another with the same reference," this entails (i) as a special case: the special case where the containing 'singular term' is a sentence, and the contained singular term is a name. And when he says "logically equivalent singular terms have the same reference," this yields, given his dictum about constant reference for the whole given constant reference of the parts, (ii): that logically equivalent sentences may be substituted, *salva veritate,* within larger sentences. Thus Davidson is here arguing that, despite appearances, any operator Φ, if it permits substitution of coreferential singular terms and substitution of logical equivalents within its scope, also permits substitution of sentences which are merely materially equivalent, i.e., which simply happen to share the same truth value. That is, using the terminology introduced above: if Φ is not hyperintensional, then it is transparent.

Let's now unpack this. As I reconstruct it, the slingshot argument consists of two assumptions – which together essentially say that Φ is nonhyperintensional – plus three 'lemmas' based on logical relations. The assumptions are:

A1. Substitution of **coreferential singular terms** in the scope of Φ will not change the truth value of the whole.
A2. Substitution of **logically equivalent sentences** in the scope of Φ will not change the truth value of the whole.

The first two lemmas state logical equivalences:

L1. The sentence '$\{x: x = x \ \& \ R\} = \{x: x = x\}$' is logically equivalent to '*R*.'
Proof: If '*R*' is true, then the left-hand side of the equation refers to the set of all individuals, because

everything is such that it is self-identical and *R* obtains. And that's what the right-hand side refers to as well. So, the equation as a whole is true, if '*R*' itself is true. If '*R*' is false, then the left-hand side of the equation refers to the empty set: if '*R*' is false then nothing is such that it is self-identical and *R* obtains. But that's not what the right-hand side refers to: the right-hand side still refers to the set of all individuals. So, the equation as a whole is false, if '*R*' is false. Thus the two sentences are logically equivalent.

L2. The sentence '$\{x: x = x\ \&\ S\} = \{x: x = x\}$' is logically equivalent to '*S*.'

Proof: Same as for L1.

The third lemma establishes a coreference relation:

L3. The singular term '$\{x: x = x\ \&\ R\}$' is coreferential with the singular term '$\{x: x = x\ \&\ S\}$.'

Proof: Given that both sentences '*S*' and '*R*' are true, both of the singular terms in L3 refer to the set of all individuals. That is, everything is such that [it is self-identical and *R*]; and everything is such that [it is self-identical and *S*].

From the two assumptions about the nonhyperintensionality of Φ, and making use of the three lemmas about set theoretic relations, we will derive that Φ is transparent. The derivation, in effect, takes us to Φ(*S*) from Φ(*R*), for any two true sentences. This will show that mere material equivalence is, despite appearances, sufficient for substitution *salva veritate* within the scope of nonhyperintensional operators such as Φ. Thus, the general result is that if a context isn't hyperintensional, it is transparent.

The derivation runs as follows. We start with (17):

(17) Φ(*R*)

Given A2 and L1, we can substitute '$\{x: x = x\ \&\ R\} = \{x: x = x\}$' for the logically equivalent '*R*' in (17) while preserving truth. This yields:

(18) Φ($\{x: x = x\ \&\ R\} = \{x: x = x\}$)

Given A1 and L3, we don't alter the truth value of (18) by substituting '$\{x: x = x\ \&\ S\}$' for the coreferential singular term '$\{x: x = x\ \&\ R\}$': these singular terms refer to the same set, i.e., the set of all objects, and we may thus substitute one name for the other. We may thus move from (18) to (19):

(19) Φ($\{x: x = x\ \&\ S\} = \{x: x = x\}$)

Now, the final step in deriving Φ(*S*) from Φ(*R*) is the appeal to logical equivalence once again. Given A2 and L2, we can derive our desired target sentence (20) from (19):

(20) Φ(*S*)

Being derivable in this way, (20)'s truth value must be the same as the original (17). The upshot is that if assumption 1 and assumption 2 are true with respect to a modifier/connective Φ (i.e., if Φ is not hyperintensional), then (20) may be derived from (17), for **any** true sentences '*R*' and '*S*.' Hence Φ, insofar as it's not hyperintensional, does allow substitution of material equivalents after all: it is a transparent operator.

