

Slingshots and Boomerangs

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A “slingshot” proof suggested by Kurt Gödel (1944) has been recast by Stephen Neale (1995) as a deductive argument showing that no non-truth-functional sentence connective can permit the combined use, within its scope, of two truth-functionally valid inference principles involving definite descriptions. According to Neale, this result provides indirect support for Russell’s Theory of Descriptions and has broader philosophical repercussions because descriptions occur in non-truth-functional constructions used to motivate talk about (e.g.) necessity, time, probability, causation, obligation, facts, states of affairs, and propositions.

We develop Neale’s claims and rebut Graham Oppy’s (1997) criticism of Neale. In particular, we (i) work out the details of several formal, philosophical, and historical points raised by Neale, Oppy, and Quine, (ii) explore the consequences of Gödel’s Slingshot for specific theories of facts, (iii) demonstrate the integrity of Gödel’s Slingshot and the claims Neale bases on it, and the falsity of all of Oppy’s main claims.

1. The generalized, description-neutral, operator version of Gödel’s slingshot

We begin by restating Neale’s *negative* conclusions. The original slingshot arguments of Church, Davidson, and Quine do *not* establish the collapses their authors sought—the collapse of facts into one Great Fact, the collapse of modal distinctions, the collapse of non-truth-functional sentence connectives into the class of truth-functional connectives. (i) If the complex descriptions (or class abstracts) being substituted at key points in slingshots are treated in accordance with Russell’s (independently motivated) Theory of Descriptions, then (a) statements containing descriptions are not identity statements, (b) descriptions are not singular terms, and (c) the Principle of Substitutivity for Singular Terms (PSST) has no application. (ii) If the descriptions *are* treated as singular terms, implausible semantic properties must be attributed to them in order to obtain the logical equivalences necessary to get the slingshots loaded. In short, the simultaneous reliance on logical equivalences involving descriptions and a treatment of descriptions

as singular terms renders these slingshots (as originally stated) incapable of producing collapses.

The situation is similar, Neale argued, if one attempts to obtain a collapse with a slingshot suggested by Gödel (1944) that uses not *logical* equivalence but a formally tighter notion—*Gödelian* equivalence—holding between sentences like “ Fa ” and “ $a = (tx) (x = a \bullet Fx)$ ”. (i) As above. (ii) If the relevant descriptions *are* treated as singular terms, implausible semantic properties must be attributed to them in order to obtain the relevant Gödelian equivalences. In short, the simultaneous reliance on Gödelian equivalences involving descriptions and a treatment of descriptions as singular terms renders Gödel’s slingshot (as originally stated) incapable of producing a collapse.

Despite these negative conclusions, Neale argued for the philosophical significance of a *generalized, description-neutral, operator version* of Gödel’s slingshot. Neale claimed—and we agree—that this proof delivers a definite constraint on the logic of non-truth-functional *S*-connectives (but not the eliminative constraint sought by Quine and Davidson). He also claimed—and we will soon *prove*—that this constraint has philosophical consequences (e.g., it can be used to narrow down the range of plausible theories of facts).

We want to clarify one inferential issue surrounding the operator version of Gödel’s slingshot. Neale’s procedure (following Quine 1953b, 1960) was as follows: (i) take an arbitrary n -place sentence connective \mathfrak{S} , an arbitrary truth-functional sentence ϕ , and a compound sentence $\mathfrak{S}(\dots\phi\dots)$; (ii) examine the logic of \mathfrak{S} by looking at what happens when the occurrence of the sentence ϕ in $\mathfrak{S}(\dots\phi\dots)$ is replaced by a sentence ϕ' obtained directly from ϕ using inference principles that are valid in truth-functional contexts. Note: the inference principles are applied *not* to $\mathfrak{S}(\dots\phi\dots)$ itself but to the occurrence of ϕ in such a sentence.

The purpose of proceeding in this abstract way is to avoid thinking about any *particular* sentence connective, to avoid being sidetracked by preconceived ideas about the logic of this or that connective, which may have something to do with, say, one’s views about facts, states of affairs, causes, or necessity.

The relevant inference principles are the Principle of Substitution of Material Equivalents (PSME), the Principle of Substitution of Singular Terms (PSST), and three principles involving definite descriptions (t -SUBS, t -INTR, and t -ELIM). These principles can be stated without mentioning scope, extensionality, semantic innocence, or direct reference. Properties corresponding to particular inference rules can be ascribed to particular *S*-connectives. For example, truth-functional *S*-connectives are +PSME:

An n -place S -connective \mathfrak{S} is +PSME iff in any sentence $\lceil \mathfrak{S}(\dots \Sigma[\phi] \dots) \rceil$ in which $\Sigma[\phi]$ is an extensional sentence occurring as one of the n -arguments of \mathfrak{S} , if ϕ and ψ are materially equivalent sentences then replacing the contained sentence $\Sigma[\phi]$ by $\Sigma[\psi]$ in the original sentence $\lceil \mathfrak{S}(\dots \Sigma[\phi] \dots) \rceil$ yields a sentence $\lceil \mathfrak{S}(\dots \Sigma[\psi] \dots) \rceil$ with the same truth-value as the original. (Mutatis mutandis for PSST.)

Truth-functional S -connectives are also + t -INTR, + t -ELIM, and + t -SUBS:

An n -place S -connective \mathfrak{S} is + t -INTR iff in any sentence $\lceil \mathfrak{S}(\dots \Sigma[x/\alpha] \dots) \rceil$ in which $\lceil \Sigma[x/\alpha] \rceil$ is an extensional sentence occurring as one of the n arguments of \mathfrak{S} (and hence occurring within the scope of \mathfrak{S}), replacing the contained sentence $\lceil \Sigma[x/\alpha] \rceil$ by the sentence $\lceil \alpha = (\lambda x)(x = \alpha \bullet \Sigma[x]) \rceil$ in the original sentence produces a sentence $\lceil \mathfrak{S}(\dots \alpha = (\lambda x)(x = \alpha \bullet \Sigma[x]) \dots) \rceil$ with the same truth-value as the original. (Mutatis mutandis for t -ELIM and the allomorphs of t -SUBS.)

Since t -INTR and t -ELIM are just “reversals” of one another (like Church’s λ -INTR and λ -ELIM), “ t -CONV” is used as shorthand for either (like “ λ -CONV”).

The generalized, description-neutral, operator version of Gödel’s slingshot takes the form of a proof concerning the logic of an arbitrary sentence connective \mathfrak{S} and is set out on pp. 789–90 of Neale’s article and again on pp. 124 of Oppy’s article.¹ It demonstrates conclusively that if an S -connective is + t -SUBS and + t -CONV then it is also +PSME, i.e. it demonstrates that any such connective is, in fact, truth-functional.² Neale called this the *Fundamental Constraint* (FC). Anyone wishing to treat a particular expression as a non-truth-functional S -connective must treat that expression as either $-t$ -SUBS or $-t$ -CONV (or both).

It is important to distinguish this formal consequence of Gödel’s Slingshot from any philosophical implications—concerning, say, facts or causation—that it may have. To have a genuine quarrel with this version of Gödel’s Slingshot is to object to the proof of FC. Metaphysical issues about (e.g.) whether there are facts or whether there are general facts, and semantic issues about (e.g.) whether descriptions are quantificational or whether names are directly referential are *not* issues concerning Gödel’s Slingshot itself (which is not to say, of course, that interesting implications for such issues might not emerge from reflecting on the slingshot in the context of this or that philosophical theory).

