Transparent truth as a logical property[*]

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February 22, 2019

Abstract

Deflationism about truth is unified mostly by negative characterizations – what truth is not. When it comes to positive characterizations, deflationary truth theorists often claim that truth is a 'logical property' in analogy with logical vocabulary. But the analogy remains only suggestive until some account of logical properties is given. This paper focuses on transparent truth – a very clear sort of deflationary truth – and provides the sense in which it is a logical property.

1 *Transparent truth*

There are notoriously many so-called deflationary truth theories. I think of *transparent truth* as a sort of pure case of deflationary truth. The transparency view has it that any (declarative, etc.) sentence is intersubstitutable (in all non-intensional contexts) with the corresponding attribution of (transparent) truth to A.[1] This intersubstitutability (or, in short, 'transparency')

[*]Acknowledgements: I'm very grateful to Jeremy Wyatt for very, very helpful feedback on this paper, both written comments and in-person discussion of relevant issues. I'm also grateful to my colleague Michael P. Lynch, who, for as long as I've known him, has pushed against my transparency conception of truth in ways that have made it clearer. Finally, my colleague Lionel Shapiro's work on truth (and logic) has influenced my own views in many ways; to him I remain grateful both for his own work in the area and especially for engagement with my work.

[1]The intersubstitutability is not sameness of meaning; it's intersubstitutability with respect to truth or consequence.

rule is fundamental to transparent truth; it – and not some sequence of so-called T-biconditionals – is the defining rule. Whether the familiar so-called T-biconditionals are true in a language depends on the language. If a language has both a transparent truth predicate (for itself) and enjoys the truth of $A \to A$ for all sentences A in the language and some conditional $\to$ in the the language, then the language also enjoys all T-biconditionals using $\to$ as their underwriting conditional;[2] but, again, there can be languages that have (their own) transparent truth predicate but lack the corresponding T-biconditionals.[3]

On the transparency account, truth is not only 'deflationary', in the sense of not being some explanatory notion of truth, but is *see-through* in the sense above, namely, that an ascription of transparent truth to a sentence is completely intersubstitutable with the given sentence. In particular, in any theory that contains its own transparent truth predicate (i.e., has a transparent truth predicate in and for the language of the theory), ascribing (transparent) truth to a sentence does nothing more nor less than deliver an equivalent sentence – equivalent in 'semantic status' and entailments (or consequences).[4] The 'disquotationalism' of Quine [22, 23, 24], as reflected in Leeds [15], might be an early precursor (if not pioneer) of a transparency

[2]Just use the transparency rule to substitute an ascription of transparent truth to A – say, $T\langle A\rangle$ – into each direction of $A \to A$, getting $T\langle A\rangle \to A$ and its converse.

[3]Some common models of transparent truth have the former (viz., a transparent truth predicate for themselves) without the latter (viz., corresponding T-biconditionals). For example, the so-called Strong Kleene model of transparent truth discussed by Saul Kripke [14] is a model of a language with its own transparent truth predicate but devoid of any derived T-biconditionals, since the Strong Kleene language itself is devoid of any conditional $\to$ for which $A \to A$ is true (for all sentences A). On the other hand, extending Kripke's Strong Kleene framework, Hartry Field's work [10], building in some ways on work by Ross Brady [7] and Anil Gupta and Nuel Belnap [12], models a language with both its own transparent truth predicate and a conditional such that $A \to A$ is true for all A in the language. Similar (but not the same) issues arise in logically dual models of transparent truth that utilize a so-called LP [1, 2, 20] framework, including work by Bradley Dowden [8], Robert Martin and Peter Woodruff [16], Graham Priest [20, 21], Jc Beall [3] and others. In a different direction, Vann McGee's work [18] is a pioneering sort of 'truth pluralism' that combines the ideas of transparent truth together with the demands for (a separate) 'semantically useful' truth property. Timothy Maudlin's work [17] explores further implications of a transparent truth predicate, as does Leon Horsten's [13].

