Truth Preservation in Context and in Its Place*

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1 The Traditional Link between Logical Consequence and Necessary Truth Preservation

Patently, certain conclusions can logically follow[1] from certain premises even if some or all of the premises are false, and even if some or all of the conclusions are false. However, can it ever be that certain conclusions logically follow from certain premises whilst all of the premises are true and all of the conclusions false? In other (possibly non-equivalent) words, is it always the case that the fact that certain conclusions logically follow from certain premises implies that, if all of the premises are true, then some of the conclusions are also true? What is, more generally, the relation between logical consequence and the *preservation of truth*?

It is fair to say that it is a well-worn philosophical idea that logical consequence is indeed *intimately linked* with necessary truth preservation. In fact, necessary truth preservation is quite often assumed to be what logical consequence *consists in*. In one of the most influential papers in twentieth-century logic and philosophy, Alfred Tarski identified in necessary truth preservation one of the central features of the notion of logical consequence. He set up his model-theoretic account of logical consequence in order to come as close as possible to capturing this feature in the systematic framework of his theory of truth:

> Consider any class K of sentences and a sentence X which follows from the sentences of this class. From an intuitive standpoint it can never happen that both the class K consists only of true sentences and the sentence X is false [...] It seems to me that everyone who understands the content of the above definition [the definition of logical consequence in terms of truth preservation in every model, EZ] must admit that it agrees quite well with common usage. This becomes still clearer from its various consequences. In particular, it can be proved, on the basis of this definition, that every consequence of true sentences must be true [...] (**?**, pp. 414, 417)

More than half a century later, the assumption that necessary truth preservation is what logical consequence consists in has become part of the philosophical lore, so much so that it is freely used to force controversial philosophical moves. Here is Timothy Williamson using the slogan that logical consequence is necessary truth preservation to force super-valuationist approaches to vagueness to adopt (what is in certain respects) a non-classical logic:

> The problem for supervaluationists is that supertruth plays no role in the definition of local validity. Yet they identify truth with supertruth; since validity is necessary preservation of truth, they should identify it with necessary preservation of supertruth. (**?**, p. 148)

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[1]Throughout, I use '*logically follow from*' and its relatives to denote the relation of logical consequence, '*entail*' and its relatives to denote the converse relation and '*implication*' and its relatives to denote the operation expressed by an ordinary conditional. '*Equivalence*' and its relatives denote two-way entailment.

The deep entrenchment of the assumption is also signalled by its being presented as one of the (few) uncontroversial starting points in contemporary surveys of philosophy of logic. This is witnessed for example by the following passage of Susan Haack's:

> What is going on, though, when one judges an informal argument to be valid? One is claiming, I take it, that its conclusion *follows from* its premises, that *its premises couldn't be true and its conclusion false.* (**?**, p. 14)

Thus, Stephen Read is connecting to a solid tradition when, in an illuminating article on material consequence, he states:

> An argument is valid if and only if there is no possible situation where the premises are true and the conclusion false. (**?**, p. 256)[2]

In this paper, I'd like to cast some doubts on this traditional wisdom. As Read's quoted statement makes clear, the assumption that necessary truth preservation is what logical consequence consists in at least implies a *two-way link* that can in turn naturally be split into *two complementary claims*:

(SUFF) Necessary truth preservation *implies* logical consequence;

(NEC) Necessary truth preservation *is implied by* logical consequence,

on which we'll henceforth focus. I'm actually sympathetic to the *spirit* of both (SUFF) and (NEC), but also happen to think that, in both cases, such spirit, when properly understood, does not licence anything close to such *unrestricted* claims as (SUFF) and (NEC) implicitly are. In this paper, I'd like to exemplify this overall stance of mine with respect to (NEC), arguing that, in the presence of *context dependence*, (NEC) *requires some substantial qualifications*. Between (SUFF) and (NEC), it is rather the former that has sometimes been explicitly put into question (for example, because of certain concerns about relevance, to which **?** offers an interesting reply). Focussing on (NEC), I'm thus going to attack the traditional link between logical consequence and necessary truth preservation where it has been taken to be at its strongest.

2   Necessary Truth Preservation and the Naive Argument

Let's first get a bit clearer about what necessary truth preservation exactly amounts to. Arguably, several interestingly different notions have some claim to spell out at least *a*

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[2]The linguistic succinctness of this statement should not obscure its conceptual richness: see for example **?** for an insightful discussion of an important dimension of complexity concealed in the statement.

notion of "necessary truth preservation", but for our purposes it'll be best to say that an argument from φ_0, φ_1, φ_2... to ψ_0, ψ_1, ψ_2... preserves truth iff the *material conditional* 'If all of 'φ_0', 'φ_1', 'φ_2'... are true, then some of 'ψ_0', 'ψ_1', 'ψ_2'... are true' holds, and then focus on *necessary* truth preservation, where in turn, until section **??**, the operative notion of necessity will be the very natural and usual one of *metaphysical* necessity: the necessity that concerns the ways *things could not have failed to be*. We thus obtain the following (provisional) sharpening of (NEC):

(MNEC$^-$) If φ_0, φ_1, φ_2... entail ψ_0, ψ_1, ψ_2..., then, metaphysically necessarily, if all of 'φ_0', 'φ_1', 'φ_2'... are true, then some of 'ψ_0', 'ψ_1', 'ψ_2'... are true.[3]

Now, one gets easily tempted into (MNEC$^-$) and, more generally, (NEC) by the following abstract argument (which I'll henceforth call 'the *Naive Argument*'; see **?**, pp. 42–43 for a very similar argument). Suppose that φ entails ψ.[4] Then, by the *deduction theorem*, the conditional 'If φ, then ψ' is valid, and so, by *necessitation*, 'Metaphysically necessarily, if φ, then ψ' is valid too, and so it holds. By the *transparency* principle according to which φ is fully intersubstitutable with ''φ' is true', that implies that, metaphysically necessarily, if φ is true, then ψ is true. (MNEC$^-$) follows.

Since the Naive Argument relies on the deduction theorem, necessitation and transparency, it is only as plausible as the conjunction of these is. In this paper, the deduction theorem will be taken for granted[5] and the focus will be on how the vagaries of context dependence generate dramatic failures of necessitation (section **??**) and transparency

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[3]For all their vagueness, while (MNEC$^-$) is more naturally understood as being a *schema* (NEC) is more naturally understood as being a full-blooded *universal generalisation*. However, important as it may be in other contexts, this difference is completely immaterial for our purposes, and so will henceforth be ignored.

[4]Our discussion does cover *multiple-premise* and *multiple-conclusion* arguments. However, in some cases it'll make for a more compact and less distracting presentation to focus on *single-premise* and *single-conclusion* arguments, as happens in the text. In all such cases, the discussion is meant to extend in the natural way to multiple-premise and multiple-conclusion arguments.

[5]As it should, I think. Recent discussions on the semantic paradoxes have focussed a lot on the fact that, in some prominent non-classical theories of truth (roughly, naive non-substructural theories), the deduction theorem fails and (NEC) is actually inconsistent (see **?**). Puzzlingly enough, I've sometimes heard in conversation people hijacking this fact in order to argue that (NEC) fails, rather than—more correctly, it seems to me—taking the fact to point to the inadequacy of those non-classical theories. (A naive substructural theory that validates both the deduction theorem and a version of (NEC) without 'necessary' is variously developed in **?**; [**?**]; [**?**]; [**?**]; [**?**]; [**?**]; [**?**].) Of course, I myself am going to argue that (NEC) and, in particular, (MNEC$^-$) fail. However, the extent of failure that I envisage for (NEC) is *importantly smaller* than the one envisaged by the non-classical theories in question. Some of my points against (NEC) and, in particular, (MNEC$^-$) (in section **??**) will rely on certain valid arguments that crucially involve *intensional context-dependent* expressions and that fail *metaphysically necessarily* to preserve truth while still preserving truth *in the actual world at the present time*, whereas those non-classical theories are committed to there being valid arguments that only involve *extensional non-context-dependent* expressions and that nevertheless even fail to preserve truth *in the actual world at the present time*. My other points against (NEC) (in sections **??** and **??**) will rely on valid arguments that crucially involve *context-dependent* expressions (or crucially involve sentences *that do not express propositions*) and that fail to preserve truth in the actual world at the present time, whereas those non-classical theories are committed to there being valid arguments that only involve *non-context-dependent*

(sections **??** and **??**) that in turn bring about substantial failures of (MNEC$^-$) and, more generally, (NEC).