It's worth stressing: Such a derivation can be constructed for **any** connective or modifier meeting conditions (i) and (ii): 'necessarily,' 'possibly,' 'before,' and 'because,' but also 'the fact that —— caused little Billie to cry' and 'the sentence "It will snow in January" stands for the proposition that ——,' and so on. So, the result isn't merely about MCT properties – the third metaphysical view of the three surveyed in the first section – but includes the broader ones that there can be at most one world-bound fact, and that sentences cannot have factlike items as their denotations. Given the importance of these broader results, let us revisit the points in detail.

Aiming the Slingshot at Facts, and Factlike Things

Davidson and others have found the technical result important because they take it to show that sentences cannot stand for 'facts,' or factlike things. Or, more precisely, they cannot when facts are taken to be complexes of ordinary objects, properties, and relations. Indeed, they take it to show that such facts in the plural simply do not exist. The connection between the just-presented technical result and these broader theses is this: if there were multiple world-bound facts, and if sentences stood for them (or something like them, e.g., propositions), then expressions of the form (21) and (22) would have to meet conditions (i)–(iii). But we have just seen an argument that no expression can do this.

(21) The fact that Ottawa is the capital of Canada is different from the fact that ——

(22) 'Ottawa is the capital of Canada' stands for the proposition that ——

Here is the argument specifically against propositions, as I reconstruct it. (It should be straightforward to run the same sort of argument with respect to (21) and facts.) According to the view under consideration, which has facts/propositions containing ordinary objects and such, you don't change from one proposition to another just by changing the name of the thing described. (As noted above, there are other ways of thinking about facts, and factlike things such as propositions, but the view that facts contain

commonplace objects is the most intuitive for reasons already sketched.) Thus, changing the name only matters when the claim is actually about words, as in (1) and (3) above – and claims can't always be about words; facts and propositions are to be autonomous from sentences. These provide good reasons why facts and propositions should be world bound, which in turn entails that the context in (22) must allow substitution of coreferring singular terms. For quite similar reasons, it seems that two sentences which 'say the same thing,' but in different words, shouldn't correspond to distinct facts/propositions; hence logically equivalent sentences should, it may seem, be substitutable in (22) without altering the truth of the whole. In this way we support variants on A1 and A2, here applied to the case (22). But once we have these two premises we can derive, using the argument above, that truth is retained if we substitute any true sentence.

Let's walk through the derivation with an example, namely (23):

(23) 'Ottawa is the capital of Canada' stands for the proposition that Ottawa is the capital of Canada

Suppose (23) is true, as it surely must be if sentences stand for factlike things. Given the logical equivalence of '$\{x: x = x \,\&\, S\} = \{x: x = x\}$' with S itself, for any sentence S, by A2 it follows that:

(24) 'Ottawa is the capital of Canada' stands for the proposition that $\{x: x = x \,\&\, \text{Ottawa is the capital of Canada}\} = \{x: x = x\}$

Given that the singular term '$\{x: x = x \,\&\, S\}$' is coreferential with the singular term '$\{x: x = x \,\&\, R\}$,' as long as R and S are both true, we can apply this generalization to 'Ottawa is the capital of Canada' and 'André Roussimoff died of a heart attack' (both of which are true) to establish that:

(25) '$\{x: x = x \,\&\, \text{Ottawa is the capital of Canada}\}$' is coreferential with the singular term '$\{x: x = x \,\&\, \text{André Roussimoff died of a heart attack}\}$'

Now, we apply substitution of coreferring singular terms to (24). The result of substituting '$\{x: x = x \,\&\, \text{André Roussimoff died of a heart attack}\}$' for '$\{x: x = x \,\&\, \text{Ottawa is the capital of Canada}\}$' is:

(26) 'Ottawa is the capital of Canada' stands for the proposition that $\{x: x = x \,\&\, \text{André Roussimoff died of a heart attack}\} = \{x: x = x\}$

The final step is to note that the complex identity statement about sets is logically equivalent to 'André Roussimoff died of a heart attack.' So, using substitution of logical equivalents a second time, now applied to (26), we can derive (27):

(27) 'Ottawa is the capital of Canada' stands for the proposition that André Roussimoff died of a heart attack

In sum, given that facts and propositions are to be language independent in certain ways, '"Ottawa is the capital of Canada" stands for the proposition that ——' should not be hyperintensional. But we can use the slingshot to show that if the context in (22) is not hyperintensional, then it is transparent. That's disastrous, however, because then this sentence 'stands for' any old true proposition! One can run precisely the same argument, beginning with (21), to show that there is only one world-bound fact.