[4]NB: That a consequence or entailment relation in a true theory might go from $P\langle A\rangle$ to a claim about the existence of sentences is not a problem for the transparency of P provided that the consequence relation also goes from any A (even ones that don't explicitly talk about sentences) to $P\langle A\rangle$. Etc.

account of truth, though it is hard to tell given that a transparency view normally requires that logic be nonclassical (at least if the truth predicate is in the very language for which it is transparent in the given way). (Quine [22] notoriously suggested that nonclassical accounts of logic (-al consequence) 'changed the subject'.) For more recent advocates and discussion of transparent truth see [5, 3, 10, 26, 28].

If, as above, a transparent truth predicate is intended to produce, for any sentence A of the language, a sentence B (say, $T\langle A\rangle$) which is equivalent in entailments to A, then the transparent truth predicate appears to express a property that does the work done by a familiar – indeed, as discussed below, *logic's* – sentential truth connective: namely, *It is is true that....*[5] The familiar truth operator, expressed by the given connective (notation: $\dagger$), takes any sentence A of the language and produces a sentence (viz., $\dagger A$) which is exactly equivalent in consequences (entailments) to A itself; and the operator, understood just so, is thereby *redundant* with respect to its consequences – much as Ramsey noted [25]. A truth operator is not 'creative' or in any way 'productive' with respective to new entailments: whatever entailments the language has without the truth operator the language has with them – except for the explicit decorations involving the connective 'It is true that...'. As it turns out, the transparent truth property, unlike the truth operator, is 'creative' and 'productive' (in ways discussed below); but the similarity between the truth operator and the property of transparent truth underlies the sense in which the given property is 'logical'.

2 *Deflationary truth as a 'logical property'*

Deflationists about truth (whether transparency theorists or otherwise) share a common negative characterization of truth: namely, that it's not itself explanatory but is often useful in expressing or voicing explanations and/or true theories generally – much in the way that logical vocabulary isn't explanatory but is useful in expressing explanations and/or true theories generally.

But then the call comes: 'But what of a *positive* characterization of truth?' And to this the idea of logical vocabulary is often invoked again.

[5] Following standard usage, I use 'connective' and 'predicate' throughout this paper for the expressions in the language's syntax that express operators and relations (or properties), respectively. (This isn't to say that all connectives express operators – that is, functions of a certain sort – but they're the only sort of connectives under discussion.)

As Jeremy Wyatt observes

> A number of deflationists have claimed that truth is a 'logical' property.... A difficulty here is that those who advance this claim rarely indicate what they take the characteristic features of logical properties to be. [29, p. 376]

And he's right. Very little is said. Wyatt proposes a natural strategy:

> To rectify this, we can consider what is perhaps the most influential account of the boundary between the logical and the non-logical, that proposed by Tarski. [29, p. 376]

The Tarski-inspired approach to logical vocabulary invokes a notion of *invariance* – a notion that serves as one mathematical model of logic's 'universality' and 'topic-neutrality'. The trouble is that, as Wyatt and others note [11, 29], Tarski's proposal, and the vast majority of variations on it, fail to accommodate truth as being invariant (and, hence, logical). And so the challenge of specifying the sense in which deflationary truth is a logical property remains.

There have been some efforts to meet this challenge by constructing a Tarski-inspired notion of invariance that accommodates truth;[6] however, I suggest a different course.[7]

3 *Logical vocabulary as universal*

Think of theories as so-called closed theories; they are sets of claims closed under a closure relation – a consequence or entailment relation that has stan-

[6]The recent approach by Bonnay and Galinon [6], which takes up Wyatt's challenge, may work as a way of accommodating the idea that truth is logical (qua a sort of invariance). I think that this approach is the best candidate for those who want to tie the would-be logicality of truth to a Tarski-inspired invariance notion; but I shall suggest a different path.

