Philosophica 91 (2017) pp.105-143

LANGUAGE AND ONTOLOGICAL EMERGENCE

J. T. M. Miller

ABSTRACT

Providing empirically supportable instances of ontological emergence is notoriously difficult. Typically, the literature has focused on two possible sources. The first is the mind and consciousness; the second is within physics, and more specifically certain quantum effects. In this paper, I wish to suggest that the literature has overlooked a further possible instance of emergence, taken from the special science of linguistics. In particular, I will focus on the property of truth-evaluability, taken to be a property of sentences as created by the language faculty within human minds (or brains). The claim will not be as strong as to suggest that the linguistic data and theories prove emergence. Rather the dialectical aim here is to say that we have some good reasons (even if not conclusive reasons) to think that the property is emergent.

1. Introduction

The consequences of emergentism concern issues within the philosophy of mind, the philosophy of science, and metaphysics. Mental properties have long been seen as difficult to explain in line with a naturalistic (broadly scientific) account of the world. Emergence suggests a solution. If emergent properties exist in the world, then mental properties need not be reduced whilst retaining causal efficacy.

However, providing empirically supportable instances of ontological emergence is notoriously difficult. Typically, the literature has focused on two possible sources. The first is the mind and consciousness; the second is within physics, and more specifically certain quantum effects. In this paper, I wish to suggest that the literature has overlooked a further possible instance of emergence, taken from the special science of linguistics.

The importance of establishing a further putative example of emergence lies in the weaknesses of other putative examples. The main two examples are (i) consciousness and mental states which are often explicitly defined such that they cannot be the subject of empirical study; and (ii) certain quantum effects which are opaque to many and controversial given the apparent coherence of combining reduction and emergence (cf. Butterfield 2011a, 2011b).

I will focus on the property of truth-evaluability, taken to be a property of sentences as created by the language faculty within human minds (or brains). The claim will not be as strong as to suggest that the linguistic data and theories *prove* emergence. Rather the dialectical aim here is to argue that in focusing on those two possible instances of emergence, the literature has overlooked other alternatives; and that we have good reason for seriously considering whether truth-evaluability can be best explained through emergence. I will argue that we have at

least as good reasons for thinking of truth-evaluability as an emergent property as we do for adopting a reductive position.

It will also help to briefly overview why considering whether truth-evaluability might be emergent could be significant to the broader philosophical debate. The main consequence is that this can start a discussion focused on a new generation of putative examples whose acceptance or rejection within the literature will help further shape the emergence debate given that there remains no accepted example of an emergent property. By considering whether truth-evaluability is emergent we can consider the concept of emergence more broadly, perhaps avoiding pitfalls in our definition that arose out of the limitations of the standard examples taken from quantum physics and the study of consciousness. In truth-evaluability we have a possible instance of emergence that (i) stands independent of the mental-physical debate—truth-evaluability need not be assumed to be either mental or physical in order for the emergence proposed in this paper to go through; (ii) is intuitively graspable; (iii) undeniably occurs in the mind/brain. These three features make truth-evaluability stand out when compared to the standard examples from quantum physics and consciousness.

Given that truth-evaluability need not be posited as specifically either a physical or mental property (see section 6.2), a discussion about it will not solve the ontological issues within the mind/brain problem. However, if it is emergent, then whether it is a physical or mental property will not be significant for the possibility of reduction. Truth-evaluability, I argue, is not reducible currently, nor does there seem to be any plausible case for future reduction except through ad hoc posits to rule out the property as emergent. Our notion of emergence should not a priori dictate that putative emergent properties must be physical or mental. In truth-evaluability, I propose we have a possible example of emergence that could be interpreted either physically or mentally, and therefore is well suited to avoid any a priori ontological claims about the nature of emergent properties.

Furthermore, truth-evaluability may indeed turn out not to be 'unique' with regards to being an emergent property of language. However, even if this is the case, it does not reduce the significance of discussing this particular case. If language, qua internal cognitive system, is found to have numerous emergent properties then this finding would be very significant, and would impact on one of the major debates within the philosophy of mind within the twentieth century—namely whether all properties of the mind/brain can be reduced to lower level neural connections (and perhaps in turn to properties of physics). If language, qua internal cognitive system, resists such reduction then the mind/brain as a whole resists an all-encompassing reduction.

A last early caveat is required. The field of applied linguistics does have a history of discussing the idea of the emergence of language. The idea of emergence has most specifically been applied to the question of language acquisition. Briefly put, the idea has been that a child's learning of a language is emergent from the complex interaction of neurophysiological, social, and cultural elements (see Ellis 1998; MacWhinney 1998, 1999, 2001). I do not deny that language learning might require such complex interactions. Indeed, it seems obvious that at least in the case of word learning that such an account is highly likely. However, my discussion here will be limited to the properties of sentences (grammatical structures) as they are created within the human mind (irrespective of how or whether they are then externalised). As I will argue in section 5, we have good reason to think that some properties of language, such as truth-evaluability, can be explained through entirely linguistic mechanisms without the need for recourse to non-specifically linguistic influences such as social interactions or wider cognitive functions. The upshot of this is that the following thesis is, I believe, consistent with the view that some elements of language are emergent (in some sense) from the complex interaction of neurophysiological, social, and cultural elements. It is consistent with that view that other aspects of language are internal to the language faculty. A broader claim

about language and emergence would require a detailed discussion of the further question of the evolution of language that is beyond the scope of this paper to consider in detail. The question for this paper is whether some internally created (syntactic) properties might have a prima facie case for being viewed as (strongly) emergent.

2. Ontological emergence

Much has been written on how to define ontological emergence, and the variations that might occur within the category of ontologically emergent entities (see Van Gulick 2001 for a summary).[1] I do not have the space here to provide a full overview, or detailed discussion, of that literature. Instead, in this section I will outline some general characteristics typically associated with ontological emergence; in sections 4 and 5 I will return to these characteristics and indicate how the property of being truth-evaluable appears to satisfy them in line with current empirical research in linguistics.

Following Yates (2009) we can distinguish within emergentism metaphysical and causal theses (assuming properties as putative emergent entities):

Metaphysical: Emergent properties are higher order properties of certain structures, synchronically determined by trans-ordinal laws. The lower level properties interact in complex ways. Emergent properties require a sufficient level of complexity for their instantiation to occur. The emergent properties are nomologically necessitated by the lower

[1] I restrict my discussion to ontological and leave aside 'epistemic' or 'weak' emergence. All references will be to ontological or metaphysical emergence unless otherwise stated.

level properties, but the laws governing the lower level properties do not logically necessitate the existence of the higher level properties. The emergent property is not 'additive' or identifiable directly with some structural arrangement.

Causal: The emergent property exerts a downward influence on the lower-level properties. The emergent properties contribute some novel causal power that combines with the causal powers of the lower level to produce the overall causal profile of the structured entity.

I am not defending the idea that the correct way to conceive of emergence lies in the conjunction of these two theses. Rather, I claim only that these two theses contain typical and common commitments for the emergentist. In this paper, I focus solely on the metaphysical thesis. Consideration of the causal thesis of emergence with respect to truth-evaluability will need to follow in subsequent research.