3 Context Dependence

Before moving on to substantiating that claim, it'll be helpful to have some background on context dependence, although for lack of space I'll have to presuppose some minimal familiarity with *two-dimensional semantics* and its applications in the philosophy of language and linguistics, including some of its recent relativistic extensions (see **?** for a standard reference on two-dimensional semantics and **?** for a seminal paper on its relativistic extensions). Say that a (syntactically individuated) expression ε is *context dependent* iff, for some contexts C_0, C_1, C_2 and C_3, the *extension* of ε *as uttered with* C_0 *is correctly assessed at* C_1 to be X while the extension of ε as uttered with C_2 is correctly assessed at C_3 not to be X. Focussing on three prominent semantic categories in philosophy of logic, I'll assume (roughly) that the extension of a *singular term* is an *object*, the extension of a *predicate* a *set* and the extension of a *sentence* a *truth value*. I'll also assume a standard view of circumstances of evaluation and contexts as *sequences* of objects. A *circumstance of evaluation* comprises a world, and maybe more (a time, an agent, a place etc.). A *context* contains everything a circumstance of evaluation contains, and maybe more (a time, an agent, a place, some *demonstrata* etc.). Each context C thus determines a circumstance of evaluation E_C. I don't always assume that the context an utterance *has* or is *with* (i.e. the one that is *semantically relevant* for interpreting it) is the one *in* which the utterance *is made* (this last issue will become relevant in section **??**).

Contemporary wisdom in the philosophy of language distinguishes *at least* four ways in which the extension of an expression ε may vary across contexts. Suppose that it is in fact the case that, for some contexts C_0, C_1, C_2 and C_3, the extension of ε as uttered with C_0 is correctly assessed at C_1 to be X while the extension of ε as uttered with C_2 is correctly assessed at C_3 not to be X. There are at least four views about how that fact is best understood:

(SC) For the *standard contextualist*, that fact holds in virtue of ε as uttered with C_0 expressing a content different from that expressed by ε as uttered with C_2;

(NC) For the *non-indexical contextualist*, that fact holds rather in virtue of ε as uttered with C_0 and as uttered with C_2 expressing a single content that ε as uttered with C_0 brings to bear on a circumstance of evaluation different from that on which ε as uttered with C_2 brings it to bear;

(TR) For the *truth relativist*, that fact holds rather in virtue of ε as uttered with C_0 and as uttered with C_2 expressing a single content that is correctly assessed at C_1

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expressions (or only involve sentences *that express propositions*) and that nevertheless fail to preserve truth in the actual world at the present time.

to determine X as extension and correctly assessed at C_3 not to determine X as extension;

(CR) For the *content relativist*, that fact holds rather in virtue of ε as uttered with C_0 and as uttered with C_2 being correctly assessed at C_1 to express a single content different from the single content which they are correctly assessed at C_3 to express.

In some of the arguments to follow, I'll have to make some (plausible) assumptions about this debate with respect to certain context-dependent expressions (see fns **??**, **??**, **??** and **??**).[6]

4 Necessary Truth Preservation and Context Dependence

Until section **??**, relying on work done in **?** I'm assuming that both logical-consequence bearers and truth bearers are *linguistic* entities. Moreover, again relying on work done in **?**, I'm taking *sentences* to be the linguistic *logical-consequence bearers*. However, with a context-dependent language, it is widely acknowledged that the linguistic *truth bearers* are *utterances* (see **?**, pp. 545–546; the alert reader will have noticed that something like that view was already being implicitly presupposed in section **??**). There are very different ways of understanding what utterances exactly are: under one understanding, they are *concrete speech acts* (see **?** for a defence of the claim that utterances should be so understood if they are to serve as absolute truth bearers for a context-dependent language); under another understanding, they are *concrete sentence tokens*; under yet another understanding, they are *abstract sentence-context pairs*. Fortunately, all the arguments to follow will ultimately be neutral on exactly what to understand utterances to be, although, for reasons that will become clear shortly (see fn **??**), in the presentation I'll assume them to be abstract sentence-context pairs (I sometimes refer to utterances more neutrally with such phrases as 'utterance u with context C' and 'sentence 'φ' as uttered with context C'). I'll briefly comment in section **??** about how the arguments in this paper pan out if we consider instead *non-linguistic* logical-consequence bearers and truth bearers (such as propositions).

Thus, while sentences are the logical-consequence bearers, it is utterances that are the truth bearers. This fundamental metaphysical difference creates an initial problem for (NEC), since it is sentences that logically follow from sentences, but it is utterances that necessarily preserve the truth of utterances. In other words, (NEC) suffers from an important *mismatch* between the kind of entity over which *logical consequence* operates and the kind of entity over which *necessary truth preservation* operates. This is an early and perhaps surprising indication that, in the presence of context dependence, contrary

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[6]I should note that, while the inclusion of some relativistic extensions of two-dimensional semantics is useful in order to place our discussion in the right perspective, it'll turn out that the assumptions I'll have to make do not require relativism in the sense of (TR) or (CR).

to the traditional wisdom there is no straightforward link between logical consequence and necessary truth preservation.

Still, there are some natural proposals for bridging the metaphysical gap between the logical-consequence bearers and the truth bearers. Notice that utterances are very similar to sentences, the only relevant difference being that utterances *have a particular context* (this is made vivid especially by the understanding of utterances that identifies them with sentence-context pairs). So we would be able to go from sentences (the realm of logical consequence) to utterances (the realm of necessary truth preservation) if only we could associate sentences with a particular context. But which one?

Here the Naive Argument, and in particular its reliance on transparency, gives us an important clue. It is a familiar point that, in the presence of context dependence, neither utterance truth nor sentential truth are in any way transparent. For example, if I am hungry, it does not follow that your *utterance* of the sentence 'I am hungry' is true—you might well not be hungry, in which case your utterance would be false. It is not even clear whether and in what sense it follows that the *sentence* 'I am hungry' is true—if I am hungry and you are not hungry why should the sentence 'I am hungry' give more weight to my hunger than to your satiety (see **?**, pp. 545–561; [**?**]; [**?**])? Since the Naive Argument relies on transparency, in its original form it simply breaks down in the presence of context dependence.

However, even in the presence of context dependence, utterance truth seems[7] to remain transparent for utterances *with this very same context* (i.e., roughly, the context of my writing this paper, which I'll henceforth denote with 'I'). At least, this seems to be the case if—as is natural and as we'll do throughout—one understands the *relativised* notion of *utterance truth at a circumstance of evaluation* as:

($\mathrm{T}_{\mathrm{at}}^E$) An utterance $\langle \varphi, C \rangle$ is true at a circumstance of evaluation E iff the proposition expressed by φ at C holds at E

and if—as is fairly natural and as we'll do throughout—one then understands the *relativised* notion of *utterance truth in a circumstance of evaluation* as:

($\mathrm{T}_{\mathrm{in}}^E$) An utterance $\langle \varphi, C \rangle$ is true in a circumstance of evaluation E iff $\langle \varphi, C \rangle$ is true at E and $\langle \varphi, C \rangle$ exists in E[8]

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[7]The reason for the several 'seems'-hedges interspersed in this and the next two paragraphs will become clear in sections **??** and **??**.

[8]An alternative understanding would have it that an utterance $\langle \varphi, C \rangle$ is true in a circumstance of evaluation E iff the proposition expressed by φ at C holds at E_C and $\langle \varphi, C \rangle$ exists in E. Useful as it may be for other purposes, this understanding is not suitable for ours, since it does not allow for non-trivial embeddings under metaphysically modal operators (it's easy to see that, under this understanding, metaphysically necessarily, an utterance is true iff it is metaphysically necessarily true). And that in turn implies that, under this understanding, utterance truth is not transparent (for example, metaphysically possibly, snow is black, but, under this understanding, it is not the case that, metaphysically possibly, $\langle$'Snow is black', $I \rangle$ is true, since in the world of I snow is not black).

(it is the latter notion that expresses the idea of the relevant utterance falling in the extension of 'true' at the relevant circumstance of evaluation, and that is the notion we need in order to understand embeddings of 'true' under *metaphysically* modal operators). For example, quite generally, it seems to be the case that, under this understanding, metaphysically necessarily, P iff $\langle$'P', $I\rangle$ is true.

Thus, there is some hope of reviving the Naive Argument by sharpening further (MNEC^-) so that it only concerns utterances with I:

(MNEC) If φ_0, φ_1, φ_2... entail ψ_0, ψ_1, ψ_2..., then, metaphysically necessarily, if all of $\langle\varphi_0, I\rangle, \langle\varphi_1, I\rangle, \langle\varphi_2, I\rangle$... are true, then some of $\langle\psi_0, I\rangle, \langle\psi_1, I\rangle, \langle\psi_2, I\rangle$... are true.

For utterances with I seem to respect transparency, and so the Naive Argument (in which transparency occurs as a key step) would seem at least to establish (MNEC).[9] And, since the Naive Argument seems in turn one of the main reasons supporting (NEC), that speaks in favour of plumping for (MNEC) as a sharpening of (NEC).