[7]I should emphasize that I think that one clear sense of 'logical property' is given by saying that truth is fully 'characterized by consequence behavior', that is, that it's a property fully characterized by the entailments in which it figures in true theories. I do not clearly see the need to say more than just that; but philosophers such as Wyatt [29] and Edwards [9] and others have argued that more needs to be said if the truth property is to be a 'metaphysically interesting property' – a desideratum not to be readily expected in the work of truth deflationists generally or especially in the work of disquotationalists or transparent-truth theorists. (See §6 for more on the 'metaphysically interesting' demand.) Even so, this paper aims to say at least a little bit more on how to think of the (transparent) truth property's being 'logical' – at least from a transparent-truth perspective.

dard so-called 'closure' properties. Theories can be thought of as containing two chief ingredients: a seed theory (a set of claims) and a closure relation, where the closure relation 'completes' the theory by adding all consequences of anything that's in the theory.

The task of truth-seeking theorists is accordingly twofold: put truths about the target phenomenon into one's theory, and construct the right consequence (closure) relation for the theory. If one is giving the true (and complete-as-possible) theory of what is known, one adds a bunch of claims (e.g., that 1+1=2, that it's known that 1+1=2, and so on). Now, if one tried to complete this theory by closing it only under logic (i.e., logical consequence), the result would be badly inadequate. To begin, claims of the form *It is known that A* would fail to entail A; logical consequence treats that 'form' as invalid because there is no logical vocabulary that validates it. The only vocabulary is the knowledge operator, which logic ignores (because it sees only logical vocabulary). This is why the epistemologist must construct an *extra-logical* consequence relation specific to the theory in question, a closure relation that gets the theory-specific entailments right.

What is the difference between *logical consequence* (or logical entailment) and the many, many other consequence (entailment) relations on our language? My answer to this question points to the *role* that logical consequence (i.e., logic) plays in our true theories.

Logical consequence is a closure relation like all of the other closure relations. The difference is that, to echo a longstanding tradition, logical consequence is 'universal' and 'topic-neutral'. Logic's role – unlike any other closure relation – is to be the basement-level closure relation involved in *all* of our true (and complete-as-possible) theories. Consider a picture of our many true (and complete-as-possible) theories:

$$\langle T_1, \vdash_{T_1}\rangle, \langle T_2, \vdash_{T_2}\rangle, \ldots, \langle T_n, \vdash_{T_n}\rangle$$

Each theory has its own consequence (closure) relation $\vdash_{T_i}$. Where is *logical* consequence in this picture? The answer: it's in each and every theory; it's at the bottom of each and every such closure relation.

On this picture, logic is 'universal' and 'topic-neutral' in straightforward ways: it doesn't matter what your true (and complete-as-possible) theory is about; logic is involved in your theory.

3.1 *What is logical vocabulary?*

What, then, is *logical vocabulary* on this picture? The logical vocabulary is simply the vocabulary involved in all true (and complete-as-possible) theories; it's the vocabulary recognized by the basement-level closure relation.

3.2 *Which vocabulary is logical?*

Debate is still open on this question but the answer I give points to a long-standing candidate: namely, the usual stock of first-order vocabulary (sans identity, which has always been controversial). This vocabulary contains the so-called Boolean quartet and the usual pair of (dual) first-order quantifiers:

- Boolean quartet:
  - Unary:
    - Truth operator (nullation): *it is true that...*; notation $\dagger$.
    - Falsity operator (negation): *it is false that...*; notation $\neg$.
  - Binary:
    - Conjunction: *...and...*; notation $\wedge$.
    - Disjunction: *...or...*; notation $\vee$.
- Quantifiers:
  - Universal: *Every object*; notation $\forall$.
  - Existential: *At least one object*; notation $\exists$.

And that's it. Any other vocabulary is extra-logical.

