Why `Not'?
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1. *Introduction*

This paper addresses some questions about negation. What is negation good for? What is its linguistic function? How might it plausibly have developed in natural language, and what if anything does this tell us about its properties? The project is thus to *explain* the existence and nature of negation in ordinary language. This explanatory stance is one thing that makes the enquiry non-trivial. For although few topics could be more central to the philosophy of language and philosophical logic, the appropriate philosophical account of negation may seem obvious and well-known, at least in outline. However, I think that the usual accounts are at best only the beginning of an understanding of the role of negation in language. To analyse negation in terms of truth, for example, is simply to postpone the issue as to why a connective so analysed should play such a prominent role in language. Moreover, I think we buy simplicity in an account of negation at the cost of complexity elsewhere, and that this turns out to be a bad bargain: it is better to tackle the complexities where they first arise, and hence to have negation available as part of the foundations for other projects.

A particular motivation for this enquiry is that the problem of the nature and origins of negation is crucial to the debate about anti-realism, in Michael Dummett's sense. Dummett has argued that certain constraints on the nature of linguistic understanding require that we abandon classical logic in favour of intuitionist logic. But Dummett's intuitionist logic is weaker than classical logic only in disallowing (in general) the inference from $\sim\sim P$ to P (the rule of Double Negation Elimination, or DNE). This means that if, *pace* Dummett, full classical negation proves compatible with such constraints on a theory of meaning, then these constraints need not lead to anti-realism. One of the main goals of this paper is to show that this is indeed the case. On the most plausible account of the origins and significance of negation, DNE is simply not open to challenge in the way that Dummett's argument requires.

First a simplifying assumption: I shall take it that we are concerned with *sentential* negation. It might be objected that natural negation is primarily non-sentential, at least in English and similar languages; that we tend to negate non-sentential components of sentences, rather than sentences themselves. I am not able to assess the linguistic evidence on this point. In

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any case, however, the proper interpretation of any such evidence would surely depend on an understanding of the function and origins of negation. Until we have some idea what negation might be *for*, it is difficult to say whether anything would hang on the discovery that a lot of it was non-sentential.

2. *Textbook negation*

Let us review some contemporary approaches. We may begin with the model-theoretic account, best exemplified in the possible world interpretation of propositions. This theory identifies a proposition with the set of possible worlds in which it is true. Propositions are thus construed as sets of possible worlds, and truth amounts to the membership relation: it holds between a set of worlds (or proposition) P and world W iff $W \in P$. Such a model provides a ready representation of the negation of a proposition P: $\sim P$ is simply the complementary set of possible worlds. It follows that $\sim P$ is true when and only when P is not true.

Does this account help us to answer the questions with which we began? I do not think it does. For one thing, there is a quite general problem as to how the existence of such a model-theoretic structure for propositions could possibly have a bearing on the development of language—as to how it could connect with an explanatory theory of the pragmatics of language. The problem is particularly acute in virtue of the fact that non-actual worlds can have had no causal influence on the development of language. This general problem aside, however, the effect of such an account of negation is simply to give our original questions a new form. If negation is to be thought of in terms of complementarity on sets of possible worlds, then what is it about this relation that makes it worth marking in language? How and why did we come to equip ourselves with simple linguistic means to express pairs of propositions so related?

One answer to these questions might appeal to the connection between set-theoretical complementarity on possible worlds and the notions of truth and falsity. What is interesting about the complement of a proposition P would be said to be that it is true when P is false and false when P is true. Hence the important thing about negation would be held to be that it reverses truth values. We thus have the orthodox truth-functional or semantic account of sentential negation.

Once again, the effect of this is to shift the focus of our original questions. We now want to know what it is about truth and falsity in virtue of which we have acquired a general syntactical means for transforming any given sentence into a sentence whose truth conditions are complementary to those of the original. This time, however, we may seem in sight of an illuminating answer—an answer suggested in the following introductory remark from Quine's *Methods of Logic*:

The peculiarity of *statements* which sets them apart from other linguistic forms is that they admit of truth and falsity, and hence may be significantly affirmed and denied. To deny a statement is to affirm another statement, known as the *negation* or *contradictory* of the first. To deny 'The Taj Mahal is white' is to affirm 'The Taj Mahal is not white'.[1]

There is room for doubt as to whether, as Quine here seems to suggest, statements may be affirmed or denied *because* they admit of truth and falsity. On the contrary, I think, the notion of assertion must be considered conceptually prior to that of truth.[2] For the present, however, the important thing is that in introducing the notions of affirmation and denial we have the beginnings of an account of why negation should matter—of what it does for speakers of a language. For as Quine points out, affirming the negation of a statement seems to be equivalent to *denying* that statement. If we can discover why denial matters, we shall have a promising start to an explanation of why negation matters. And if we can explain denial without invoking the notions of truth and falsity, then we'll have the prospect of an account of negation that does not itself depend on these notions.

