Indexical Color-Predicates:
Truth-Conditional Semantics vs. Truth-Conditional Pragmatics

Introduction

Truth-conditional semantics is the project of "determining a way of assigning truth-conditions to sentences based on A) the extension of their constituents and B) their syntactic mode of combination" (Rothschild and Segal, 2009). This research program has been subject to objections that take the form of *under-determination* arguments, an influential instance of which is presented by Travis:

> … consider the words 'The leaf is green', speaking of a given leaf, and its condition at a given time, used so as to mean what they do mean in English. How many distinct things might be said in words with all that true of them? Many. … Suppose a Japanese maple leaf, turned brown, was painted green for a decoration. In sorting leaves by colour, one might truly call this one green. In describing leaves to help identify their species, it might, for all the paint, be false to call it that. So words may have all the stipulated features while saying something true, but while also saying something false. (Travis, 1994, 171-2)

Travis describes two contexts, one in which we are sorting leaves by color and the other in which we are sorting leaves by species. In the two contexts factors A) and B) are the same. Yet the use of 'The leaf is green' in the decoration-sorting context is true, but the use of it in the species-sorting context is false. So, contrary to what is assumed by truth-conditional semantics, factors A) and B) under-determine the truth-conditions of utterances of 'The leaf is green.'

Such under-determination arguments are invoked by theorists who reject truth-conditional semantics in favor of *truth-conditional pragmatics*. The central idea of this alternative perspective is that information available in the context that is not semantically encoded by an uttered declarative sentence is relevant for determining the truth-conditions of the utterance.[1] But many defenders of truth-conditional semantics do not accept such arguments, and there are two principal strategies of response. First, the response of *semantic minimalism* is to reject the presumption that intuitive

judgments concerning the truth-conditions of *utterances* bear directly on the truth-conditions of the *sentences* uttered.[2] Minimalism thus responds to under-determination arguments by maintaining that the truth-value of the *sentence* uttered in two contexts does not vary, rather what varies is only the truth-values of the *speech acts* performed. Thus according to minimalism, supposing that such under-determination arguments pose a threat to truth-conditional semantics is confusing semantic sentence-content and pragmatic speaker-content. And second, the response of *indexicalism* is to analyze some constituent expression of the sentence uttered in two contexts as being indexical.[3] So, under an indexicalist response, the fact that utterances of 'The leaf is green' can have different truth-values in different contexts is no more troubling for truth-conditional semantics than is the fact that two utterances of 'Today is Tuesday' can have different truth-values on different days. Indexicalism thus differs from both truth-conditional pragmatics and minimalism in that indexicalism rejects the claim that the judgments of truth-conditions elicited in under-determination arguments must be explained pragmatically. Rather, by extending the class of indexical expressions the indexicalist hopes to increase the explanatory range of truth-conditional semantics so that it encompasses such judgments of truth-conditions.[4]

My purpose here is to criticize several indexicalist proposals that analyze color-adjectives, e.g. 'green', appearing in color predicates, e.g. 'is green', as being, or otherwise involving, some sort of indexical expression, and to present some empirical evidence suggesting that color-adjectives are not indexicals.[5] In what follows I first clarify the theoretical issue that divides truth-conditional semantics and truth-conditional pragmatics, and explain the indexicalist strategy relative to this fundamental disagreement. Second, I consider the *hidden-variable* version of indexicalism for color-adjectives proposed by Szabó (2001). I argue that this version of indexicalism is both

too strong, because it over-generates interpretations of sentences, and too weak, because it does not provide an explanation of judgments made manifest in under-determination arguments involving color-predicates. Third, I motivate Rothschild and Segal's (2009) complex *overt-indexical* proposal by presenting problems for a more simplistic overt-indexical analysis, but then I argue that Rothschild and Segal's more complex proposal fails because under it so-called "indexical predicates" are not really indexical expressions. Finally, fourth, I present empirical evidence which suggests that color-adjectives are semantically contextually-invariant.

1. Truth-Conditional Semantics, Truth-Conditional Pragmatics and Indexicalism

Semantics concerns knowledge of the meanings of lexical items and how the meanings of grammatical combinations of lexical items, including sentences, depend upon the meanings of their structure and constituents. Semantics thus concerns knowledge of expression *types* that competent speakers bring to particular contexts of language use. In contrast, *pragmatics* concerns application of such semantic knowledge in a particular context in the process of linguistic communication. Thus pragmatics involves a combination of semantic knowledge together with other sorts of knowledge and abilities, including perception, "mind-reading," general encyclopedic knowledge, and whatever else competent speakers utilize to interpret one-another. This much, perhaps only in virtue of its imprecision, is common-ground between truth-conditional semantics and truth-conditional pragmatics. What divides them is the question of where the notion of *truth*, or *truth-conditions*, belongs.

The fundamental idea of truth-conditional semantics, as the name suggests, is that semantic knowledge suffices for the determination of the truth-conditions of sentences. So, for example, Larson and Segal (1995) maintain that "semantics is the study of linguistic meaning" (1995, 1) and "the property of being true or false depends

on two things: what the sentences means, and how things are in the extralinguistic world" (1995, 5). According to truth-conditional semantics then, a competent interpreter's ability to grasp the truth-conditions expressed by a declarative utterance is explained solely by her knowledge of the meanings of words in the sentence, and how such meanings are combined, in accord with the syntactic structure of the sentence. This fundamental idea of truth-conditional semantics is encapsulated in what Larson and Segal (1995) call "hypothesis T." Where (T) is the familiar Tarski-schema,

> (T) S is true if and only if *p*. (1995, 25)

Larson and Segal propose

> ***The T hypothesis*** A speaker's knowledge of meaning for a language *L* is knowledge of a deductive system (i.e. a system of axioms and production rules) proving theorems of the form of (T) that are interpretive for sentences of *L*. (1995, 33).

Though truth-conditional semantics is strictly a view about *what* knowledge suffices for understanding the truth-conditions expressed by utterances of declarative sentences, its defenders often take it to imply a view concerning the *cognitive architecture* of competent language users. In the following passage Borg summarizes the connection between a *modular* conception of semantic knowledge and truth-conditional semantics:

> The truth-conditional semantic theory is governed, not by rich non-demonstrative inferential processes, but rather by formally triggered, deductive operations. So, from the start this looks good for someone who wants to see linguistic understanding as the result of processing in some distinct, compartmentalized language faculty, governed by computational processes and appealing to something less than the full range of information possessed by the agent. … Formal semantics and modularity about linguistic understanding seem to be a match made in heaven (2004, 8).

The same conception of cognitive architecture is endorsed by Larson and Segal (1995), who maintain that knowledge sufficient for understanding the truth-conditions expressed by declarative utterances is encapsulated in a "semantic module" which

"contains specifications of meanings for the simplest expressions of the language and rules for deducing the meanings of complex expressions on the basis of the meanings of their parts and the structural configuration in which they occur" (1995, 22).

In contrast to truth-conditional semantics, truth-conditional pragmatics maintains that "it is not sentences but assertions that are true or false. That is, speakers say what is true or false by using sentences in some conversational context" (Bezuidenhout, 2002, 105). Thus, according to truth-conditional pragmatics, it is particular *speech acts* performed by using declarative sentences for particular purposes that express truth-conditions. Thus truth-conditional pragmatics denies that knowledge of only linguistic meanings and syntactic structure suffices for grasp of the truth-conditions of declarative utterances. This semantic under-determination of truth-conditions, or of *what is said*, is what Travis takes to be the general lesson of the argument cited above:

> … grasping what it is that is said in given words requires, over and above knowing what they mean, and what they refer to, an adequate appreciation of the effects … which their surrounding had. … I … call this a suitable sensitivity to surroundings. That now emerges as an extra capacity, beyond knowledge of meaning and referents – beyond e.g. knowing what green is, and which leaf is in question – on which understanding what is said inescapably depends. (1994, 176-7)

Note that nothing in the above citation suggests that knowledge of *meaning* is not encapsulated in a cognitive module. Though I will not attempt to explain Travis's notion of "sensitivity to surroundings," there is no doubt that this involves precisely the sorts of context-dependent "rich non-demonstrative inferential processes" (Borg, 2004, 8) that are *not* plausibly contained in a semantic module. But Travis is very clear that this "sensitivity to surroundings," which he claims is required for grasp of truth-conditional "what is said" content, is a capacity "over and above" knowledge of meaning. So, while there is nothing in the passage suggesting that *knowledge of meaning* is not encapsulated in a cognitive module, it does imply that the ability to

grasp *truth-conditional content* requires more than what can be encapsulated in such a module. The issue that divides truth-conditional semantics and truth-conditional pragmatics is thus *not* whether a competent language user's *semantic* competence, her knowledge of *meaning*, can be encapsulated in a cognitive module. We may take that much as agreed upon.[6] Rather, the issue that divides them is whether or not *all* of the knowledge required for grasp of the *truth-conditional content* of declarative utterances is of the sort that could be encapsulated in a semantic module.[7]

Matters are complicated by the fact that grasping the truth-conditional content expressed by *some* declarative utterances obviously requires extra-semantic, pragmatically provided, information that is clearly not contained in a semantic module; in terms of Larson and Segal's statement of the fundamental motivation of truth-conditional semantics, the "T hypothesis" is obviously false. This is because natural languages include indexical expressions – 'I', 'that', 'she', 'today', tensed verbs, etc. – and thus it is obviously false that *linguistic meaning* together with a mode of combination supplied by syntax determines the truth-conditions of every *sentence*. The point is familiar, and so I will not belabor it here. Rather, here I am concerned to explain how it is that truth-conditional semantics, whose motivation is hypothesis T, continues as the dominate perspective in philosophy of language and semantics, given that hypothesis T is obviously false. What does the proponent of truth-conditional semantics do about this "very large fly in the ointment" (Davidson, 1967, p. 33 in Davidson 1984)?

