CLEARING A PATH FOR CONVENTIONALIST MODAL SEMANTICS

By

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To Kupusić Medonja, without whom, naught

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LIST OF ABBREVIATION AND SYMBOLS

$P^1{}_0, P^1{}_1, P^1{}_2, \ldots$	1-place predicate terms of the regimented language of the model theoretic update of Carnap's semantical systems S_1, S_2 and S_3.
$P^n{}_0, P^n{}_1, P^n{}_2, \ldots$	n-place predicate terms for $n \geq 0$ of the regimented language model theoretic update of Carnap's semantical systems S_1, S_2 and S_3. (If the number of places of the predicate term is clear from the context the superscript may be omitted.)
Π^1	Set of 1-place predicate terms for this language: $\{P^1{}_0, P^1{}_1, P^1{}_2, \ldots\}$.
Π^n	$\{P^n{}_0, P^n{}_1, P^n{}_2, \ldots\}$ for $n \geq 0$.
$\phi^n, \phi^n{}_0, \phi^n{}_1, \ldots$	Metalinguistic variables ranging over Π^n.
$a_0, a_1, a_2, \ldots$	Individual constant terms of the regimented language model theoretic update of Carnap's semantical systems S_1, S_2 and S_3.
Γ	Set of individual constant terms: $\{a_0, a_1, a_2, \ldots\}$.
$\gamma, \gamma', \gamma^*, \gamma_0, \gamma_1, \ldots$	Metalinguistic variables ranging over Γ.
ζ_0, ζ_1	Metalinguistic variables ranging over Carnap's "designators": $\{\Pi^n \cup \Gamma\}$.
$x_0, x_1, x_2, \ldots$	Individual variable terms of the regimented language model theoretic update of Carnap's semantical systems S_1, S_2 and S_3.
X	Set of individual variable terms: $\{x_0, x_1, x_2, \ldots\}$
x , x'	Metalinguistic variables ranging over X.
$\xi_0, \xi_1, \xi_2, \ldots$	Metalinguistic variables ranging over $\{\Gamma \cup X\}$.
χ	A metalinguistic variable ranging over strings comprising the concatenation of the elements of n-tuples of elements of X. For example, χ might take the value '$x_0x_1x_2$' for $n = 3$.
WFF	A Well–Formed Formula – a syntactical string of the languages we outline.
Φ, Ψ, Θ	Metalinguistic variables ranging over the set of WFFs
D	Set of definite descriptions: WFFs of the form '$(\iota x)(\ldots x \ldots)$'.
$\underline{\gamma}, \underline{\gamma}', \underline{\gamma}_0, \underline{\gamma}_1, \ldots$	Metalinguistic variables ranging over $\{\Gamma \cup D\}$.
Σ	Set of sentences of the language of S_1, S_2 and S_3.

$\sigma, \sigma', \sigma_0, \sigma_1, \ldots$	Metalinguistic variables ranging over Σ.
$\mathscr{I}$	An interpretation of the language of S_1, S_2 and S_3.
Ω	An index set for admissible interpretations ($\omega \in \Omega$, $\omega^* \in \Omega$, $\omega' \in \Omega$, . . .)
$\{\mathscr{I}_\omega\}_{\omega\in\Omega}$	Set of admissible interpretations.
Δ_ω	A subset of the range of $\mathscr{I}_\omega$ restricted to $\{\Gamma \cup D\}$.
Δ	$\cup_{\omega\in\Omega}\Delta_\omega$: The set containing all of the individuals in Δ_ω for each $\omega \in \Omega$.
V_0, V_1	Metalinguistic variables ranging over $\{\mathscr{T}, \mathscr{F}\}$ (functional equivalents of truth values for a specific interpretation).
$\underline{c}, \underline{c^*}, \underline{c'}, \underline{c_0}, \underline{c_1}, \ldots$	Concept (in Carnap's sense of "individual concepts") variables.
$c, c^*, c', c_0, c_1, \ldots$	Concept (in the sense we shall sketch in Chapters Seven and Eight) variables.
$\ulcorner, \urcorner$	These are respectively opening and closing quasi-quotations (see Quine 1976). We use these to indicate a string of a particular type that is represented with both object language symbols and metalinguistic variables.
SD	<u>S</u>tate <u>D</u>escription. A state description is a list of atomic sentences and negations of atomic sentences such that for every predicate letter ϕ^n and all individual constants $\gamma_0, \gamma_1, \ldots, \gamma_{n-1}$, a state-description contains either $\ulcorner\phi^n(\langle\gamma_0, \gamma_1, \ldots, \gamma_{n-1}\rangle)\urcorner$ or $\ulcorner{\sim}\phi^n(\langle\gamma_0, \gamma_1, \ldots, \gamma_{n-1}\rangle)\urcorner$.
L-truth	A property of sentences defined in *Meaning and Necessity*. A sentence is L-true if and only if it is true in every state-description.
N	A sentence operator defined in Carnap's *Meaning and Necessity*. For sentence *S*, the sentence formed by prefixing N, i.e. 'N*S*' is true just in case *S* is L-true, false otherwise.
QML	Quantified Modal Logic.
$\diamond$	Operator of QML and other similar formal systems corresponding to the English word 'possibly.' Sometimes used in formalization of the semantics of sentences involving the term 'possibly.'
$\Box$	Operator of QML and other similar formal systems corresponding to the English word 'necessarily.' Sometimes used in formalization of the semantics of sentences involving the term 'necessarily.'