Giving an illustrative example is, of course, contentious. We cannot give an example of emergence when the debate is precisely over whether there is emergence in the world. However, a classic example would be mental states. Mental states are putatively emergent because mental states are a higher-level property of certain structures that emerge from the complex interaction of the lower-level (physical) properties of the brain. The existence of the mental states might be taken to be nomologically necessitated, but not logically, and it is often claimed that mental states are in some sense causally independent from their lower-level emergent base, perhaps even exhibiting downward causal influence on the lower-level physical states.

The characterisation of emergence that I have given is admittedly broad in places. However, this broad characterisation acknowledges many major aspects of emergent properties, present within otherwise very different accounts. Furthermore, it is right to consider any new putatively emergent phenomena under a broad notion of emergence. If

we were to place unduly high or specific demands on what it is to be emergent, then we might not benefit from considering any new phenomena as emergent. A highly specific definition of emergence could rule out or presume the emergent nature of a given phenomenon prior to serious investigation and research. The characterisation offered here is intended to avoid this threat.

The contrasting view to emergence that I will focus on here is that of the reductionist. The reductionist will seek to explain away any higher-level properties. Higher-level properties for the reductionist will be patterns of lower-level properties, or additive properties that arise entirely due to the nature of the lower-level properties. A classic example is the weight of a 1kg bag of flour. The property of being 1kg in weight is not an emergent property as it can be wholly explained through reference to the lower-level properties of the weight of each grain of flour being added together to reach 1kg. Or, alternatively, we could say that the property of being table-shaped is not an emergent property as the property can be wholly explained by the arrangement of lower-level properties of the parts of the table.

Again, this conception of reduction is admittedly vague. The reductionist could have many different reasons for arguing for a reductive position, and these reasons might lead to different forms of reductive theories. The main idea that will be used in this paper is that the reductionist will seek to wholly explain the nature and causal powers of the higher-level property through certain arrangements or additive aspects of the lower-level properties.

3. Linguistics and truth-evaluability

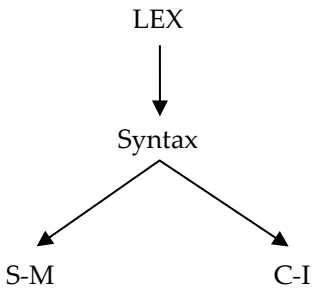
Linguistics takes the faculty of language to be a describable and investigable natural object. One central distinction within the linguistic literature is the split between those who posit a specific language

'module' within the mind (most prominently those working within the Generative Grammar research program), and those that deny this, instead positing that language forms out of more general cognitive learning capacities (most prominently, the Cognitive Linguistics research program). I will here assume a Generative Grammar approach. I will also assume the empirical justification for the theoretical linguistics that I cite here. Linguistics is a (special) science, and as such its claims are falsifiable—should a language be discovered, spoken naturally by a human population, that contradicts some claim within the linguistic theory, then that claim would have been put under significant pressure. Such discoveries might be made, and the claims of the science may move on. However, in so far as when discussing other sciences in a philosophical context it is not unreasonable to discuss the consequences of the currently best supported theories. I will proceed in this manner for linguistics. I therefore do not have the space to defend these assumptions; however, the motivations for these positions stand fully independent of the claims about ontological emergence.

A recent version of Generative Grammar, first outlined in Chomsky 1995, is the Minimalist Program.[2] The Minimalist account specifies how the different systems affecting language production and comprehension interact in such a way as to form a single functioning system, which possesses characteristics well associated with language such as recursivity and discrete infinity. In what follows I will give a brief outline of the aspects posited within the language faculty by Minimalism.

Minimalist theories hold that the language faculty consists of four parts, which can be captured by the following 'inverted-Y' diagram (1):

[2] For more details on the Minimalist Program, see inter alia Adger 2003, Boeckx 2006, Bošković and Howard 2006, Lasnik, Uriagereka, and Boeckx. 2005, Radford, 2004, and Uriagereka, 1998. See Johnson, and Lappin 1997; 1999 for some criticisms of the move to Minimalism.



These parts are the lexicon (LEX) which is the 'mental dictionary' present within the speaker (this could be taken to be the conceptual store for many philosophers); the syntactic component of language; and the sensory-motor (S-M) and conceptual-intentional (C-I) interfaces. Assuming the correctness of the Minimalist Thesis, it is crucial to see that the positing of any further aspects of the language faculty is unwarranted. Everything within the linguistic derivation will need to be explained through aspects of the language faculty as outlined in (1).

The notion of truth-evaluability that I wish to discuss requires some clarification in light of the linguistics. I will assume here that truth-evaluability is an immediately recognisable property of a sentence. By this, I mean that the considered examples can *independent of any further additions* (i.e. pragmatic or contextual influences) be investigated *qua* the instantiation of the property of truth-evaluability.

I wish to also sharply disentangle the notion of truth-evaluability from truth itself. Truth has been taken to consist in many different things. We could take truth to consist in correspondence with facts; or in coherence with a set of beliefs or propositions; or in the ideal outcome of rational inquiry; or only in the ascription of the truth predicate. Whatever theory of truth we adopt though, either substantive or deflationary, truth-evaluability is separate. Truth-evaluability makes no claims upon the world, whilst truth does (or at least might do). If something is true, then it states something about how the world is (for correspondence theories), or how we think about it (for more pragmatic

or coherence based theories). We can accept that a sentence is truth-evaluable whilst refusing to ascribe to it a truth value. In this way truth-evaluability is independent of the world; the same cannot be said for truth.

A further way to get at the notion that I have in mind is to consider how truth 'gets into' language. In this paper I will be suggesting that truth might 'get into' language via emergence occurring at a certain level of complexity, and that the emergent explanation is at least as good as the reductive one.[3] An interest in how truth gets into language plausibly goes as far back as Plato. In the *Sophist* (and to a degree also in the *Theaetetus* and the *Timaeus*; see Charlton 2014, chapter 2 for further discussion), Plato outlines various grammatical distinctions, and does so to illuminate when it is that sentences can be considered true or false. It is in this same spirit that I intend this work to be taken. Truth-evaluability is the property that allows truth to get into language.

This helps to illustrate, I hope, that I am taking truth-evaluability to be a syntactic property, whilst truth is perhaps a semantic one. Since at

[3] There is a further alternative that might be suggested. Some in the minimalist program have been accused of some form of scepticism about semantics. This scepticism is not about the existence of semantics, but rather whether we could ever produce a scientifically tractable, empirically supported, and fully explanatory theory of semantics. Those inclined towards this view might be tempted to take an eliminativist rather than reductionist approach to truth-evaluability. I will not discuss this option in detail here, but it is worth pointing out that I here assume a non-eliminativist approach to truth-evaluability. The reductionist I have in mind is of the same kind as in the philosophy of mind that holds that we should not eliminate mental states, but reduce them to physical ones. Mental states in a sense 'exist' but they are entirely realised by physical states. The reductionist in mind here is one that would seek to entirely reduce the higher-level property of truth-evaluability to properties at the lower-level. Thanks to an anonymous reviewer for suggesting this possibility to me.