The fundamental idea, sketched by Davidson (1967) and further developed by Kaplan (1989), involves two concessive steps. The first step is to maintain, what is surely correct, that it is an aspect of the *meanings*, the *semantic features*, of such indexical expressions that they have "variable references" and thus "can pick out a

certain object on one occasion of use and certain other object on another occasion" (Larson and Segal, 1995, 198). Since it is part of the *meanings* of indexicals that they have "variable reference," the fact that the semantic features of a sentence such as 'I am here' are not themselves sufficient for the derivation of an interpretive T-theorem, though it may violate the letter of the T hypothesis, does not violate the spirit of truth-conditional semantics. That is, defenders of truth-conditional semantics concede that the existence of indexical expressions strictly speaking undermines the claim that knowledge of meaning and syntactic mode-of-combination alone determine truth-conditions, but they still defend the weaker claim that semantic knowledge, together with additional pragmatically provided information *that semantic knowledge specifies as necessary*, is sufficient to determine truth conditions. As Larson and Segal (1995) put it, even sentences containing indexical expressions have "fully determinate semantic features" that "constitute a sort of recipe that allows us to calculate the truth conditions of a propitious utterance once we know the relevant details of the context" (1995, 219). Following Kaplan (1989), I will refer to such "recipes" as *characters*, and following Recanati, (2004,7) I will say that characters require *contextual saturation*.

The second concessive step consists of a technique for incorporating characters into truth-theoretic semantic theory. There are various ways this can be done, but the essential idea is that "the presence of variable-reference terms shows that we cannot assign values to expressions simpliciter; rather, we must assign them *with respect to a context of use or a context of utterance*" (Larson and Segal, 1995, 199). The technique implemented by Larson and Segal (1995) and endorsed in Rothschild and Segal (2009) involves conditionalized T-theorems:

> The basic idea is that the context-independent semantics provides the means to prove a T-theorem, given information about the extensions of expressions in specific contexts. Very roughly, the idea for, say, 'that is remarkable' is that the

context-independent semantics allows for one to derive a conditional along the lines of **D**:

> **(D)** If *u* is an utterance 'that is remarkable' and the speaker uses 'that' in *u* to refer to *x*, *u* is true iff *x* satisfies 'is remarkable' (2009, 471).

So, semantic knowledge of the *character* of 'that' provides knowledge of conditionals such as (D). In virtue of having purely semantic knowledge of (D), an interpreter knows that determining the truth-conditions of an utterance of 'that is remarkable' requires having non-semantic knowledge concerning what the speaker is referring to by using 'that'. And once the semantically required yet pragmatically provided information is gathered from the context, the character can be saturated and the antecedent of (D) can be detached; and what is expressed by the consequent has the form of a traditional T-theorem, expressing the truth-conditions of the utterance. This interaction between pure semantic knowledge, contained in the semantic module, and other sources of information to determine truth-conditional content is described by Larson and Segal as follows:

> … deductions … determining the truth conditions of particular utterances must be viewed as a joint cognitive enterprise. The semantics module provides [context]-relative axioms… . Other modules provide the extra semantic information about what sentence has been uttered and what objects have been referred to in the process. (1995, 210).

So, it is conceded that the semantic module alone is insufficient to derive truth-conditions; rather it is only this semantic knowledge "given information about the extensions of expressions in specific contexts" (2009, 471) that determines truth-conditions. This concession, however, is not a repudiation of truth-conditional semantics because the knowledge that such non-semantic information is required to determine truth-conditions is itself *semantic* knowledge, deriving from knowledge of the character of 'that'. Larson and Segal make explicit that on their view it is "knowledge about pronouns and demonstratives [that] gives speakers the ability to take

an utterance even in which various objects are demonstrated and referred to and to infer from it the truth-conditions of that utterance" (1995, 207). So, though it is acknowledged that semantic knowledge of "specifications of meaning for the simplest expressions … and rules for deducing the meanings of complex expressions on the basis of the meanings of their parts and the structural configuration in which they occur" (1995, 22) is insufficient to determine truth-conditions, it is nonetheless still maintained that such semantic knowledge together with pragmatically provided information *which such semantic knowledge itself specifies as required* is sufficient to determine truth-conditions.

And now the issue dividing truth-conditional semantics and truth-conditional pragmatics, as well as the indexicalist response to under-determination arguments, can be stated more precisely. Truth-conditional semantics maintains that all truth-conditional variability of sentences is a result of the presence of indexical expressions in those sentences. Thus, though mere semantic knowledge alone is not sufficient to determine the truth-conditions of utterances of such sentences, pure semantic knowledge together with pragmatically provided information that is specified as required by the characters of such expressions does suffice to determine truth-conditions. And hence the indexicalist response to under-determination arguments is to maintain that the truth-conditional variability manifested in such arguments is explained by the presence of some indexical expression in the sentence, an expression whose character specifies what information must be pragmatically provided to determine extension, and thus truth-conditions. In contrast, truth-conditional pragmatics maintains that the truth-conditional variability of some sentences is not explained by the presence of some such indexical expression.

2. Hidden-Variable Color-Predicates

Szabó's hidden-variable approach to color-predicates is based upon two related principles: first, "Contextual incompleteness in adjectives has different dimensions" (2001, 136), and second that "different dimensions of incompleteness correspond to different sorts of variables in the logical form." (2001, 136). So, to provide an analysis of, e.g., 'green' the first task is to identify the dimensions of "contextual incompleteness," and the second is to posit variables corresponding to these dimensions in the logical forms of sentences containing 'green'.[8] Thus, Szabó identifies two dimensions of contextual incompleteness: first, "'Green' is … a scalar adjective" (2001, 137), whose extension relative to some context depends upon which comparison class is contextually salient. And second, Szabó maintains that "An object is green if some contextually specifiable (and presumably sufficiently large) *part* of it is green" (2001, 138). And then Szabó posits two hidden variables, one for the "comparison class" dimension, and the other for the "contextually specifiable … part" dimension. And, thus Szabó concludes that "the logical form of 'green' is '(green(C,P))(x)' where 'C' is a [variable] standing for a comparison class and 'P' is a variable standing for a certain part of the object" (2001, 138). Finally, Szabó applies this indexicalist analysis to Travis's under-determination argument: "the context-dependency that appears in Travis's example is a relatively easily characterizable kind: it is a matter of different contextually specified values for the variable 'P'" (2001, 138). Thus, the truth-conditional variability manifested in Travis' argument is to be explained by the (aphonic) indexical 'P' being contextually saturated by different parts of the leaf in the two contexts.

I will here present two problems for Szabó's hidden-variable approach, though the second is more serious than the first. The first problem is that the approach seems to make incorrect predictions concerning the behavior of color-adjectives with regard to

quantification and binding. Since this sort of objection is developed in some detail by others (Rothschild and Segal, 2009), and because the objection depends upon at least questionable assumptions about logical form, I will here present only an outline of the problematic phenomena. If, e.g., 'green', somehow brings with it *variables* that are present in the logical forms of sentences containing 'is green', then one would expect there to be syntactic evidence of such variables. In particular, one would expect such variables to be bound by suitable quantifiers.[9] The problem is such binding does not seem to occur.

According to Szabó's analysis 'is green' is, at logical form, relevantly similar to, 'is appreciative of him': where the latter predicate has the pronoun 'him', the former predicate has the variable 'P'. (For simplicity I will ignore the comparison-class variable 'C'.) Hence, though the assumption is questionable, it is reasonable to expect that the variable 'P' alleged to be present in 'is green' can be bound in roughly the same way that the pronoun 'him' appearing in 'is appreciative of him' can be bound. That is,

(1) Every man belongs to a club that is appreciative of him.

can be given a bound reading, which can be represented by,

(1′) [every man$_1$] [belongs to a club that is appreciative of him$_1$]

So, given the alleged similarity of the predicates, one would expect that

(2) Every part belongs to a leaf that is green.

can also receive a bound reading, represented by,

(2′) [every part$_1$] [belongs to a leaf that is green(P_1)]

But (2) does not admit of such a bound reading. Let us assume for simplicity that there is only one leaf, and that the domain of 'every part' is restricted to all the parts of this leaf. Under these simplifying assumptions, the bound reading of (2) would require not only (a) that the leaf is green, but moreover (b) that every part of the leaf is green. But

under no reading of (2) is (b) required: Suppose that the leaf is green on its outer-surface, but red inside and that we are in a context (an art class, say) where being this way suffices to satisfy 'is green'. In such a context an assertion of (2) would be judged true – the leaf counts as green, and all the parts in the domain of quantification are parts of this leaf. But the bound reading predicted by Szabó's hidden-variable analysis would be false, since not all the parts of the leaf are green – the inside parts are red.