5   Non-Normality

Unfortunately, although the utterances referred to in (MNEC) may seem to respect transparency (which was a key step in the Naive Argument), context-dependent languages have other features that make (MNEC) extremely problematic. In particular, certain context-dependent expressions licence arguably valid arguments that force the modal logic of natural language to be *non-normal*, and in particular to be such that the metarule of *necessitation* fails. For example, 'If snow is black, then, actually, snow is black' is arguably a validity in the logic of actuality. Yet, necessitation on that validity fails: 'Metaphysically necessarily, if snow is black, then, actually, snow is black', far from being another

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[9]These considerations also point to the reasons for why, in this dialectic, it is better to understand utterances as abstract sentence-context pairs. Since there is no guarantee that the actual world @ contains a concrete speech act involving φ or a token of φ, if we understood utterances as concrete entities of some kind or other transparency would straightforwardly fail even in the version that restricts to utterances with I: φ would no longer entail 'An utterance of 'φ' with I is true', for, contrary to the abstract sentence-context pair $\langle\varphi, I\rangle$, the concrete entity that would now be required may not exist. And, for precisely this reason, (MNEC) would fail in a rather boring way: if φ entails ψ but @ only contains a speech act involving φ or a token of φ, then, while it is the case that φ as uttered with I is true, it is not the case that ψ as uttered with I is true (for no utterance of ψ would exist in @ in the first place). Relatedly, since there is no guarantee that a metaphysically possible world w contains a concrete speech act involving φ or a token of φ, if we understood utterances as concrete entities of some kind or other transparency would straightforwardly fail even in the version that restricts to utterances with I: 'Metaphysically possibly, φ' would no longer entail 'Metaphysically possibly, an utterance of 'φ' with I is true', for, contrary to the abstract sentence-context pair $\langle\varphi, I\rangle$, the concrete entity that would now be required may not exist in w. And, for precisely this reason, (MNEC) would again fail in a rather boring way: if φ entails ψ but w only contains a speech act involving φ or a token of φ, then, while it is the case that φ as uttered with I is true in w, it is not the case that ψ as uttered with I is true in w (for no utterance of ψ would exist in w in the first place).

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validity of the logic of actuality, embodies a misunderstanding of the workings of 'actually'. Necessitation was another key step in the Naive Argument, and so it should come as no surprise that such failures of necessitation provide counterexamples to (MNEC). Arguably, in the logic of actuality, 'Actually, snow is black' logically follows from 'Snow is black'. Given this, (MNEC) requires that, metaphysically necessarily, if ⟨'Snow is black', I⟩ is true, then ⟨'Actually, snow is black', I⟩ is true. Consider however a world w in which snow is black. By (T_{in}^E), ⟨'Snow is black', I⟩ is true in w (since ⟨'Snow is black', I⟩ exists in w, says that snow is black and snow is indeed black in w), but ⟨'Actually, snow is black', I⟩ is not true in w (since ⟨'Actually, snow is black', I⟩ says [that, actually (i.e. in @),[10] snow is black],[11] and not even in w is snow black in @). w is thus a counterexample to the metaphysically strict implication required by (MNEC).

In fact, the failure of necessitation for context-dependent languages has even more compounding effects, strongly suggesting that no *interestingly strong* constraint on logical consequence in terms of preservation of truth as uttered with I is forthcoming. For not only does the *metaphysically strict implication* required by (MNEC) fail; in the example above, also the weaker *counterfactual implication* to the effect that, [if ⟨'Snow is black', I⟩ were true, then ⟨'Actually, snow is black', I⟩ would be true] fails (since the closest worlds in which ⟨'Snow is black', I⟩ is true—i.e. the closest worlds in which snow is black—are not worlds in which ⟨'Actually, snow is black', I⟩ is true—even in those worlds, snow is not black in @).

An analogous structural flaw emerges if one is tempted by a retreat to actuality, claiming that, if logical consequence does not require *metaphysically necessary* truth preservation, it at least requires *eternal* truth preservation. In particular, certain context-dependent expressions licence arguably valid arguments that force the tense logic of natural language to be non-normal, and in particular to be such that the metarule of "*eternalisation*" (if φ is valid, then 'Always, φ' is valid) fails. For example, 'If Hadrian rules Britannia, then, now, Hadrian rules Britannia' is arguably a validity of the logic of the present. Yet, eternalisation on that validity fails: 'Always, if Hadrian rules Britannia, then, now, Hadrian rules Britannia', far from being another validity of the logic of the present, embodies a misunderstanding of the workings of 'now'. Now, arguably, in the logic of the present, 'Now, Hadrian rules Britannia' logically follows from 'Hadrian rules Britannia'. Consider however time 120 AD at which Hadrian ruled Britannia. By (T_{in}^E), ⟨'Hadrian rules Britannia', I⟩ is true in 120 AD (since ⟨'Hadrian rules Britannia', I⟩ exists in 120 AD, says that Hadrian rules Britannia and Hadrian did rule Britannia in 120 AD),[12] but ⟨'Now, Hadrian rules Britannia', I⟩ is not true in 120 AD (since ⟨'Now, Hadrian rules Britannia', I⟩ says that, now (i.e. in 2012), Hadrian rules Britannia, and not even in 120 AD did Hadrian rule Britannia in 2012). 120 AD is thus a counterexample

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[10]For the rest of this section, I'm assuming that the world and time of I are @ and 2012 respectively.

[11]Throughout, I use square brackets to disambiguate constituent structure in English.

[12]The last sentence should really read in tense-logical perspicuity 'In 120 AD, Hadrian rules Britannia'. However, English syntax usually requires that a simple-present sentence modified by a past temporal adverb such as 'in 120 AD' be transformed into the corresponding simple-past sentence, and for this reason the text has 'Hadrian did rule Britannia in 120 AD'.

to the idea that logical consequence requires eternal truth preservation.[13]

Sometimes, the arguments from φ to 'Actually, φ' or to 'Now, φ' are resisted, mainly because of the question-begging reason that they generate non-normality in the logic. However, if anything like modal logic or tense logic make sense (and they do), it's hard to find fault with such arguments: there would seem to be no reason to think that 'actually'—contrary, say, to 'necessarily'—does not enjoy its own interesting modal logic, and no reason to think that 'now'—contrary, say, to 'always'—does not enjoy its own interesting tense logic; yet, if those expressions do have their own interesting logics, the arguments in question would seem to be absolutely central to them.

In any event, the counterexamples from non-normality needn't rely on the peculiar logic of 'actually' and 'now'. Failures of necessitation and eternalisation occur at an even more fundamental level. For example, 'If everything is loved by God, then x is loved by God' is a validity of standard non-free and free first-order logics. Yet, necessitation

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[13]The counterexample assumes—in my view plausibly—that the context dependence introduced by tense is of the (NC)-kind. The view is usually known as '*temporalism*', and the opposite view according to which the context dependence introduced by tense is of the (SC)-kind is usually known as '*eternalism*' (views according to which the context dependence introduced by tense is of either the (TR)- or the (CR)-kind seem rather hopeless). Under eternalism, the counterexample fails since, under eternalism, ⟨'Hadrian rules Britannia', C⟩ says that Hadrian rules Britannia at the time of C, so that ⟨'Hadrian rules Britannia', I⟩ is not true in 120 AD (since, under eternalism, ⟨'Hadrian rules Britannia', I⟩ says that Hadrian rules Britannia in 2012, and not even in 120 AD did Hadrian rule Britannia in 2012). **?** is an early—in my view inconclusive—criticism of temporalism. An analogous—in my view even more plausible—assumption was needed in the counterexamples involving the logic of actuality in the last two paragraphs (as well for some claims made in section **??**), to the effect that the context dependence introduced by the indicative mood (and some other moods) is of the (NC)-kind. The view is sometimes known as '*contingentism*', and the opposite view according to which the context dependence introduced by the indicative mood (and some other moods) is of the (SC)-kind is sometimes known as '*necessitarianism*' (views according to which the context dependence introduced by the indicative mood (and some other ones) is of either the (TR)- or the (CR)-kind seem again rather hopeless). **?** is a recent—in my view inconclusive—criticism of contigentism. Having said this about the assumptions of the counterexamples, I hasten to add that the adoption of either eternalism or necessitarianism does little to ameliorate (MNEC)'s overall position. Let's focus, without loss of generality, on necessitarianism. Firstly, under necessitarianism, transparency straightforwardly fails even in the version that restricts to utterances with I. For example, while it is metaphysically necessary that [snow is black iff snow is black], under necessitarianism it is not metaphysically necessary that [snow is black iff ⟨Snow is black, I⟩ is true]. For consider a world w in which snow is black. Snow is black in w, but, under necessitarianism, ⟨'Snow is black', I⟩ is not true in w (since, under necessitarianism, ⟨'Snow is black', I⟩ says [that snow is black in @], and not even in w is snow black in @). Thus, under necessitarianism, the Naive Argument still fails to establish (MNEC), since it breaks down at the transparency step. Secondly, not only, under necessitarianism, is the Naive Argument blocked; (MNEC) itself is stripped of its intended force. For, under necessitarianism, '⟨φ, C⟩ is true' does not have non-trivial embeddings under metaphysically modal operators (it's easy to see that, under necessitarianism, metaphysically necessarily, ⟨φ, C⟩ is true iff it is metaphysically necessarily true, see also fn **??**). Thus, under necessitarianism, (MNEC) adds no real modal force to a requirement of merely actual truth preservation, and so, contrary to its own spirit, it places no constraint on logical consequence that is not met, say, by the silly argument from 'Snow is black' to 'Snow is black and grass is green'. Thirdly, under necessitarianism, principles very similar in spirit to (MNEC) fail. For example, under necessitarianism the principle that, if φ entails ψ, then, metaphysically necessary, φ implies the truth of ⟨ψ, I⟩ fails (for 'Snow is black' entails itself, but, as noticed above, under necessitarianism it is not metaphysically necessary that, if snow is black, then ⟨Snow is black, I⟩ is true).