least the work of Davidson, truth and semantics have often been considered together, and the semantics of a sentence is understood through giving the truth conditions for when that sentence would be true. This Davidsonian approach presupposes that sentences can be evaluated for truth at all. It is this presupposition that is of interest here. Truth-evaluability is therefore, as I see it, a property of grammar, and is required prior to semantic consideration for truth-value. In making this assumption I might be taken to be drawing a sharp distinction between semantic content and syntactic structure. This is correct to a degree. I am following a tradition in the minimalist program of drawing a distinction in this way. However, it is not my intention to draw this distinction across the board. I am not claiming that no issues in semantics affect syntax or vice versa. My claim will be (in section 4) that truth-evaluability cannot be wholly explained at the lower-level, one part of which is semantics (as seen in (1)). Semantic content may affect what syntactic structures result in various cases (see Carlson 1980, and Carlson and Pellettier 1995 on generics for a potential example due to the stage- and individual-level distinction). The claim here is limited to the thought that semantic content will not directly affect whether or not a particular sentence is truth-evaluable or not (though it certainly will affect whether that sentence is taken to be true or false)

Next, we can see that matrix (or sentential) structure is a necessary but not sufficient condition for truth-evaluability. Consider:

(2) Caesar destroyed Syracuse.
(3) Mary believed that Caesar destroyed Syracuse.
(4) Who killed Bill?
(5) You idiot!
(6) a table

(2) and (3) are truth-evaluable, whilst (4) and (5) are not. This is despite all of (2) - (5) being perfectly grammatical and well-formed sentences.

Any sub-sentential part also fails to be independently truth-evaluable, as seen in (6).[4] This means that single words cannot be truth-evaluable, nor independent noun phrases, determiner phrases, verb phrases etc.

The linguistic evidence indicates that truth-evaluability requires a particular form of structural complexity (Hinzen 2009, 2013, 2014). Truth-evaluability comes independent of the semantic content of the lexical items present within the sentence, and only occurs when certain structural complexity is reached. The semantic content is independent from whether or not the sentence is truth-evaluable, though not from the truth-value. This independence of truth-evaluability from semantic content can be seen in the truth-evaluability of (7) and (8):

(7) The present king of France is bald.
(8) Colourless green ideas sleep furiously.

Both of these famous cases may fail to have a truth-value—we might think that the failure of reference does not render them false, but instead unvalued. But even if this is the case (something I wish to remain neutral about), both are truth-evaluable. Both possess the requisite grammatical

[4] These examples must be considered independent of any context that might be imagined. (6), for example, might be considered to be truth-evaluable as the answer to the question 'What furniture is in your office?' In this instance (6) would be considered linguistically to contain an anaphora, and thus have the same linguistic structure of stating 'My office contains a table'. This additional structure, in English, need not be spoken, but to understand the meaning of (6) in that context requires understanding the anaphora present. This indicates the difference between literal and contextual meanings. (6) taken alone, without any context to provide anaphora, however, cannot be truth-evaluable. All examples should be read independent of context and the discussion taken to concern their literal, not contextual, meanings.

structure, as indicated by their matrix structure, that truth-evaluability requires.

Some readers might link truth-evaluability to the notion of truth-aptness. Truth-aptness is also commonly taken to only apply to a sub-set of linguistic items. If we adopted some forms of syntacticism, then the instances of what I am calling truth-evaluability and truth-aptness would perfectly overlap. However, I have refrained from using the notion as truth-aptness is often used in relation to debates about which domains are in the business of expressing truths, such as a non-cognitivist account of ethics (see Jackson, Oppy and Smith 1994 for discussion). Indeed, we might think similarly that (7) and (8) are not 'truth-apt' if they are not intended to express facts about how the world is. Through truth-evaluability I can remain neutral on these issues. If non-cognitivism about ethics is right, then I would wish to claim that ethical statements are truth-evaluable even if they are not truth-apt. Truth-evaluability, so understood, is concerned with linguistic structure independent of speaker intentions.

The Minimalist Thesis provides four different lower level elements that go into making a linguistic derivation (LEX, Syntax, and the C-I and S-M interfaces). Grammatical analysis reveals that it is only at a certain level of grammatical complexity that sentences have the property of being truth-evaluable. I will now explore the idea that this property of truth-evaluability is ontologically emergent. In order to do this, I will consider how a reductionist might explain the appearance of truth-evaluability. In section 4, I will consider the idea that truth-evaluability is not a higher order property and it is instead had by some lower level element of a linguistic derivation. In section 5, I will consider a reductionist account that claims truth-evaluability is nothing 'over and above' the instances of particular grammatical structures. In section 6, I consider some more general objections that might be raised against an emergentist analysis of truth-evaluability.

4. Is Truth-evaluability instantiated at the lower-level?

The empirical evidence is clear that truth-evaluability is a property of matrix clauses, or sentences. This would, for some, be evidence of emergence already. The existence of truth-evaluability at the higher level would indicate that it is at the very least 'epistemically' or 'weakly' emergent.

However, in order to show that the property might be ontologically emergent, more is needed. What is needed is to show that the property of truth-evaluability does not appear amongst the lower-level parts of the language faculty, nor fall out of the ordering principles that operate over those parts. To do this requires considering each posited part of the language faculty in turn in order to show that the property of truth-evaluability is not a lower-level property. (I will consider whether relevant information could be added from extra-linguistic sources in section 5).

The first possible source of truth-evaluability to discount is the lexicon. The lexicon is split between the category-neutral items (such as *apple*) and those words that correspond to functional categories (such as *the*). Consider, from di Sciullo (2005):

(9a)	tut-or	
(9b)	tut-ee	
(9c)	*or-tut-ee	
(10a)	tavol-ett-ino	'little funny table'
(10b)	tavol-in-etto	'funny little table'

These are instances of category-neutral items. In both (9) and (10), even though single words can encode quite complex semantic information, it

is clear that they are not capable of being truth-evaluable. Single words such as these are certainly not semantically simple (or at least need not be); but these category-neutral items cannot possess truth-evaluability as part of the lexicon. The same can be said of the other kind of lexical item—those that correspond to functional categories. Items such as *the* similarly clearly cannot be truth-evaluable on their own.

The reason why we cannot find truth-evaluability within the lexicon is simple. Single lexical items do not fulfil the requisite grammatical complexity that was noted in section 3. Truth-evaluability, minimally, requires a matrix clause. Lexical items fail even this minimal requirement and so cannot be the source of the property of truth-evaluability. LEX therefore cannot provide an explanation for the property of truth-evaluability that we see in language.

Note that this is not to say that single words cannot be true responses, typically to questions. If asked, 'What role does that person play in the department?', and I answered 'Tutor', then this could be a true and felicitous response. However, in this case, the linguistic analysis of my response would be that there is anaphoric grammatical structure inherited from the question. In English, and in this example, that structure is unspoken, but its presence is still highly relevant (see fn. 5).

What about the other parts of the 'inverted-Y' conception of the language faculty? The interfaces act as the point whereby the language faculty interacts with other cognitive systems, and thereby must meet any restrictions that other cognitive systems place upon it. The S-M interface is predominantly concerned with physiological restrictions, imposing a linear order from the hierarchical order derived within the syntactic component due to limitations such as our inability to pronounce more than a single syllable at a time (see Kayne 1994: 3). The C-I interface checks and values the semantic features of the derivation, ascribing a complete semantic and intentional assignment to the sentence.