Though the absence of bound readings for sentences such as (2) does raise a problem for a hidden-variable account, the objection depends upon a number of syntactic and lexical assumptions which might be denied. In particular, it is open to Szabó to deny that the so-called variables 'P' and 'C' are really *variables* that can be bound; perhaps they are more like aphonic "pure indexicals" – such as 'I' and 'now' – which resist binding.[10] Or perhaps the location of the variables in logical form somehow makes them inaccessible to nominal quantifiers.[11] Or perhaps Szabó could claim that in a context where we are concerned only with the surface-color of the leaf, the domain of the domain of 'every part' cannot include inner, non-green, parts. If the domain of quantification had to be further restricted in this way, the objection would not go through, since the bound reading (2′) would now (also) be true.[12] Though these responses are somewhat *ad hoc*, they cannot be ruled out *a priori*. The second problem I will raise, however, does not depend upon questionable theoretical assumptions, and thus it constitutes a more compelling case against the hidden-variable approach.

The second problem is that there is not a *predetermined* fact of the matter as to how many dimensions of "contextual incompleteness" are associated with color-adjectives. Szabó claims that Travis's argument can be undermined by appeal to variation along the part-dimension that is semantically encoded in the (aphonic) reference-variable expression 'P'. And he is also surely correct that other under-

determination arguments involving color-predicates could be constructed where the intuitive "contextual incompleteness" involved differing comparison classes; and thus (aphonic) reference-variable expression 'C' will also be required to defend truth-conditional semantics. But these are not the only dimensions along which one might find "contextual incompleteness." Szabó considers, but then rejects, the proposal that 'green' is an "evaluative adjective" whose extension might vary relative to different contextually provided *judges*: "it is incorrect to say that a leaf is green *for me*" (2001, 137). But this does not accord with pre-theoretic intuition; in appropriate contexts we have no trouble understanding such perceiver-relative ascriptions of color. It is a trivial exercise to construct an under-determination argument wherein the intuitive "contextual incompleteness" depends upon a variation in judges.

Suppose we are psychologists studying color-blindness, and each week is devoted to studying a particular subject. During the first week we are studying subject-#1. He is shown various swatches, and when one looks green to him he responds affirmatively. During this first week, we adopt our use of 'green' to match subject-#1's perceptual judgments; so, during the first week, a swatch counts as green iff it is green *for subject-#1*. The following week we are studying a different subject, subject-#2, and during this second week we adopt our use of 'green' to match her perceptual judgments. And of course it might happen that a particular swatch, swatch-27 say, is green for subject-#1, but not for subject-#2. And thus uses of 'Swatch-27 is green' might count as true during the first week, but not during the second week, and the intuitive dimension of "contextual incompleteness" concerns the judge. So, Szabó's second principle compels us to add another hidden variable. And thus the proposed logical form is now '(green(C, P, J))(x)', where 'J' is a variable standing for a judge.

But of course one can imagine situations in which other dimensions give rise to intuitive contextual incompleteness: Suppose there is a variety of flower that is green until the humidity drops below a certain point, at which point it turns blue. So, whether or not this species of flower counts as green might vary depending upon what level of humidity is taken to be relevant, and thus we apparently need to posit a hidden *humidity* variable as well. (And note that just as he relevant judge need not be the speaker, so the relevant level of humidity need not the humidity in the context of utterance.) Or perhaps there is a kind of fluid that changes color depending the temperature, or time of day, or distance from the equator, etc. The point of such gruesome cases is that the dimensions along which one might find intuitive contextual incompleteness are not fixed beforehand in the meaning of 'green'. The various intuitive dimensions of contextual incompleteness are not *discovered* by way of imagining under-determination arguments; rather the dimensions are *created* through the process of understanding the uses to which predicates are put in such arguments.

Appreciation of the ease with which under-determination arguments can be constructed evidences that there are two sorts of context-sensitivity at play: First, there is the context-sensitivity that is revealed *within* each under-determination argument. This *intra*-dimensional context sensitivity involves two utterances that intuitively invoke *distinct values* along *the same dimension* of intuitive contextual incompleteness. But there is also, second, context-sensitivity that is revealed *among* different under-determination arguments. This *inter*-dimensional context-sensitivity involves two *pairs of utterances* that intuitively invoke various values along *distinct dimensions* of intuitive contextual incompleteness. So, for example, comparing our intuitions concerning the two utterances of 'the leaf is green' that occur within Travis's argument reveals intuitive difference along the *part-of-object* dimension. In contrast, comparing our intuitions

concerning *the pair of utterances* in Travis's argument with our intuitions concerning *the pair of utterances* in the color-blindness argument reveals an intuitive difference between the *dimensions* of contextual incompleteness that are relevant in the two arguments: in the former argument the relevant dimension is the *part-of-object* dimension, whereas in the latter argument the relevant dimension is the *judge* dimension. My second objection against Szabó's hidden-variable account is that it has no explanation of *inter*-dimensional context-sensitivity. The account provides a framework for a *semantic* explanation of why, *within* Travis's argument we intuit that the two utterances of 'the leaf is green' have distinct truth conditions, but it provides no explanation as to why *among* different under-determination arguments *different dimensions* of context incompleteness are relevant.

Why could the indexicalist not then posit *just one* hidden-variable corresponding to a sort of meta-dimension, a dimension along which various dimensions of contextual incompleteness can be fixed as values? Kennedy and McNally (forthcoming, 16) seem to propose such an analysis. They analyze the content of the (nongradeable[13]) adjective 'green' as

(24) $T(\text{green}_{\text{A}}{}^{nongr}) = \lambda x.P_i(x) \wedge \mathbf{cor}(P_i, \mathbf{green})$

where **green** is the denotation of the *nominal* 'green' and P_i is some property that is picked-out in the context *i*. So, according to this analysis, to predicate 'is green' of an object *x* in context *i* is to assert both that *x* has property P_i *and* that P_i is *correlated* in some way with the color **green**. For example, when the psychologist utters 'Swatch-27 is green' during the first week, she is asserting that swatch-27 received an affirmative response from subject-#1 *and* that having received an affirmative response from subject-#1 is *correlated* with **green**.

Kennedy and McNally present the analysis in (24) as providing the truth-conditional content contributed by a use of 'is green'; they say, "the 'classification by color' meaning that (24) is designed to represent is an aspect of the truth conditions that remains constant no matter how we fix the value of P_i" (forthcoming, 16). But (24), understood as an analysis of the *truth-conditional content* of a use of 'is green', is problematic. It is plausible that, e.g., a felicitous use of 'is green' to communicate that an object has some property P_i that is only remotely related to the color **green** requires some mutually understood correlation between P_i and **green**. But it does not follow that this correlation must be included in the *truth-conditional content* of such a use. Suppose we are picking mushrooms and we have read in our field-guide that while brown and white mushrooms are edible, green mushrooms are deadly poisonous. You bend down to pick a mushroom, and I cry 'Don't! It's green!' Applying the analysis of (24) to this case yields the following: P_i is the property *being poisonous*, and the required correlation between this property and **green** is the information provided by the field-guide, that mushrooms that are instances of **green** are poisonous. So, according to (24), in uttering 'It's green' I assert that the mushroom is poisonous *and also* that the correlation obtains. But in uttering 'It's green', and thereby asserting that the mushroom is poisonous, did I also *assert* that the correlation obtains? Granted, I could not have used 'It's green' to assert that the mushroom is poisonous if the correlation were not mutually understood to obtain; but is the proposition that the correlation obtains part of the truth-conditional content of my assertion?

There is compelling reason to think that it is not. Suppose that though we mutually understand the correlation described by the field-guide to obtain, in fact the guide is totally wrong, and there is no correlation whatsoever between the color of mushrooms and their being poisonous. Further suppose that despite the absence of

correlation, the mushroom in question both instantiates **green** and is poisonous. Under these suppositions, (24) predicts that my assertion is *false*: the mushroom does have property P_i (i.e. *being poisonous*) but the proposition that the correlation obtains is false, so the conjunction is false. But this does not seem to be the right prediction. There is some inclination to say that my utterance is *true*: after all, I predicate 'is green' of an object that instantiates **green**, and thereby succeed in communicating that the object is poisonous, which is also true. So how could my utterance be *false*? Despite this inclination to say that my utterance is true, however, it is even more appropriate to say that it is *infelicitous*; this case is roughly analogous to an utterance of 'He is English, and therefore brave' made of an Englishman who happens to be brave. Though here is not the place to explore the details, the general idea is clear enough: the sentence can be used felicitously only if *being English* appropriately correlates with *being brave*. And similarly, my utterance of 'That one is green' used to assert that the mushroom is poisonous is *felicitous* only if *being poisonous* appropriately correlates with **green**.