on that validity fails: 'Metaphysically necessarily, if everything is loved by God, then, x is loved by God', far from being another validity, embodies a misunderstanding of the workings of free variables (assign Saul to x, and consider any world in which everything is loved by God but, *pace* **?**; **?**, Saul does not exist). Now, in standard non-free and free first-order logics, 'x is loved by God' logically follows from 'Everything is loved by God'. Given this, (MNEC) requires that, metaphysically necessarily, [if ⟨'Everything is loved by God', I⟩ is true, then ⟨'x is loved by God', I⟩ is true]. However, let I assign Saul to 'x', and consider a world w in which everything is loved by God but Saul does not exist. By ($\mathrm{T}_{\mathrm{in}}^{E}$), ⟨'Everything is loved by God', I⟩ is true in w (since ⟨'Everything is loved by God', I⟩ exists in w, says that everything is loved by God and everything is indeed loved by God in w), but ⟨'x is loved by God', I⟩ is not true in w (since ⟨'x is loved by God', I⟩ says that Saul is loved by God, and Saul is not loved by God in w, as he does not even exist in w). w is thus a counterexample to the metaphysically strict implication required by (MNEC) that only relies on standard non-free or free first-order logics. (Analogous points apply of course to counterfactual and eternal truth preservation.)

Of course, in light of these counterexamples, one may retreat even further and claim that, if logical consequence requires neither metaphysically necessary nor eternal truth preservation, it at least requires actual, present truth preservation. However, it is not even clear that no analogous structural flaw would again emerge. For in addition to *contingency* and *temporality*, it might be that truth values can change also because of *egocentricity*. For example, on an influential theory (see **?**), when at least thinking "from the first-person perspective" *agents self-attribute properties*, which may be exemplified by some agents and fail to be exemplified by others. On this view, when John (a Californian), as the folk say, "believes that he lives in California", what he really does is to self-attribute the property $\lambda x(x$ lives in California).[14] If that's correct, we should certainly model the rationality of agents' first-personal thought by having a logic of properties, according to which, for example, '$\lambda x(x$ lives in California)' entails '$\lambda x(x$ lives in California or x lives in Alaska)'. 'Everyone' and 'I' would then be intensional operators in such "*personal*" logic, playing the same roles played in modal logic by 'necessarily' and 'actually' respectively (or in tense logic by 'always' and 'now' respectively).

In particular, 'I' would licence arguably valid arguments that force the personal logic of natural language to be non-normal, and in particular to be such that the metarule of "*generalisation*" (if '$\lambda x(\varphi)$' is valid, then 'λx(Everyone is such that $\varphi_{\mathrm{they}/x}$)'[15] is valid) fails. For example, 'λx(If x lives in California, then I live in California)' is arguably a validity of the logic of the first person. Yet, generalisation on that validity fails: 'λx(Everyone is such that, if they live in California, then I live in California)', far from being another validity of the logic of the first person, embodies a misundersanding of the workings of 'I'. Now, arguably, in the logic of the first person, 'λx(I live in California)' logically fol-

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[14]Such a theory can be interpreted as holding that the context dependence introduced by first-person pronouns and adjectives and similar devices is of the (NC)-kind. **?** is an early—in my view inconclusive—criticism of the theory.

[15]Throughout, $\varphi_{\mathrm{they}/\xi}$ is the result of substituting the impersonal 'they' (anaphoric on 'everyone') for the free occurrences of ξ in φ (making the adjustments required either by English morphology or by "clashes of pronouns").

lows from '$\lambda x(x$ lives in California)'. Consider however John. By (T^E_{in}), $\langle$'$\lambda x(x$ lives in California)', $I\rangle$ is true[16] for John (since $\langle$'$\lambda x(x$ lives in California)', $I\rangle$ exists for John, expresses the property of living in California and John does live in California), but $\langle$'$\lambda x(I$ live in California)', $I\rangle$ is not true for John (since $\langle$'$\lambda x(I$ live in California)', $I\rangle$ expresses the property of being such that I (i.e. EZ) live in California, and not even John is such that EZ lives in California). John would thus be a counterexample to the idea that logical consequence requires actual, present (but impersonal) truth preservation.

Be that as it may with personal logic, actual, present truth preservation is not a very interesting property—what is so special about 5.55pm of 15/05/2012 in @ (the time and world of I)? Nothing really. In other worlds and times, I'll truly and justifiedly think that logical consequence requires *another*, similar but different, property (preservation of truth at the world and time of *that context* rather than preservation of truth at @ at 5.55pm of 15/05/2012). In fact, although (MNEC) may initially have struck us as a plausible *univocal* principle, *it in fact conveys at each new time a slightly different theory*, since each new time will impose a slightly different understanding of the phrase 'this very same context' which is the *definiens* of 'I'. Thus, even if we endorsed a watered down version of (MNEC) restricted to actual, present truth preservation, we would really be endorsing at each new time a slightly different theory. Could it be that our theorising about logical consequence and truth preservation is condemned to such an embarrassing level of *ephemerality*? This train of thought actually suggests a sharpening of (NEC) alternative to (MNEC$^-$) and (MNEC), a sharpening which I'll explore in section **??**. But before investigating that alternative sharpening, it'll be helpful to observe how, beyond the dramatic failures of necessitation and its like observed in this section, other vagaries of context dependence generate equally dramatic failures of transparency which make even actual, present truth preservation bound to fail.

6   Doubly Improper Utterances

As I've already mentioned in section **??**, I don't always assume that the context that an utterance has is the one in which the utterance is made—the world, time, agent etc. in or by which an utterance happens to be uttered need not be the world, time, agent etc. figuring in the context that is semantically relevant for interpreting it (I'll call utterances exhibiting this divergence '*improper*'). For example, if u is an utterance of a sentence belonging to a *mythological* discourse, the world of the context that is semantically relevant for interpreting u may not be the world in which u is made, but

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[16]It is not clear that utterances of λ-expressions and other linguistic constructions expressing properties are properly evaluated in terms of truth and falsity (including truth and falsity in a circumstance of evaluation). I'm assuming for the sake of argument, and for time being, that they are. Obviously, if they aren't, since a logic of properties is a perfectly fine logic this will bring about substantial failures of (MNEC) and, more generally, (NEC). I'll articulate this point in section **??** with respect to clearer-cut cases of logical-consequence bearers whose utterances are not properly evaluated in terms of truth and falsity (including truth and falsity in a circumstance of evaluation).

a world at which the relevant mythology is true.[17] However, and most interestingly for our purposes, 'actual' and its like may in the same context be used to refer back to the world in which u is made (I'll call improper utterances exhibiting this further kind of divergence '*doubly improper*'). Let's consider an example. An utterance a_0 of 'Achilles and Patroclus were in a romantic relationship' made in @ during a discussion of Greek mythology might well count as true. The context M that is semantically relevant for interpreting a_0 has as world entering into the circumstance of evaluation E_M a world at which Greek mythology is true. However, and most interestingly for our purposes, the speech can be truly expanded with an utterance a_1 of 'Achilles and Patroclus, whose actual existence is doubtful, were in a romantic relationship', presumably keeping the context fixed. Thus, although M is such as to have as world entering into E_M a world at which Greek mythology is true, it is also such as to assign @ to 'actual' and its like.