¹ For brevity, in lines [11]–[16] of the proof Neale and Oppy both use “ t -SUBS” in the right-hand column as shorthand for “the assumption that \mathfrak{S} is + t -SUBS” (mutatis mutandis for t -CONV, i.e., t -ELIM and t -INTR).

² Similarly, an operator version of the Church-Quine-Davidson slingshot demonstrates conclusively that if an S -connective is + t -SUBS and +PSLE, then it is also +PSME.

2. Interpretive problems

It is difficult to tell which of two overarching claims Oppy (1997) is making: (i) there is something wrong with the operator version of Gödel's Slingshot: it does *not* establish FC and therefore is of no philosophical significance; or (ii) the operator version of Gödel's Slingshot is a perfectly sound deductive argument that delivers FC, but *the result itself* is of no philosophical significance. A careful reading reveals that Oppy isn't sure which of these two claims he is making. In any event, we shall show that both are false.

There are at least two places in which Oppy appears to accept that FC has been proved by the operator version of Gödel's Slingshot:

- [1] This Slingshot establishes that any *S*-connective which is both +*t*-SUBS and +*t*-CONV will also be +PSME—i.e. will allow substitution of material equivalents—for sentences which contain occurrences of singular terms. (p. 124)
- [2] It is plain that we should agree with Neale that Gödel's Slingshot shows that no nonextensional *S*-connective can permit the use of both *t*-SUBS and *t*-CONV on extensional sentences within its scope. (p. 124–5)

Modulo a qualification in [1]—see below—these remarks suggest that Oppy acknowledges the slingshot proof of FC. And so does his claim that the proof has “technical and historical significance” (p. 122). But matters are complicated by Oppy's claim that “Neale does not try to locate Gödel's Slingshot on a level playing field” (p. 131) because he decides to “exile terms that fail to refer” (p. 130). Were we to allow such terms, says Oppy,

it would be question-begging to try to develop such an argument in the context of classical logic (in which it is assumed that all singular terms refer); rather, the proper venue for a formulation of putative Slingshot arguments would be some kind of free logic. It isn't obvious that Gödel's Slingshot can be successfully reformulated in (all versions of) such logics. (p. 128, n. 8)

This looks like a *complaint* about the slingshot proof of FC. It's not a very good complaint, but that is not our point here.³ Our point for the moment is that *if* Oppy is acknowledging FC, he appears to be doing so grudgingly.

³ Gödel's Slingshot nowhere assumes that the language of the deduction presupposes referents for all singular terms, much less that it is classical (it could not be *fully* classical as it contains purportedly non-truth-functional *S*-connectives). All that is assumed is that its non-truth-functional *S*-connective is +*t*-SUBS and +*t*-CONV. Oppy's complaint must concern the background logic, which is plausibly classical. It is at least true that first-order logic presupposes that all terms refer. What is less clear, however, is that this supposition plays any role in deriving FC. In fact, an inspection reveals that the argument goes through unaltered when the background logic is taken to be free.

Our suspicion that Oppy is not entirely happy with the slingshot proof of FC is fuelled by his claim that “the assumption of semantic innocence (or direct reference, or both) is implicitly built into the construction of Slingshot arguments” (p. 123) and by a careful reading of the end of §1 of his paper. We examine the claim about semantic innocence and direct reference in §4; for the moment, let us focus on Oppy’s §1.

Immediately after setting out Neale’s operator version of Gödel’s Slingshot and *before* discussing any particular *S*-connectives, Oppy says [2] above, considers what he suggests might be two related *objections* to the proof of FC, and claims to show how to “amend” Gödel’s Slingshot in order to deal with them. As far as the objections are concerned, he says

One might think to *object* [our italics, SN/JD] that [i] the Slingshot can be avoided by those who insist on reparsing singular terms using predicates and quantifiers (à la Quine)—i.e. by those who insist that there are no singular terms in canonical notation. Moreover, and relatedly, one might suggest that [ii] it can be avoided by those who suppose that there are only general facts (and not particular facts)—in this case, the proof offers no reason to fear that non-extensional operators must collapse. (p. 124)

How should we understand the suggestion that here are *objections* to Gödel’s Slingshot? The contrast between the objections is striking. Whatever philosophical faults the first may have, it is at least *relevant* to the logico-semantic issues raised by the proof. By contrast, the second brings *facts* into the fray, and its relevance is hard to discern at this particular point in the dialectic.

The first objection is based on the following idea: since the operator version of Gödel’s Slingshot presupposes the existence of singular terms, those who deny the existence of singular terms at bedrock can simply reject the proof. In response to the question “how is it possible to reject the existence of singular terms at bedrock?” Oppy points to Quine’s idea of (i) analyzing *all* singular terms as definite descriptions, (ii) analyzing *all* definite descriptions in accordance with Russell’s theory, and thereby (iii) reducing *all* sentences containing “singular terms” to sentences containing quantifiers, variables, the identity sign, predicates, and truth-functional *S*-connectives. It appears to be Oppy’s idea, then, that one might consider objecting to Gödel’s Slingshot on the grounds that an across-the-board treatment of so-called “singular terms” as Russellian descriptions makes it impossible to even *formulate* slingshot arguments.

The first sign that this objection is stillborn comes from putting together the following two thoughts: (i) Quine formulates and endorses an operator slingshot that makes use of singular terms; (ii) Quine thinks all singular terms can be analyzed away by means of Russell’s Theory of Descrip-

tions. So if a Quinean treatment of singular terms undermines slingshot arguments, Quine must be attempting to hold an untenable position. The antecedent of this conditional is false. The interpretation of slingshot arguments when singular terms are eliminated in a Quinean fashion is obvious. (i) *I*-SUBS is interpreted as shorthand for an inference principle in which the descriptions it contains are given their Russellian expansions. (ii) *I*-CONV receives a trivial modification: the description it contains is given its Russellian expansion and occurrences of the singular term “*a*” are replaced by the description “ $\iota x(Ax)$ ”—where “*A*” is a one-place predicate uniquely true of the object *a*—which is also given its Russellian expansion.⁴ Oppy’s “Quinean” objection to the slingshot is no objection at all, and certainly not one that Quine would propose.⁵

Oppy’s second (“related”) objection seems to be irrelevant to immediate concerns because it is *metaphysical* rather than logico-semantic. The suggestion that “there are only general facts (and not particular facts)” is not the rejection of any logico-semantic assumption made by the operator version of Gödel’s Slingshot. This slingshot is a *formal* argument and assumes *nothing* about the particular interpretation of **3** and nothing about theories of (e.g.) facts, propositions, necessity, reference, or justice. One cannot rebut a formal argument by declaring oneself an advocate of a theory of facts according to which there are only general facts. No premise or inferential step is undermined by such a declaration. So perhaps Oppy’s real point—despite his wording—is that anyone who posits only general facts will have a theory that is not going to fall to Gödel’s Slingshot—sound as that argument is—because such a theory will not license discourse about facts from which a non-truth-functional *S*-connective that is both +*I*-SUBS and +*I*-CONV can be extracted. This is a sensible and interesting claim to make. However it does not belong to logico-semantic issues concerning the Gödel’s Slingshot itself, but rather to metaphysical issues upon which this sound argument may have an impact.