So it would be a mistake for the indexicalist to claim that (24) provides the *truth-conditional content* of a use of 'green'. It is much more plausible to treat (24) as providing the *meaning*, the character, of 'green': just as the character of 'I' is a rule for determining the content of a particular use of 'I' in a particular context, so Kennedy and McNally should maintain that (24) provides a rule for determining the content of a use of 'green' in a particular context. Understood in this way, (24) expresses a rule according to which a use of 'green' denotes a property that is in some way conversationally relevant and is also correlated, in some relevant way, with **green**.[14] Whatever property P_i is determined by following that rule in context *i* is the *content* of

'green' in i.[15] (And if no such property P_i is determined by following the rule, the utterance is infelicitous.)

Now in my view 'green' does not have anything like a *character* as its meaning, and thus I do not think that (24) expresses such a character. But here I have been concerned to show only that Kennedy and McNally's analysis, which seems to involve a hidden-variable 'P_i' ranging over dimensions, is more plausible if it is understood as a proposal concerning the *character*, as opposed to the *content*, of color-adjectives. That is, Kennedy and McNally's proposal is more plausible if it is viewed as a version the *overt-indexical* approach according to which, e.g., 'green' is *itself* an indexical expression, a word that has different contents in different contexts in the same way that 'I' has different contents in different contexts. Demonstrating that such an overt-indexical analysis is also untenable is the task of the following section.

3. Overt-Indexical Color-Predicates

Segal and Rothschild (2009) claim to endorse such an overt approach to indexical predicates. They claim, "Our analysis … treats 'red' itself as a simple indexical, like 'I' or 'that'. There are no variables associated with 'red'. It's just a word that happens to change extension across contexts" (2009, 470). Given this characterization of their analysis, one would expect the proposal for 'red' to be very similar to the proposal for, e.g., 'that', the essence of which is expressed in the conditionalized T-theorem (D), cited above. That is, if 'red' is "a simple indexical" like 'that' and (D) provides an analysis of 'that is remarkable', then one would expect the analyses of 'Kebles College is red' to be something like,

> (R) If u is an utterance of 'Kebles college is red' and the speaker uses 'red' in u to designate extension E, u is true iff Kebles College is an element of E.[16]

The analysis of 'red' provided by (R) is analogous to the analysis of 'that' provided by (D), but there are compelling reasons to think that nothing like (R) provides a plausible

analysis of 'red'. Indeed, the analysis of 'red' provided by (R) is implausible *because* (R) is analogous to (D), yet 'red' does not behave like an indexical such as 'that'.

The general form of the point is familiar from the recent debates between indexicalism and semantic relativism. For example, in the following passage MacFarlane (2007) objects against an indexicalist analysis of predicates of personal taste such as 'delicious':

> [indexicalism] has obvious appeal. It explains how the truth of the claims at issue can depend both on how things are with their explicit subject-matter (say, apples) and on how things are with a subject or subjects who is not explicitly mentioned. And it does so in a perfectly straightforward way, invoking semantic mechanisms that are already needed to handle the more familiar kinds of context sensitivity exhibited by indexicals and demonstratives … But the [indexicalist] solution has a price. If in saying "apples are delicious" I am saying that they taste good *to me*, while in saying "apples are not delicious" you are denying that they taste good *to you*, then we are no more disagreeing with each other than we would be if I were to say "My name is John" and you were to say "My name is not John." Intuitively, though, it does seem that we are disagreeing. We certainly take ourselves to be disagreeing. I may say, "Wrong!" or "That's false" – neither of which would be appropriate if you had said explicitly that apples taste good to you. (2007, 3)

MacFarlane is here objecting to an indexicalist analysis of 'delicious' but an analogous objection can be raised against the analysis of 'red' provided by (R): this analysis allows different uses of 'red' in the same conversation to vary in extension depending upon the speaker's intentions and other context-based factors, in the same way that different uses of 'my' or 'that' in the same conversation vary in extension depending upon such factors. Thus, the analysis of 'red' provided by (R) would allow for exchanges such as (5), just as the analysis of 'that' provided by (D) allows for exchanges such as (3):

(3a) John: That is an oak tree.
(3b) Mary: Yeah, but that is not an oak tree.

(4a) John: Apples are delicious.
(4b) Mary: Yeah, but they are not delicious. (??)

(5a) John: Apples are red.

(5b) Mary: Yeah, but they are not red. (??)

Competent speakers do use 'that' in the way displayed by exchange (3); there is nothing odd about the speaker of (3b) accepting the previous assertion of '*That* is an oak tree' and then asserting the negation of this very sentence, because, utilizing their mutual knowledge of the character of 'that', the two speakers can, perhaps after pointing and otherwise manipulating factors of the context specified by the character, use 'that' to refer to different things. Anyone with knowledge of the meaning of 'that' must know that such divergent uses are possible, and possible within the same conversation. In contrast, speakers do not use 'red' in this way. Exchanges such as (5) are not allowed by the *meaning* of 'red'; the speaker of (5b) cannot, merely by having and making manifest appropriate referential intentions, assert the negation of the very sentence asserted in (5a) without contradicting what was asserted in (5a). And this too is a matter of the semantics of 'red'; the *meaning* of 'red' is not a character, a "sort of recipe that allows us to calculate" extensions, based upon the referential intentions of the speaker or other context-based factors.[17]

A related phenomenon concerns the intuitive validity of arguments mutually formed by two or more speakers. So, for example, competent speakers are hesitant to judge John's inference in the following sort of exchange to be valid:

(6a) John: If that's North, we're headed the right direction.
(6b) Mary: But wait, that's North.
(6c) John: OK. So, we're headed the right direction. (??)

But competent speakers exhibit no such hesitation with regard to parallel exchanges utilizing 'red':

(7a) John: If Keble College is red, then it's made of brick.
(7b) Mary: But wait, Keble College is red.
(7c) John: OK. So, it's made of brick.

The analysis of 'that' provided by (D) predicts and explains the intuitions of validity exhibited by (6): every competent speaker knows that the character 'that' allows for the referent of a use of the term to be fixed, at least in part, by the intentions of the speaker, and so competent speakers are hesitant to judge John's inference in (6) valid; they know it is semantically possible that John and Mary are using 'that' to refer to different directions. But (R) falsely predicts that competent speakers will exhibit an analogous hesitation with regard to (7), which again implies that 'red' is not context-sensitive in the way that 'that' is context-sensitive.[18]

Though under-determination arguments involving color-predicates demonstrate that there is a sense in which they are context-sensitive, the meaning of, e.g., 'red' seems to be much different than the meaning of, e.g., 'that'. It is this difference that (apparently[19]) motivates Rothschild and Segal to provide a indexicalist analysis of 'red' that is more complex than the analysis provided by (R). The essence of their more complex analysis is presented in the following citation:

> Our theory requires a rather complicated metaphysics of language. We group together all the tokens of an expression that occur within a given context: so, for example, if the customer says to the greengrocer 'is that a red one?' and the green grocer says 'yes, it is a red one', we group together those two tokens of 'red'. We treat the tokens of an indexical predicate that occur within the same contexts as tokens of a single syntactic type. No token of that type can occur in another context. We indicate the syntactic type by indexing. Thus all tokens of 'red' that occur in a given context receive the same index, as in 'red_j'. We will use numbers to keep these context-bound expressions in line: thus all the 'red_j's occur in the *j*-th context. The context-bound expression types are subtypes of larger types, such as the one that includes all the 'red_j's, 'red_k's, etc. We can think of this larger type as context-independent and possessed of a context-independent semantics. Its semantics, intuitively speaking, is given by a function from contexts to extensions. The semantics for each context bound 'red_j' is the extension it receives relative to its context. This extension is determined by the conversational standards of the context: an object satisfies a token of 'red_j' in a context, if it counts as red by the standards of that context. (2009, 471-2).