3. *Negation and the need for denial*

What might denial be *for*? One way to approach this question is to try to imagine a community whose language does not allow for denial. Perhaps they have never developed it; or perhaps they are 'Ideological Positivists': the fanatical disciples of Norman Vincent Peale. Somewhat in the spirit of *1984*, they have tried to reconstruct their language so as make negative thinking impossible. What linguistic capabilities do they lack?

At first sight, it might seem that they have lost a great deal of the expressive power of language. For surely there are many things that they can no longer say about the world; or even believe about it, if the revision lives up to its Orwellian hopes. However, this overlooks the fact that in practice, almost everything we want to say can be expressed in what is overtly a positive form. ('Yes, we are free of bananas, we are totally free of them all', for example.) Of course, this might not true of every language.[3] But it seems likely to be true of natural languages; which suggests that the point of negation does not lie in extending the expressive power of language.

Where it does lie, I suggest, is in exhibiting conflicts between beliefs, and thereby facilitating argument. To illustrate the point, suppose that

[1] Quine, *Methods of Logic*, 3rd edn, London, Routledge & Kegan Paul, 1974, p. 9.

[2] See my 'Truth and the nature of assertion', *Mind*, 1987 pp. 202–20, and *Facts and the Function of Truth*, Oxford, Basil Blackwell, 1988, ch. 2.

[3] It would have to be false of Orwell's Newspeak, if Thoughtcrime was to be rendered impossible; cf. Hollis, *Analysis*, 1985 pp. 177–9, at p. 177.

you and I are Ideological Positivists ourselves, and that we happen to have a common desire in mind: we both want to see Fred. 'Fred is in the kitchen', I declare. This leads you to think about Fred and about the kitchen, with the result that you say, 'Fred is in the garden. The kitchen is free of Fred.' (Let us ignore the fact that 'free of' can function much like a term for negation.) Our beliefs now conflict, in the following behavioural sense: other things being equal, they are such as to lead us to make different choices. If we both want to see Fred, your belief will lead you to the garden, mine me to the kitchen. Fred cannot be in both places; so one of us, at most, will satisfy our common desire. How much better things might have been, if we had only noticed that our beliefs were incompatible, and hence discussed Fred's whereabouts, before we set out to look for him.

It is true that even as Ideological Positivists we might realize that 'Fred is in the kitchen' and 'Fred is in the garden' are incompatible, and hence reconsider. It is also true that in the real world we might miss the incompatibility, by missing the inference from 'Fred is in the garden' to 'Fred is not in the kitchen'. But the advantage of a sign of denial is that it gives us a perfectly general means of registering and pointing out the incompatibility. Think how it might go for us as Positivists:

Me: 'Fred is in the kitchen.' (Sets off for kitchen.)
You: 'Wait! Fred is in the garden.'
Me: 'I see. But he is in the kitchen, so I'll go there.' (Sets off.)
You: 'You lack understanding. The kitchen is Fred-free.'
Me: 'Is it really? But Fred's in it, and that's the important thing.' (Leaves for kitchen.)

Your problem is to get me to appreciate that your claims are incompatible with mine. Even in such a trivial case, we can see that it would be useful to have a device whose function was precisely to indicate that an incompatible claim was being made: precisely to *deny* an assertion or suggestion by somebody else. It seems that this is what negation gives us. If you can say 'No, Fred is not in the kitchen', then if I accept this and continue to claim that Fred is in the kitchen, I am not simply being slow-witted. I demonstrate that I do not understand the function of negation (or conceivably of something else involved). Thus there seems to be a role in dialogue for an expression whose significance is captured by the law of non-contradiction: by the principle that a proposition and its negation cannot both be accepted. At any rate, argument seems to be greatly facilitated by something like this.[4]

Of course, these considerations are as yet merely suggestive. They do

[4] I would also argue that it probably needs, and certainly benefits from, something more: namely the idea of an external standard embodied in the notion of truth. See *Facts and the Function of Truth*, chs 6 and 7.

not show that what argument needs is something with the detailed characteristics of ordinary negation. For one thing, they do not yet explain the fact that the sign of denial seems to function interchangeably as a force modifer and as a sense modifier. Denying P seems to be equivalent to asserting $\sim P$. If negation is primarily a sign of denial, it needs to be explained how this equivalence can hold. I mention this problem mainly to set it aside, for the general issue as to what makes an utterance an assertion is beyond the scope of this paper. It is true that I am thereby putting to one side a venerated objection to an account of negation in terms of denial, namely Frege's argument that such a view cannot make sense of embedded negations, such as the antecedent in the conditional premiss of the inference from 'If $\sim P$ then Q' and $\sim P$ to Q.[5] However, if we allow that (an utterance of) $\sim P$ may properly be regarded *both* as a denial with content P *and* as an assertion with content $\sim P$, then Frege's argument is powerless; for in this case the latter reading is available to explain the contribution of $\sim P$ to complex constructions, in the standard way. The difficult task is to defend a view of assertoric discourse and its limits that permits this kind of multiple factorization, and it is this task I am here setting aside.[6]

The above suggestion purports to explain why we need explicit denial and hence negation in public language. I want to note in passing a similar argument for the practical necessity of negation in the language of thought, if there is such a thing. The language of thought hypothesis suggests that beliefs are stored as sentences in the language of thought. As Jerry Fodor puts it:

> For any organism O and for any proposition P, there is a relation R and a mental representation MP such that: MP means that (expresses the proposition that) P; and O believes that P iff O bears R to MP. (And similarly, R desires that P iff O bears some different relation R', to MP. And so forth. . . .)[7]

In effect, then, coming to the belief that P is a matter of loading a token of a sentence of the language of thought that means that P into one's 'belief register'.