⁴ Mutatis mutandis for PSLE in connection with operator versions of the Church-Quine-Davidson slingshot.

⁵ We are here indebted to W. V. Quine for discussion. Oppy proposes a modified slingshot to deal with the first (“Quinean”) and second (fact-based) objections. But his modification fails in connection with the first objection: he proposes an inference principle, IDENT, that permits ϕ and $\lceil \phi \bullet a = a \rceil$ to be inferred from one another and suggests that now we can prove that if **3** is +*I*-SUBS, +*I*-CONV, and +IDENT then it is also +PSME. Since IDENT is an inference principle that introduces or eliminates singular terms, how *this* modified slingshot can help if there are no singular terms is a mystery. Oppy appears to concede the failure of his modification when he says that it will not help against “the resolute” Quineans (p. 124). Oppy could save his modification by adopting the cornerstone of the Quinean reinterpretation we suggest above: replace occurrences of “*a*” by the description “ $\iota x(Ax)$ ” and provide a Russellian analysis of descriptions. But doing this would make Oppy’s own modification superfluous.

We are going to be ruthless in keeping these apart; only confusion will result if they are run together. We return later, especially in §6, to issues which belong to the second category.

3. Direct reference and semantic innocence

One pervasive and bizarre feature of Oppy's paper is his insistence that "the assumption of semantic innocence (or direct reference, or both) is implicitly built into the construction of Slingshot arguments" (p. 123). Semantic innocence and direct reference are semantic theses; so prima facie a case might be made that they have a direct bearing on slingshot arguments. But if Oppy is claiming that slingshot arguments presuppose semantic innocence or direct reference, then he must be claiming that the proof of FC by Gödel's Slingshot presupposes the truth of semantic innocence or direct reference. But slingshot arguments in general, and the operator version of Gödel's Slingshot in particular, do *not* assume semantic innocence or direct reference.

We can begin with a blatant appeal to authority: the *originator* of the slingshot was Church (1943, 1956), although Church himself detects the argument in Frege. *Both Frege and Church reject both direct reference and semantic innocence.* Operator versions of slingshots are deductive arguments, and it is among the virtues of deductive arguments that they make perfectly clear what is and is not assumed. If one is interested in locating the assumptions of Gödel's slingshot, one should take a look at its right-hand column and at the details of the inference rules or assumptions employed.

If Oppy is really claiming that slingshots presuppose the truth of semantic innocence or direct reference, he must be confusing the preservation of *truth* with the preservation of *meaning*. Principles of inference are meant to be *truth*-preserving; so to the extent that the appearance of a line *L* in the operator version of Gödel's Slingshot is justified by appeal to some earlier line (or lines) assumed to be true and some inference principle, *L* is to be regarded as *true*. And this extends, of course, to the appearance of a line justified by some earlier line and an assumption about the logic of \mathfrak{S} (e.g., the assumption that \mathfrak{S} is *+I-SUBS*). So the operator version of Gödel's Slingshot appeals to the *truth*-values of sentences, to *truth*-preserving principles, and to *truth*-relevant properties of connectives in connection to principles that are *truth*-preserving. It nowhere appeals to the *meanings* of sentences, to principles or operations that are meant to be *meaning*-preserving, or *meaning* properties of *S*-connectives.

Consequently, the slingshot is simply agnostic on whether the *meaning* of an expression remains constant across linguistic contexts (semantic innocence) and on whether certain singular terms contribute just an object to the propositions expressed by sentences containing them (direct reference). Semantic issues about whether expressions have (e.g.) senses as well as references (or intensions as well as extensions) and about whether (e.g.) the reference of an expression shifts in various non-truth-functional contexts—interesting as they are—are simply irrelevant as far as the validity of Gödel’s Slingshot is concerned. Church, Gödel, and Neale commit themselves to neither direct reference nor semantic innocence; indeed, Church’s own positive proposals entail *the denial of both*, a fact Oppy seems to have overlooked.

4. *Methodological muddles*

Oppy imposes three conditions which, according to him, any slingshot must meet in order to be philosophically interesting. One is that “such an argument should impose a constraint for which it is *prima facie* plausible that there are interesting theories of the kind in question which fail to meet the constraint” (p. 124). We accept this condition, and we will soon demonstrate that Gödel’s Slingshot satisfies it.

But Oppy’s other conditions are unacceptable. His first condition is that a slingshot argument “would need to impose a further constraint upon those theories, beyond those constraints which may be deduced simply from consideration of general theoretical desiderata such as consistency, completeness, simplicity, accommodation of data, and so on” (p. 122); his third is that it should “impose a constraint which operates independently of theoretical assumptions which would, by themselves, suffice to undermine or demolish the theories in question” (p.122). That Oppy could suppose these two conditions to be reasonable success criteria indicates that there is something seriously wrong with his methodology. Gödel’s Slingshot is not a magical way of imposing utterly novel constraints on a philosophical position; *it’s a deductive argument meant to draw out inconsistencies already lurking in a position*. The mere constraint of consistency already entails any constraints unearthed by Gödel’s Slingshot—no consistent theory can contain a non-truth-functional *S*-connective that is both +*I*-SUBS and +*I*-CONV. Gödel’s slingshot is *a way of showing* that such a theory is inconsistent. *Of course* it cannot establish anything that wasn’t already lurking, how could it? Gödel’s Slingshot is simply an ana-

lytic tool that can reveal when the commitments one has already made lead one to inconsistency.

As an example of the trouble Oppy gets into because of these methodological worries, consider a claim he makes about *t*-SUBS in connection with referential treatments of descriptions. According to Oppy:

... it seems perfectly clear that those who wish to treat descriptions as singular terms will deny that FIC is +*t*-SUBS (and +PSST). After all, there is a reading on which the inference from “Necessarily, nine is the square of three” to “Necessarily, nine is the number of planets” is invalid, even though it apparently involves substitution of co-referring descriptions in an intensional context. (p. 126)

There is no reason to think that every fact theorist is going to treat FIC and \Box as having the same logic. \Box is not +*t*-SUBS: this much was clear from Quine’s original complaints about quantified modal logic and from Smullyan’s (1948) elegant explanation of why the claim that \Box is +PSST is not threatened if one assumes Russell’s Theory of Descriptions. Smullyan’s explanation is intimately connected in form to Gödel’s explanation of how Russell is able to treat FIC as –*t*-SUBS and +PSST. But none of this guarantees that *every* fact theorist is going to treat FIC as –*t*-SUBS, let alone treat it as –*t*-SUBS because \Box is –*t*-SUBS.

Gödel’s Slingshot is a deductive argument; it shows that a contradiction results when one posits a non-truth-functional *S*-connective that freely permits the use of two inference principles involving descriptions within its scope. The contradiction arises, roughly speaking, because descriptions (as standardly understood) contain *formulae* as proper parts; by permitting the interchange of such devices when their contained formulae are satisfied by the same object, one is essentially permitting the interchange of formulae; and once some weak additional inference principle is assumed—and it is in the weakness of its principle that Gödel’s Slingshot is superior to those of Church, Quine, and Davidson—the formulae in question can be drawn out of their *iota*-governed contexts to make the purportedly non-truth-functional *S*-connectives provably truth-functional.