Moreover, M might well be I. If so, by $(\mathrm{T}^E_{\mathrm{in}})$, ⟨'Achilles and Patroclus were in a romantic relationship', I⟩ is true (that is, true in E_I: for ⟨'Achilles and Patroclus were in a romantic relationship', I⟩ exists, says that Achilles and Patroclus were in a romantic relationship, the world w entering into E_I is a world at which Greek mythology is true and so Achilles and Patroclus were in a romantic relationship in w), but ⟨'Actually, Achilles and Patroclus were in a romantic relationship', I⟩ is not true (that is, not true in E_I: for ⟨'Actually, Achilles and Patroclus were in a romantic relationship', I⟩ says that Achilles and Patroclus were in a romantic relationship in @ (for I assigns @ to 'actually' and its like), the world w entering into E_I is a world at which Greek mythology is true but not even in w were Achilles and Patroclus in a romantic relationship in @, as they did not even exist in @).[18]

Or, if u is an utterance of a sentence belonging to a *historiographical* discourse, the time of the context that is semantically relevant for interpreting u may not be the time at which u is made, but the time at which the relevant bit of history occurs. However, and most interestingly for our purposes, 'now' and its like may in the same context be used to refer back to the time at which u is made. Let's consider an example. An utterance b_0 of 'Bradwardine is in Oxford' made in 2012 during a discussion of which logician is where in the 1320s might well count as true. The context H that is semantically relevant for interpreting b_0 has as time entering into the circumstance of evaluation E_H the 1320s. However, and most interestingly for our purposes, the speech can be truly expanded with an utterance b_1 of 'Bradwardine, who is now a highly regarded logician, is in Oxford', presumably keeping the context fixed. Thus, although H is such as to have as time

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[17]Realistically, in most situations of this kind no *single world* can be selected as the world that u talks about, and it'd be more sensible to think of u as talking about a *range of worlds*. However, since taking this point into account would require a lot of changes in the presentation of the argument without any change in its substance, I'll continue to talk under the pretence that there is a single world that u talks about.

[18]**?**, pp. 40–75 provides a persuasive defence of the possibility and theoretical significance of *improper* utterances. However, he does not seem to contemplate the possibility of *doubly improper* utterances, as a_1 patently is. It is this possibility that belies his claim that every instance of 'If φ, then, actually, φ' is, for absolutely every context C, true at C and E_C: the relevant instances of that schema are false at M and E_M.

entering into E_H the 1320s, it is also such as to assign 2012 to 'now' and its like.

Moreover, H might well be I. If so, by (T^E_{in}), $\langle$'Bradwardine is in Oxford', $I\rangle$ is true (that is, true in E_I: for $\langle$'Bradwardine is in Oxford', $I\rangle$ exists, says that Bradwardine is in Oxford, the time entering into E_I is the 1320s and Bradwardine was indeed in Oxford in the 1320s), but $\langle$'Now, Bradwardine is in Oxford', $I\rangle$ is not true (that is, not true in E_I: for $\langle$'Now, Bradwardine is in Oxford', $I\rangle$ says that Bradwardine is in Oxford in 2012 (for I assigns 2012 to 'now' and its like), the time entering into E_I is the 1320s but not even in the 1320s was Bradwardine in Oxford in 2012, as he does not even exist in 2012).[19]

Since, for example, assuming that M is I, $\langle$'Achilles and Patroclus were in a romantic relationship', $I\rangle$ is true but $\langle$'Actually, Achilles and Patroclus were in a romantic relationship', $I\rangle$ is not true even if 'Achilles and Patroclus were in a romantic relationship' entails 'Actually, Achilles and Patroclus were in a romantic relationship', even a watered down version of (MNEC) restricted to actual, present truth preservation fails, and so even a watered down version of the Naive Argument which avoids the necessitation step and restricts itself to utterances with I must break down. But where does that version of the Naive Argument exactly break down? It unsurprisingly breaks down at the *transparency* step from 'If φ, then ψ' being valid to 'If $\langle\varphi, I\rangle$ is true, then $\langle\psi, I\rangle$ is true' being valid (or being true). In particular, although the *non-semantic* sentence 'If Achilles and Patroclus were in a romantic relationship, then, actually, Achilles and Patroclus were in a romantic relationship' is valid, the *semantic* sentence 'If $\langle$'Achilles and Patroclus were in a romantic relationship', $I\rangle$ is true, then $\langle$'Actually, Achilles and Patroclus were in a romantic relationship', $I\rangle$ is true', far from being valid, is false. Contrary to transparency even as restricted to utterances with I (see section **??**), φ is not always intersubstitutable with '$\langle\varphi, I\rangle$ is true'.

The examples considered in this section may seem baffling: how can one truly assert 'Achilles and Patroclus were in a romantic relationship' and, with the same context, truly deny 'Actually, Achilles and Patroclus were in a romantic relationship', if the former entails the latter? What emerges here is *how loose the relation is between logical consequence and the extreme variety of our uses of language*. To a very rough first approximation, rather unsurprisingly logical consequence is more tightly connected with uses of language exhibiting *full-fledged acceptance* (and *belief*) rather than with uses of language only exhibiting *assertion*. It still seems plausible that, if one truly and full-fledgedly accepts 'Achilles and Patroclus were in a romantic relationship' (and so believes that Achilles and Patroclus were in a romantic relationship), then, in the same context, one can truly and full-fledgedly accept 'Actually, Achilles and Patroclus were in a romantic relationship' (and so believe that, in one's world, Achilles and Patroclus were in a romantic relationship). But some uses of language, as exemplified by the mythological and histori-

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[19]I've put the point assuming, again, that the context dependence introduced by tense is of the (NC)-kind (see fn **??**). But the point can equally well be put in a standard eternalist framework, in which the example I've offered would be interpreted as one where the implicit time variable introduced by the present tense is assigned a different value from the value assigned to 'now' and its like. An analogous comment holds for the example involving 'actually' in the third and second last paragraphs.

ographical discourses discussed above,[20] do not exhibit full-fledged acceptance, although they do exhibit assertion (and truth).[21] It should thus actually come as no surprise that (MNEC) fails for such uses.

7 Multiply Referring Utterances

In the limit case in which φ logically follows "from nothing" (i.e. φ is valid), (MNEC) requires that, metaphysically necessarily, $\langle \varphi, I \rangle$ be true, and a watered down version of (MNEC) restricted to actual, present truth preservation requires that $\langle \varphi, I \rangle$ be true. Even the last claim is however subject to well-known counterexamples of an even simpler character than those discussed in the last section. For example, 'If Dave is here, then Dave is here' is valid in sentential logic. But that sentence is uttered falsely in a context D in which two different places p_0 and p_1 are successively demonstrated, with Dave being at p_0 but not at p_1 (I'll call utterances exhibiting this divergence '*multiply referring*').[22] Moreover, D might well be I. If so, $\langle$'If Dave is here, then Dave is here', $I \rangle$ is not true (that is, not true in E_I).[23]

Since, assuming that D is I, $\langle$'If Dave is here, then Dave is here', $I \rangle$ is not true even if 'If Dave is here, then Dave is here' is valid, even a watered down version of (MNEC)

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[20]And arguably by other ones too. For instance, if u is an utterance of a sentence belonging to a *suppositional* discourse, the world of the context that is semantically relevant for interpreting u may not be the world in which u is made, but a world at which the relevant suppositions are true. However, and most interestingly for our purposes, 'actually' and its like may with the same context be used to refer back to the world in which u is made. Let's consider an example. An utterance c_0 of 'Daugapils is the capital of Latvia' made in @ during a discussion of what follows under the supposition that the official and operative site of the Latvian Parliament, Prime Minister, President etc. is Daugapils rather than Riga might well count as true. The context S that is semantically relevant for interpreting c_0 has as world entering into the circumstance of evaluation E_S a world at which that supposition about Latvia is true. However, and most interestingly for our purposes, the speech can be truly expanded with an utterance c_1 of 'Daugapils, whose actual importance is less than Riga's, is the capital of Latvia', presumably keeping the context fixed. Thus, although S is such as to have as world entering into E_S a world at which that supposition about Latvia is true, it is also such as to assign @ to 'actual' and its like. And this opens the way to failures of even a watered down version of (MNEC) restricted to actual, present truth preservation which are analogous to the one from mythological discourse detailed in the text.

[21]Also in the case of the historiographical discourse discussed above such full-fledged acceptance seems to be missing. Although in that case one does intend to connect with real facts of the matter, intuitively there is nevertheless a certain feeling of pretence when one so connects by uttering 'Bradwardine is in Oxford' in that situation (and, intuitively, in uttering that sentence in that situation, one does not express any belief to the effect that Bradwardine is in Oxford).