The proposal is then formalized in terms of a T-theory as follows (where 'n' ranges over *numerals*, and each numeral is mapped to a context, so that 'c_n' can be read as "context n"):

(1) (x)(n) (x satisfies 'Keble College', c_n iff x = Keble College)
(2) (x)(n) (x satisfies 'is red'⌢n, c_n iff x is $red_@$ by the standards of c_n)[20]
(3) (S)(NP)(VP) (If S = NP⌢VP, then
((n) (S is true, c_n iff (x)(x satisfies NP, c_n and x satisfies VP, c_n))
(4) (u)(n)(S) (if u is an utterance of S in c_n, then (u is true iff S is true, c_n))

Some remarks of clarification concerning these axioms: (1)-(3) define the satisfaction and truth of expression types relative to contexts, whereas (4) presents a non-relative definition of truth for *utterances* in terms of the relative notion of truth for sentence types. The crucial axiom is (2). Note, first, that (2) defines satisfaction for a particular predicate type only relative to the *unique* context in which tokens of this type exist; so, for example, the satisfaction conditions of 'is red_6' are defined *only* relative to context 6. This reflects the complex metaphysics according to which "tokens of an indexical predicate that occur within the same contexts [are identified] as tokens of a single syntactic type. No token of that type can occur in another context" (2009, 471). Second, context @ is *this* context, the context in which the axioms are presented and interpreted; Rothschild and Segal refer to this context as the "academic" and/or "general" context. Thus it is '$red_@$' that we theorists use when we utter sentences such as 'The watermelon is *red* by the standards of the greengrocer's context'. But of course the greengrocer is no philosopher, and thus he uses some other color-adjective to describe the watermelon. (For example, if the greengrocer's context is context 5, then he uses 'red_5'.) Finally, note that, as one would expect with a *semantic* analysis of indexicals, absent *pragmatic* knowledge concerning the context in which a particular utterance of 'is red' occurs, no truth-conditions can be derived from the axioms. Let us evaluate an utterance u* of 'Keble College is red' that takes place in an arbitrary context

j* about which we lack relevant pragmatic knowledge. The semantic axioms (1)-(4) enable us to derive

(T_{j*}) u* is true iff Keble College is $red_{@}$ by the standards of c_{j*}

but absent relevant pragmatic knowledge concerning context j*, we have no idea what the RHS amounts to – we know that the sentence is true relative to j* iff Keble College is $red_{@}$ by some standard or other, but we have no idea what that standard is. This is analogous to having the semantic knowledge that an arbitrary utterance of 'That is remarkable' is true iff the referent of the sub-utterance of 'that' is remarkable, without having the pragmatic knowledge of what is referred to by this sub-utterance.[21] Similar to the relationship (D) bears to utterances of 'That is remarkable', axioms (1)-(4) enable one to derive statements of the truth-conditions of utterances of 'Keble College is red' only if supplemented by pragmatic information concerning particular contexts of utterance.

I grant that axioms (1)-(4) constitute a T-theory that, when supplemented with sufficient pragmatic information, enable one to derive interpretive T-theorems for utterances of 'Keble College is red'. My objection to Rothschild and Segal's analysis is not that it will deliver intuitively incorrect truth-conditions. Rather my objection is that the analysis is not an instance of *indexicalism*: the acknowledged truth-conditional variability of, e.g., 'Keble College is red' cannot be a result of a *character* of 'red' that specifies what pragmatically provided information is required to determine truth-conditions. On Rothschild and Segal's analysis the linguistic meaning of 'red' is nothing like a *character*.

A necessary condition for 'red' to have a character as its meaning is that its extension vary across different contexts of utterance; its extension must vary systematically in some way with regard to relevant aspects of the contexts, where which

aspects are relevant is specified by the character. So, for example, the extension of the demonstrative 'that' varies across different contexts depending upon (roughly) the intentions of the speaker to refer to something, and the extension varies in this systematic way because the character of 'that' determines that its extension, relative to a context of utterance, is the object the speaker intends to refer to by using it. But axioms (1)-(4) do not even state satisfaction conditions for the type 'red', at least if the type 'red' is construed as the "larger type" of which all the context-bound adjectives – 'red_6', 'red_{19}' etc. – are subtypes. So, the satisfaction conditions of the supertype 'red' do not, under Rothschild and Segal's analysis, vary systematically across contexts, for the simple reason that under Rothschild and Segal's analysis, this supertype is not assigned satisfaction conditions at all.

Axioms (1)-(4) do, however, assign satisfaction conditions to each subtype 'red_j', but the satisfaction conditions of these subtypes do not vary systematically across contexts. For, first, Rothschild and Segal state that according their metaphysics, "No token [of 'red_j'] can occur in another context" (2009, 471). So, for example, under axiom (2) 'red_9' is not assigned satisfaction conditions relative to c_{10}, because it is *metaphysically impossible* for an instance of 'red_9' to occur in any context other than c_9. So, 'red_9' *cannot* have different satisfaction conditions in different contexts, because it cannot even occur in different contexts. And second, Rothschild and Segal maintain that "the semantics of each context-bound 'red_j' is *the* extension it receives relative to its context" (2009, 472, my emphasis), and moreover that for each 'red_j' the extensions of *utterances* of sentences containing this context-bound predicate are "simply inherited" from the type.[22] And therefore not only is it metaphysically impossible for a context-bound predicate type to occur in another context, but moreover each instance of a context-bound type in its proper context is assigned the very same satisfaction-

conditions. So, Rothschild and Segal's claim that their analysis treats 'red' as "just a word that happens to change extension across contexts" (2009, 470) is false, for under axioms (1)-(4) *nothing* changes extension across contexts.

A defender of Rothschild and Segal's analysis might respond by claiming that I have misunderstood the *sort* of context-sensitivity they are attributing to color-adjectives. The context-sensitivity is not to be found in the variance of the extensions of the supertypes across contexts, because they are not assigned satisfaction conditions at all. Nor is it to be found within each subtype, e.g., 'red_5', for though such subtypes are assigned extensions, they do not vary across contexts. Rather, the response continues, the context-sensitivity is to be located in the metaphysical subtype-supertype relation that obtains between, e.g., each 'red_j' and the supertype 'red'. Thus what varies across contexts is not what *extension* is assigned to the supertype 'red', but rather what *subtype* of the supertype 'red' is tokened; across different contexts c_j different subtypes 'red*j*' are tokened. Indeed, the defense concludes, it is precisely by exploiting this new sort of metaphysical context-sensitivity that Rothschild and Segal are able to allow for enough context-sensitivity to account for under-determination arguments involving color-predicates, but not so much that their analysis treats color-adjectives as straightforward indexical expressions such as 'that' and thereby runs afoul of the sorts of problems raised by, e.g., (5a-b) and (7a-c).

The problem is that this new sort of context-sensitivity is not due to something like a *character* of the supertype 'red'; i.e. the new sort of context-sensitivity is not due to our semantic knowledge of a "recipe that allows us to calculate the truth conditions of a propitious utterance once we know the relevant details of the context" (1995, 219). For, first, though Rothschild and Segal vaguely suggest that "intuitively speaking" the semantics of the supertype 'red' "is given by a function from contexts to extensions"

(2009, 471-2), they never describe any sort of character, or "recipe," knowledge of which would enable an interpreter to compute such a function. And moreover, second, if they did provide such a recipe, then the "complicated metaphysics of language" presupposed by Rothschild and Segal would be rendered otiose. If the supertype 'red' is given a character which determines for each context c_j a subtype 'red*j*' and the (fixed) extension of that subtype, so that each 'red_j' has the same extension as the larger type 'red' relative to context *j*, then there is no need to posit the subtypes 'red_3', 'red_6', etc. That is, if the supertype 'red' were assigned such a character, then Rothschild and Segal's analysis would be reduced to something along the lines of the simple indexical analysis (R), which we have already shown to be untenable.

4. Evidence that Color Adjectives are Context-Invarient.

It is important to appreciate that even if an indexical analysis of some adjectives is justified – e.g. a strong case could be made in favor of the indexicality of 'local' – it by no means follows that an indexical analysis of color-adjectives is justified. Kennedy and McNally (2005, 2007) and Syrett *et al.* (2010) have argued that while *relational gradeable adjectives*, e.g. 'small', 'warm', 'tall' are (when used without a degree-modifier) indexicals, other *absolute gradeable adjectives*, e.g. 'full', 'quiet', 'wet', are (even when used without a degree-modifier) context-invariant. (In the discussion that follows all the relevant occurrences of adjectives involve *gradeable* adjectives appearing *without a degree-modifier*. Thus, for expository purposes, I will omit the qualifiers and take it for granted the relevant adjectives are *gradeable* and occur *without a degree-modifier*.) They argue that the primary factor determining which category

adjectives fall into is "the structure of the scales they use" (2007, 1). Absolute adjectives are associated with c*losed scales*, scales with *endpoints* in one or both directions, whereas relational adjectives are associated with scales that are *open* in both directions. So, e.g., 'full' is associated with a scale that is *closed* in both directions: A container that is *totally empty* cannot be further along the amount-scale in the negative direction, and a container that is *completely full* cannot be further along this scale in the positive direction. In contrast, 'small' is associated with a scale that is *open* in both directions: No matter how small something is, it could be further along the size-scale in the negative direction, and no matter how big, it could be further along this scale in the positive direction. That is, no matter how small a thing is, it cannot be *absolutely small*, and no matter how big a thing is, it cannot be *totally big*. And some adjectives are associated with scales that are closed in one direction, but open in the other. For example, 'loud' is associated with a scale that is closed in the negative direction, but open in the positive direction; there is no degree on the noise-scale less than *completely quiet*, but no noisy thing can be *completely loud*.