With this in mind, consider what Oppy regards as the *prior* problem with allowing a non-truth-functional *S*-connective to be +*t*-SUBS: in connection with \Box , such substitutions are not truth-preserving (as Quine observed). In one respect, to notice this is to notice very little; but in another respect, it is to catch the glimmer of something important. What we have here is a “mild” slingshot based on the following assumptions: (i) \Box is a non-truth-functional *S*-connective, and (ii) \Box is +*t*-SUBS. One does not derive a contradiction from the “mild” slingshot, but a sentence that seems false (“ \Box nine is the number of planets”) from premises that seem true (“ \Box nine is the square of three” and “the number of planets =

the square of three”). To stop here is to stop at just the point things start to get interesting, as Quine realized. If one could just saddle \Box with one more plausible inference principle, perhaps one could derive an outright contradiction; and if one could make the additional principle extremely weak, perhaps the contradiction would generalize to *all* non-truth-functional *S*-connectives, not just the modal ones. Following Church (1943), Quine (1953b, 1960) appeals to an inference principle for substituting logically equivalent sentences.⁶ Gödel appeals to a weaker inference principle, *t*-CONV. The failure of a particular non-truth-functional *S*-connective to be +*t*-SUBS comprises most of what one needs to produce a full slingshot because descriptions (as standardly understood) contain *formulae* as proper parts, a fact that one’s second inference principle (PSLE or *t*-CONV) is going to exploit. And the full slingshot has two obvious advantages over the “mild” one: (i) it produces an outright contradiction, rather than just counterintuitive truth conditions, and (ii) the result is fully general, resulting in a constraint—FC in the case of Gödel’s Slingshot—on *all* non-truth-functional operators, not just modal ones.

The fact that Oppy takes the Quinean observation that \Box is not +*t*-SUBS to show that it is pointless constructing a full slingshot commits him to the view that the “mild” slingshot robs Gödel’s Slingshot of its philosophical significance. What we are witnessing here is the fall-out of Oppy’s insistence that if a slingshot argument is to be of any significance in connection with philosophical theories, it must “impose a further constraint upon those theories, beyond those constraints which may be deduced simply from consideration of general theoretical desiderata such as consistency, completeness, simplicity, accommodation of data, etc.” (p. 122). But such was never the goal of Gödel’s slingshot, nor could it have been. Gödel’s Slingshot is a deductive argument that merely serves to bring out, in as sharp and general a way as possible, problems that might already be lurking in the semantics of non-truth-functional *S*-connectives that one might need.

⁶Oppy suggests (p. 131, n. 12) that Neale is illicitly running together modal (intensional) and attitude (hyperintensional) contexts when discussing Quine’s (1960) slingshot. This is wrong. It is certainly *true* that Quine chooses to use an attitude construction when formulating his slingshot in *Word and Object* in 1960. But it is equally true that (a) nothing in Quine’s 1960 version turns on any *particular* nonextensional construction, (b) Quine’s *formal* target is nonextensional *S*-connectives quite generally, (c) *philosophically*, Quine’s main targets were modal connectives, and (d) Quine’s 1953 version (in “Three Grades of Modal Involvement”) does not use an attitude construction and is formulated in a way that is meant to *show* that it generalizes. Indeed Quine was the first person to propose an operator-based slingshot, his intention being to argue on purely *formal* grounds without getting embroiled in the semantics of this or that *S*-connective. We are here indebted to Quine for discussion.

5. The philosophical significance of Gödel's slingshot

Any philosophical importance that Gödel's Slingshot has is due to the fact that non-truth-functional S-connectives can be found in discourse about necessity, possibility, probability, obligation, time, causation, explanation, intentionality, facts, states of affairs, and propositions. We know from Gödel's Slingshot that no non-truth-functional S-connective is both $+t$ -SUBS and $+t$ -CONV. In addition to the usual non-truth-functional S-connectives found in philosophical discourse, such connectives can be extracted from (or created on the basis of) sentences that purport to be about facts, propositions, or psychological states, or indeed anything else that is naturally expressed sententially; for example, it is a trivial exercise to construct two-place entity-identity connectives from sentences, e.g. "FIC(ϕ , ψ)" for "the fact that ϕ = the fact that ψ ", "PIC(ϕ , ψ)" for "the proposition that ϕ = the proposition that ψ ", "BIC(ϕ , ψ)" for "the belief that ϕ = the belief that ψ ", etc. FIC, PIC, and BIC are obviously non-truth-functional (-PSME); so none is both $+t$ -SUBS and $+t$ -CONV. The relevance of this to theories of facts, propositions, and beliefs is clear: no theory of facts (/propositions/beliefs) can treat FIC (/PIC/BIC) as both $+t$ -SUBS and $+t$ -CONV for otherwise the fact (/proposition/belief) that Fa will be identical to the fact (/proposition/belief) that Gb for arbitrary predicates F and G and arbitrary singular terms a and b , and so all facts (/propositions/beliefs)—or at least all *atomic ones*—will collapse into one Great Fact (/Proposition/Belief).

The interesting philosophical question here is the degree to which FC constrains theories of necessity, time, probability, causation, explanation, obligation, intentionality, facts, states of affairs, and propositions. Some such theories are going to be in better shape than others, for presumably some will satisfy FC while others will not. If, as Oppy claims, *the formal constraint is so weak that no one could ever consider putting forward a theory that was later found to violate it*, then one might be inclined to agree with him that the constraint is of no philosophical significance. Presumably, in order to establish this one would need to either (i) examine every theory of necessity, time, probability, causation, explanation, obligation, intentionality, facts, states of affairs, and propositions ever postulated (or likely to be postulated) and then show that each satisfies the constraint, or (ii) discover some precise feature F of every such theory and show that any theory with F satisfies the constraint. Oppy does neither.

We take it, then, that Oppy gives no reason to think that Gödel's Slingshot has *no* philosophical significance. As far as "philosophical insignificance" is concerned—see Oppy's title—the rhetoric is unsupported. At best, Oppy can show that Gödel's Slingshot has no philosophical significance *for particular kinds of theories*. As far as beliefs (and other psycho-

logical states) are concerned, the constraint is trivially satisfied. To the extent that there is any widespread and sustained agreement about substitutions *salva veritate* (*s.v.*) in contexts of propositional attitude, only perfect synonyms may be swapped; and since the result of applying *t*-SUBS to an extensional sentence ϕ will rarely, if ever, yield a sentence ϕ' that is synonymous with ϕ , there is no reason to think that $\text{BIC}(\phi, \phi)$ and $\text{BIC}(\phi', \phi)$ will always agree in truth-value. In short, *no* theory of belief is likely to treat BIC as *+t*-SUBS and to that extent Gödel's Slingshot, although sound, is not going to have an impact on such theories.⁷

When it comes to propositions and facts, matters are considerably more complex and interesting. So let us turn to the weaker claim Oppy makes, *viz.* that Gödel's Slingshot has no philosophical significance for theories of *facts* and *states-of-affairs*.