[22]Someone may consider the hypothesis that the sentences that are uttered in cases of multiply referring utterances really have a *form* along the lines of that of 'If Dave is here$_i$, then Dave is here$_j$', which is uncontroversially invalid. I take such hypothesis to be unmotivated on empirical linguistic grounds (contrary to an analogous hypothesis for other context-dependent expressions like English personal pronouns). Thanks to Jim Pryor and François Recanati for discussions of this point.

[23]The particular counterexample is most plausibly interpreted as exploiting an (SC)-kind of context dependence. Yet, similar counterexamples are available which exploit other kinds of context dependence. For instance, under temporalism (see fn **??**), we would still have the same problem for 'If Dave is sitting, then Dave is sitting'.

restricted to actual, present truth preservation (and to no-premise arguments)[24] fails,[25] and so even a watered down version of the Naive Argument which avoids the necessitation step and restricts itself to utterances with I (and to no-premise arguments) must break down. But where does that version of the Naive Argument exactly break down? Again, it unsurprisingly breaks down at the *transparency* step from φ being valid to '$\langle \varphi, I \rangle$ is true' being valid (or being true). In particular, although the *non-semantic* sentence 'If Dave is here, then Dave is here' is valid, the *semantic* sentence '$\langle$'If Dave is here, then Dave is here', $I \rangle$ is true', far from being valid, is false. Again, contrary to transparency even as restricted to utterances with I (see section **??**), φ is not always intersubstitutable with '$\langle \varphi, I \rangle$ is true'. Stephen Read, among many others, has rightly warned us that, in the presence of context dependence, for essentially the reasons mentioned in section **??** transparency fails (see e.g. **?**, p. 3). What the last section and this section bring out is that, in the presence of context dependence, transparency fails *also for other reasons*, and that the full extent to which it fails is also such as to bring about substantial failures of (MNEC) and, more generally, (NEC)—principles that, as we've seen in section **??**, are otherwise dear to Read and to many other theorists.

In a fallacy of *equivocation*, glorious failures of truth preservation are usually attributed to a failure of keeping the *meaning* of an expression fixed across an argument. For example, although the argument from 'Barclays is a bank' to 'Barclays is a bank or a charity' may at first be thought to be valid as it stands, its premise may be true (if 'bank' as it occurs there is understood as meaning money bank) while its conclusion false (if 'bank' as it

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[24]This parenthetical strengthening could already have been established by means of the examples discussed in the last section. For instance, because of the reasons given in that section, assuming that M is I $\langle$'If Achilles and Patroclus were in a romantic relationship, then, actually, Achilles and Patroclus were in a romantic relationship', $I \rangle$ is not true (that is, not true in E_I).

[25]Someone may consider the hypothesis that multiply referring utterances do not really have any *single* context, but rather span across *different* contexts. Then, it would be literally wrong to say that the relevant utterance of 'If Dave is here, then Dave is here' has I as its context (plus, the representation of that utterance as $\langle$'If Dave is here, then Dave is here', $I \rangle$ would become at best inappropriate). And, since (MNEC) only talks about utterances with I, that utterance would now be irrelevant for the question whether (MNEC) holds. In reply, I of course have no in-principle objection to using the word 'context' so that multiply referring utterances count as not having a single "context"—certainly, one is free to individuate contexts with different levels of fineness of grain for different purposes! What I do object to is to use this freedom to stipulate away the counterexamples to (MNEC). Multiply referring utterances are perfectly legitimate, natural and useful utterances. They offer a potential touchstone for assessing generalisations no less than other utterances do. In particular, although in section **??** consideration of the Naive Argument did lead to a restriction to utterances with I, the reasons for that restriction by no means support a restriction to utterances that are not multiply referring: for those reasons concern how to block the illicit transition from my hunger to the truth of certain unrelated utterances and sentences (or *vice versa*), but multiple reference licences no additional such transition (what we're focussing on in the text is how it licences an illicit transition from a non-semantic sentence being valid to certain semantic sentences being valid). It may well be (and I'm actually very sympathetic to the idea) that multiply referring utterances require a revision of the nowadays standard semantic framework that interprets sentences at (single) contexts (and thus a revision of the representation of utterances as sentence-context pairs). But, if such revision is indeed needed, that should also lead to a revised formulation of (MNEC) that still encompasses multiply referring utterances. I try to make a start on a suitable non-standard semantic framework in **?**.

occurs there is understood as meaning river bank). *That* failure of truth preservation is indeed plausibly reflected in a failure of logical consequence. For an *ambiguous* expression in natural language is plausibly taken to correspond, at the level of representation relevant for logical evaluation, to distinct lexical items, and, after such disambiguation has taken place, the equivocating argument is exposed as invalid. For example, the above argument, under the equivocating reading, is disambiguated as having as premise something like 'Barclays is a bank$_{\text{MONEY}}$' and as conclusion something like 'Barclays is a bank$_{\text{RIVER}}$ or a charity', and that argument is straightforwardly invalid.

However, we now see that the trouble emerging in a fallacy of equivocation is merely a *special* case of a *more general* trouble that has its ultimate root not so much in a difference in *meaning*, but in a more general difference in *extension*. For example, 'here' as it is used in D has the same meaning but different referents as it occurs in the antecedent and as it occurs in the consequent, and that is sufficient for bringing about a failure of truth preservation. And, in that example as well as in many others, the difference in extension is *not* plausibly taken to correspond, at the level of representation relevant for logical evaluation, to distinct lexical items (see fn **??**), and so such difference is not reflected in a failure of logical consequence, contrary to what happens in a fallacy of equivocation.

I should like to note that an appealing hypothesis is that doubly improper utterances and multiply referring utterances *are at root the same phenomenon*, in the sense that doubly improper utterances *are really just a special case* of multiply referring utterances. For multiple reference can be exhibited not only by two occurrences of the *same* expression, but also by two occurrences of two *different* but nevertheless *completely synonymous* expressions. For instance, an example very much analogous to the one given in this section involves an utterance of the sentence 'If Dave is here, then Dave is in this place'.[26] That is also an example in which a valid (or at least analytic) sentence is uttered falsely because occurrences of expressions which *logical evaluation* treats alike are *in context used* to latch onto different extensions. And one might think that something like the latter kind of multiple reference is also exhibited in the case of a_1 of the last section, on the grounds that the indicative mood and 'actual' are synonymous expressions (or at least morphemes) whose occurrences are treated alike by *logical evaluation* (at least at C and E_C) by assigning to them the same possible world (the world entering into E_C), but are *in the context of a_1 used* to latch onto different possible worlds. Appealing as this line of thought may be in providing a *unified* diagnosis of the most dramatic failures of (MNEC), its pursuit is better left for another occasion.

I should also like to mention briefly a different series of considerations, which, although strictly speaking not concerning context dependence, vividly illustrate another dimension in which the extreme variety of our uses of language outstrips the narrow-mindedness embodied by (MNEC) and, more generally, (NEC). For among such uses, there are also the fundamental *non-assertive* ones of giving *commands* and asking *questions*. We should certainly model the rationality of agents' giving commands and asking questions by having a logic of commands and questions (see **?** for a defence of the logic of commands and

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[26]The example would be even nicer in some Romance languages (think for example of Italian 'Se Davide è qui, allora Davide è qua').

? for a defence of the logic of questions). Such logics typically have valid sentences like 'Bring it about that either there is a slab or not!' and 'Is it the case that either there is a slab or not?', which are usually judged to be valid because they express either a command that is satisfied by satisfying any command or a question that is settled by settling any question. Although valid, such sentences are arguably not true (and not false either), since they express commands or questions.[27]

8 Semantically Necessary Truth Preservation and Its Limits

Especially the dialectic of section **??** strongly suggests that (MNEC) as a sharpening of (NEC) is on the wrong track. My own view is that we get a more interesting sharpening of (NEC) by shifting our focus from *metaphysical* necessity to some kind of *semantic* necessity: the necessity that concerns the ways *words could not have failed to be used.* That is the kind of meaning that is attached to 'necessarily' and its like when locutions like 'Necessarily, I am here now' sound true, and which is often heard as being "covertly metalinguistic".[28] Consequently, since, at least for a context-dependent language, semantic necessity can usefully be understood as somehow involving an implicit *universal quantification over contexts* (rather than over metaphysically possible worlds), I think that we should abandon the (egocentric) fixation on I required by the Naive Argument and let instead the contexts associated with the relevant sentences be the contexts that are somehow implicitly quantified over by the operator of semantic necessity as well as be the contexts that provide the circumstance of evaluation for the relativised notion of utterance truth at a circumstance of evaluation (which is the notion that is most naturally used in order to understand embeddings of 'true' under *semantically* modal operators). The joint net effect of these changes is the following sharpening of (NEC):

(SNEC) If φ_0, φ_1, φ_2... entail ψ_0, ψ_1, ψ_2..., then, for every context C, if all of $\langle \varphi_0, C \rangle$, $\langle \varphi_1, C \rangle$, $\langle \varphi_2, C \rangle$... are true at E_C, then some of $\langle \psi_0, C \rangle$, $\langle \psi_1, C \rangle$, $\langle \psi_2, C \rangle$... are true at E_C.