Truth-evaluability cannot be a lower-level property of the interfaces. The reason is that the interfaces by stipulation within the Minimalist Thesis do not add information or content. The interfaces only contain legibility requirements in order to ensure that any structure created in the language faculty can be read by our other cognitive systems. This cannot include adding information into the derivation without denying premises within the empirical linguistics. To stress, the claim is not that the constraints that the interfaces impose tell us nothing about truth-evaluability. For example, if we posit a full interpretation principle for the C-I interface, then we might hold that no sentence can be truth-evaluable unless it fulfils that requirement. But, this would not tell us how the sentence becomes truth-evaluable—or, put differently, how truth gets into language. This would only tell us that just like non-truth-evaluable sentences, truth-evaluable sentences need to be able to receive a full interpretation at the C-I interface.

The remaining lower-level aspect of the language faculty is syntax. Syntax is solely populated by Merge, a simple and 'dumb' set building operation as the simplest set building operation that we could posit (Chomsky 2004: 117; Boeckx 2008: 79). Merge creates symmetric sets, wherein the set {a, b} is indistinguishable from {b, a}. Merge is the simplest generative operation that could be posited, whereby "[u]nbounded Merge or some equivalent is unavoidable in a system of hierarchic discrete infinity, so we can assume that it "comes free" (Chomsky 2008: 137). Merge is also blind to the source of the elements that it merges, meaning that the source could be some element from the lexical array, or could be a set that has already been merged. This later possibility is 'Internal Merge' which allows for the creation of sets such as {α, {α, β}} or {β, {α, β}} (Boeckx 2009: 47).

Merge, so understood, clearly is unable to be a lower-level source of truth-evaluability. Merge cannot add properties—it only builds unordered sets. Such simple set building operations are inherently not the sort of operation that can add properties into the sets that they

create. To posit otherwise would go against the stipulation that Merge is 'dumb' and the empirical support for that stipulation. This can further be seen in that truth-evaluability only appears with a certain level, and certain forms, of complexity. What we observe is that truth-evaluability only occurs after numerous iterations of Merge. Were truth-evaluability to be added by the Merge operation itself, then there would be no reason to expect this—i.e. we would expect it to be possible that a single instance of Merge could result in truth-evaluability. Consider:

(11) Mary's smile

(11) cannot be truth-evaluable, and yet it certainly requires instances of Merge, both external and internal to ensure that we understand that it is Mary's smile, and not as in (12):

(12) *Smile's Mary

(12), whilst also clearly being ungrammatical, would occur if the internal merge operation labelled *smile* not *Mary* as the head of the merged set. (11) exhibits all of the capabilities that Merge provides the language faculty, and yet it remains non-truth evaluable. If Merge were a lower-level source of truth-evaluability, then this empirical finding would be surprising and would be unexplained.

All the lower-level aspects of the language faculty have been shown to not possess the property of truth-evaluability. This exhausts the available aspects of the linguistic faculty, and exhausts the possible sources of truth-evaluability at the lower level. Truth-evaluability simply is not a property that the sentence gains from its parts. Truth-evaluability therefore only arises with complexity—it remains to say whether the property could just be identified with a certain structural arrangement.

5. Is Truth-evaluability Structural?

Perhaps the primary response that the reductionist would wish to make against the claim that truth-evaluability is emergent is that even though it might not be clear exactly what that structure is, it is structure alone that leads to truth-evaluability. Thus, no emergent entities are required. This reductionist claim is likely impossible to entirely disprove. It will always be possible to claim that there is some as yet undiscovered or theorised piece of structure that is playing the role that we without which might posit an emergent property. As such, I cannot give a conclusive argument that truth-evaluability is not merely a structural property. In this section, I will instead give some reasons as to suppose that a reductionist account is prima facie no better than an emergentist one. By this, I mean that the emergentist account is no less explanatory, no less supported by the available evidence, and ultimately no less plausible, than the reductionist account. Reductionism with an appeal to structure should not be our default hypothesis to explain truth-evaluability.

We first need to be clear as to what the claim that truth-evaluability is a structural property might amount to. This notion is sometimes described as 'additive' within the emergence literature (see McLaughlin 1992:89). There is however a distinction to be made between some putative examples of such properties. Consider the mass of an apple. This is ruled out as emergent as it is merely the additive mass property of all the mass properties of the parts that make up the apple. Truth-evaluability is not like this, as it is not the case that each part of a sentence provides a truth-evaluability property that is additively joined to create the truth-evaluability of the sentence. Alternatively, we can consider the sphericity of the apple. This is also taken to be additive in the sense that the sphericity of the apple is only a matter of how the parts that make up the apple are arranged. The parts are not themselves

spherical, but so combined the apple can be said to be spherical. The property of 'being spherical' thus is not emergent. If the reductionist is to claim that truth-evaluability is not emergent, and instead is structural, then it must be in an analogous way to the sphericity of the apple, not its mass. The claim must be that the parts of the language faculty, so combined in a particular way and with no further posit required, provides an explanation for the truth-evaluability of that particular sentence.

If truth-evaluability is a structural property, identifiable with a particular arrangements of lower-level parts, then we would expect to see truth-evaluability being instantiated in every instance of that structure. We have already noted that truth-evaluability cannot be equated with matrix (or sentential) structure because (4) and (5) are matrix clauses (sentences) and yet fail to be truth-evaluable. What remains therefore is to consider whether truth-evaluability is equatable with a particular form of matrix clause. Consider:

(13) Caesar destroyed Syracuse
(14) Mary believed that [Caesar destroyed Syracuse]

In (13) and (14) we can see the same structure, firstly as a matrix clause, and then embedded within a larger piece of grammatical structure. It is reasonable to suppose that the same structure occurs in the overlapping parts of (13) and (14). The embedded clause in (14) is not a truth-functional ingredient within the full sentence—it does not matter whether Mary is correct in believing that Caesar destroyed Syracuse. Whether Caesar did destroy Syracuse or not does not matter when we are considering whether Mary believes that he did. However, that same structure, as a matrix clause in (13), is truth-evaluable and is also a truth-functional ingredient of the entire sentence.

The emergentist can provide a simple explanation for the difference. An emergent property requires particular complexity in order for that

property to arise. For the emergentist, the matrix clause and particular grammatical complexity are necessary conditions for truth-evaluability—i.e. this is the required emergence base. The property does not occur when the same structure is embedded as one of the necessary conditions is not met. The reductionist alternatively seems to have two options to explain this apparent difference: (i) claim that the same structure as it appears in (14) is truth-evaluable; or (ii) posit something further that accounts for truth-evaluability. In the remainder of this section, I will consider each of these routes, and argue that the reductionist arguments are not conclusive in either case. This will show that there remains a prima facie case for truth-evaluability to be emergent.

Taking (ii) first, one suggestion along these lines would be to posit some further component of language, speech, or thought that assigns truth-evaluability. This might be something akin to a Fregean force.[5] In situations where the sentence is truth-evaluable, this would be an assertive force, and other kinds of force would occur in other forms of sentences. Depending on what kind of force applied, the sentence becomes assertive (truth-evaluable), or a question, or a sentence of some further kind. This would be akin to the idea that truth is a norm for assertability, and thus that assertion is linked to truth-evaluability. These additional norms for assertability that we might posit could be taken to explain why declarative sentences such as "The dog has been fed" are truth evaluable while questions such as "Has the dog been fed?" or imperatives such as "Feed the dog" are not truth-evaluable.