Now it is plausible that for a variety of purposes, agents need an ability to detect and register conflicts between new suggestions or hypotheses and their existing beliefs. Putting this in terms of a language of thought, agents need to be able to occupy a state that amounts, roughly, to barring a sentence P from their belief register. More formally, they require a functional state $DISBEL[P]$, whose effect is just to prevent P being registered as a belief. Again the question arises as to the level at which this

[5] 'Negation', in Geach and Black (eds), *Translations from the Philosophical Writings of Gottlob Frege*, Oxford, Basil Blackwell, 2nd edn, 1960, pp. 117–35, at pp. 129–30. See also Michael Dummett's *Frege: Philosophy of Language*, London, Duckworth, 1973, pp. 316–17.

[6] I defend such a view in *Facts and the Function of Truth*.

[7] Fodor's guide to mental representation', *Mind*, 1985, pp. 76–100, at p. 88.

distinction is appropriately represented. Is disbelief a fundamentally different sort of activity from belief, as denial might be from assertion? Or is there a negation operator within the syntax of the language of thought itself, so that *DISBEL*[*P*] can be represented as *BEL*[$\sim P$]? This question is a matter of some interest for those who take the language of thought view seriously. It raises difficult problems to do with the constitution and determinateness of the syntax of such a language. Again I mention it mainly to set it aside, but also by way of a caution to anyone who is tempted to try to analyse public negation in terms of negation in the language of thought.

Whether conducted at the public or private level, however, these arguments require that the apprehension of incompatibility be an ability more primitive than the use of negation. The negation operator is being explained as initially a means of *registering* (publicly or privately) a perceived incompatibility. This requirement might seem problematic. We might have hoped to have been able to cash out incompatibility or inconsistency in terms of negation, the basic idea being that P and Q are incompatible if and only if $\sim(P \& Q)$. An orthodox truth-functional account of negation and conjunction might seem to allow this: P and Q are contraries if they cannot be true together, and it follows from the truth tables that this is just to say that $\sim(P \& Q)$ is true. This advantage is illusory, however, for it clearly depends on our knowing that truth and falsity are incompatible. If we do not have a sense of *that*, the truth tables for negation give us no sense of the connection between negation and incompatibility.

4. *The origins of incompatibility*

Where might a sense of incompatibility first arise? I think there are at least two possible evolutionary stories. The first, which I shall call the *active* account, would locate our first grasp of a sense of incompatibility in our experience as agents. We often find ourselves faced with a choice between performing and not performing a specified action. Not all choices are like this. Sometimes we have two or more options, each independently described in positive terms. But at other times nature offers us an opportunity, and our choice is simply to accept or to decline. To have a sense that there is a decision to be made in such a case seems already to have a sense of the incompatibility of the options. Once language comes to be associated with the activity of agents, there is thus a need for negation in formulating, offering, and expressing choices.

Roughly, then, we might say that on the active account negation first arises in the non-descriptive part of language. The alternative seems to be that it arises in direct association with the development of the descriptive use of language. It is a familiar idea that the descriptive or assertoric use of

language might have evolved from a system of signals between the members of a social group—signals indicating the presence of states of affairs of mutual concern, such as 'food', 'danger', and the like.[8] The value of such signals obviously depends on the fact that they are not used at random, but correlate, more or less, with certain conditions of the environment. Signals thus have appropriateness conditions. Notice also that against the background of a general practice of signalling when certain conditions obtain, lack of the signal in question itself becomes significant. It is a kind of signal in its own right, and understanding of the practice involves an understanding that this is so. Competent signallers have to know when to signal and when to remain silent. They need a sense of the absence as well as of the presence of the conditions in which a signal is appropriate. And our first taste of incompatibility might be that of the difference between these two kinds of condition. From this then follows denial, expressed by negation. Negation might stand in for a very pointed silence—in effect, we would come to say $\sim P$ when we felt that it was appropriate not to say P (and perhaps, at least initially, when someone else had said P).

Obviously more needs to be said about this. In particular the account needs to pay attention to the fact that it is possible to distinguish several grades of dissension. For example we distinguish challenging someone's grounds for an assertion from claiming that the assertion in question is false. Why does negation, or for that matter silence, indicate one form of dissension rather than the other? These issues will be important below, where I shall try to show that there are good pragmatic reasons why we should have developed classical rather than intuitionist negation. For the moment, however, the important thing is that even such a basic linguistic task as that exemplified by our signalling ancestors contains the materials on which to build negation. To signal significantly one needs to be capable of discrimination. One needs to signal in some circumstances and to remain silent in others. One needs a sense that these are mutually exclusive possibilities.