6. *Theories of facts and Gödel's slingshot*

Facts have been called upon to play diverse philosophical roles, including those of (e.g.) truth-makers, causal relata, objects of knowledge, objects of perception, slices of possible worlds, and (when big enough) possible worlds themselves. Consequently, the literature contains all sorts of theories of facts.⁸ For some, facts are true propositions, others vehemently deny this; some individuate facts by their constituents and structure, others deny that facts have objectual constituents; some identify facts that necessarily co-exist, others treat all facts as necessary existents; some posit only atomic facts, others posit (e.g.) conjunctive, negative, or general facts.

Neale did not claim that every theory of facts falls to Gödel's Slingshot. Following Gödel he explicitly claimed that Russell's theory is untouched. Russell holds a structuralist theory in the sense of Fine (1982): (i) facts contain objects and properties as components; (ii) the structure of a true sentence mirrors the structure of the fact it stands for. Additionally, Russell holds that (iii) no object corresponds to a definite description because a phrase of the form 'the F ', like a phrase of the form 'every F ', is not a singular term but a device of quantification. On such accounts FIC is not

⁷ It is tempting to draw the same conclusion in connection with *t*-CONV, but some people have expressed to us the conviction that BIC is *+t*-CONV and also *+λ*-CONV.

⁸ See (e.g.) Armstrong (1993), Austin (1950, 1954), Barwise and Etchemendy (1989), Baylis (1948), Bennett and Baylis (1939), Bennett (1988), Bergmann (1960, 1992), Clark (1975), Ducasse (1940, 1942), Fine (1982), Grossman (1983, 1992), Lewis (1943), Mellor (1991, 1995), Olson (1987), Pollock (1984), Prior (1948, 1967), Searle (1995), Skyrms (1981), Taylor (1976, 1985), van Fraassen (1969), Vendler (1967a, 1967b), Wells (1949), and Wilson (1959a, 1959b, 1974).

+*t*-SUBS, because two codenoting definite descriptions will not, in general, contribute the same (denotation-determining) properties to a fact. Second, the structured nature of facts guarantees that FIC will not support *t*-CONV, since the quantificational nature of descriptions will introduce properties not present in the pre-*iota*-conversion fact. So Russell's theory of facts is *fine* as far as FC is concerned: even if Russell takes FIC to be +PSST (which he does), he assumes his own Theory of Descriptions and takes FIC to be –*t*-SUBS (and also –*t*-CONV, given other aspects of the theory).

But of course not all theories of facts are Russellian. The relevant question is whether *every* friend of facts can deny that FIC is +*t*-SUBS and +*t*-CONV easily, i.e. without giving up core components of his or her theory. As Taylor (1985) points out, there are legitimate philosophical pressures driving the fact theorist toward acceptance of the inference principles *t*-SUBS and *t*-CONV in connection with FIC. Such an acceptance

... embodies two further evident consequences of the traditional conception of the descriptum of a sentence as the complex of the entities relevant for its truth—that sentences so closely connected as to be guaranteed by logic alone to share a truth-value cannot differ in truth-relevant entities, and so must share their descriptum; and that sentences which, like “Cicero orated” and “Tully orated”, differ merely in the manner they choose to specify the same truth-relevant entity cannot diverge in the complex of such entities they describe. (1985, p. 30)

Taylor is pointing out that according to a common view of the role and nature of facts, FIC is *both* +*t*-SUBS and +*t*-CONV. This is already enough to refute Oppy's claim that *no* fact theorist could ever begin constructing a theory of facts that, upon later examination, was found to entail a treatment of FIC as +*t*-SUBS and +*t*-CONV.

It would appear that Oppy is simply ignoring the important work by Taylor that Neale discussed. *Prima facie*, says Taylor, theories of facts will treat FIC as both +*t*-SUBS and +*t*-CONV. According to Oppy, by contrast, every *prima facie* plausible theory of facts will treat FIC as either –*t*-SUBS or –*t*-CONV. Taylor and Oppy are being pulled in different directions by their own ideas of what facts should look like. The obviously sensible thing for neutral observers to do in the circumstances is avoid commitment one way or the other. *Prima facie*, philosophers are likely to posit all sorts of theories of facts.

Neale did not articulate any non-Russellian theories of facts or explore how they might fare in connection Gödel's Slingshot. His aim was simply to delimit the terrain upon which theories of facts can be constructed. But in view of Oppy's response to Neale, we want to show why some non-Russellian theories of facts are vulnerable to Gödel's Slingshot.

Wittgensteinian theories of facts—by which we mean theories shaped by a number of doctrines found in the *Tractatus*—are interestingly different from their Russellian cousins. At bedrock there are just atomic particular facts because (i) all facts are truth-functions of particular facts, and (ii) the logical constants do not stand for components of facts.⁹ The positive thought behind these doctrines is that the world is the totality of atomic particular facts. This totality determines everything. The negative thoughts behind the doctrines are reflexes of (a) a reluctance to regard properties as components of facts, and (b) the purported incomprehensibility of the idea that (e.g.) “ p ” and “ $\neg p$ ” should stand for distinct facts. Appeal to first-order properties is meant to be finessed by appeals to “arrangements” of objects; appeal to second-order properties (i.e. generality) is meant to be finessed by appeal to truth-functions of atomic, particular facts. The case against “ p ” and “ $\neg p$ ” standing for distinct facts is usually made, in part, by appeal to the doctrine that the conclusion of a formal inference must be “in some sense contained in the premisses and not something new” (Ramsey 1927, p. 48). From the single fact that p one should not be able to infer an infinite number of different facts, such as the fact that $\neg p$ and the fact that $p \bullet \neg p$; at best, says Ramsey, we have here distinct linguistic forms that stand for the same fact.

Wittgensteinian theories also hold that tautologies do not stand for facts.¹⁰ This invites a question about “ $p \bullet (q \vee \neg q)$ ”, where “ p ” is true. And the official answer is that this sentence and “ p ” stand for the same fact.¹¹ This is also a consequence of the account proposed by Prior (1948), according to which logically equivalent sentences stand for the same fact. It would appear, then, that neither Wittgenstein nor Prior has the means (or the inclination) to claim that “ Fa ” and “ $a = (\iota x)(x = a \bullet Fx)$ ” stand for distinct facts (where “ Fa ” is true). Both are drawn to Russellian analyses of descriptions which ensure the logical equivalence of “ Fa ” and “ $a = (\iota x)(x = a \bullet Fx)$ ” (Wittgenstein’s position is complicated by his postulation of only particular facts).¹² In short, Wittgenstein and Prior

⁹ Proposition (i) is a reflex of *Tractatus* 5 (“A proposition is a truth-function of elementary propositions”) and (ii) a reflex of *Tractatus* 4.0312 (“My fundamental idea is that the ‘logical constants’ are not representatives; that there can be no representatives of the *logic* of facts”).

¹⁰ This is a reflex of *Tractatus* 4.462 (“Tautologies and contradictions are not pictures of reality. They do not represent any possible situations. For the former admit *all* possible situations, and the latter none”).

¹¹ This is a reflex of *Tractatus*, 4.465 (“The logical product of a tautology and a proposition says the same thing as the proposition. This product, therefore, is identical to the proposition”).

¹² The viability of the project of the *Tractatus* presupposes the viability of Russell’s Theory of Descriptions (or some similar nonreferential treatment). See Anscombe (1959).

treat FIC as +*I*-CONV, and the sorts of considerations motivating them no doubt motivate (i) Taylor's (1985) suggestion that sentences "so closely connected as to be guaranteed by logic alone to share a truth-value" should stand for the same fact and (ii) Fine's (1982) suggestion that what he calls *empirical* theories of facts identify facts if and only if they "necessarily co-exist", a suggestion that Olson (1987) finds attractive.