Responses to the Slingshot Argument

It seems, very much contrary to initial appearances, that modal, causal, and temporal words lack at least one of these properties:

  i. Coreferential singular terms may be substituted one for another within the scope of these words without altering the truth of the whole sentence;
 ii. Logically equivalent sentences may be substituted one for another within the scope of these words without altering the truth of the whole sentences;
iii. Sentences which are merely materially equivalent – i.e., which just happen to have the same truth value – may not be so substituted.

Also, because of substitution patterns like this, we seem also to be forced to give up world-bound facts and factlike propositions as the denotations of sentences. How is a metaphysician to respond?

One simply cannot give up (iii) as a condition on 'the fact that ——' and such. That's because, put in terms of an example, this would allow 'the fact Ottawa is the capital of Canada' to stand for the fact that Toronto is larger than Halifax! There are, however, at least three ways of saving MCT properties, facts, and factlike things such as propositions, in the face of the slingshot: two ways corresponding to (i) and one way corresponding to (ii). I will take them in reverse order.

First, one can reject the idea that logically equivalent sentences really do stand for a single fact, or factlike proposition. This is explicitly suggested by Barwise and Perry (1981). The proposal is that sentences with different subject matters do not stand for the same fact, even if they are true in precisely the same circumstances. Now (15) and (16), though logically equivalent, clearly have different subject matters, since only the latter talks about sets. So these sentences need not be taken to stand for the same fact. Granted, this makes facts, which are supposed to be built from ordinary elements of the world on the world-bound conception, look a bit more like the

linguistic items that stand for them: facts get individuated in terms of meaning-related criteria such as 'subject matter.' However, this need not jeopardize the distinction between sentences and their meanings. For instance, we can still insist that sentences in different languages can stand for the same fact – as long as they have the same subject matter. And we can even insist that sentences made up of coreferential words, put together in the same way, stand for the same fact. Maybe even transformed sentences can stand for the same fact, if the transformation does not alter the subject matter: e.g., 'Moe kissed Juana' might stand for the same fact as 'Juana was kissed by Moe.' One thus saves world-bound facts, and propositions, by rejecting (ii). (It's less obvious that this move allows MCT properties to have the three features we want; but explaining the ins and outs of that would take us too far afield.)

Second, one can reply to the slingshot argument by denying that (i) really applies. This 'it doesn't apply' move can be pursued in two different ways. Those who follow Frege (1892) maintain that you only have the same fact, or proposition, when not just the referent, but also the sense of the name, is the same. Famously, Frege introduced a two-level semantics, with guises-of-things occupying the level of sense, and the things themselves occupying the level of reference. Crucially for present purposes, being the same fact or proposition is supposed by Frege to require being the same at both levels. So, for example, 'Elton John lives in England' and 'Reg Dwight lives in England' don't really correspond to the same proposition, because the two names differ in sense – even though these two names do refer to the same singer. This is to say that (i) 'doesn't apply' in the sense that it's **false**: coreferring singular terms can give rise to different facts/propositions. It should be clear that making this reply forces one to give up the world-bound conception of facts and factlike things. It is now not objects themselves, but objects described one way or another, that become the components of facts and propositions. This notion of proposition, with different propositions corresponding to the same referents arranged in the same way, is safe from the slingshot. As is the associated notion of fact. For this notion of fact/proposition allows one to reject substitution of coreferential singular terms in the contexts in question – and without that, the slingshot argument cannot get going.

Many contemporary philosophers find this Fregean approach unacceptable, however, for reasons already sketched: it seems like it's the rose itself which smells sweet, not the rose under a guise; and it's the man himself who died of a heart attack; and so on. So it seems, there should be no more to facts than perfectly ordinary objects, properties and relations. Not wanting to abandon the world-bound conception of facts, their alternative response to the slingshot argument is to insist that (i), though it is true, cannot be used as the proponent of the slingshot wishes to, because things like '{x: $x = x$ & André Roussimoff died of a heart attack}' aren't really singular terms. It is in this sense that condition (i) doesn't apply. As Russell (1905) insisted, say these theorists, such expressions are complex definite descriptions whose role is quantificational, not referential: 'the set of objects such that ...' (which is what this mathematical expression actually means), is not namelike; it is instead more like the quantifiers 'every set of objects such that ...' and 'some set of objects such that ....' And condition (i) above, along with A1, which derives from (i), do not say anything about being able to substitute quantificational expressions *salva veritate*: A1 and (i) only apply to expressions whose function is to pick out an object, without describing it. Put in terms of examples, while it's quite true that 'Elton John is a singer' and 'Reg Dwight is a singer' both stand for the same fact, since these involve two genuine names for the entertainer, it nevertheless is not the case that the description-involving sentences 'The Queen of England lives in London' and 'Canada's head of state lives in London' stand for the same fact. Descriptions do not 'merely pick out the object.' Indeed, say these followers of Russell, what the sentence containing 'the Queen of England' really means is: There exists exactly one queen of England, and every queen of England lives in London. Crucially, therefore, the introduction of things like '{x: $x = x$ & André Roussimoff died of a heart attack}' takes us out of the realm of names (where [i] and A1 apply), and into the realm of descriptions (where they don't). Thus, when one appeals to A1 *et al*. – to move from (18) to (19) in the general case, and from (24) to (26) in the specific case of '"*S*" stands for the proposition that ——' – a fallacy is committed. (Neale, 1995, following Gödel, 1944, gave roughly this reply to the slingshot. Barwise and Perry, 1981 made related points.)