Notice that this brings the descriptive account very close to the active account. The choice to signal or not to signal is the choice between actions, even if an understanding of the significance of these particular actions depends on a sense of the existence of exclusive possibilities in the world. As descriptive speech becomes deliberate we thus require a sense of the incompatibility of both speaking and not speaking, as well as that of the conditions under which we ought properly to do one or the other.

The descriptive and active accounts intertwine in other ways as well. There is a familiar sense in which an expression of intention approximates

[8] See for example Jonathon Bennett, *Linguistic Behaviour*, Cambridge, Cambridge University Press, 1976; and Daniel Dennett, 'Intentional systems in cognitive ethology; The "Panglossian paradigm" defended', *The Behavioural and Brain Sciences*, 1983, pp. 343–90.

a self-description. The active negation needed in formulating and expressing choices thus becomes the descriptive negation needed in signalling relevant states of oneself to the members of one's community. These interconnections are not problematic. There is no reason to expect either the active or the descriptive perspective to be the exclusive source of our experience of incompatibility and hence of negation. We meet the world both as observers and as agents, and the two perspectives always interweave. For present purposes what matters is that incompatibility be a very basic feature of a speaker's (or proto-speaker's) experience of the world, so that negation can plausibly be explained in terms of incompatibility. In fact we find more than this. We find that incompatibility is basic not once but twice, being essential to the use of language in the two main modes in which creatures relate to their environment. We thus have more foundations than we need, and can well afford to sacrifice some of this multiplicity in the interests of the greater plausibility of a version that allows the two foundations to interact.

In summary, I suggest that negation be explained in terms of the primitive notion of incompatibility. Where P signals a state of affairs of a certain kind—whether an intention to act, or the obtaining of some condition in the world—$\sim P$ signifies the corresponding incompatible state. The importance of the latter signal stems from its use in marking disagreements. This is not the whole story, of course. More work is needed to show that this basis does yield something with the main characteristics of negation. But it is an important first step. It is the beginnings of an answer to the questions with which we began; and of an answer which does not depend on the notions of truth and falsity.

5. *Why not intuitionist 'not'?*

I want now to try to fill in some of the details. In particular, I want to show that a more detailed account of the discursive function of negation explains why we should have developed classical rather than intuitionist negation. Thus, *inter alia*, the account provides the prospect of a rebuttal of Dummettian anti-realism.

I think the most detailed Dummettian discussion of negation and its likely genealogy is that by Neil Tennant, in his recent book *Anti-Realism and Logic*.[9] Tennant's account has much in common with the one suggested in the previous section. In particular, as we shall see, he emphasizes the fundamental role of incompatibility. However he takes the approach to explain the development of intuitionist rather than classical negation. I want to show that he is wrong about this. To begin with I want to consider the route that Tennant describes for the development of what

[9] *Anti-Realism and Logic*, Oxford, Oxford University Press, 1987.

is recognizably intuitionist negation. I want to show that there is a simpler and more plausible route to another sort of negation—a route that starts from the same place, that is from the ground that Tennant and I have in common, but does not lead to intuitionist negation.

As I said, Tennant gives an account of the origins of negation which suggests that the development of intuitionist negation is the normal course of events—the state of nature, so to speak. My objection turns on a point that is well made (if not well heeded) by Tennant himself. Tennant stresses the role of negation in dialogue:

> Once there is survival value in having a means for transferring information within a social group, so too there is survival value in any member having recourse to a method whereby one can cancel or reject an assertion by a fellow member. (p. 83)

He emphasizes, however, that there are various ways in which one may reject an assertion, and that it is important to locate negation correctly:

> The challenger must have information to the contrary, rather than be merely playing the *uniformed* doubter. The [use of $\sim$S] would otherwise be no more than a putting on public record of a call for the warrant putatively behind the assertion of S. If S concerned, say, the quality of a distant food source, then by challenging an assertion of S the uninformed doubter . . . could not plausibly be understood as saying something *about the same subject matter* (in this case, the food source) to the effect, roughly, of . . . 'Things there are not as you say they are'.
>
> For [the use of $\sim$S] to have precisely this force of a *denial* of the content of S as it concerns its subject matter, we have to imagine something stronger. We have to imagine the challenger as representing himself as having . . . a warrant to the contrary. [This] would show how S has consequences in explicit tension with other warranted assertions. (p. 84)

Tennant here notes a passing the need for a primitive notion of incompatibility, or 'contrariness', saying that 'contrariness is immanent in our categorizations and . . . is presupposed by eventually explicit forms of negation'. He continues:

> The thought I am following out here may . . . be put as follows. In order for challenges by means of [negation] to belong to the same language game, or at least to the same level therein as the assertions challenged, they must be conceived of as possessing warrants that are as open to independent public assessment as are the warrants of the assertions challenged. (Compare Heyting's . . . remarks to the effect that if one retreats from strong negation—'I can prove that p is impossible'—to weak negation—'I cannot prove that p'—one is no longer doing mathematics). (pp. 84–5).