In my view, (SNEC) is a considerable improvement over (MNEC), at least in the sense that it completely avoids the embarrassing dialectic that, in section **??**, we observed

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[27]Similar cases could even come from *assertive* uses of language. 'x is either prime or not' is valid, but it's very doubtful that an utterance of it anaphoric on the discourse-initial 'Suppose that x is a natural number' is true (since it's very doubtful that such utterance expresses a proposition in the first place). 'If that dagger is covered with blood, that dagger is covered with blood' is valid, but it's very doubtful that an utterance of it with a context in which there is no dagger is true (since it's very doubtful that such utterance expresses a proposition in the first place).

[28]For an example of a contrast between metaphysical and semantic modality that plausibly does not involve context dependence, consider the falsity of 'Possibly, Hesperus is not Phosphorus' under the metaphysical-possibility reading and its truth under the semantic-possibility reading. This second example also makes clear that *semantic* modality cannot be explained away in terms of *epistemic* modality—we know full well that Hesperus is Phosphorus.

(MNEC) to be exposed to. For example, the standard semantic clause for 'actually' is:

(@) For every context C and circumstance of evaluation E, 'Actually, φ' is true at C and E iff φ is true at C and at the circumstance of evaluation that is just like E save for having as world the world of E_C

(for simplicity, I'm setting aside for the time being the possibility of doubly improper utterances). Suppose that $\langle \varphi, C \rangle$ is true at E_C. Then, by ($\mathrm{T}^E_{\mathrm{at}}$), the proposition expressed by φ at C holds at E_C, which, in a standard two-dimensional semantic framework, is tantamount to saying that φ is true at C and E_C. Thus, by (@), 'Actually, φ' is true at C and E_C, which again, in a standard two-dimensional semantic framework, is tantamount to saying that the proposition expressed by 'Actually, φ' at C holds at E_C. Thus, by ($\mathrm{T}^E_{\mathrm{at}}$), $\langle$'Actually, φ', $C \rangle$ is true at E_C. And, since φ and C were arbitrary, this argument shows that (SNEC)—contrary to (MNEC)—is satisfied in the case of the valid argument schema from φ to 'Actually, φ'. In the peculiar, semantic sense of (SNEC), that argument schema does necessarily preserve truth.[29]

Before proceeding further, it'll be worthwhile to record explicitly an important, *anti-deflationist* upshot of our dialectic so far. According to deflationism, and a little roughly, transparency is the fundamental and unique principle on whose basis every other truth-theoretic principle can be accounted for (see e.g. **?**). Since (NEC) is a very salient truth-theoretic principle, short of rejecting it the deflationist will have to maintain that it too can be explained in terms of transparency. However, the only remotely *prima facie* natural account of (NEC) in terms of transparency that I can think of is something along the lines of the Naive Argument (and something along the lines of the Naive Argument is in effect quickly run by **?**, p. 75). And, as I've already observed in section **??**, by its very structure the Naive Argument can only hope to vindicate (MNEC) rather than (SNEC). Unfortunately, since (MNEC) has performed so poorly in the dialectic of section **??**, the result is bad news for deflationism. It is instructive here to go back to how, in the last paragraph, I argued that (SNEC) is satisfied in the case of the valid argument schema from φ to 'Actually, φ'. The argument relied on ($\mathrm{T}^E_{\mathrm{at}}$) and (@) (and on some basic features of a standard two-dimensional semantic framework), but nowhere on transparency: it relied on *deep, semantic* principles rather than on the *shallow, broadly logical* principle of intersubstitutability between φ and ''φ' is true'.[30]

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[29] While *weaker* than (MNEC) in not requiring *metaphysically* necessary truth preservation, (SNEC) is also *stronger* than (MNEC) in requiring *semantically* necessary truth preservation. And the fact that (SNEC) is in this sense more exacting than (MNEC) is welcome, as it weeds out arguments whose manifest invalidity is not detected by (MNEC). For example, since it is metaphysically necessary that $\langle$'It is 2012', $I \rangle$, $\langle$'Actually, snow is not black', $I \rangle$, $\langle$'Hesperus is Phosphorus', $I \rangle$ are true, the manifest invalidity of the corresponding sentences is not detected by (MNEC), but such sentences are nevertheless weeded out by (SNEC).

[30] The only kind of broadly logical argument I can think of with respect to which (MNEC) does clearly better than (SNEC) concerns *transparency itself* (and, as will become apparent, the kind of argument in question can be said to be "broadly logical" only, at best, in a very stretched sense). As I've observed in section **??**, in the presence of context dependence, transparency for utterance truth fails. For example,

Having said this much in favour of (SNEC) (and against deflationism), I should dampen the enthusiasm that this might have created by explicitly adding that the further problems discussed in sections **??** and **??** affect (SNEC) just as well as (MNEC). Indeed, with its implicit quantification over *absolutely all contexts*, in that respect (SNEC) makes things even worse than (MNEC): while, at least to some extent, I could watchfully try to police I so that it does not give rise to doubly improper or multiply referring utterances (and, more generally, to untrue utterances of valid sentences), I have no such power over many other contexts that (SNEC), but not (MNEC), talks about. Still, having duly recognised the substantial limits to (SNEC) and, more generally, to (NEC) that are still placed by the extreme variety of our uses of language, I think that the considerable extent to which, *within those limits*, (SNEC) outperforms (MNEC) demonstrates that it is a better sharpening of (NEC) than (MNEC) is (and that we thus have a truth-theoretic principle—with an admittedly restricted range of application—that deflationism cannot account for).

9   Logical Consequence and Truth beyond Language

With both (MNEC) and (SNEC) on the table, we can briefly extend the scope of our discussion so far. Back in section **??**, I've assumed that both logical-consequence bearers and truth bearers are *linguistic* entities, and have identified these with sentences and utterances respectively. However, it is widely assumed in contemporary philosophy of logic and language that there are also *non-linguistic* logical-consequence bearers and truth bearers: *propositions*.

There are two most salient variants of (MNEC) and (SNEC) in which propositions play a role. On the first variant, *sentences* are kept fixed as *logical-consequence bearers* and *propositions* are taken only as *truth bearers*:

(MNEC$^{\mathrm{SP}}$) If φ_0, φ_1, φ_2... entail ψ_0, ψ_1, ψ_2..., then, metaphysically necessarily, if all of $\ulcorner\varphi_0, I\urcorner$, $\ulcorner\varphi_1, I\urcorner$, $\ulcorner\varphi_2, I\urcorner$... are true, then some of $\ulcorner\psi_0, I\urcorner$, $\ulcorner\psi_1, I\urcorner$, $\ulcorner\psi_2, I\urcorner$... are true;

(SNEC$^{\mathrm{SP}}$) If φ_0, φ_1, φ_2... entail ψ_0, ψ_1, ψ_2..., then, for every context C, if all of $\ulcorner\varphi_0, C\urcorner$, $\ulcorner\varphi_1, C\urcorner$, $\ulcorner\varphi_2, C\urcorner$... are true at E_C, then some of $\ulcorner\psi_0, C\urcorner$, $\ulcorner\psi_1, C\urcorner$, $\ulcorner\psi_2, C\urcorner$... are true at E_C

I am Italian, but Stephen's utterance of 'I am Italian' is not true; conversely, Stephen's utterance of 'I am British' is true, but I am not British. Yet, even if transparency fails for some utterances, as I've also observed in section **??** a version restricted to utterances with I still seems to hold. Let i_0 be $\langle$'I am British', $I\rangle$ and i_1 be $\langle$'I am Italian', $I\rangle$. Then, let's assume that, in some very stretched sense, the arguments from 'I am British' to 'i_0 is true' and from 'i_1 is true' to 'I am Italian' are valid. Let finally S be Stephen's context (as opposed to I). It follows that $\langle$'I am British', $S\rangle$ is true at E_S even though $\langle$'i_0 is true', $S\rangle$ is not true at E_S (and so (SNEC), but not (MNEC), fails for the argument from 'I am British' to 'i_0 is true'), and it follows that $\langle$'i_1 is true', $S\rangle$ is true at E_S even though $\langle$'I am Italian', $S\rangle$ is not true at E_S (and so (SNEC), but not (MNEC), fails for the argument from 'i_1 is true' to 'I am Italian').