I	The map "stitched together" from $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$. (See Chapter 6.)
$\underset{i}{\Rightarrow}$	This is the interpretation implication operator – a metalanguage symbol informally defined in the following way. If an interpretation is such that it makes true σ, then if that interpretation is such that the truth of σ semantically entails σ_1, we write '$\sigma \underset{i}{\Rightarrow} \sigma_1$'. There is more explication in Chapters Three and Six.
I′	"Uncurried" I. (See Chapter 7.)
$\mathcal{Q}$	A metalinguistic variable ranging over {'$\exists$', '$\forall$'}. Either '$(\exists x_0)P^1{}_0(x_0)$' or '$(\forall x_0)P^1{}_0(x_0)$' might replace $\ulcorner(\mathcal{Q}x_0)P^1{}_0(x_0)\urcorner$.

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CLEARING A PATH FOR CONVENTIONALIST MODAL SEMANTICS

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In this dissertation, I engage in a research project in modality and the philosophy of language aimed specifically at formulating and assessing the thesis that both *de dicto* and *de re* modal statements can be given a semantic treatment which shows that sentences whose primary operator is ‘necessarily’ can be understood to be true in virtue of the analyticity of the sentence following the modal sentential operator. I call this sort of semantic treatment ‘analytic-deflationary.’ Rather than defending an analytic-deflationary view outright, I take rather the preliminary step of assessing this analysis of necessity and trying to determine if the view is, after all, viable.

My strategy is to argue that the conventionalist analytic-deflationary approach can clear some *prima facie* challenges to it by developing (at least the beginnings of) a semantical system taking inspiration from Carnap’s work in *Meaning and Necessity*. Within this semantical system, I try to explain how to meet challenges to do with circularity, the problem of *de re* modality and a coherent treatment of quantification in (and into) both modal and non-modal contexts. My hope is that the semantical treatment I develop for the sentence operator ‘necessarily’ will be something which is of the right sort to serve as a small part of a larger project – a general semantical theory that is based on a Davidsonian interpretive truth theory.

CHAPTER 1
INTRODUCTION

Our Project

In this dissertation, we shall engage in a philosophy of language project in which we endeavor to show that a certain approach to modal semantics is a viable one. In this sense, we are trying to "clear a path" for this sort of approach to modal semantics, rather than to defend this particular approach against all objections. But first things first: what is 'modal semantics'? And what is the approach to it for which we shall try to clear a path? In philosophy, *semantics* is the study of meaning of linguistic entities such as sentences ('the cat is on the mat,') and "sub-sentential parts" out of which sentences might be constructed such as predicate terms ('is blue' and 'is trapezoidal'), names ('Bobby' and 'Omar'), logical operators ('and,' 'or,' 'not'), quantifiers ('for all,' 'there exists') and variables ('something,' 'x'). To provide more definition for the term 'semantics', we might think about what semantics is *not* (or at least what it is not required to be). The study of semantics can be thought of as distinct from the study of syntax. *Syntax* describes which strings of the vocabulary of a language are sentences. So one can use syntax to determine which strings of words are well-formed and which are ill-formed. For example, consider two strings of the same words: 'a lumberjack quickly chops down a tree,' and 'tree a chops a down quickly lumberjack.' According to the rules of syntax for English the first is well-formed and the second is ill-formed. Only strings which are well-formed are candidates to be sentences, and only strings which are well-formed are those whose semantics we can investigate.