It seems to me that Tennant here makes a strong move in the right direction, but fails to carry it through. He is right to associate negation with denial, and hence to expect $\sim A$ to have the same subject matter as A does. But what he offers us (and what Heyting offers us, for that matter) is no such thing. He says that

denial of A has the force 'I have good reason to believe that there is no warrant for A', rather than the weaker 'I have no reason to believe (apart from your asserting it) that you have any warrant for A'. (p. 85)

So construed, negation is naturally interpreted intuitionistically. Assertion of $\sim\sim A$ has the force of 'I have good reason to believe that there is no warrant for the view that there is no warrant for A'; and there seems no reason to take this to be as strong as 'I have good reason to believe that A'. Perhaps I simply believe that it cannot be shown that there is not a reason to believe that A.

However, the trouble with this construal of denial is that it still fails Tennant's own condition: it entails that to deny A is to talk about the warrant for A, rather than to say something about what A itself is about. If A is 'The grass is greener on the other side of the mountain', for example, then on this reading $\sim A$ concerns the existence of a warrant for asserting A, rather than the colour of the grass over the mountain. The difference shows up in the nature of the ensuing argument: if we wanted an expert to settle the issue, we should dismiss our agronomist in favour of an epistemologist.

We need to say not that denial of A has the force of 'I have good reason to believe that there is no warrant for A', but that denial of A has the force of 'It is not the case that A'. The fact that this looks (and is) circular simply means that we cannot give a reductive account of the force of negation. We can explicate it in other ways, however. In particular, we can say that denying A (or equivalently, asserting $\sim A$) is appropriate when one recognizes that A (or strictly, perhaps, the hypothesis that A) is incompatible with one's existing commitments—when one recognizes that A 'has consequences in explicit tension with other warranted assertions', as Tennant puts it.

To explicate negation and denial this way is to give an account of the *subjective* assertibility conditions of negative judgement. It is thus compared to a commonplace explication of assertion in terms of belief—the view that it is appropriate to assert that P just when one believes that P. Another example is provided by Ernest Adams's well-known account of conditional judgement in terms of subjective conditional probability.[10] Adams notes that it is appropriate to assert that if P then Q just when one holds a high conditional credence in Q given P. In all these cases the claim is not that saying X amounts to saying *that* Y, but that saying X is appropriate *when* Y.

Modern philosophy has a curiously pervasive tendency to overlook this distinction, and so to confuse 'saying when' with 'saying that'. This confusion underlies the persistent view that ethical emotivism takes a moral claim to *report* its speaker's evaluative attitudes, for example. In

[10] 'The logic of conditionals', *Inquiry*, 1965, pp. 166–97.

verificationist theories of meaning it is virtually endemic, as truth comes to be identified with assertibility. True, it is perhaps unfair to label it a confusion in this case—in Dummett's version of verificationism, at least, it clearly has some claim to be independently motivated. Even in this case, however, my impression is that Dummett's project would have looked less appealing if there had not been already a tendency to run together these notions.

The present point is that in the case of negation, 'saying that' and 'saying when' can be kept apart. Given the assumption that ordinary speakers have some acquaintance with incompatibility, and some capacity to recognize it in their dealings with the world, we have the basis for a 'saying when' account of denial and hence negation. Tennant himself gives us one reason not to regard this as a 'saying that' account: we want to respect the intuition that denials are about what the corresponding assertions are about, rather than about the evidence that bears on those matters. To this I think we can add another reason. It is tempting to think that agronomy is an older profession than epistemology—that we could think, talk, and argue about grass (and many other important things) at least an evolutionary step or two before we hit on the concepts of warrant, reason, justification, and the like. One of the great advantages of the 'saying when' – 'saying that' distinction is that it enables us to make sense of such hunches about our ancestors (or our contemporaries, for that matter). 'Saying when' accounts are allowed to be 100 per cent *implicit*, whereas 'saying that' accounts have to be at least potentially *explicit*. If saying 'No grass' is saying *that* there is no warrant for saying 'Grass', then goats stand on the brink of epistemology—a tersely expressed epistemology to be sure, but none the worse for that. Whereas if the suggestion is only that 'No grass' (or its goat equivalent) is uttered *when* (as we would put it) these conditions obtain in the goat, then we can safely say that goats are native agronomists, but little more.

The suggestion is thus that it is appropriate to deny a proposition P (or assert $\sim P$) when there is some proposition Q such that one believes that Q and takes P and Q to be incompatible. We thus have an account that is not explicitly intuitionist, in the manner of Tennant's analysis in terms of warrants. But is it necessarily classical? Does it guarantee DNE? A natural objection is that it does so, if at all, only by importing a classical assumption under the cover of the notion of incompatibility.