Kennedy and McNally argue that many adjectives associated with closed scales are *semantically* related to an endpoint of the scale, and there are two ways they can be so related. "Maximum-standard" absolute adjectives "require their arguments to possess a maximal degree of the property in question" (2997, 22). So, for instance, 'full' is semantically related to the positive endpoint on the amount scale, and thus a jar containing liquid can satisfy 'is full' iff the degree to which it contains liquid *is* the positive endpoint of the amount-scale. So, to satisfy 'is full' the jar must be *maximally full*. Similarly, 'quiet' is semantically related to the negative endpoint of the noise-scale. For a room to satisfy 'is quiet' the degree of noise it possesses must *be* the negative endpoint of the scale; the room must be *maximally quiet*. In contrast,

"minimum-standard" absolute adjectives "simply require their arguments to possess some minimal degree of the property they describe" (2007, 21). A paradigmatic minimum-standard absolute adjective is 'open'. This adjective is associated with a scale that is closed in both directions: a window could be *completely open*, or *completely closed*. But 'open', in contrast to 'full', does not require that its argument possess the property of its associated scale to a maximum degree. Rather, to satisfy 'is open' a door need only be *not closed*; i.e. the degree to which the door possesses the relevant property need only exceed the negative endpoint of the scale. Similarly, to satisfy 'is bent' a stick need only possess some degree of bend greater than zero; it need only be *less than perfectly straight*. Thus, the *meanings* of both maximum-standard and minimum-standard absolute adjectives relate arguments to the semantically fixed endpoints of closed scales, though in different ways: predicates containing maximum-standard adjectives require their arguments to possess the relevant property to the degree of one of the endpoints, whereas predicates containing minimum-standard adjectives require only that their arguments have the property to a greater (or lesser) degree than an endpoint.

Kennedy and McNally maintain that both predicates containing *relative* adjectives and those containing *absolute* adjectives require their arguments to possess the relevant property to a particular degree, where this degree is the "standard of comparison" (2007, 16-7). But the two types of predicate differ as to how the relevant standard of comparison is determined:

> The endpoints of a totally or partially closed scale provide a fixed value as a potential standard, which in turn makes it possible to assign context-independent truth conditions to the predicate (*greater than a minimum*, *equal to a maximum*). The alternative – and the only option available for adjectives with open scales – is to compute the standard based on some context-dependent property of degrees … (2005, 361).

So, for example, since the maximum endpoint is "inherent … to the meaning of a closed scale adjective" (2007, 34), 'full' is context-invariant – as a matter of *meaning* it invariantly designates the positive endpoint of the amount scale. As a consequence the corresponding predicate is also context-invariant: regardless of the context, a jar containing some amount of liquid is *semantically* determined to satisfy 'is full' iff the degree to which the jar contains liquid *is* the positive endpoint of the scale. Thus, meaning alone determines that the jar must be *completely full* to satisfy 'is full'. In contrast, "there is nothing about the meaning of an open scale adjective alone that provides a basis for determining [a standard of comparison]" (2007, 35) and as consequence such adjectives are indexicals whose meanings require contextual saturation. For instance, the size-scale is open in both directions, and thus 'small' – though it is semantically related to the negative direction of the scale – cannot be semantically related to a particular degree. And as a result the corresponding predicate 'is small' is semantically incomplete: if 'is small' is predicated of a child, context must somehow supply the *standard* – the degree on the size scale – that the child must fall under in order to satisfy the predicate.

What about color-adjectives? They are gradeable, and thus are semantically associated with scales, degrees of possessing the relevant color. But are these color-scales open or closed? Though Kennedy and McNally do not directly address this question, there is good reason to think that color-scales are closed in both directions. For, taking the negative direction first, just as a jar containing no liquid – and thus at the negative endpoint – cannot have a lesser amount, so paint swatches that are not red to any degree cannot become less red. (This is not to say that it is clear or even determinate where one is to draw the line between being red to some minimal degree, and not being red at all.) That color-adjectives are associated with scales that are

closed in the negative direction is further evidenced by the fact that they accept degree-modifiers that are appropriate only for adjectives with negative endpoints. So, while all of the degree-modifiers applied to 'red' and 'open' in (8a-b) are felicitous, the same modifiers applied to 'small' in (8c) are infelicitous[23]:

(8a) That is barely/slightly/partially red.
(8b) That is barely/slightly/partially open.
(8c) That is barely/slightly/partially small. (??)

And, now taking the positive direction, just as jars containing the maximum amount of liquid – and thus at the positive endpoint – cannot have a greater amount, so swatches that are *perfectly red* cannot get any redder.[24] And again, that color-adjectives are associated with scales that are closed in the positive direction is further evidenced by the fact that they accept degree-modifiers that are appropriate only for adjectives with positive endpoints:

(9a) That is totally/completely/perfectly red.
(9b) That is totally/completely/perfectly full.
(9c) That is totally/completely/perfectly big. (??)

Finally, as is suggested by the above evidence, color-adjectives accept *proportional modifiers*, which can be applied only to adjectives associated with scales that are closed in both directions:

(10a) That is 50%/mostly/two-thirds red.
(10b) That is 50%/mostly/two-thirds full.
(10c) That is 50%/mostly/two-thirds loud. (??)

More evidence that color-adjectives are closed-scale absolute adjectives is (or could be) provided by differences with regard to the ability of competent interpreters to accommodate presuppositions of definite descriptions containing either absolute or relative adjectives. Syrett *et al.* (2010) report that competent speakers are easily able to accommodate the presuppositions of requests such as

(11a) Please give me the big one.

but are not easily able to accommodate the presuppositions of requests such as

(11b) Please give me the full one.
(11c) Please give me the spotted one.

Experiments were performed in which competent adults and children were placed in a context with two salient objects, one larger than the other. When an experimenter used (11a) to request subjects to give him an object, subjects readily complied by handing-over the larger of the two objects. In contrast, in a context with two spotted disks, though one with noticeably more spots than the other, speakers rejected a request made using (11c) as infelicitous. Kennedy (2007, 28-29) proposes that the data is explained by the fact that 'big' is an indexical requiring saturation by a contextually supplied standard, whereas 'spotted' is not such an indexical, and the relevant standard is inherent to its meaning. That is, interpreters can easily accommodate the presuppositions of (11a) by adjusting the context-dependent standard so that only the larger of the two objects satisfies 'is big'. But, because the minimal standard is inherent in the meaning of 'is spotted', the request made using (11c) cannot be accommodated; both disks are judged to exceed the semantically encoded minimum-standard, and because this standard is semantically determined, it cannot be adjusted to accommodate the uniqueness presupposition. Kennedy concludes that the judged infelicity of requests made using (11b) and (11c) "despite the pressure to satisfy the requirements of the definite, shows that the standards for *full* and *spotted* are not sensitive to the context (in the same way as relative adjectives), but are instead fixed to maximum and minimum values on the scale respectively" (2007, 29).

Though Syrett *et al.* do not test subjects using color-adjectives, intuition strongly suggests that competent interpreters' are unable to accommodate definite descriptions involving color-adjectives just as they are unable to accommodate absolute adjectives such as 'spotted'. That is, in a context containing two red objects, though one

noticeably more red than the other, competent interpreters would reject a request made using

(11d) Please hand me the red one.

as infelicitous. And the explanation would be essentially the same as the explanation of interpreters' inability to accommodate requests made using (11c): because the minimal standard is inherent in the meaning of 'is red', the request made using (11d) cannot be accommodated; both objects are judged to exceed the semantically encoded minimum standard, which cannot be adjusted to accommodate the uniqueness presupposition.

The above evidence strongly suggests color-adjectives are closed-scale absolute adjectives, and thus are not indexicals. But are they maximum standard, or minimum standard, absolute adjectives? I suggested above that color-adjectives resemble minimum-standard absolute adjectives such as 'spotted' and 'open' and in fact color-adjectives exhibit the entailment patterns that Kennedy and McNally (2005) and Kennedy (2007) maintain are characteristic of this category. First, minimum-standard adjectives differ from maximum-standard adjectives in that they do not entail satisfaction of the property of the associated scale to a maximum degree. That is, satisfaction of 'is full' entails possession of the amount property to the maximum degree on the scale:

(12a) The jar is full. $\models$ The jar is completely full.

But, for the reasons described above, minimum-standard absolute adjectives do not support such entailments:

(12b) The door is open. $\not\models$ The door is completely open.

(12c) The shirt is red. $\not\models$ The shirt is completely/perfectly red.

Minimum-standard absolute adjectives do however support a different sort of entailment. Kennedy and McNally claim that "for a minimum-standard absolute

adjective *adj*, a denial *x is not adj* should entail that x has zero degree of *adj*-ness" (2005, 358). The reasoning is that a predicate containing a minimum-standard absolute adjective is satisfied by an object iff the object possesses the property of the scale *at least* to the semantically specified minimum degree. And thus an object satisfies the negation of this predicate iff it does not possess the property of the scale to the semantically specified minimal degree, in which case it does not satisfy the predicate to any degree. This pattern is exhibited by 'open'; if a door is not open, it cannot be open to any degree:

(13a) The door is not open. ⊨ The door is closed.