A standard view is that sentences of a natural language like English are about something non-linguistic, and that there are "word-world" connections which secure this "aboutness." For example, the sentence 'Bobby is trapezoidal' is about the individual picked out by the name

‘Bobby’ and makes the claim that that individual has a certain shape, specifically that individual is trapezoidal. So we see that the study of semantics must be closely bound up with truth; if one understands the meaning of this sentence, then one knows the conditions under which it is true.

Another standard view is that sentential meaning (the meanings of grammatically complex expressions generally) is compositional: we can understand the meaning of a sentence if we can understand the meaning of the sub-sentential parts of that sentence and understand the manner in which these parts are combined to form a syntactical string. So, according to these two received views, we can engage in an investigation into semantics of sentences by studying the semantics of the sub-sentential parts. If we can come to understand how to understand the semantics of the name ‘Bobby’ and predicate term ‘is trapezoidal’ and can come to understand how to understand in terms of a semantical theory (or theory of meaning) the manner in which these two terms are combined to form a meaningful sentence, then we can understand the meaning of the sentence. As an intuitive first stab at an account of the semantics of the sentence ‘Bobby is trapezoidal,’ we might say that the sentence is true if and only if that which is named by ‘Bobby’ is among that class of things that are indicated by the predicate ‘is trapezoidal.’ If the ‘is trapezoidal’ “picks out” the class of things each of which is trapezoidal, then the sentence is true just in case that class includes Bobby. That is, it is true just in case Bobby is trapezoidal.

So far, so good, but what is meant by the ‘modal’ in ‘modal semantics’? A *modal* is a qualifier for the truth of a sentence. In terms of our example, we might qualify the truth of the sentence ‘Bobby is trapezoidal’ with the related sentence, ‘Possibly, Bobby is trapezoidal’ or another related sentence ‘Necessarily, Bobby is trapezoidal.’ These two variations are modal sentences because the truth of the original ‘Bobby is trapezoidal’ is qualified. The first is true if and only if it *could be the case* that Bobby is trapezoidal, the second if and only if it *must be the* *case* that Bobby is trapezoidal.[1] Clearly, to give an account of the semantics for these modal sentences, we need to consider something more than the actual class of trapezoidal individuals and whether Bobby is among its members or not. There are other modals such as those expressed by (the temporal operators) 'it will always be the case that . . .,' 'it will be the case that . . .,' 'it has always been the case that . . .,' 'it was the case that . . .,' (and the deontic operators) 'it is obligatory that . . .,' 'it is permitted that . . .' and 'it is forbidden that . . .' But we will be focused only on the modals expressed by 'possibly' and 'necessarily,' and since these operators are duals of each other, that is, one can be defined in terms of the other and 'not' ('Necessarily, Bobby is trapezoidal' is true just in case 'It is not the case that possibly Bobby is not trapezoidal' is true), we will focus almost exclusively on 'necessarily.' Understanding how to give an account of the semantics for sentences like these last two will occupy us for the next roughly 245 pages.

I have said that we shall try to clear a path for an account of modal semantics of a certain sort. Of what sort is the account? The account we shall try to clear a path for is a 'conventionalist' and 'analytic-deflationary.' What do these terms mean? We can begin an answer by saying that the success of our work depends upon the notion of analyticity or, roughly, truth in virtue of meaning, and that truth in virtue of meaning depends upon the linguistic conventions in force. More specifically, we formulate and assess the thesis that both *de dicto* and *de re* modal statements[2] can be given a semantic treatment which shows that sentences whose

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[1] There is of course a standard epistemic reading of these English modal adverbs as well. We might say that on this reading, 'Possibly, Bobby is trapezoidal' is true just in case it is conceivable or imaginable that Bobby is trapezoidal, and that on this standard epistemic reading 'Necessarily, Bobby is trapezoidal' is true just in case it is *in*conceivable or unimaginable that Bobby is *not* trapezoidal.