I want to suggest two ways of replying to this objection. The first accords with an appealing challenge to anti-realism of Dummett's sort. As is well known, Dummett's arguments rest on constraints on the acquisition and manifestation of linguistic knowledge. He argues that a classical bivalent notion of truth may violate the requirement that linguistic competence be acquired and manifestable in our ordinary dealings with the world. However, it is a familiar suggestion that linguistic competence

may be to some degree innate. This seems to have the potential to evade the Dummettian constraints. Why should we have to manifest what we are all born with? In particular it seems to side-step the suggestion that the manifestation requirement undermines bivalence. Could not bivalence be a simple consequence of an innately classical logic? If so, then all we need is a plausible evolutionary reason for classical logic to be innate, and that is what the following argument claims to provide. It claims to show that even if a speech community were to be led to intuitionist negation by the path described above (or indeed by any other path), pragmatic conditions would favour the adoption of DNE—that is, of the further strength of classical negation. Classical mutants would prosper in an intuitionist world.

6. *The evolutionary argument for DNE*

The evolutionary argument is in two parts. The first draws attention to an important functional similarity between believing that P and believing that $\sim\sim P$. This suggests that for practical purposes the two beliefs are bound to be identical—that practical psychology leaves no room for intuitionism. The second part of the argument concedes, in effect, that the first is not conclusive; but contends that to the extent that could be a difference here—a difference between believing that P and believing that $\sim\sim P$—we would be well advised always to infer the former from the latter. DNE thus has practical biological advantages.

For the first stage, the crucial idea is that a commitment or a belief is a stance with which an agent meets the future. To judge that P is to turn one's back on many of the ways the future might have been. Which ways? All the ways in which it would be the case that $\sim P$. Turning one's back on a possibility here means something like being prepared completely to discount that possibility in planning and acting for the future—to leave one's flank exposed to that quarter, in the belief that it carries no threat.

What then does an intuitionist's commitment to $\sim\sim P$ amount to? To a readiness to discount the possibility that *not* $\sim\sim P$—that is to discount $\sim\sim\sim P$, the triple negation of P. However, even the intuitionist takes $\sim\sim\sim P$ to be equivalent to $\sim P$. This follows from contraposition and the fact that from Q the intuitionist may derive $\sim\sim Q$—it is only the converse implication that fails in intuitionist logic. Even for an intuitionist, therefore, believing $\sim\sim P$ and believing P come to the same thing: both amount to a disposition to discount the possibility that $\sim P$.

The intuitionist may object that the fact that two beliefs have identical effects on behaviour falls a long way short of showing that they have identical contents. This is the kind of objection that needs to be backed up by examples. I have been unable to think of any that are particularly relevant in this context. There are certainly some irrelevant cases. Two

beliefs may have identical effects in virtue of some identity in the world of which the believers concerned may be unaware (Morning Star beliefs and Evening Star beliefs, say). Or they may have identical behavioural effects in virtue of having no such effects. But these possibilities do not come close to the systematic and *agent-accessible* pragmatic equivalence of the belief that P and the belief that $\sim\sim P$.

Let us turn then to another objection. The intuitionist may say that to concentrate on behavioural effects is to ignore the very aspect that distinguishes the belief that P from the belief that $\sim\sim P$, namely the fact that they are *warranted* in different circumstances. We may be warranted in believing that $\sim\sim P$, and hence in excluding the possibility that $\sim P$, without yet being warranted in believing that P. The two beliefs have the same *rejection conditions* but different *acceptance conditions.*

This is the point at which the argument changes tack. So far it has been that in virtue of sameness of rejection conditions, a belief that $\sim\sim P$ just *is* a belief that P. I think the classicist should now concede that a community of speakers might be such that they took $\sim\sim P$ and P to differ in virtue of having different acceptance conditions; but should counter that their sameness of rejection conditions provides a good biological reason for such a community to move from intuitionist to classical negation—to take an acceptance condition for $\sim\sim P$ to *be* an acceptance condition for P. There are a number of considerations which might come into play here. I think the strongest argument will be that cognitive economy favours the classical move. If double negations always vanish, then we do not need the cognitive resources for long-term storage of commitments of the form $\sim\sim P$. A commitment to P is easier to store, to retrieve, and to use; while the fact that it has the same rejection conditions ensures that simplicity is not bought at the expense of behavioural utility. It is in virtue of this that intuitionists would be well advised to mutate. In other words, they would be well advised to come to *regard* a warrant for $\sim\sim P$ as a warrant for P.

I suggested an argument of this kind to Neil Tennant (in correspondence from which he quotes in *Anti-Realism and Logic*, pp. 153–5). I saw it as particularly apposite in his case, in view of the fact that he acknowledges (e.g. p. 16) that linguistic competence may be to some degree innate. As I explained above, this seems to evade Dummettian constraints on the manifestation of linguistic knowledge. Why should we have to manifest what we are all born with? All we need, apparently, is a plausible evolutionary reason for classical logic to be innate.