One might pause (maybe even flinch) at the listing of logic's truth (null) operator. This operator (at least its connective which expresses it) is almost never listed among the stock of *logical* connectives; but that's just because it's logically redundant – a point on which the so-called redundancy theory is absolutely and uncontroversially correct. Logic's truth operator takes a sentence and delivers a logically equivalent sentence. The truth operator is the dual of logic's falsity operator, where logic's falsity operator takes any sentence to its dual.[8]

[8]E.g., $\neg\dagger A$ to $\neg A$, $\neg\neg A$ to $\dagger A$, and similarly $\neg(A \vee B)$ to $\neg A \wedge \neg B$, etc. [4, 19].

While it's often omitted from the usual stock of logical vocabulary, logic's truth operator is uncontroversially among the logical vocabulary; it is uncontroversially in the vocabulary of every true and complete-as-possible theory – even if its appearance is usually implicit.

Logic's truth operator is the key to the sense in which (transparent) truth is a logical property. But what are logical properties in the current picture?

4 Two sorts of logical properties

As per §3.2, there are no predicates in the logical vocabulary (understood as universal, as above). Hence, there's no truth predicate in the logical vocabulary.

On the question of whether truth – in particular, transparent truth – is a 'logical property' a distinction is worth drawing between two sorts of logical properties.

4.1 *Logical properties (simpliciter)*

The first sort of logical property is the obvious one: *a property is logical if it's expressed by a logical predicate.* As there are no logical predicates there are no logical properties of the first sort.

One might doubt that there are no predicates in logic's stock of vocabulary. (E.g., it remains controversial whether there's a logical relation of identity – even if the standard presentation of mainstream first-order logic contains a binary predicate serving to express one candidate for a would-be logical identity relation.) What matters for present purposes is whether there's a *truth* predicate in logic's stock of vocabulary. If there is, then the given truth predicate is in the language of every true (and complete-as-possible) theory. But there are clear-cut counterexamples against such a universal truth predicate. Witness, for (but one) example, true arithmetic – say, Peano arithmetic – which is closed under so-called classical logic. There is no truth predicate in the language of that theory; and there is certainly no transparent truth predicate – the main focus of this discussion – in that theory.[9] But this doesn't mean that there isn't a clear sense in which truth –

[9]If Peano arithmetic had a transparent truth predicate in (and for) the language of the theory then the theory couldn't be coherently closed under classical logic (it would 'explode' into the trivial theory which contains every sentence of the given language of the

indeed, the focus here, *transparent truth* – is a sort of logical property.

4.2 *Emergent logical properties*

For lack of a better term, *emergent logical properties* are a sort of property correlate of logical vocabulary. The term 'emergent logical properties' is not used to suggest that properties of the target sort are somehow epiphenomenal or anything of the sort; the term 'emergent' here is used only to suggest that the given properties emerge directly from some other kind of thing – in the current case, logical expressions (e.g., operators).[10]

Think of emergent logical properties in terms of a prior project:

- Project: give 'property correlates' to each of logic's Boolean operators.
- Desideratum: introduce predicates that are intersubstitutable (according to the theory of the given properties) with the logical connectives to which they correspond.

Example: take logical conjunction (viz., $\wedge$). This connective expresses an operator, not a property. The project at hand is to give a property correlate for the operator. The (binary) predicate, corresponding to the (binary) relation of logical conjunction, should be something intersubstitutable with the connective; and so we introduce (say) the binary predicate $C(x, y)$ via just such a 'transparency' rule. Where $\langle A \rangle$ and $\langle B \rangle$ are suitable names of sentences A and B,

$$C(\langle A \rangle, \langle B \rangle)$$

theory); but true Peano arithmetic is classically (and non-trivially!) closed. If one rejects that true Peano arithmetic is (non-trivially) classically closed, just change the example to some true, classically closed (non-trivial!) theory. (That such true and complete-as-possible theories are closed under classical logic is not to suggest that logical consequence itself – the universal, basement-level consequence relation involved in all of our true theories – is per the classical-logic account. Transparent truth theorists reject as much due to familiar paradox – more on which below.)