[2] Roughly, a *de dicto* modal statement can be understood to be about a sentence or about some word(s) (*dicta*), and a *de re* modal statement can be understood to be about an individual thing (*res*). For example, the following is a sentence that is ambiguous between a *de re* and a *de dicto* interpretation: 'Necessarily, the number of the planets is greater than seven.' An extensive *de re* paraphrase of this sentence goes something like: 'The individual that numbers the planets, *vis*, a *number* is such that necessarily, it, that is the number itself, is greater than seven,' and an extensive *de dicto* paraphrase of this sentence goes something like: 'It is necessary that the number of the planets is greater than seven.' The *de re* interpretation is true because that individual that numbers the planets, the number nine

primary operator is 'necessarily' can be understood to be true in virtue of the analyticity[3] of the sentence following the modal sentential operator, hence an *analytic*-deflationary approach to modal semantics. My inclination is to say that an analytic-deflationary semantics is the right way to go in an investigation in modality, but rather than defending such a view outright, we take rather the preliminary step of assessing this notion of necessity and trying to determine just what would be required for this sort of view to be a "live option".

Conventionalist Modal Semantics

To be such, I think the analytic-deflationary strategy must be at least as appealing as realist approaches to modality. We can get at what is meant by 'conventionalist' approach to modal semantics by contrasting that sort of approach to a 'realist' approach. A realist approach to modal semantics is one according to which we give properties *qua abstracta* a place in ontology and whose relationships are to secure the truth or falsity of modal claims *or* according to which possible worlds (concrete or abstract) are taken *really to exist* and to secure the truth or falsity of such claims. On a conventionalist approach, the truth or falsity of modal claims – sentences involving the modal operators 'necessarily' or 'possibly' – are secured by something other than mind-independent properties *qua abstracta* or possible worlds which serve as the truth-makers for our modal talk. Specifically, a conventionalist takes the truth or falsity of modal claims to be rooted in linguistic *convention*. Typically, one who held such a position would hold roughly that all and only those sentences which are analytic express necessary truths, and so, as linguistic convention plays a key role in spelling out the usual notion of analyticity, these conventions are *one* (but not the *only*) key component of the beginnings of modal semantics. There are issues

(or actually eight in 2009), is greater than seven of necessity, and the *de dicto* interpretation seems false because it seems that there might have been only five planets instead of nine (or eight). We shall say more about the *de re* / *de dicto* distinction and the corresponding issue at stake over the course of this document.

[3] We will, of course, say much more about the notion of analyticity as well over the course of the next few chapters.

over whether something as seemingly contingent as linguistic convention could be the basis for the truth or falsity of sentences prefixed by ‘necessarily,’ but such issues need not stymie a conventionalist view.[4] For the sort of view for which we shall try to clear a path, necessity will be explained in terms of analyticity, a linguistic notion, but analyticity will, in turn, be explained in terms of the relations of concepts (on a specific understanding of those). Since the relation of concepts is at the root of this sort of modal semantics, on the face of things, we shouldn’t see the contingency of linguistic conventions as a problem for the sort of conventionalism we try to make room for. That certain linguistic entities express certain concepts as a matter of contingency is a side issue.

***Analytic-Deflationary* Modal Semantics**

Since the linguistic notion of analyticity is the only window we have into the relations of concepts to one another, we must pursue an account of the sentence operator ‘necessarily’ given in terms of analyticity: roughly, a sentence of the form ‘Necessarily, S’ (where ‘S’ stands for a sentence) is true just in case it is analytic that S, and a sentence of the form ‘There is x such that, necessarily $\phi(x)$’ (where ‘$\phi(x)$’ is a formula with only ‘x’ free – for example, ‘x is a person’) is true just in case there is a singular term ‘a’ such that it is analytic that $\phi(a)$.

The account is in part entitled ‘deflationary’ because we try to *deflate* the sentence operator ‘necessarily’ of its metaphysical stuffing. We shall endeavor to make no use of an ontology of concrete or abstract possible worlds or properties *qua abstracta*. Rather, we will endeavor to keep our ontology as spare as we can. We may speak of ‘possible worlds’ or ‘properties’ as heuristics the cash value of which will be carefully explained, and any talk of which can be

[4] For example (Sidelle, 2007).

cashed out as soon as one would like after these two terms and their accompanying senses, as heuristics, play their functional role.