To summarize, then, the slingshot is an argument that deploys very modest machinery to take on several very important metaphysical views. The views include the two broad ones, that there are world-bound fact*s* in the plural, and that what sentences stand for are factlike things, and a related more technical view about what kind of sentence-modifying and sentence-connective operators there can be. The key move in the argument is to start with an arbitrary sentence containing '*R*' and one of the problematic operators ('necessarily,' 'before,' 'because,' 'it's a fact that ——,' etc.), to create a logically equivalent sentence that has

'$\{x: x = x \,\&\, R\} = \{x: x = x\}$' in the scope of the suspect operator. This latter sentence *ipso facto* contains the singular term '$\{x: x = x \,\&\, R\}$,' which, assuming both 'R' and 'S' are true, is coreferential with '$\{x: x = x \,\&\, S\} = \{x: x = x\}$.' Hence, one can deploy the substitution of logical equivalents and the substitution of coreferring singular terms to derive another arbitrary materially equivalent sentence now containing not 'R' but 'S' in the scope of the operator. This shows that if the operator is not hyperintensional, then it's transparent. The three ways to block this argument are (a) to give up substitution *salva veritate* of logical equivalents in the scope of the operator, (b) to follow Frege, and give up substitution *salva veritate* of coreferential singular terms (and with it the world-bound conception of facts) and (c) to insist that substituting expressions of the form '$\{x: x = x \,\&\, R\} = \{x: x = x\}$' is not, in fact, a matter of substituting singular terms, since such expressions are not referential at all, but are instead quantificational expressions.

Pulling back from the details, the slingshot illustrates how careful reflection on a linguistic phenomenon can contribute to debates in metaphysics. In particular, we have taken as our example the role of various principles of substitution *salva veritate* in attacks on facts, propositions, and views about the properties of modal, causal, and temporal properties. The possible replies to the slingshot highlight still further, I think, the importance of linguistic details when discussing metaphysics.

See also: Davidson, Donald (1917–2003); Factivity; Mood, Clause Types, and Illocutionary Force; Russell, Bertrand (1872–1970); Strawson, Peter Frederick (b. 1919).

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Metapragmatics

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There are at least three senses in which it is possible to speak of metapragmatics. The first, the most general and potentially generic one, refers to the theoretical debate on pragmatics and its central concerns, its epistemological foundations, and the definition of its relevant object and scope. Metapragmatics in this sense concerns itself with the criteria of pertinence of the discipline, not to state which is the 'best' pragmatics, but to verify the consistency of the basic assumptions, the definitions of the questions to be asked, and the methods to be adopted.

The second, narrower sense, highlights the conditions that make speakers' use of language possible and effective. The task of metapragmatics in this sense is, above all, to make those conditions explicit. This kind of metapragmatics, which can be related to the problem of the universals of human communication, is transcendental in a Kantian sense inasmuch it deals with the constitutive elements of human knowledge.

The third sense is less ambitious than the other two. It is concerned with the investigation of that area of the speakers' competence that reflects judgments of appropriateness on one's own and other people's communicative behavior. In this sense, metapragmatics deals with the 'know-how' regarding the control and planning of, as well as feedback on, the ongoing interaction.

The metapragmatic level is not just *one* of the metalinguistic levels: on the contrary, it is different from them, as the knowledge it refers to concerns not 'the ability to say' but 'the ability to do' (and the ability to say what one does). The metapragmatic level represents the interface between the linguistic and the extra-linguistic: it enables the language user to relate language and world, by checking the