Tennant takes issue with some of my specific claims about evolutionary advantage, but he concedes that we may well be 'hard-wired to apply DNE or dilemma' (p. 155). His main reply is therefore that innateness is not after all a sufficient answer to the Dummettian requirements. He claims that there is a problem about the *justification* of logical rules, which of course an evolutionary point simply does not address. He says that 'we

have to distinguish what we are prone to do from what we are *justified* in doing' (p. 156). 'Thus hard-wired for classical reasoning, we inadvertently extend our principles to new domains where ... a justification is not forthcoming. It is the task of the philosopher of language and logic ... to press for the required reforms' (p. 157). The problem with DNE (or equivalently with dilemma), Tennant says, is that it 'subverts the transmission of warranted assertability from premisses to conclusion' (p. 157).

As I see it, the tactical problem at this point is to respond to the suggestion that DNE is in general unjustified, without buying into the whole issue as to the justification of deductive rules. In the final section of the paper I want to suggest a way of doing this. The basic idea is that DNE is not a logical rule at all, and hence is not subject to general constraints on the justification of logical rules.

7. *DNE as a grammatical rule*

In natural languages there are many different ways of saying exactly the same thing. For one thing, there are countless significantly different possible sentence tokens of any sentence type. (Here 'significantly different' simply means that we could tell them apart.) Even restricting ourselves to sentence types, however, we find that natural languages admit of many merely grammatical differences between sentences. For example, to be instructed to *boldly go* where no man has been, is to be instructed to *go boldly* where no man has been. One doesn't need a rule of inference here: these are simply equivalent forms of the same instruction.

My suggestion is that it is the same with DNE. That is, we should simply regard the interchangeability of P and $\sim\sim P$ (or of their equivalents in less formalized languages) as a grammatical matter. Thus there is not a problem about justifying the move from $\sim\sim P$ to P, for these are simply two ways of saying the same thing. In formal terms the best way to put this seems to be to say that the negation operator iterates modulo two. It thus has only two significantly different states.[11]

The potential problems for this suggestion seem to be of three kinds. First, there might possibly be problems in implementing this suggestion in formal logic. I have not gone into this in any detail, but on the surface it seems straightforward enough: one simply builds the equivalence of P and $\sim\sim P$ into the syntactical rules.[12] Second, there may be neo-Quinean concerns about the lack of sharp boundaries between grammar and logic, just as there are about the analytic/synthetic boundary. At present,

[11] Negation *toggles*, as John Collins suggested I put it.

[12] For a formal treatment of negation which seems to have much in common with this proposal, see Kent Bendall, 'Negation as a sign of negative judgment', *Notre Dame Journal of Formal Logic*, 1979, pp. 68–76.

however, I cannot see any reason to think that these concerns will weigh more heavily for me than they do for my opponents. On the contrary, it seems that if there were no logic/grammar distinction at all then logic would be in no more need of justification than grammar is, and hence the present appeal to grammar would simply be unnecessary.

So to the third and I think most significant problem. It is clear that grammatical form is to some extent constrained by linguistic function. Grammatical rules are not simply arbitrary, but often reflect the needs of particular linguistic tasks. Why is it that in the case of negation the mod-2 view is even a live prospect? Clearly it would not be a live prospect for many other sentential operators.

For an answer to this, let us go back to the above sketch of a possible genealogy for negation, and to the descriptive notion of incompatibility that that sketch involved. I said that this notion might arise from the perception that useful descriptive signalling requires a sense of when not to signal, as well as of when it is appropriate to signal. I noted that the former perception admits of further discrimination. It is easy to see a distinction between informed and uninformed failure to signal—between pointed and unpointed silence, so to speak. Unpointed silence cannot be marked, of course, for it includes the cases in which a speaker simply fails to notice the issue at hand. If a distinction is to be drawn at all then it must be *deliberate* failure to signal that comes to be explicitly marked. Negation thus stands in on the side of pointed silence; it is an explicit null-signal. But what does it signal? Is it the absence of grounds for the corresponding positive signal? No, we saw that it was much more plausible that it should be the absence of what the positive signal would be a signal *of*. Signals are expressions of perceptions about the world. $\sim P$ is a signal that the world is such as would be incompatible with the presence of the conditions signalled by P. It signals that those conditions are absent.

The progression thus goes like this. In the simplest possible descriptive signalling, null signals (off-states) are not significant. Given such a signalling practice, however, benefit accrues to those who realize that off-states may be significant. In appropriate conditions, they may themselves be signals of the absence of the condition signalled by the on-state. From here there is further benefit in marking informed off-states—in distinguishing these from the uninformed silences. This new signal might mark informed unwillingness to use the positive signal. This would give us Tennant's intuitionist negation. Given the practice's original focus on signalling the presence of certain conditions in the world, however, it is much more appropriate, plausible, and useful that the new explicit off-state should mark the absence of these conditions.