[10]Stephen Schiffer has written about what he calls 'pleonastic properties' [27]. I think that Schiffer's notion is subsumed by the more general idea of (what I'm calling) 'emergent properties', but Schiffer's full theoretical framework around 'pleonastic entities' should not be read into the following discussion. (Thanks to Jeremy Wyatt for prompting this footnote.)

is intersubstitutable in all (non-intensional) contexts with

$$A \wedge B.$$[11]

In this way, the predicate C expresses the relation extracted from the given logical operator. Which relation? An obvious answer points to the relation of *being related by logical conjunction*. This is different, of course, from *being a logical conjunction*, which is only a syntactic (unary) relation (for lack of a better term), and in any event is expressed by a unary predicate (viz., 'is a logical conjunction') rather than by the target binary predicate (viz., '...is related by logical conjunction to...'). Given the (transparency) constraint on the 'property correlate' of logical conjunction, the two claims (say)

Grass is brown

and

Honey bees are kind

are related by logical conjunction (expressed via C as above) just if their logical conjunction, namely,

Grass is brown and honey bees are kind

is true, and so just if both

it is true that grass is brown

and

it is true that honey bees are kind

are true, and so – via the logical redundancy of 'it is true that...' – just if both

Grass is brown

[11] Of course, given that logic's truth operator is logically redundant, the transparency rule for C (above) is equivalent to the '†'-adorned rule in which $C(\langle A\rangle, \langle B\rangle)$ is intersubstitutable with $\dagger A \wedge \dagger B$. But what might be useful to recall is that transparent truth (say, T) is itself supposed to be intersubstitutable, and so the rule for C (above) is also equivalent to the 'T'-adorned rule in which $C(\langle A\rangle, \langle B\rangle)$ is intersubstitutable with $T\langle A \wedge B\rangle$.

and

Honey bees are kind

are true, and so – via the transparency of 'is true' – just if grass is brown and honey bees are kind. So, the relation expressed by the 'new' predicate C is the relation exemplified by two claims just when their logical conjunction is true. And that's the 'emergent logical property' – in this case, 'emergent logical relation' – correlated with logic's binary conjunction operator. This is the property (relation) reflected in the transparency rule governing C.

And there is nothing peculiar about logic's conjunction operator. The same 'property correlate' project applies to each bit of logic's vocabulary; but for present purposes I focus on logic's truth operator.

5 *Transparent truth as a logical property*

Transparent truth, defined by its transparency rule, is an emergent logical property in the sense above (§4.2); it is motivated directly by logic's truth operator; it is the property correlate of logic's truth operator. Just as with the example of logical conjunction (which is binary), we have a unary property extracted (or abstracted) from logical nullation – that is, logic's truth operator (which is unary) – in such a way that

$$T\langle A\rangle$$

is intersubstitutable in all (non-intensional) contexts with

$$\dagger A$$

And since $\dagger A$ is (according to logic) intersubstitutable with A, we have the usual transparency rule for every theory in which the given predicate (viz., the transparent-truth predicate) appears: $T\langle A\rangle$ and A are everywhere (non-intensional) intersubstitutable.

There is not more to say about the sense in which transparent truth is a logical property beyond its being an emergent logical property so understood. But a few features of the property, in contrast to logic's truth operator, should be highlighted.

5.1 *Not redundant*

Logic's truth operator is logically redundant. The property correlate of logic's truth operator – namely, transparent truth – is not redundant in the true theories in which it appears. As deflationists have long emphasized (e.g., with respect to the generalizing role that suitable deflationary truth predicates – certainly transparent predicates – play), there are some claims in true theories that are not expressible in the theories without transparent truth.

That logic's truth operator is redundant in all true (and complete-as-possible) theories while the corresponding truth property (viz., transparent truth) is not redundant in all such theories is not a problem for the running account of (transparent) truth's logicality; it's a feature of the work that properties (and the predicates used to express them) can do over operators. To put the point at a linguistic level (not that it needs to be at this level): predicates (over sentences) tend to be more expressive than corresponding (e.g., sentential) operators. Witness the creative difference between the operator *it is known that...* and the corresponding predicate *...is known* – a creative difference brought out by infamous spandrels of such predicates. (See below.)