Wilson (1959, 1974), pursuing some of the ideas lying behind the Russellian and Wittgensteinian pictures of facts, holds that (i) a true sentence corresponds to a fact, (ii) facts are true propositions, (iii) propositions contain individuals, properties, and times as components, (iv) there are only atomic particular propositions and hence only atomic particular facts, (v) the world is the totality of facts, (vi) FIC is both +PSST and +*I*-SUBS, and (vii) the fact that the teacher of Plato is wise is identical to the fact that something is wise and identical to all and only those things which are teachers of Plato (p. 307). But the conjunction of (iv), (vi), and (vii) entails that (viii) FIC is +*I*-CONV. So Wilson's theory does not satisfy FC. His theory of facts collapses, and with it two of Oppy's sweeping claims.

Austinian theories of facts are also vulnerable. Austin construes facts quite broadly: "... phenomena, events, situations, states of affairs ... surely of all of these we can say that they are facts" (1954, p. 156). To the extent that he wants facts as "entities", Austin wants them as truth-makers, and it is this feature of his approach to truth that leads people to view it as a version of the correspondence theory and prompts Davidson (1969) to present a slingshot argument against facts.

Austin denies that there must be a *structural* correspondence between the words used to make a (true) statement and a fact; he distinguishes himself from Russell and Wittgenstein in no uncertain terms:

... there is no need whatsoever for the words used in making a true statement to "mirror", in any way, however indirect, any feature or component of the situation or event; a statement no more needs, in order to be true, to reproduce the "multiplicity", say, of the "structure" or "form" of the reality, than a word needs to be echoic or writing pictographic. To suppose that it does, is to fall once again into the error of reading back into the world the features of language. (1950, p. 125)

It is hard to pin Austin down on the precise status of facts and the way we are meant to distinguish them from one another. Although he voices suspicion of the "fact that" idiom and outlaws questions as to whether a statement fits a particular fact, Austin does permit questions as to "whether the statement that *S* squares with or 'does justice to' the fact that *F* ('*F*' ≠ '*S*')" (1954, p. 160). The phrases that replace "*S*" and "*F*" will be sentences; so, although we cannot extract FIC from Austin's talk, we can extract a

two-place non-truth-functional *S*-connective SQ, where “SQ(ϕ , ψ)” is read as “the statement that ϕ squares with the fact that ψ ”.

The fact that, on Austinian theories, facts are commonplace parts of the world leaves such theories particularly vulnerable to Gödel’s Slingshot, particularly if descriptions are treated as singular terms (presumably Austin would not endorse Russell’s theory). Consider

- (1) The cat has mange.

This squares with a fact, and that fact is just the condition of the cat: “the condition of the cat is a fact, and is something in the world” (1954, p. 158). However we understand the condition of the cat, the description we use to pick out the cat itself will not affect that condition (that it has mange). Thus the condition of the cat is the very same condition as the condition of the largest feline in the room—if “one” is in a mangy condition, then “both” are.¹³ So if the condition of the cat is the fact that the cat has mange, then both of the following are true:

- (2) The statement that the cat has mange squares with the fact that the cat has mange.
- (3) The statement that the largest feline in the room has mange squares with the fact that the cat has mange.

So the Austinian connective SQ is plausibly +*I*-SUBS.

It also seems likely that it will be +*I*-CONV, at least if descriptions are treated referentially. The relevant question here is whether the following square with the same fact:

- (4) Cicero snores
- (5) Cicero is the unique person who (snores and is Cicero).

In both cases, the relevant fact is just the condition of Cicero (his snoring condition, if the statements are true). Again, since Austin wants his facts to be just ordinary parts of the world singled out by the demonstrative conventions of the sentence in question, and since sentences related by Göde-

¹³This is at least clear on the assumption that descriptions are interpreted referentially, and thus provide the same object—that cat—in both cases. Matters are less clear when descriptions are taken to be Russellian. Austin says next to nothing about the nature of the demonstrative conventions at work in quantified statements, but at one point he does express skepticism about general facts:

Either we suppose that there is nothing there but the true statement itself, nothing to which it corresponds, or else we populate the world with linguistic Doppelgänger (and grossly overpopulate it—every nugget of “positive” fact overlaid by a massive concentration of negative facts, every tiny detailed fact larded with generous general facts, and so on). (1950, p. 123)

One plausible interpretation is that, on Austin’s account, general statements are demonstratively correlated with the entire world, in which case intersubstitution of (Russellian) definite descriptions will not affect the fact expressed.

lian equivalence share demonstrative content (by any reasonable account of what counts as a demonstrative convention), the Austinian has little room for manoeuvre.¹⁴ It seems likely, then, that the simplest Austinian theories will be hit by Gödel's Slingshot, reducing to the position that there is only one fact.¹⁵

7. *1-SUBS* and *1-CONV*

What would Oppy need to do in order to demonstrate the philosophical insignificance of Gödel's Slingshot for theories of facts? He would need to show that every *prima facie* plausible theory treats FIC as either *-1-SUBS* or *-1-CONV*. But we already know he can't do that: the mere existence of the theories of Wilson (1974), Taylor (1976, 1985), and Searle (1995) falsifies Oppy's claim about what is *prima facie* plausible. However, it will be instructive to examine Oppy's argument for his false conclusion, which starts out with a discussion of whether or not FIC is *+PSST*.

On neo-Russellian accounts, facts are individuated by reference to their components; hence the fact that Phosphorus is bright is the fact that Hesperus is bright; hence FIC, on such accounts, is *+PSST*. Now Oppy is committed to the view that *such theories of facts are not even prima facie plausible*. For according to him if we say that the fact that Hesperus is bright is identical to the fact that Phosphorus is bright

it seems that we will be committed to the claim that the fact that Hammurabi believes that Hesperus is bright is the fact that Hammurabi believes Phosphorus is bright. And—the claims of semantically innocent direct reference theorists aside—this seems like

¹⁴ Interestingly, Austinian theories appear to avoid the Church-Quine-Davidson slingshot. In general, the Austinian has no reason to assume that SQ is *+PSLE*. In particular, the necessary interchange of " ϕ " and " $a = (\lambda x)(x = a \bullet \phi)$ " will be rejected by the Austinian when " ϕ " contains no occurrence of the singular term " a " (or some other term with the same reference).