Clearing a Path

We shall not argue explicitly for an analytic-deflationary account of modal semantics over other (realist) approaches, but endeavor only to show that the analytic-deflationary approach can meet some of the challenges that face it. It may be that in trying to show that such an account can meet those challenges we expose problems for competing accounts of modal semantics, but we shall not explicitly argue for or against either a realist or conventionalist story. We shall simply try to prepare the way so the sort of generic conventionalist approach we sketch might more easily compete with realist approaches that suggest that any attempt at understanding necessity in terms of analyticity cannot succeed. There are three main parts of the project of clearing a path. First, we must motivate the project by arguing for the initial plausibility of understanding the notion of analyticity without appealing to a modal notion of necessity or a closely related (family of) modal notion(s). To use the very notion (or notions closely related to the one) we set out ultimately to analyze in our work on analyticity would be to produce an uninformative, circular account. This is the work of Chapter Two through Chapter Eight. Second, we must show how the analytic-deflationary approach is able to endorse so-called "*de re* modal claims". We may have the intuition that some singular terms are directly referring, yet there are sentences in which those names appear that are true of necessity. If the senses associated with directly referring terms (if any there be) are insufficient to determine their referents, then how could a sentence in which those terms occur be simply a matter of meaning? Would not the (necessary) truth of such sentences have to lie in the some feature or other of the actual individual picked out, not simply how we talk about it? Showing how the analytic-deflationary account of modal semantics can endorse these claims is the project of Chapter Ten and Chapter Eleven. Finally, in Chapter

Twelve, we take on the closely related work of how to understand so-called "quantified *de re* modal claims" – such as 'There is an individual x such that, necessarily, $\phi(x)$' where there is quantification *into* the scope of a modal operator. In Chapter Twelve, we will have the opportunity to see just how the account of modal semantics we have developed fits in with a certain type of general semantic theory (interpretive truth theories as compositional meaning theories). Hopefully, we will see that there is space for model theoretic approaches, like the one we undertake, *within* the larger context of general semantical theories of the Davidsonian sort.

We shall have succeeded if we have developed a generic analytic-deflationary account for which arguments can be made without the *immediate* blockages of circularity, problems over *de re* modality or issues over how to understand quantification. Of course, there may be other issues, lurking beneath the surface that are not resolved, and that is acceptable, given our goals for this project. If the initial hindrances are removed for our account, then it will only be a benefit to be in a position to assess these less obvious difficulties for it. After all, we are in the business of assessing philosophical positions by assessing arguments for and against them: the more depth we can achieve in our assessment, the better. Such depth is best had by bringing as many issues to light as possible, in as clear language as is possible.

Thorny Issues for such a Project

A wise man[5] once said that the vast majority of mistakes in a philosophy paper are made at the outset, usually on the first page. Someone might see the word 'conventionalist' immediately preceding the phrase 'modal semantics' and straight away think that something has gone wrong. More seriously, two major, controversial assumptions have already been made in the page and a half since Chapter One began: the separability of syntax and semantics and compositionality in

[5] Perhaps it was J.L. Austin originally, but I heard it first in the fall of '02 in Professor Ludwig's Proseminar.

semantics. I believe that syntax and semantics should and can be separated and that doing so is essential for a fruitful investigation into modal semantics, and I hold the compositionality thesis I sketched earlier. If the reader is adverse to these theses, then the bumpy ride has already begun; progress of any sort is impossible if one waits to resolve all fundamental disagreements before one begins. To engage in a philosophical investigation is to critically examine everything – even the foundations upon which everything else rests – and this sort of critical examination causes disagreements. The philosophical living room is an uncomfortable abode; a portrait of certainty has no place among the pictures on the walls, the furniture is constantly in danger of being rearranged (or removed altogether in preemptory fashion), and we are constantly trying to increase the size of the windows to make greater our ability to see by letting more light in. Of course, letting in more light means that folly within can be all the more easily observed.

It is my wish for this document to be such that it lays its own weaknesses bare. I believe much more philosophical progress is made if one can clearly lay out an account with all of its possible benefits while at the same time making no effort to disguise its liabilities. Indeed, much more progress is made (and more easily made) when the proponent of a view points to its weak parts and to the controversial assumptions that must be made in order for the view to get off the ground.