5.2 *Spandrels and paradox*

The operator *It is known that...* takes *sentences* (or propositions or whatever) and makes new sentences; but it demands a sentence before you get a sentence. Predicates are very different, even if they express the property correlates of the operators in question. In particular, '...is known', as a predicate defined over sentences,[12] takes *names* of sentences (or singular terms denoting sentences, etc.) to make a new sentence; it doesn't require a 'previously existing' sentence to make a new sentence. For example, while there's no way to get the following ticked sentence merely from the knowledge operator (I'm assuming that there's no available truth predicate or similar sort of predicate to do the middle work):

✓ The ticked sentence is known

there is a simple way to get it once the predicate 'is known' is available. (The simple way is just grammar, which counts it as grammatical.)

[12]One can put all of this in terms of propositions if one wishes, but the 'creative' difference between operators and predicates remains the same.

There is a big creative difference between operators and their property (relation) correlates; and transparent truth is no different. Such properties bring about ‘spandrels’ – inevitable and often unintended side effects of the given property. (In the case of truth, some spandrels are downright twisted – witness the infamous liar such as ‘it is false that this sentence is true’, a construction that doesn’t arise from logic’s truth and falsity operators on their own. This is why logic’s truth operator can be – and implicitly is – in all true theories, even classically closed ones; however, transparent truth is not similarly ‘universal’.)

In the end, emergent logical properties outreach their logical mate by unleashing spandrels that, in some cases (e.g., truth) put severe limits on the universality of the emergent property.

6 *Some objections and replies*

I’ve put forward the sense in which transparent truth is a logical property – namely, the emergent logical property understood as the property correlate of logic’s truth operator.

6.1 *Not general enough*

An objection to the account is that it is not general enough. The account applies only to transparent truth; it will not – at least as given (e.g., in terms of transparency constraints on emergent logical properties) – apply to deflationary truth properties generally.

The reply: true. But this is not a problem for the account; it’s a problem for the other accounts of deflationary truth which have to give their own accounts of truth’s would-be logicality if they take it to be a ‘logical property’ at all.

6.2 *Not metaphysically interesting*

Another objection is that emergent logical properties (relations), understood per above, are not metaphysically interesting properties.

My reply: I am not sure what is involved in the notion of a metaphysically interesting property, but whatever it is is likely not to be something that should apply to a transparent-truth property – or to a suitably 'deflated' truth property generally.

Setting aside whether emergent logical properties are 'metaphysically interesting', it is worth flagging at least one interesting feature of emergent logical properties – namely, their important creative capacities that can (and, in the case of truth, do) impose wide-ranging constraints on our true theories. As per §5.2, truth not only ushers in spandrels; it ushers in paradoxes that preclude the universality of the property – preclude the property's being expressible in all of our true theories (despite the property's being the direct property correlate of logic's universal truth operator). This constraint, brought about by the creative powers of the transparent property, has spawned a great deal of interesting work on how our true theories can navigate around the property's given constraint.[13] The property of *transparent truth* has the feature *creativity* to a degree that no other properties have, as far as I can tell. In that respect, the property 'has a feature' that may qualify it as 'metaphysically interesting' [29], but I leave that issue to future debate among those who demand 'metaphysical interest' from transparent truth.

7 *Concluding remarks*

Deflationism about truth is a many-faced philosophy. A deflationary account of truth must makes its face clear. In this paper I've focused on what I take to be the simplest – the purest – form of deflationary truth, namely, transparent truth. A transparency account of truth is 'deflationary' in taking the given property of truth to be non-explanatory. As for a positive account of the property of transparent truth, the usual tag 'logical property' applies, and in turn confronts the question: What's that? What's a logical property? I've aimed to answer that question in this paper. There are many other questions that confront transparent truth; but those questions are left for elsewhere.

[13] Beall, Glanzberg and Ripley [5] give a short introductory survey of some of the interesting work prompted by the emergent logical property of (transparent) truth.

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