[5] I do not intend to ascribe this view to Frege, only that something like a Fregean force could be used in this way by a reductionist in order to attempt to show that no emergence is required to explain truth-evaluability. Thanks to Olley Pearson for suggesting this possibility.

There is a good reason that any claim like this that would speak against the idea of truth-evaluability being emergent would need to be an independent posit. This is because even if assertability is key to understanding the notion of truth, we have to give an account of why some sentences are assertable but others are not. I am open to the claim that there is a connection, but there is no reason to think that sentences are truth-evaluable *because* they are assertable, rather than that they are assertable *because* they are truth-evaluable. The assertable sentences could be picking out exactly the same sentences that I am picking out as truth-evaluable because of the presence of the emergent property. This means that for the claim to be against truth-evaluability as emergent, the source of assertability must be some additional posit in language, thought, speech, or some other meaning-producing system.

This additional posit could either be linguistic, or extra-linguistic. I will examine the prospects for both views.

Consider the posit as linguistic. This would require us to *a priori* posit some new piece of linguistic structure with no empirical support for that structure except as it appears in truth-evaluable sentences. There are recent approaches in linguistics that posit a lot of fixed structure at the vP (such as Tense and Aspect in so-called 'cartographic' theories—see Cinque and Rizzi 2009). Perhaps, we could argue that some of this fixed structure is relevant for an analysis of truth-evaluability.

However, there would seem to be no independent reason to posit that particular bit of structure or that role to otherwise posited structure except so far as it rules out truth-evaluability as emergent. Should that piece of structure have independent linguistic justification, and the requisite empirical support, then the reductionist position would be strengthened. Should we have evidence that some other structure (perhaps even Tense and Aspect or something similar) is the source of the property of truth-evaluability then this too would strengthen the reductionist case. I do not rule out that this could occur; I also do not want to dictate what the science of linguistics will or will not posit in the

future. However, given the current state of the science, the posit seems unjustified.[6]

In addition to the above, a further issue might arise. It would not be enough for the reductionist to show that some more specific syntactic constraints on clause formation, for example theta-criterion which guarantees that arguments of predicates will be saturated, applies in cases of sentences that have the property of being truth-evaluable. As in the case of the interfaces where the full interpretation requirement might be in some way connected to truth-evaluability, the theta-criterion does not distinguish between truth-evaluable and non-truth-evaluable sentences. It does not tell us how truth gets into language, merely that various structural features apply in language independently of whether the sentence is truth-evaluable or not. Maybe future research will show a stronger connection between some piece of linguistic structure and truth-evaluability, but premising the reductionist claim on this future discovery again seems unjustified.

This has been to so far assume that any additional linguistic posit would be syntactic in nature. This may also be doubted. For example, we might think that the property of truth-evaluability is syntactico-semantic. One version of this might say that truth-evaluability is a (defeasible, in the absence of irony, pretence etc.) indication of acts being bound by a truth norm relative to a specific content indicated by some clause structure.[7] The idea here could be that some Gricean illocutionary force that is indicated by the declarative mood of a matrix clause. Perhaps, the other two complex syntactic structures that have been

[6] This of course brings to mind claims by some physicalists in the philosophy of mind about future neuroscience. If the reader finds arguments there persuasive, then I do not expect to persuade here. However, it should at least be noted that such appeals do strike many as problematic.

[7] I am grateful to an anonymous reviewer for raising this.

mentioned here—the interrogative and imperative moods—could be ascribed somewhat related properties of "answer-evaluability" and "compliance-evaluability". Such properties are the analogous properties given certain syntactic structures to truth-evaluability. This account would make truth-evaluability a syntactico-semantic property that arises only given certain syntactic complexity and is the result of certain illocutionary force towards the content of that complex structure.

However, it is not clear why this needs to be read as reductionist as opposed to emergentist. The inclusion of a Gricean illocutionary force could be taken to be part of the emergence base for the property of truth-evaluability. This would mean that I was wrong in stating that the emergence base is only a certain syntactic complexity and the structure appearing in a matrix clause; but not wrong about the emergent nature of truth-evaluability. This would be an addition to the Chomskian conception of language that I have favoured here, but not one that would prove necessarily to be reductionist in nature.

I have in my characterisation of truth-evaluability focused on the syntactic aspect of the property, and assumed that this is sufficient to explain the nature of this property. This is partly due to the distinction that I stressed between *truth* and *truth-evaluability* where the former requires the consideration of the semantic content of an expression whilst the latter does not. Introducing the idea of an illocutionary force into the explanation complicates that purely syntactic account. It posits some semantic aspect to the property and as such might be taken by some to be needed to properly understand what the property is actually like. However, the complication does not favour the reductionist over the emergentist, and the emergence explanation of truth-evaluability is still at least as plausible as the reductionist one.

Alternatively, the truth-evaluability-relevant posit could be extra-linguistic, perhaps as part of wider cognitive architecture. This would be most in line with views that truth is a norm for assertability, and presumably then that truth-evaluability as a property occurs when the

sentence is assertable. But this would again run the risk of redundancy. The linguistic data is capable of providing an account of truth-evaluability, including an account of when the property occurs and when it does not. The motivation for positing some further cognitive structure would seem to only be to rule out emergence a priori. The additional posit would seem to be redundant given the linguistic analysis and account of truth-evaluability.

Similarly, a reductionist might appeal to the social aspects of language. The claim might be that truth-evaluability arises out of social interactions, and perhaps some requirement that we have to trust our fellow humans. Truth-evaluability would then not strictly be part of the language faculty as defined here, but would instead be part of a wider account of social phenomena. Again, this is an occupiable position for the reductionist. Whether we are moved by this possibility will likely depend on a wider debate concerning the evolution of language and the human mind. For example, we might think that language evolved in a single mutation and further tie this to the human mind (see Hauser, Chomsky, and Fitch 2002; Tattersall 2004; Miller and Hughes 2014). If we agree with this claim, then appealing to social phenomena will look redundant, as truth-evaluability would be secured internally through this single language-producing mutation. Alternatively, we might adopt a socially mediated account of language evolution (see Pinker 2003; Tallerman 2007). This would allow the reductionist more room to reply to the emergentist, as the emergentist could be accused of picking out the wrong lower-level base for truth-evaluability.

Commenting on which of these views is correct is beyond the scope of this paper. The moral remains that there are solid prima facie reasons to consider truth-evaluability as possibly being emergent. The reductionist case is not clear-cut, and would be premised on various additional claims, all of which would need to be independently justified and supported. This, at least, means that the reductionist case is not better supported than that proposed by the emergentist.

Let us now consider option (i). The reductionist here would claim that in both (13) and (14) the structure 'Caesar destroyed Syracuse' is truth-evaluable. In (13) the truth-evaluability is clear; in (14) the reductionist will need to claim that the embedded clause in virtue of being the same structure as (13) is also truth-evaluable. If this claim is right, then truth-evaluability would be identifiable with a particular structure—i.e. the structure exhibited by 'Caesar destroyed Syracuse' in both (13) and (14). In the remainder of this section I will indicate that there are good reasons to reject that option.