¹⁵ At one point, Oppy suggests that the constraint imposed on theories of facts by Gödel's Slingshot is no more philosophically interesting than this one: "Oppy's cheapshot says that no theory of facts should allow that it is a fact that the moon is made of green cheese. Oppy's cheapshot is a genuine constraint: no decent theory of facts should violate it" (p. 127). Apparently realizing the weakness of the comparison, Oppy retreats in a footnote to a revised cheapshot in order to make the same point: "no theory of facts should allow that it is a fact that the greatest prime number is less than 200" (p. 127, n. 7). The purported advantage of the revised cheapshot is that it imposes a constraint on "what facts there could be, and not what facts there are" (p. p.127, n. 7). Again, Oppy has missed the real point of Gödel's Slingshot: it imposes a *structural* constraint on theories of facts, a constraint about the *logic* of facts as manifested in the *S*-connective FIC, a constraint on fact *identity*.

a bad result. So there is a good *prima facie* case for the view that friends of facts should deny that FIC is +*t*-SUBS. (p. 127)

It might be thought that Oppy is muddying the waters here by running together PSST and *t*-SUBS. The former is an inference principle (valid in some contexts and not in others) pertaining to singular terms e.g., names and, on some accounts, definite descriptions; the latter is an inference principle pertaining to definite descriptions, however treated. If descriptions are treated in accordance with Russell's theory, then the difference between PSST and *t*-SUBS is crucial. For example, many modal logicians who endorse Russell's Theory of Descriptions hold that \Box and \Diamond are +PSST and $-t$ -SUBS (and rightly so in our opinion). However, Oppy has not slipped up here. He appears to be trying to show that FIC is $-$ PSST and *therefore* very plausibly $-t$ -SUBS. But it is far from clear that he makes the case that FIC must be treated as $-$ PSST. The dubious claim that if the fact that Phosphorus is bright is identical to the fact that Hesperus is bright, then the fact that Hammurabi believes that Hesperus is bright is identical to the fact that Hammurabi believes Phosphorus is bright is argued for as follows:

... suppose—as many friends of facts do—that facts are objects of knowledge. Suppose that Hammurabi knows that Hesperus is bright. Given that the fact that Hesperus is bright is identical to the fact that Phosphorus is bright, it seems to follow that Hammurabi knows that Phosphorus is bright, and that Hammurabi's knowing that Hesperus is bright is the very same thing as Hammurabi's knowing that Phosphorus is bright. In other words, it seems to follow that the fact that Hammurabi believes that Hesperus is bright is identical to the fact that Hammurabi believes that Phosphorus is bright. (p. 125, n. 5)

Oppy adds that anyone who rejects this argument must either deny that facts are the objects of knowledge or else deny that facts individuate states of knowledge. Finding both moves “counterintuitive”, he concludes by claiming that he has shown that “there is *prima facie* reason to think that FIC is not +*t*-SUBS even in the case of co-referring proper names” (p. 126, n. 5).

Recall the dialectical situation here. Even if Oppy's argument were perfectly coherent, it would succeed in achieving his goal—showing that no plausible theory of facts can be threatened by Gödel's Slingshot—only if *every* *prima facie* plausible theory agrees with him on the following: (1) Attitude contexts are not +PSST; (2) Facts are the objects of knowledge; and (3) Facts individuate states of knowledge. But it is absurd to claim that *no one* quarrels with any of (1)–(3). (1) is famously rejected by direct reference theorists. (2) flies in the face of the traditional wisdom—encoded in the very name—that the objects of the propositional attitudes are prop-

ositions (moreover, Ramsey (1927) and others have pointed to very serious problems with the idea that facts are the objects of knowledge or perception). Only on the additional claim, made by (e.g.) Ducasse (1940, 1942) and (more tentatively) by Carnap (1947), that facts are true propositions does (2) become remotely plausible. But Russell (1918), Bennett and Baylis (1939), Baylis (1948), Moore (1953), Sprigge (1970), Slote (1974), Clark (1975), Fine (1982), and others have given a variety of reasons for rejecting this claim, so it is hardly a *universal* feature of theories of facts.¹⁶ (Additionally, it should not be overlooked that many theories of propositions take logically equivalent sentences to express the same proposition.) Claim (3) fares no better if it is interpreted in the way it needs to be for the argument to be intelligible: (3') Given facts *X* and *Y*, knowledge of *X* is identical to knowledge of *Y* iff *X* is identical to *Y*. If one holds that something can be known under a guise, a mode of presentation, or a description—hardly an unusual philosophical position—then one will reject (3'). In summary, Oppy has provided no argument capable of convincing us that fact theorists are all in agreement that FIC is not +PSST, and thus no reason yet to think that they are all in agreement that FIC is not +*t*-SUBS. Of course, it is hardly surprising that Oppy has not demonstrated this conclusion: Taylor (1976, 1985), Wilson (1959, 1974), and Searle (1995) all take FIC to be +PSST and +*t*-SUBS.

Oppy also attempts to show that *no* friend of facts will accept that FIC is +*t*-CONV. His argument (pp. 125–6) assumes that friends of facts hold the following: (1) There are both atomic and general facts; (2) the classes of atomic and general facts are disjoint; (3) atomic sentences all of whose argument positions are occupied by singular terms (e.g. “Cicero snores”) express atomic facts; (4) sentences containing quantified expressions in argument positions (e.g. “every Roman snores”) express general facts; (5) there are both monadic facts (e.g. the fact that Cicero snored) and dyadic facts (e.g. the fact that Cicero denounced Catiline); (6) the classes of monadic and dyadic facts are disjoint. A cursory glance at the literature reveals that there are fact theorists who do *not* accept all of these assumptions. For example, Wittgenstein and Wilson reject (1) and (4). (Austin would probably regard all six sentences as species of nonsense.) Assump-

¹⁶Oppy himself finds it difficult to endorse the idea that facts are true propositions:

Mainly for the sake of ease of exposition, I am going to assume that facts are true propositions. This assumption is *not compulsory*, and, indeed, may even involve some kind of category error. (We ordinarily say that propositions are true or false, but that facts obtain or fail to obtain.) (p. 132, *emphasis added*, SN/JD)

Oppy seems to have forgotten that he requires this very assumption at an earlier stage of his discussion.

tions (1)–(6) are, of course, paradigmatically Russellian assumptions about facts; again Oppy has fallen into the trap of assuming that all theories of facts are just like the one he favours.

8. *What is Oppy's objective?*

At times, Oppy appears to be arguing that, other non-truth-functional constructions aside, no prima facie plausible theory of facts will fall to Gödel's Slingshot, saying that "there isn't even prima facie reason for friends of facts to be afraid of Gödel's Slingshot" (p. 126) and that

(f)riends of facts and referential treatments of descriptions can, and should, proceed with the construction of their theories, blithely ignoring the many slingshots which now litter the landscape". (p. 121–3)

As we have already seen, this strong claim is false. Not only *can* there be theories of facts which fall to Gödel's Slingshot, there already *are* such theories in the literature. So Oppy, having already failed to demonstrate that Gödel's Slingshot is of no philosophical significance, also fails to show that it is of no philosophical significance to theories of facts or states of affairs. Interestingly, Oppy's prose sometimes suggests he had a much more limited goal in mind all along: to show only that it is *possible* to construct theories of facts that satisfy FC with respect to FIC:

In order to bolster the arguments which I give, I shall also try my hand at sketching a kind of theory which is fact-friendly, and in which definite descriptions can be treated as singular terms. The aim will be to provide enough detail to suggest (i) that it isn't obvious on independent grounds that no theory of this kind can succeed; and yet (ii) that it is quite clear that this theory will not fall to Gödel's Slingshot. (p. 123)

It is unclear what dialectical purpose is meant to be served by Oppy's sketch as the construction of a theory of facts cannot advance the claim that Gödel's Slingshot lacks philosophical significance. Indeed, the fact that Oppy bothers to construct a theory is tantamount to an admission that *other* theories of facts may fall to Gödel's Slingshot. In any case, that theories of facts can satisfy FC with respect to FIC *is something that Neale pointed out Gödel pointed out* when examining *Russell's* theory of facts! However, Oppy does *attempt* to do something more useful than rehearse Neale's point: he attempts to show that it is possible to construct an FC-approved theory of facts if one accepts a treatment of descriptions as singular terms. Of course, the mere existence of Oppy's own theory—which may or may not be coherent—does not show that *every* plausible theory

of facts satisfies FC with respect to FIC. So it cannot show that Gödel's Slingshot has no philosophical significance for theories of facts and states of affairs.