(where $\ulcorner\varphi, C\urcorner$ is the proposition expressed by φ at C). On the second variant, *propositions* are taken *both as logical-consequence bearers and as truth bearers*:

($\mathbf{mnec}^{\mathrm{PP}}$) If $\mathcal{P}_0$, $\mathcal{P}_1$, $\mathcal{P}_2\ldots$ entail $\mathcal{Q}_0$, $\mathcal{Q}_1$, $\mathcal{Q}_2\ldots$, then, metaphysically necessarily, if all of $\mathcal{P}_0$, $\mathcal{P}_1$, $\mathcal{P}_2\ldots$ are true, then some of $\mathcal{Q}_0$, $\mathcal{Q}_1$, $\mathcal{Q}_2\ldots$ are true;

(SNEC$^{\mathrm{PP}}$) If $\mathcal{P}_0$, $\mathcal{P}_1$, $\mathcal{P}_2\ldots$ entail $\mathcal{Q}_0$, $\mathcal{Q}_1$, $\mathcal{Q}_2\ldots$, then, for every context C, if all of $\mathcal{P}_0$, $\mathcal{P}_1$, $\mathcal{P}_2\ldots$ are true at E_C, then some of $\mathcal{Q}_0$, $\mathcal{Q}_1$, $\mathcal{Q}_2\ldots$ are true at E_C.

(where $\mathcal{P}_0$, $\mathcal{Q}_0$ and their like range over propositions).

The dialectics to which both (MNEC) and (SNEC) have been subjected do not essentially change in the case of (MNEC$^{\mathrm{SP}}$) and (SNEC$^{\mathrm{SP}}$) (basically, throughout these dialectics, we simply need to replace talk of $\langle\varphi, C\rangle$ being true in E with talk of $\ulcorner\varphi, C\urcorner$ being true in E). The situation is more interesting in the case of (MNEC$^{\mathrm{PP}}$) and (SNEC$^{\mathrm{PP}}$). Notice that, in a standard two-dimensional framework, the main consequent of (SNEC$^{\mathrm{PP}}$) now *entails* the main consequent of (MNEC$^{\mathrm{PP}}$), and so (SNEC$^{\mathrm{PP}}$) itself now entails (MNEC$^{\mathrm{PP}}$) itself. It is for this reason that, while the dialectics to which both (MNEC) and (SNEC) have been subjected in sections **??** and **??** also do not essentially change in the case of (MNEC$^{\mathrm{PP}}$) and (SNEC$^{\mathrm{PP}}$), the dialectic in section **??** is in fact exacerbated. For example, the proposition that snow is black entails the proposition that, actually, snow is black, but it is metaphysically possible that the former proposition is true and the latter false. Hence, (MNEC$^{\mathrm{PP}}$) fails. Moreover, in this new setting, *the move from metaphysical modality to semantic modality can do nothing to ameliorate the situation*, since, given the entailment from (SNEC$^{\mathrm{PP}}$) to (MNEC$^{\mathrm{PP}}$), (SNEC$^{\mathrm{PP}}$) fails just as well as (MNEC$^{\mathrm{PP}}$) does. In my view, the fact that, in this new setting (in which propositions are taken as logical-consequence bearers), even *within the limits* placed by the problems discussed in sections **??** and **??** there is no *modally strong* principle linking logical consequence with truth preservation is yet another reason (in addition to those adduced in **?**) for taking sentences rather than propositions as the (primary) logical-consequence bearers (since doing so at least affords us (SNEC) or (SNEC$^{\mathrm{SP}}$), which, within the limits placed by the problems discussed in sections **??** and **??**, do provide modally strong principles linking logical consequence with truth preservation). Be that as it may, clearly the shift from sentences and utterances to propositions does nothing to protect the traditional link between logical consequence and necessary truth preservation from the attacks of this paper.

10   Logical Consequence and Truth

Non-normality shows that a modally strong principle linking between logical consequence with truth preservation needs to be understood in terms of a modality concerning the ways *words could have been used* rather than the ways *things could have been* (and that such link cannot be accounted for by deflationistically acceptable means). Moreover, doubly improper utterances and multiply referring utterances show how the extreme variety of

our uses of language manifested in context dependence allows utterances *to have semantic properties that lie outwith the purview of logic.* In those cases, there are more ways of referring and being true than logical consequence ever dreamt of. Somehow conversely, valid sentences that do not express propositions show how the extreme variety of our uses of language manifested in both its assertive and non-assertive uses allows sentences *to have logical properties even if they lack the semantic properties required for being in the game for truth or falsity.* In those other cases, there are more ways of being valid and logically following-from than truth ever dreamt of. In all these kinds of cases, careful consideration of context dependence and other vagaries of our uses of language brings a sobering appreciation of substantial gaps between logical consequence and the preservation of truth.

References

Hartry Field. Truth and the unprovability of consistency. *Mind*, 115:567–605, 2006.

Hartry Field. *Saving Truth from Paradox*. Oxford University Press, Oxford, 2008.

Jeroen Groenendijk and Martin Stokhof. *Studies on the Semantics of Questions and the Pragmatics of Answers*. PhD thesis, University of Amsterdam, Amsterdam, 1984.

Susan Haack. *Philosophy of Logics*. Cambridge University Press, Cambridge, 1978.

Paul Horwich. *Truth*. Clarendon Press, Oxford, 2nd edition, 1998.

David Kaplan. Demonstratives. In Joseph Almog, John Perry, and Howard Wettstein, editors, *Themes from Kaplan*, pages 481–563. Oxford University Press, Oxford, 1989.

David Lewis. Attitudes *De Dicto* and *De Se*. *The Philosophical Review*, 88:513–543, 1979.

Bernard Linsky and Edward Zalta. In defense of the simplest quantified modal logic. *Philosophical Perspectives*, 8:431–458, 1994.

John MacFarlane. Future contingents and relative truth. *The Philosophical Quarterly*, 53:321–336, 2003.

Stefano Predelli. *Contexts*. Oxford University Press, Oxford, 2005.

Stephen Read. Formal and material consequence. *Journal of Philosophical Logic*, 23: 247–265, 1994.

Stephen Read. Logical consequence as truth-preservation. *Logique et Analyse*, 183:479–493, 2003.

Stephen Read. The truth schema and the liar. In Shahid Rahman, Tero Tulenheimo, and Emmanuel Genot, editors, *Unity, Truth and the Liar: The Modern Relevance of Medieval Solutions to the Liar Paradox*, pages 3–17. Springer, New York, 2008.

Mark Richard. Temporalism and eternalism. *Philosophical Studies*, 39:1–13, 1981.

Jonathan Schaffer. Necessitarian propositions. *Synthese*, 2012. Forthcoming.

Robert Stalnaker. Indexical belief. *Synthese*, 49:129–151, 1981.

Alfred Tarski. O pojciu wynikania logicznego. *Przegląd Filozoficzny*, 39:58–68, 1936. Translated as: On the concept of logical consequence. In Alfred Tarski, *Logic, Semantics, Metamathematics*, 2nd edition, editor John Corcoran, pages 409–420. Hackett, Indianapolis, 1983.

Peter Vranas. In defence of imperative inference. *Journal of Philosophical Logic*, 39:59–71, 2010.

Timothy Williamson. *Vagueness*. Routledge, London, 1994.

Timothy Williamson. Bare possibilia. *Erkenntnis*, 48:257–273, 1998.

Elia Zardini. Truth and what is said. *Philosophical Perspectives*, 22:545–574, 2008.

Elia Zardini. Truth without contra(di)ction. *The Review of Symbolic Logic*, 4:498–535, 2011.

Elia Zardini. Naive *Modus Ponens*. *Journal of Philosophical Logic*, 2012a. Forthcoming.

Elia Zardini. The role of utterances in Bradwardine's theory of truth. *Recherches de théologie et philosophie médiévales*, 2012b. Forthcoming.

Elia Zardini. Getting one for two, or the contractors' bad deal. Towards a unified solution to the semantic paradoxes. In Theodora Achourioti, Kentaro Fujimoto, Henri Galinon, and José Martínez, editors, volume on truth. Springer, Berlin, 2012c.

Elia Zardini. Naive logical properties and structural properties. *The Journal of Philosophy*, 2012d. Forthcoming.

Elia Zardini. Context and consequence. An intercontextual substructural logic. ms, 2012e.

Elia Zardini. It is not the case that [*P* and 'It is not the case that *P*' is true]. ms, 2012f.

Elia Zardini. Naive restricted quantification. ms, 2012g.

Elia Zardini. Naive truth and naive logical properties. ms, 2012h.

Elia Zardini. The bearers of logical consequence. ms, 2012i.

Elia Zardini. The opacity of truth. ms, 2012j.