It is important here to stress that we must consider the truth-evaluability of the structure as it appears in (14) *qua* embedded clause. It is not enough to say that that same structure in another context or as a matrix clause, as in (13), is truth-evaluable, and hence that it is truth-evaluable *qua* embedded clause. This is because it is the status of the structure with respect to truth-evaluability *as embedded* that is in question and dispute here. It is not a legitimate move to alter the grammatical structure of an example and then re-import that altered grammatical structure back into the original structure. The discussion therefore must be strictly *qua* embedded clause.

A first claim against the reductionist is that it is already a held position within the philosophical literature that truth-evaluability only occurs at the sentential level. I have outlined some of the empirical case for this above also. If we accept the claim that truth-evaluability only occurs at the sentential level then it is simply a category error to think of embedded clauses as being capable of being truth-evaluable *qua* embedded clause. The same structure as a matrix clause might be truth-evaluable, but that is not in dispute. The emergentist about truth-evaluability can claim that the structure and its status as a matrix clause are necessary conditions for the property to emerge. To think of 'Caesar destroyed Syracuse' as truth-evaluable in (14) is therefore to ascribe properties to embedded clauses that they cannot possess.

The reductionist here might object that this response is itself based on intuition and may be in danger of begging the question back against them—we cannot simply assume that embedded clauses are not truth-evaluable, as that is what is in dispute. However, there is a prima facie reason to reject this in favour of the intuition that embedded clauses *qua* embedded clauses cannot be truth-evaluable. To see this, we must ask ourselves why is it that we might ever have the intuition that the embedded clause is truth-evaluable *qua* embedded clause?

Part of the response I offer comes from a distinction made in the emergence literature. Chalmers distinguishes weak and strong emergence via the notion of deducibility. Thus, a "high-level phenomenon is strongly emergent with respect to a low-level domain when the high-level phenomenon arises from the low-level domain, but truths concerning that phenomenon are not deducible even in principle from truths in the low-level domain" (2006: 244). This is contrasted with weakly emergent phenomena, which are merely 'unexpected'.

If we assume, with the reductionist, that the embedded clause in (14) is truth-evaluable, then in what sense is that truth-evaluability deducible? If the higher-level property of truth-evaluability is not deducible from the lower-level domain, then the property would satisfy Chalmers' account of strong emergence. The truth-evaluability of the embedded clause, however, seems to only be in any sense deducible by considering the embedded clause outside of its embedded situation—i.e. only by no longer considering the embedded clause *qua* embedded clause. The supposed truth-evaluability of the embedded clause in (14) can only be claimed to be deducible from considering that embedded clause not *qua* embedded clause but instead as a matrix clause as in (13). I have already noted how this is not a valid dialectical move. We cannot readjust the grammatical structure of the examples without potentially begging the question against the opponent, in this case the emergentist. The emergentist about truth-evaluability, as I have sketched the position here, takes as the emergent base a particular level of grammatical

complexity within a matrix clause. If the same structure embedded can only be shown to be truth-evaluable via making that embedded clause a matrix clause, then it is simple for the emergentist to claim that the truth-evaluability of the structure is actually only present in the matrix case.

In other words, to even get the intuition about the truth-evaluability of the embedded clause *qua* embedded clause assumes the correctness of the emergentist position as it requires considering that structure *qua* matrix clause, which is the specified emergent base. This line of argument is no help to the reductionist.

The aim of the last two sections is to suggest that we should devote further research to linguistics and emergence. I have argued that there are good prima facie reasons for thinking that truth-evaluability is an ontologically emergent property. The emergence base for truth-evaluability, on this account, is a particular level of grammatical complexity within a matrix clause. We have seen that neither a matrix clause without that grammatical structure, nor that structure within an embedded clause is sufficient for truth-evaluability to arise. These would appear to be necessary conditions for the emergence of truth-evaluability. We have further seen that the truth-evaluability is not deducible from the lower level properties. I argue that this indicates that we have initial reasons for thinking that truth-evaluability is nomologically necessitated by the lower level structures and properties—i.e. the grammatical structure in a matrix clause; but truth-evaluability is not logically necessitated by those lower-level properties.

The nomological necessity of truth-evaluability can be observed in that if the emergent base is present, then it is no mere choice as to whether the property of truth-evaluability has arisen. Presented with a sentence of the kind in (13) and (14), we are compelled to ascribe truth-evaluability to that sentence. We may choose to refuse to specify a truth-value—we might be error theorists about sentences of that kind for example—but its evaluability for truth is not something that we have a

choice over. However, as we have seen, it does not follow logically from the properties of the lower-level parts of the language faculty that particular sentences (or indeed any sentences) are truth-evaluable. It does not seem entirely unconceivable that we could have a language that makes no claims about truth or truth-evaluability at all. I do not want to stress this point as I do not have the space to comment on the myriad of issues surrounding conceivability and possibility. However, it seems to be the case that we cannot logically deduce the presence of truth-evaluability, and yet its presence given the presence of the base properties and complexity is necessary.

6. Initial Criticisms

Before concluding, I will make some more general remarks in response to what may be the most common issues that have arisen in the paper.

6.1 Sentences as truth-bearers and truth in logic

I have assumed throughout this paper that sentences are truth-bearers. This should not be read, though, as a claim about whether any other entities can be truth-bearers. If the claims made in this paper do not generalise to other kinds of entities that might be truth-bearers (say propositions) then that does not reduce the significance of the possibility that truth-evaluability as it occurs in sentences is emergent.

A similar consideration can be applied to the response that I have overlooked the notion of truth as it appears within logic. Truth in logic is a rigorously defined notion and one that we understand well, and in light of that understanding it might be claimed that I have overcomplicated the entire issue. However, following the same line as above, I can accept that within the formal structure of logic, truth-evaluability might not be emergent. To have a position on this would require a complicated account of how language and logic relate to each other. I cannot provide

that here, though it is worth noting that it is also not clear whether that would aid the emergentist or the reductionist. Much further research would be required. Again, though, even if the claims here do not generalise, this would not reduce the significance of these claims as they apply to language.

6.2 Is this property real?

One response to the suggestions in this paper would be to simply deny that truth-evaluability is a real property. Certainly, those interested in the metaphysics of emergence are unlikely to initially consider truth-evaluability to be amongst existent properties, especially if they are inclined towards a sparse theory of properties.

The first thing to note with respect to the reality of a truth-evaluability property is that it is necessary if we want to have any notion of truth. This is clearly so for substantive theories of truth, but is also so if we are deflationists about truth. A deflationary theory of truth does not deny that that there are some things that are truth-evaluable. The deflationist thinks instead that there is not a common feature or property that explains why many different sentences are true. This is compatible with my claims about *truth-evaluability*. I have said nothing about what makes any sentence true (or false). The deflationist can therefore accept what the linguistics indicates about truth-evaluability without being forced into thinking that there is any substantive about the property of truth. Noting this, and assuming that philosophers will be unwilling to completely jettison the idea of truth, we seem well positioned to think that truth-evaluability is a real property.

A critic might also doubt the reality of truth-evaluability by comparing it to the properties of formal systems. Take the property of completeness that occurs in many different forms across a number of different formal systems. Typically, though, we would not take completeness to indicate an ontologically real property. There are

however at least two significant differences. The first is that language, unlike formal systems such as set theory, mathematics etc., is a natural phenomenon. This is unlike such formal systems that do not occur without systematic creation—see below for more on this aspect of language.