Thorny Issue One: No Completeness Theorems Will Be Proved

We wil *not* propose a derivation system for the language which we develop. From the technical viewpoint taken by those who study philosophical logic (an area which this dissertation brushes up against), work in semantics may seem to lack credibility unless a completeness theorem is available to relate the formal semantics and formal derivation method for drawing inferences from a given set of sentences of the language/formal system under consideration. There are systems of modal logic for which proofs of completeness theorems exist, and the availability of these proofs will, to some extent, guide our investigation, but our efforts will not be to establish any original technical results (of the sort that Fitting & Mendelsohn[6] or Hanson & Hawthorne[7] do) along these lines or to develop any explicit method for drawing inferences in the language whose formal semantics we develop.[8]

Thorny Issue Two: How Can a Model Theoretic Treatment of Carnap[9] Be Consistent with a Conventionalist Approach to Modal Semantics?

We develop a model-theoretic treatment of some aspects of modal semantics and the intensions of predicate terms. By 'intension' of a predicate term, I wish to signal roughly that notion of the meaning of the term which is not entirely captured by, and outstrips, any understanding of the term which would be such that all and only the *actual* objects that fall under that term are described in a particular aspect by it. Placing the term 'intension' in opposition with the term 'extension' is helpful to the see what is to be signaled by the former. The extension of the predicate term 'blue' is just the collection of all and only those things that are blue. But we should not claim that one understands the predicate term 'blue' just if one is proficient at determining exactly those things that are in the extension of 'blue.' To say that one understands the term 'blue' or knows what 'blue' means is to say that one knows what the *intension* of the term 'blue' is. To do that, one must understand, for instance, that the term is such that it might have applied to certain individuals which are not blue but which were such that if they had been

[6] For all references to Fitting & Mendelsohn see (Fitting, M. & Mendelsohn, R.L., 1998).

[7] For all references to Hanson & Hawthorn see (Hanson, W.H. & Hawthorne, J., 1985).

[8] This is not quite accurate because we will try to show the semantic equivalence (in a strictly, technical and non-philosophical sense) of our modal language and a traditional system of QML developed by Fitting and Mendehlson (1998). From this semantic equivalence, we can see that there is a Henkin-style completeness proof of QML which we could use, given this semantic equivalence to show that a system of derivation based on their system of QML put to use for the language whose semantics we develop in this dissertation is such that for an arbitrary set of sentences a conclusion is derivable from that set just in case that sentence follows as a logical consequence from that set of sentences.

[9] For all references to Carnap see (Carnap, R., 1947).

different in relevant ways (ways to do with how their surfaces reflected light in what we might call "normal" conditions) then they would be such that the term 'blue' would correctly apply to them. To know the intension of a predicate term is to know how the term would be used appropriately in descriptions of novel circumstances. By definition, such a model-theoretic account is *referential* and *extensional*. That is, the account we try here to develop here is such that intensions of predicate terms will be defined in terms of various domains of discourse. Roughly, we try, first, to follow through on Carnap's characterization of intension as a map from terms and state-descriptions to individuals in the "domains" of those state-descriptions. And so intension (or meaning) is explicated in terms of individuals in the various domains of interpretations. Yet, as the reader recalls from just a few pages ago, we shall try to give an account of modal semantics that is ontologically spare in that it admits no possible worlds or properties qua *abstracta*. How are both goals simultaneously achievable? I am uncertain whether both are simultaneously achievable, but I shall outline in the following, very briefly, what the strategy is.

In Chapters Three, Four and Five, we generalize Carnap's treatment in *Meaning and Necessity* explicitly in model-theoretic terms while we try to get out on the table all the concerns over Carnap's original work that might plausibly be addressed in this idiom. In Chapters Six and Seven we try to show that with the generalization of Carnap into a model-theoretic idiom, we can change our understanding of this idiom in a way suggested to us by some fairly uncontroversial views on concepts and concept possession. Instead of relying on an ontological commitment to the individuals in the respective ranges of the maps that go proxy for Carnap's state-descriptions (*SD*s), we shall come to understand these proxy maps (interpretations) in terms of the dispositional abilities of concept possessors (or those who have conceptual mastery with regard to what is expressed by a certain predicate). And so, if we can understand dispositions or dispositional abilities with recourse to only the spare ontology required for conventionalism, then we shall have used the robustly model-theoretic reinterpretation of Carnap's work merely as an intermediate step on the way to understanding modal semantics with a minimal ontology.