And similarly, if a swatch is not red, then it is not red to any degree – it must be some other color(s) or colorless:

(13b) The swatch is not red. ⊨ The swatch is blue or olive … or transparent.

The above described entailment patterns can be used to distinguish "minimal-standard absolute adjectives" – such as 'open' and 'red' – from "maximum-standard absolute adjectives" – such as 'empty' and full'. A different sort of entailment pattern distinguishes minimal-standard absolute adjectives from relative adjectives. This test concerns entailments in comparative constructions (2005, 360). Given the semantic properties that Kennedy and McNally ascribe to minimum-standard absolute adjectives, one would expect a relative claim involving such an adjective to entail an absolute claim involving the adjective. That is, if the degree to which *x* is *adj* exceeds the degree to which *y* is *adj*, then it must follow that *x* possesses at least the minimal degree of *adj*. And this prediction is borne out:

(14a) The door is more open than the window. ⊨ The door is open.
(14b) The chair is more red (redder) than the table. ⊨ The chair is red.

In contrast, relational adjectives do not support such entailments:

(14c) The dog is bigger than the cat. $\not\models$ The dog is big.

(14d) The TV is louder than the radio. $\not\models$ The TV is loud.

The explanation for the difference between (14a-b) and (14c-d) is straightforward: The premise of (14a), for example, is true only if the degree of openness possessed by the door is greater than the degree of openness possessed by the window. But in order for this to be true, the degree of openness possessed by the door must be at least the minimum-standard *semantically* determined by the meaning of 'open'. And the conclusion merely states that the door possesses openness to at least this semantically specified minimal degree. But the conclusion of, for example, (14d) is not semantically invariant – it requires context to supply a *standard* to saturate the predicate. And, as Kennedy and McNally explain, "the mere fact that one object exceeds another with respect to some relative property tells us nothing about how the objects stand in relation to a contextually determined standard" (2005, 360).

Thus Kennedy and McNally provide evidence that absolute adjectives are unlike relative adjectives in that such absolute adjectives are not indexicals requiring contextual-saturation by a *standard*. And since such evidence seems to apply equally well to color-adjectives – in particular color-adjectives fall squarely into the category of "minimal-standard absolute adjectives – this implies that color-adjectives also are not indexicals requiring contextual-saturation. But then what ought Kennedy and McNally say in response to under-determination arguments involving color-adjectives? Indeed, what would they say about an under-determination argument involving the absolute minimum-standard adjective 'open'?[25] Though Kennedy and McNally do not directly address such under-determination arguments, they do claim that "relative [adjectives] are context-sensitive relative to an aspect of their *meaning* (variability in the standard of comparison), while absolute [adjectives] are context-sensitive relative to their *use*"

(Syrett *et al.*, 2010, 9). That is, the contextual-variance evidenced by under-determination arguments involving absolute adjectives "involves layers of reasoning that go beyond the computation of semantic content, even semantic content that requires fixing contextual parameters, and takes into account alternative denotations and judgments of communicative intent" (Syrett *et al.*, 2010, 30). This sort of a pragmatic explanation of contextual-variance is of course precisely what is proposed by truth-conditional pragmatics.[26]

Kennedy and McNally's evidence regarding absolute adjectives, as well as the phenomena involving intuitive judgments of disagreement and validity, reveal that the overt-indexical analysis provided by (R) (perhaps underwritten by a *character* along the lines of (24)) is too simplistic.

Conclusion

If the above reasons for being skeptical of indexicalism are sound, then the truth-conditional variability manifested in many under-determination arguments cannot be explained semantically, and thus must be explained pragmatically. This leaves it open as to which of the remaining strategies – minimalism or truth-conditional pragmatics – is to be pursued, since both endorse a pragmatic approach. Recall that what distinguishes minimalism from truth-conditional pragmatics is that the latter maintains that in many cases purely semantic knowledge does not determine truth-conditional content of *sentences* (even relative to contexts), while the latter maintains that purely semantic knowledge always determines truth-conditional content of sentences (relative to contexts), with the caveat that this minimal purely semantic-content is inaccessible to ordinary speakers. Though I cannot address the issue here, at this point I am allied with indexicalism; that is, Rothschild and Segal are correct to maintain that this alleged inaccessibility of semantic-content "makes it very hard to understand what the data for a

semantic theory are supposed to be" (2009, 469-70).[27] I conclude then that under-determination arguments do undermine truth-conditional semantics, and thus some version of truth-conditional pragmatics must be pursued.

Notes

[1] Paradigmatic defenders of truth-conditional pragmatics include Chomsky (1996), Travis (1997), Bezuidenhout (2002), and Pietrosky (2005). A wide variety of approaches, including semantic relativism (Kölbel, 2002), relevance theory (Sperber and Wilson, 1986), and discourse representation theory (Asher and Lascarides, 2003), thus fall under the general rubric of *truth-conditional pragmatics*.

[2] Defenders of minimalism include Cappelen and Lepore (2005), and Borg (2004). Precursors to the minimalist approach are presented in Salmon (1986) and Lasersohn (1999).

[3] The position I am calling *indexicalism* is sometimes called *contextualism*. (See for example McFarlane, 2007.) But I prefer to call it indexicalism, because the position I call truth-conditional pragmatics is also sometimes called contextualism. (See for example Bezuidenhout, 2002.) Paradigmatic indexicalist responses to various sorts of under-determination arguments are presented in Davidson (1968), Lewis (1996), Stanley and Szabó (2000), Stanley (2000), and Glanzberg (2008).

[4] Of course the defender of truth-conditional semantics need not claim that *one* strategy of response is applicable to *all* under-determination arguments. That is, the defender of truth-conditional semantics could invoke the minimalist strategy in response to some under-determination arguments, and the indexicalist strategy with regard to others.

[5] As the term will be used here, an *indexical expression* is an expression that has as its meaning something like a *character*, a semantic rule specifying how specified features of contexts of utterance determine the extensions of occurrences of the term. Thus, for example, pure indexicals, demonstratives, pronouns, and tensed verbs are all clear examples of indexical expressions.

[6] I am not claiming that Travis would agree that such knowledge is modular. Other advocates of truth-conditional pragmatics do, however, maintain that semantic knowledge is modular. See, e.g., Jackendoff (2002).

[7] Of course lexical and syntactic *disambiguation* are essential to interpretation, but also are not plausibly viewed as issuing solely from a semantic-module. Disambiguation is typically viewed by defenders of truth-conditional semantics as a *pre-semantic* pragmatic processes. The idea is that determining *which sentence* has been uttered is not a task performed by the semantic module, but once the sentence has been identified, the semantic-module alone determines its truth-conditions. Thus, Kennedy and McNally (forthcoming) defend truth-conditional semantics from Travis' argument by claiming that color-adjectives are *ambiguous* between a *classificatory* meaning and a *gradable* meaning.

[8] There are various positions in logical form where the variables could be placed. Though Szabó does not propose how the posited variables are to be incorporated into logical forms, the most natural idea would be to treat the variables as adjective modifiers, though not degree-modifiers.

[9] Binding phenomena have played an important and controversial role in the ongoing debate between truth-conditional semantics and truth-conditional pragmatics. Stanley (2000) influentially invoked binding phenomena to argue in support of hidden-variable indexicalism for nominals. The argument has been criticized from all sides: In support of truth-condition pragmatics, Recannati (2004) objects that the argument falsely assumes that if a nominal contains a hidden-variable when bound, it must also contain it when not-bound, and Lasersohn (2008) objects on the grounds that predicted cross-over phenomena do not occur. In support of minimalism, Cappelen and Lepore (2005) object that the argument is too strong because its soundness would have absurd consequences, and Cappelen and Hawthorne (2009) object that at least certain versions of the argument confuse operators and modifiers. So, even in the case of nominals where some sort of binding-phenomena clearly occurs, the claim that such phenomena support the existence hidden-variables in nominals is, at best, controversial.

[10] Of course whether or not idexicals such as 'I' and 'now' can ever be bound is itself a controversial issue. Kaplan (1989) famously claims that they cannot be bound – that there are no "monsters." But others, including Rothschild and Segal (2009), claim that they can.

[11] Indeed, Rothschild and Segal make just such a claim concerning 'red', which they claim is an overt context-sensitive term: "words like 'red' should be considered as part of the semantic class of unbindable indexicals/demonstratives" (2009, 490).

[12] An anonymous referee suggested this third response.

[13] Kennedy and McNally are concerned to show that color-adjectives are ambiguous between a nongradable, *classificatory*, sense, and a *gradable* sense. I will not argue against the ambiguity thesis here, but only note that what Kennedy and McNally construe as a particular classificatory *meaning* of unmodified adjectives is much better understood as a particular sort of use. For my purposes here what is important is that many under-determination arguments utilizing color-adjectives involve only the "classificatory reading," and hence I consider only their analysis of this classificatory sense, which is provided by (24).