Second, truth-evaluability is special in that it is required to understand those properties of formal systems. Consider:

(15) This logical system has the property of completeness.

(15) is truth-evaluable. This indicates that in order to understand such formal systems, we require truth-evaluability. This means that the property of truth-evaluability has some special status compared to the properties of formal systems. Ascribing a status to truth-evaluability that we do not ascribe to the properties of formal systems is thus not unreasonable. We cannot understand or even create those formal systems without the property of truth-evaluability. We cannot understand or assess (15), and subsequently the entire formal logical system that it refers to, without (15) instantiating the property of truth-evaluability.

6.3 Is truth-evaluability mental or physical?

In this paper I have also not mentioned two very commonly evoked concepts within the emergence literature—that of 'mental' and 'physical'. Clearly, language is an aspect of our mental world. However, some such as Chomsky want to take the word 'mental' as being "on a par with 'chemical', 'optical', or 'electrical'" (2000: 106). The term should be taken to imply no metaphysical commitment to dualism or physicalism. Even if we accept that all linguistic phenomena can be reduced to neural patterns, and can be given plausible physical explanations, then this

paper would point to the idea that there are emergent physical properties within the brain.

The idea that it could be physical properties that are emergent is not unheard of within the literature. Indeed, there is a lively tradition within the emergence literature looking at the fractional quantum hall effect, renormalisation groups, protein folding, and any other number of potential instances of physical emergence (see various papers in this issue for examples of this). It would be strange to insist that quantum field states, if they are emergent, are not physical. Thus, it could be that truth-evaluability is a physical emergent property. This is as compatible with the view as described here as an account that might invoke the mental/physical distinction.

Truth-evaluability, though, will have one feature that instances of emergence drawn from physics will not have. This is because whatever the ontological category of truth-evaluability is, the property occurs within the mind/brain. If the claims in this paper are correct, this makes the human mind an (the?) epicentre of emergent entities. I leave open here what consequences this has on broader debates such as those surrounding consciousness.

6.4 Animals, and Martian, truth-evaluability?

We might also question whether animals, or philosophically posited language-using aliens, might also have some form of cognition that has the property of being truth-evaluable. I am inclined to think that there is little empirical evidence in favour of animals having such abilities—we have no empirical idea about language-using aliens. However, even if they do, they might not possess the property via the same mechanisms as present in humans.

A similar point though holds for Martian languages. Alien and non-human languages may or may not have the property of truth-evaluability. But if they do, then I am willing to stipulate for the purposes

of this paper that truth-evaluability occurs via alternative routes.[8] In other words, I am limited here to discussing truth-evaluability and its status as seemingly ontologically emergent in human languages. If such a property is ontologically emergent in human languages, this is not to say that it is also emergent in other systems in which it occurs (if there are any). Evidence for any ontologically emergent property would be significant, and more so if found to be an aspect of human language given the potential impact on research into the human mind and consciousness. Thus, this caveat on the scope of the claim about to be made but in no way lessens the ultimate significance of the idea that language provides empirical evidence for the existence of an ontologically emergent property.

6.5 Truth conditions and logical supervenience

The last response that I wish to consider is that the truth-evaluability of a sentence is not an emergent property of the sentence; but it is, rather, in fact guaranteed with logical necessity by the meaning of the sentence. A way of fleshing this out then would be to say that a sentence is truth-evaluable if and only if it has a truth condition. We can then construct the following general principle: if a sentence S means that p, then S is true if and only if p.

However, the problem here is that this response has failed to disentangle truth and truth-evaluability fully. The correctness of this general principle has no bearing on the issue of truth-evaluability. For my discussion here, S may or may not be true, and hence p may or may

[8] Note that this says nothing about communication with Martians or with speakers of any alien language in the same way as we can communicate with animals despite it being plausible that they do not possess the capabilities for truth and truth-evaluability.

not be the case; irrespective of these issues we can ask why it is that S, and not other sentences, is truth-evaluable.

A somewhat connected view might say that we need not talk about truth conditions here. Instead, we can say that truth-evaluability is a result of sentential meaning. We could then hold that the meaning of a sentence is not an emergent property of the sentence, but rather is logically supervenient on mental and social facts about speakers. Thus, truth-evaluability cannot be emergent either.

In response, we must remember that amongst the mental or social facts would be the facts of grammar. As shown earlier, grammar is central to understanding whether a sentence is truth-evaluable or not—we cannot know from purely semantic or social facts whether a sentence is truth-evaluable, as, to be truth-evaluable, the sentence must have a particular grammatical structure. It is these linguistic properties that are relevant to truth-evaluability. Now, if truth-evaluability is emergent, then is correct to say that it does rely on some emergence base, where the emergent base is a particular level of grammatical complexity within a matrix clause.

My argument here has been that no addition to what I have taken to be the emergence base could explain the higher-level property of truth-evaluability (or at least that we have good reason to think that no addition could). When we want to see whether some property is emergent, we must consider the relevant properties. By this I mean the properties that might otherwise explain the existence of the higher-order property without the need to invoke emergence. I think the evidence discussed here shows that the relevant properties to truth-evaluability are certain grammatical properties, and that truth-evaluability is not explainable at the lower-level. Additional semantic or social facts about speakers are not relevant to whether a sentence is truth-evaluable (though they will be relevant to whether the sentence is true).

7. Conclusions and consequences for emergence

It only remains to say where I envisage this discussion leaves debates about emergence. There would seem to be two options:

i) Accept truth-evaluability as an empirically supported instance of ontological emergence.
ii) Reject that this shows that linguistic properties are emergent.

(i) is overstrong, and I doubt that anyone except perhaps those particularly disposed towards emergentism will want to accept a conclusion such as this. However, if we weaken it to the claim that linguistic properties prima facie appear to have a case for being instances of ontological emergence, then this is still a significant finding. Any further instance of emergence that can be appealed to is significant. We might think that emergence is mysterious if emergent phenomena only appear in a small number of places. The linguistic example is entirely novel, and is otherwise undiscussed within the literature. The reductionist must produce an argument against each putative instance of emergence—this paper indicates that the reductionist must also respond to linguistic examples.

(ii) would require new arguments as to why we should accept this conclusion. Importantly, these arguments would need to ensure that it was not simply an ad hoc addition to our definition of ontological emergence to rule it out. Truth-evaluability certainly seems to satisfy the metaphysical requirement upon emergent entities I outlined in section 2. It might be that we also need to provide a case for downward causation or influence in line with the causal thesis. If that is the reason for doubting the emergent status of truth-evaluability then it would appear

that this instance may still be as close as we have come to an example of emergence given that it appears to satisfy the metaphysical thesis.

It might instead be that we have doubts over the emergence of truth-evaluability given that it is a linguistic property. However, it is unclear how this would progress without potentially running contra empirical evidence from linguistics, or being an ad hoc addition stating that linguistic properties are not the sort of properties that could be emergent. Assuming here that it is not the place of philosophers to dictate to the science of linguistics as to the validity of their claims, I take it that the first route is not viable. The second is clearly as unattractive as all ad hoc claims are.