9. The semantics of descriptions

FC tells us that no non-truth-functional *S*-connective can be both +*t*-SUBS and +*t*-CONV, so anyone who wishes to posit a particular non-truth-functional *S*-connective ③ must explain how it shapes up with respect to these inference principles. This leads us directly to the "Description Constraint":

- (DC) When one takes a stand on the inferential properties of a particular non-truth-functional *S*-connective ③ in connection with definite descriptions—i.e. a stand on whether or not ③ is +*t*-SUBS or +*t*-CONV—one has a concomitant obligation to show that one has a plausible semantics for descriptions that is consistent with the ascription of such inferential properties to ③.

(One cannot simply treat ③ as, say, +*t*-CONV yet be independently committed to a treatment of descriptions that cannot combine with the purported logic of ③ to yield this result.)

Oppy denies DC. He claims that we have "not the slightest reason to think that [Gödel's Slingshot] has any bearing on the question of the semantic analysis of definite descriptions" (p. 128). The position appears to be based on two confusions.

First, Oppy's conviction that Gödel's Slingshot assumes semantic innocence has blinded him again. He claims that "assumptions involved in the construction of Gödel's Slingshot must be denied by any [plausible] referential treatment of definite descriptions" (p. 123) and that

Gödel's Slingshot is formulated in an environment in which referential treatments of descriptions are more or less ruled out by fiat. ... In order to give referential treatments of descriptions a fair trial, one needs to draw back from the assumptions implicit in the methodology which underlies Gödel's Slingshot". (p. 130)

The environmental features and assumptions that Oppy cites are *semantic innocence* and *direct reference*. But these are not environmental features of, or assumptions involved in the construction of Gödel's Slingshot. It may well turn out to be *difficult* to construct an attractive referential theory of descriptions given Gödel's Slingshot, but that fact (if it is a fact) does not *invalidate* this slingshot! Semantic innocence is not assumed, explicitly or implicitly, by Gödel's Slingshot or any other.

Second, Oppy seems to feel that since Gödel's Slingshot does not dictate *exactly* what semantics must be adopted for descriptions, it has no power to force people to take a stand on the issue. There are exactly three ways of evading the Slingshot in connection with a purported non-truth-functional *S*-connective \textcircled{S} : (i) deny that it is *+I-SUBS*, (ii) deny that it is *+I-CONV*, or (iii) deny both. Of course, considerations arising from Gödel's Slingshot do no more than force the theorist to commit to one of three disjunctions, each consisting of those semantic theories of descriptions that validate one of the three choices made in connection with the inference principles. As much is acknowledged in the statement of DC itself. Nonetheless, we have a genuine constraint here, one whose consequences become sharper as the unacceptability of options in the theorist's chosen disjunct becomes clear.

The contrast between modal and causal constructions is interesting in this regard. FC tells us that \Box cannot be both *+I-SUBS* and *+I-CONV*. It is clearly not *+I-SUBS* so Gödel's Slingshot will cause no damage here; but since many logicians wish to treat \Box as permitting the substitution *s.v.* of proper names and demonstratives, a Russellian treatment of descriptions comes very naturally to the modal logician, as the work of Smullyan, Marcus, and Kripke demonstrates. On such accounts, \Box is *+PSST*, *+PSLE*, *-PSME*, and *-I-SUBS*, a very satisfying combination. (*De re-de dicto* ambiguities involving descriptions and \Box can be explained in terms of scope.) This is not a *proof* that descriptions must be given a Russellian treatment, but it is extremely suggestive. When it comes to causal connectives like "the fact that () caused it to be the case that ()" or "because", the situation is mad-deningly inconclusive. Certainly these connectives permit the substitution of proper names and demonstratives *s.v.* But, as Neale showed, if such connectives *seem* also to be *+I-SUBS*, on a Russellian account of descriptions this could easily be an illusion attributable to reading the sentences in such a way that the *S*-connective occurs within the scope of the relevant descriptions. If they are genuinely *+I-SUBS*, then these *S*-connectives will have to be *-I-CONV* in order to survive. This is clearly an area where there is much work to be done.

Oppy casually dismisses Neale's claim that Gödel's Slingshot "highlights unpleasant consequences for referential treatments of descriptions" and poses questions about the "logical and philosophical consequences of rejecting Russell's Theory of Descriptions" (p. 139). Again, Oppy has misunderstood what is going on. In §12 of his paper, Neale examines a number of referential treatments of descriptions; the reason is clear: if Russell's theory is assumed, the *most* that can be proved by means of Gödel's Slingshot is that no non-truth-functional *S*-connective can be both *+I-SUBS* and *+I-CONV*; and the *most* that can be proved by means of the

Church-Quine-Davidson slingshot is that no such *S*-connective can be both +*t*-SUBS and +PSLE. Quine and Davidson were both after bigger fish: they were aiming to show that no such *S*-connective can be both +PSST and +PSLE; but in order to have any hope of establishing *this*, they need to assume a treatment of descriptions (or abstracts) as singular terms, i.e. a referential treatment.

After examining some potential referential treatments—due to Frege, Carnap, Scott, Grandy, Strawson and Taylor—in connection with “improper” descriptions and operator versions of slingshots, Neale concludes that none of them can be used to establish the results that Quine and Davidson were seeking. Neale reaches this negative conclusion by showing that each of the proposed referential treatments either fails (unlike Russell’s theory) to permit the intuitively valid inferences that PSLE and *t*-CONV are meant to capture in truth-functional contexts, or else fails in some other way to provide an intuitively plausible semantics for definite descriptions in natural language. This point—or rather, half of it—surfaces only because the behaviour of descriptions in connection with the inference principles used in slingshot arguments is being examined. Thus Neale is correct to say that “referential treatments of descriptions have unpleasant consequences that are *highlighted* by Gödel’s slingshot, and to some extent, those of Church, Quine, and Davidson” (p. 817, italics added, SN/JD) and that Gödel’s Slingshot (via the inference principles it assumes) poses questions about the “logical and philosophical consequences of rejecting Russell’s Theory of Descriptions” (p. 765). Oppy seems to have overlooked the point that in order to be taken seriously, a theory of descriptions must at least validate *t*-CONV in truth-functional contexts. Oppy cannot respond to this by claiming that “*Fa*” and “ $(\iota x)(x = a \bullet Fx)$ ” do not have the same *meaning* or do not (when true) stand for the same *fact*, for what is at issue is whether the *truth* of “*Fa*” guarantees the *truth* of “ $(\iota x)(x = a \bullet Fx)$ ”; valid inference principles need to be *truth*-preserving, not *meaning*-preserving or *fact*-preserving.

There is no doubt that Gödel’s Slingshot is philosophically significant for theories of facts, states of affairs, or anything else expressed sententially.¹⁷

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