[14] There is a striking similarity between (24) and Nunberg's two "conditions on predicate transfer" (1995, 112). Predicate transfer is a pragmatic process that "takes names of properties into new names that denote properties to which they functionally correspond" (1995, 109) So, for example, predicate transfer might take color-adjectives naming color-properties to "new" adjectives (with the same phonology) that name, say, *being edible* or *being poisonous*. In order for such a process to take place, (i) there must be a "salient transfer function" relating two sets of properties, and (ii) the "new property names" must designate a "noteworthy" property, where a property is *noteworthy* "if it offers a useful way of classifying its bearer relative to the immediate conversational interests" (1995, 114).

[15] Kaplan (1989) argues the truth-conditional content of, e.g., Kaplan's utterance *u* of 'I am hungry' is not *that the speaker of u is hungry* but rather simply *that Kaplan is hungry*. That is, in uttering *u*, Kaplan is not asserting that he is uttering *u*; this is evidenced by the fact that what Kaplan asserted can be true in counter-factual circumstances in which he did not utter anything, but is nonetheless hungry. A similar argument can be constructed to show that the correlation between *being poisonous* and **green** is not part of the content of my utterance of 'It's green'. Suppose that I make the utterance in a context in which it is both true and felicitous: the mushroom instantiates **green** and is poisonous, and the correlation between *being poisonous* and **green** obtains. Now let us consider whether or not *what is said* by this felicitous utterance, the *content* I express, would be true in a counter-factual circumstance in which the correlation did not obtain. Granted, if the correlation does not obtain in the counter-factual circumstance, then one could not *in that circumstance* felicitously use 'is green' to assert that a mushroom is poisonous. (Similarly, Kaplan cannot felicitously use 'I' to refer to himself in the counter-factual circumstance wherein he is not the speaker.) But given that *in the context of utterance* the correlation between **green** and *being poisonous* does hold, would the truth of *what I said* be undermined if there were no such correlation? Would *what I said* be false if the mushroom was indeed poisonous, yet there was no correlation between **green** and *being poisonous*? The intuitive answer is "no." It seems that in using 'is green' to characterize the mushroom as poisonous, I depend upon there being a correlation between **green** and *being poisonous*, but in using 'is green' in this way I am not *asserting* that this correlation holds.

[16] The character that (24) is understood as expressing could be taken to explain *why* (R) is true, in the same way that the character of 'that' explains *why* (D) is true.

[17] It is important that (3ab)-(5ab) are conversational exchanges, taking place relative to a shared background of goals and information. For, contrary to what is claimed by Cappelen and Hawthorne (2009, 54-5) inter-conversational comparisons do not provide good evidence for indexicality. For example, if an artist utters 'the leaf is green' in a conversation about decorations, and a botanist utters 'the leaf is not green' in a conversation about species, we would not take them to be disagreeing. But this does not show that 'is green' is an indexical predicate – or at least it blatantly begs the question against truth-conditional pragmatics to assume so.

[18] Szabó's hidden indexical approach is also incompatible with the data concerning disagreement and validity judgments, since there is nothing in Szabó's theory which prevents two occurrences of the same hidden variable (type) in one conversation from having different extensions.

[19] Rothschild and Segal do not explain why they eschew the straightforward analysis provided by (R) for their more complicated analysis, but that their motivation is the sort of consideration raised by exchanges (3) and (7) is suggested by the following remark: "If it is possible for someone truly to say of a given object 'Well, it red, but it's not red', using 'red' in different senses, then we would represent this by something like this: 'Well, it is red_j but not red_k'" (2009, 471, ftn. 10) The implication here is that it is very dubious that one could make such a seemingly contradictory utterance, but that even if it were possible, they could explain the utterance by individuating *contexts* very finely.

[20]I have slightly altered the statement of this axiom because Rothschild and Segal's statement of it invites confusion in two ways: First, the use of the letter 'g' to indicate the current, actual, context (what Rothschild and Segal refer to as the "general context") invites confusion because whereas the subscripted letter 'g' is being used as a *name* for *this* particular context, other subscripted letters ('j' and 'k') are used as *schematic variables* standing proxy for numerals which themselves are names for particular contexts. Second, their use of 'is red_g, c_n' is confusing because it looks very similar to ''is red'⌢n, c_n'. The similarity thus invites confusion between, for example, considering the extension of 'red_8' relative to context 8, and, in contrast, *saying* of Keble College that it is $red_@$ by the standards of context 8. So, where Rothschild and Segal have simply 'is red_g, c_n', I instead have 'is $red_@$ under the standards of c_n'.

[21] There is an unfortunate, and insignificant, disanalogy between the conditional analysis of 'that is remarkable' presented by (D) and the analysis of 'Keble College is red' presented by axioms (1)-(4). In the case of (D), lack of the requisite pragmatic knowledge prevents one from deriving the truth-conditions expressed in the consequent of (D). Thus, all the requisite pragmatic knowledge is expressed by the antecedent of (D), and not in the bi-conditional statement of truth-conditions that is the consequent. In contrast, in (T_j) the relevant pragmatic knowledge is expressed in the bi-conditional statement of truth-conditions itself (indeed, on the RHS). This disanalogy, however, results not from the proposed indexicality of 'is red', but rather from the fact that it is a *predicate* rather than a referring term. Following Larson and Segal (1995), the semantic machinery of Rothschild and Segal (2009) does not, first, assign objects as extensions of singular referential terms and sets as extensions of predicates, and then, second, define *predicate satisfaction* in terms of set-membership. Rather, no sets are assigned as extensions of predicates, and predicate satisfaction is defined as a *direct* relation between objects (referents) and predicates. For example, if 'is remarkable' is not an indexical predicate, the axiom stating its satisfaction conditions would be, "(x) (x satisfies 'is remarkable' iff x is remarkable." Now, if predicate satisfaction is defined in this direct manner, then it is not possible to formulate a conditional analysis of the indexical predicate 'is red' that is analogous to the conditional analysis of the referring term 'that' provided by (D). An analogous conditional analysis would be provided by (R), but of course (R) requires that an extension be assigned to utterances of predicates, which is contrary to the direct definition of predicate satisfaction favored by Rothschild and Segal. Note, however, that if we allow utterances of predicates be assigned extensions, then the "rather complicated metaphysics of language" (2009, 471), can be imposed upon (R) in the following manner:

(R*) If *u* is an utterance of 'Kebles College is red_n' in c_n, and Σ ('red_n') = *E*,
then *u* is true iff Kebles College $\in$ *E*.

Σ is a function from "context-bound" indexical predicates, such as 'red_8', to sets of objects. To know the value of Σ for a predicate "bound" to context n, one must have *pragmatic* knowledge of the standards utilized in context n. (Function Σ thus plays a role very similar to the role played by Larson and Segal's "selection relation Σ" 1995, 207.) So, (R*) is similar to (D) in that all the *pragmatic* knowledge required for deriving truth-conditions is expressed in the antecedent; absent such pragmatic knowledge, one cannot detach the truth-conditions in the consequent.

[22] The uniqueness of the extensions of the context-bound types is expressed by axiom (2), and the inheritance of the extensions of context-bound types by utterances of them is expressed by axioms (3) and (4).

[23] Kennedy (2007, 34) proposes the modifiers 'slightly' and 'partially' as providing a test for an adjective's being a minimal standard absolute adjective. I propose that 'barely' provides an even better test: clearly something can be *barely red* iff there is a minimal standard for being red. Also, as Kennedy and McNally (forthcoming, 17) note, there seem to be two scales associated with color-adjectives: a *quality-scale* corresponding to how close to, e.g., perfectly red something is, and a *quantity-scale* corresponding to *how much* of something is red. Different degree-modifiers require different scales: 'partially' clearly requires the quantity-scale, whereas 'perfectly' and 'barely' seem to require the quality-scale. The difference between the scales is not central to my purposes, however, since (i) both scales seem to be closed in both directions, and (ii) unmodified occurrences seem to require consideration of both scales. So, for example, a shirt satisfies 'is red' iff its hue exceeds the minimum-standard on the quality-scale *and* the amount of it that is red exceeds the minimum-standard on the quantity-scale.

[24] Byrne and Hilbert (2003, 13) report that red, green, yellow and blue have *unique hues*: "there is a shade of red ('unique red') that is neither yellowish nor bluish."

[25] For example, a door might count as *open* in a context in which there is shared concern of letting cold air into a home, but not count as open relative to a context where there is shared concern about whether or not it is permissible for a visitor to enter the home.

[26] There is thus a significant tension between the analysis of absolute gradable adjectives provided by Kennedy and McNally (2005, 2007) and Syrett *et al.*, (2010), and Kennedy and McNally's (forthcoming) proposal that color-adjectives (both the gradable and non-gradable sense) are indexicals.

[27] I develop this sort of objection against minimalism in (Author, XXXX).

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