The effect of this is that descriptive signals now come in pairs. Each original signal is paired with its explicit null-signal. These pairs are symmetric, in the sense that a signal is the explicit null-signal of its own

explicit null-signal. So when negation comes into use as a syntactical device for transforming a signal to its null-signal, the identity of P and $\sim\sim P$ is an immediate consequence. Signalling is a bi-polar activity, and negation a device for changing poles. So there is no function for the signal $\sim\sim P$, other than as an alternate form of the signal P. A language might handle this by explicitly excluding double negations, ruling in effect that no expression is well formed if it contains iterated negations. But an alternative is to allow arbitrary iterations, simply treating all pairs of expressions of the form P and $\sim\sim P$ as grammatically equivalent. Either way, there is no logical problem concerning our right to the inference from $\sim\sim P$ to P. These are the same signal, and hence, *inter alia*, are warranted in the same circumstances. P cannot but be warranted when $\sim\sim P$ is warranted, and the question as to whether DNE is warrant-preserving simply does not arise.

Thus I am inclined to say that the Dummettian problem about the status of DNE arises from a misconception about the linguistic role and grammatical structure of negation. Negation is grammatically a toggle operator, a fact explicable in terms of its association with the bi-polar activity of assertion and denial. It follows that DNE is not a logical rule, and is therefore not in need of whatever justification logical rules in general might need. I think that in this respect Dummett's verificationism thus addresses an illusory problem.

The intuitionist might object that the need for justification simply emerges at a new level. If DNE is a grammatical rule, does not this simply show that grammatical rules may stand in need of justification? There are difficult issues here, but my impression is that the move from logic to grammar does dramatically alter the nature of the debate. No one expects grammatical rules to play a significant role in reasoning, or to display the combination of necessity and fruitfulness that is so problematic in the case of logical rules. To defend a grammatical tansformation we would ordinarily do nothing more than to appeal to the conventions in force in the language we were using. It is true that there may be an external perspective from which we can say that some systems of grammar would be better than others. Some might be better adapted than othres to particular linguistic tasks, for example. This is the biological or evolutionary perspective, however, and here we have already seen that classicists seem to have the advantage. We may not have the best of all possible languages, but it is doubtful if a general move to an intuitionist grammar would much improve matters.

It is compatible with this conclusion that there might be *local* areas of discourse in which a non-standard grammar for negation would be appropriate. For example, vagueness might best be dealt with by allowing a distinction between asserting that P and denying that $\sim P$. Thus I emphasize that there may still be scope for an argument for Dummettian

anti-realism (i.e., failure of bivalence) on local grounds. The above point bears only on Dummett's more general argument for anti-realism, resting on the possibility of undecidability in language. I have tried to show that on a plausible account of negation and its role in language, there is not the conceptual space for an argument of that kind. Challenged to defend the step from $\sim\sim P$ to P, our proper response as classicists is polite bewilderment. We should not acknowledge that there is a step here, for we should not concede the existence of a logical lacuna for such a step to bridge.

The point comes down to one of burden of proof: if DNE were really a logical principle then there would be at least a case to be made that it stands in need of justification—whether a good case is another matter, but put that aside.[13] The effect of treating it as a grammatical principle is simply to side-step that issue. If the intuitionist thinks he has a superior grammar then by all means let him explain its advantages. However, let this not be taken to imply that there is *at present* any onus on us to justify our existing grammar, or any current philosophical responsibility that we are failing to meet. The two grammars might simply provide altenative ways of dealing with the world, each fully coherent by its own lights. And this makes a very big difference: it means that classicism is not ultimately an untenable position, as Dummett's argument would have us believe. If the intuitionist tells us that it is not the best position, then of course in one sense we knew this already. God might have done a much better job, if it had not been for the appalling constraints on time, raw materials, and so forth. Our scepticism simply concerns the intuitionist's particular programme for self-improvement; and here the onus lies with the intuitionist to show us that the change he recommends is both possible and desirable.

To finish, let me acknowledge that there is one respect in which this answer to Dummett leaves a lot to be desired. If sound, it shows that there must be something wrong with Dummett's argument; but it gives almost no indication as to where the error might lie. At best it is a non-constructive proof of the existence of a mistake. This is better than nothing, but an intuitionist would not be alone in claiming that a constructive proof would be better still. The issues that Dummett addresses are clearly important, and yet his argument has always had the character of a persuasive move from plausible premisses to implausible conclusions. The above reply might sharpen the last of these intuitions, but it does nothing to show how it might be reconciled with the others. I do have a view about this: several years ago I argued that the plausibility of Dummett's move from undecidability to anti-realism stems from his

[13] A natural suspicion is that its apparent strength stems at least in part from a confusion between on the one hand the legitimate demand for a justification of a particular inference in terms of a general principle, and on the other the far more problematic demand for a justification of the general principle itself.

failure to take seriously the possibility that sense might be determined jointly by assertion conditions and rejection or falsification conditions.[14] One of the weaknesses of that paper was that it took too seriously the Dummettian demand for a justificaton of DNE. I see it as one of the advantages of the present argument that in challenging that demand, it strengthens the case for my earlier diagnosis of Dummett's central mistake.[15]

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[14] 'Sense, assertion, Dummett and denial', *Mind*, 1983, pp. 174–88.

[15] I am very grateful for comments from John Burgess, John Collins, Lloyd Humberstone, and Neil Tennant, and from audiences at Monash University and ANU.