Alternatively, but along similar lines, my interpretation of the linguistic data might be doubted. This is a valid possibility, but, again, it would require real engagement with the linguistic data with respect to emergence. Given that the dialectical aim of this paper was as much as to suggest an overlooked source of empirical data relevant to the emergence literature as it was to defend the idea of truth-evaluability as emergent, I would take that engagement with the linguistic data as a significant step forward. I wish to remain neutral as to which option is best; minimally it seems that the emergence literature needs to begin to consider linguistics and language as a potential source of empirical data and research about the possibility of emergent phenomenon.

Department of Philosophy
Trinity College Dublin, Dublin, Republic of Ireland
Email: jamiller@tcd.ie

ACKNOWLEDGEMENTS

This research was made possible due to a research award from the Durham Emergence Project, funded by the John Templeton Foundation. I am grateful to all of the members of the Durham Emergence Project for their comments and helpful discussions during my time as a Research Fellow on the project, and the audience at the Towards a Science of Consciousness conference in Helsinki June 2015. Particular thanks to Alex Carruth, John Heil, Robin Hendry, Wolfram Hinzen, and a number of anonymous reviewers that all helped significantly improve this paper.

REFERENCES

Adger, D., 2003, *Core Syntax: A Minimalist Approach*, Oxford: Oxford University Press.

Boeckx, C., 2006, *Linguistic Minimalism: Origins, Concepts, Methods and Aims*, Oxford: Oxford University Press.

Boeckx, C., 2008, *Bare Syntax*, Oxford: Oxford University Press.

Boeckx, C., 2009, *Language in cognition: Uncovering mental structures and the rules behind them*, Malden: Wiley-Blackwell.

Bošković, Ž., and Lasnik, H. (eds), 2006, *Minimalist Syntax: The Essential Readings*, Malden, MA: Blackwell.

Carlson, G. N. *Reference to Kinds in English*. Garland Publishing, New York, 1980.

Carlson, G. N., and Pelletier, F. J. (eds.), 1995, *The Generic Book*, Chicago; London: Chicago University Press.

Chalmers, D.J., 2006, "Strong and Weak Emergence". In: Davies, P., & Clayton, P. (eds.), *The Re-Emergence of Emergence*, Oxford University Press.

Charlton, W., 2014, *Metaphysics and Grammar*, London: Bloomsbury.

Chomsky, N., 1986, *Barriers*, MIT Press.

Chomsky, N., 1995, *The Minimalist Program*, Cambridge, MA: The MIT Press.

Chomsky, N., 2000, *New Horizons in the Study of Language and Mind*, Cambridge: Cambridge University Press.

Chomsky, N., 2004, "Beyond explanatory adequacy". In: Belletti, A. (ed.), *The cartography of syntactic structures: Vol. 3 Structures and beyond*, Oxford: Oxford University Press.

Chomsky, N., 2005, 'Three Factors in Language Design', *Linguistic Inquiry*, 36(1): 1–22.

Cinque, G., and Rizzi, L., 2009, The Cartography of Syntactic Structures. In: Heine, B., and Narrog, H. (eds.), *The Oxford Handbook of Linguistic Analysis*, New York: Oxford University Press.

Di Sciullo, A.M., 2005, *Asymmetry in Morphology*, Cambridge, MA: MIT Press.

Ellis, N. C., 1998, "Emergentism, connectionism and language learning", *Language Learning*, 48/4: 631–64

Gallego, A., 2010, *Phase Theory*, Amsterdam: John Benjamins.

Hauser, M.D., Chomsky, N., & Fitch, W.T., 2002, "The Faculty of Language; What is it, Who has it, and How did it Evolve?", *Science* 298: 1569-1579.

Hinzen, W., 2009, "Hierarchy, Merge, and Truth". In: Piattelli-Palmarini, M., Uriagereka, J., & Salaburu, P. (eds.), *Of minds and language: A Dialogue with Noam Chomsky in the Basque Country*, Oxford: Oxford University Press.

Hinzen, W., 2013, "Naturalism pluralism about truth". In: Pedersen, N., & Wright, C. (eds.), *Truth and Pluralism*, New York: OUP.

Hinzen, W., 2014, "Recursion and truth". In: Roeper, T., & Speas, P. (eds.), *Recursion: Complexity in Cognition*, Studies in Theoretical Psycholinguistics 43, Dordrecht: Springer.

Jackson, F., Oppy, G., and Smith, M., 1994, "Minimalism and Truth Aptness", *Mind*, 103(411): 287-302.

Johnson, D. E., and Lappin, S., 1997, "A Critique of the Minimalist Program", *Linguistics and Philosophy,* 20, 273–333.

Johnson, D. E., and Lappin, S., 1999, *Local Constraints vs Economy,* Stanford: CSLI.

Kayne, R.S., 1994, *The Antisymmetry of Syntax. Linguistic Inquiry Monograph Twenty-Five,* Cambridge, MA: MIT Press.

Lasnik, H., Uriagereka, J., and Boeckx, B., 2005, *A Course in Minimalist Syntax*, Malden, MA: Blackwell

MacWhinney, B. (ed.), 1999, *The Emergence of Language*, Hillsdale, NJ: Erlbaum.

MacWhinney, B., 1998, "Models of the emergence of language", *Annual Review of Psychology*, 49: 199–227.

MacWhinney, B., 2001, "Emergentist approaches to language". In: J. Bybee and P. Hopper (eds), *Frequency and the Emergence of Linguistic Structure*, Amsterdam: Benjamins.

McLaughlin, B,. 1992, "The rise and fall of British emergentism". In: Beckermann, A., Flohr, H., & Kim, J. (eds.), *Emergence or Reduction? Essays on the Prospects for Non-Reductive Physicalism*, Berlin: Walter de Gruyter.F

Miller, J.T.M. and Hughes, T.J., 2014, "Lexicalisation and the Origin of the Human Mind", *Biosemiotics,* 7(1): 11-27.

Moravcsik, J.M.E., 1968, "Aristotle's Theory of Categories". In: Moravcsik, J.M.E. (ed.), *Aristotle: A Collection of Critical Essays*, Macmillan: London.

Pinker, S., 2003, "Language as an Adaptation to the Cognitive Niche". In: Christiansen, M., and Kirby, S. (eds.), *Language Evolution*, New York: Oxford University Press.

Radford, A., 2004, *Minimalist Syntax: Exploring the Structure of English*, Cambridge: Cambridge University Press.

Radford, A., 2004, *Minimalist Syntax: Exploring the Structure of English*, Cambridge, UK:Cambridge University Press.

Tallerman, M., 2007, "Did the Ancestors Speak a Holistic Protolanguage?", *Lingua*, 117(3): 579-604.

Tarski, A., 1944, "The Semantic Conception of Truth: and the Foundations of Semantics", *Philosophy and Phenomenological Research*, 4(3): 341-376.

Tattersall, I., 2004, "What Happened in the Origin of Human Consciousness", *The Anatomical Record, Part B New Anatomy*, 276B, 19-26.

Uriagereka, J., 1998, *Rhyme and Reason: An Introduction to Minimalist Syntax*, Cambridge, MA: MIT Press.

van Gulick, R., 2001, "Reduction, Emergence and Other Recent Options on the Mind/Body Problem: A Philosophic Overview", *Journal of Consciousness Studies,* 8 (9-10):1-34.

Yates, D., 2009, "Emergence, Downwards Causation and the Completeness of Physics", *Philosophical Quarterly*, 59 (234):110—131.