Thorny Issue Three: "Abduction" versus "Apodicticity"

I believe that much of the progress that was made in Kripke's[10] *Naming and Necessity* was the result of a sort of inference to the best explanation about essences and metaphysical necessity. I maintain that to hold the proposition expressed by the sentence 'water is H_2O' is metaphysically necessary but that it is epistemically possible that the sentence is untrue, one must hold that it is the deep structure of what we call 'water' (in this world) that necessitates its superficial "watery stuff" characteristics OR that it is the deep structure of something of a particular natural kind (whatever the superficial characteristics are had by a sample of it) that serves as that which determines whether a particular sample of something falls under the predicate that expresses that particular natural kind ('water' in this case). In either case, inference to the best explanation, or *abductive* reasoning, either about the relationship of deep to superficial characteristics or about correct use in fantastical counterfactual scenarios (such as Twin Earth) is the driving force for Kripke's conclusion.

By way of full disclosure and at the risk of sidetracking us for just a few lines, I need to add that in this dissertation, I do not address explicitly the issue over whether the account I try to clear a path for can endorse the truth of (1)

1. 'Necessarily, water is H_2O.'

[10] For all references to Kripke see (Kripke, S. 1972/1980).

I think this account could plausibly endorse such a sentence if one granted its logical form could be given by adverting to the following paraphrase (2).

2. 'Necessarily, for any amount of stuff which is the individual referred to by α, if the referent of α is water then the referent of α is H_2O.'

Such is roughly the strategy of Koslicki[11]. Of course, a philosopher taking the Kripkean line might deny that such a paraphrase was legitimate in holding that because that predicate terms like 'water' and 'H_2O' are (directly) referring terms. This is the approach of Putnam's (1975)[12] as well as Nathan Salmon[13] who undertakes to show how holding this view – that natural kind predicates are directly referring terms – leads one inexorably to a thesis of metaphysical essentialism. (Much more on this later.) Suffice it to say that I do not find it at all consistent with the spirit of the conventionalist account to hold that natural kind predicates (or predicates of any sort for that matter) are referring terms. If one were to insist upon this sort of semantic treatment of natural kind predicates, then I fear anything I say in the following document will be in vain. I might only add, by way of enticement to a philosopher of Kripkean bent, that from the truth of (1) follows the truth of (2), so to refuse the semantic treatment of predicates I offer here is to be indisposed to the analytic-deflationary conventionalist strategy at the outset as a matter of philosophical principle; nothing I can say or demonstrate will close this sort of gulf, save perhaps by showing that the way we clear a path for here has more pleasant consequences regarding other of our philosophical desiderata.

A certain sort of inference to the best explanation, or *abductive* reasoning, is also at the root of the claim that a properly semantical assertion, such as that proper names are rigid

[11] For all references to Koslicki see (Koslicki, K. 1999).

[12] In addition to other philosophers of language of that particular era.

[13] For all references to Salmon see (Salmon, N. 1981).

designators, can lead us to a metaphysical conclusion such as the claim that Aristotle is essentially human. From the semantical claim, we must infer, given how rigid designation is spelled out[14], that since the same individual is picked out in each possible world by the proper name 'Aristotle' and that we have the (modal) intuition that anything which is not, or was not, human cannot be Aristotle, then we must conclude that Aristotle is human in each possible world (if we affirm our intuition). We must conclude therefore that Aristotle is essentially human. We infer a metaphysical conclusion on the basis of a semantic "fact" because the metaphysical conclusion seems to be that which best explains the semantic "fact"; a textbook case of abductive reasoning. (Of course, there is a host of tangles to do with the very notion of rigid designation and whether we have already committed ourselves to too much if we have even taken this notion on board while at the same time trying to engage in an analytic-deflationary, conventionalist path-clearing. More on this later as well.)

I shall argue that an approach which is at least as productive is one in which we engage in a sort of apodictic reasoning; this is a sort of reasoning where we reason from starting points to a conclusion in a deductive manner. (Alonzo Church[15] adumbrates the need for abstract entities in semantic analysis, the need of which is seen by reasoning abductively, but on pain of philosophical apostasy, I would assert that a certain particular admonition of his[16] should not be

[14] I try to take the most doctrinaire approach and claim, by way of explication that a term γ is a rigid designator just in case if γ has a referent at an arbitrary possible world W_1, then if γ has a referent at a different possible world W_2, the referent of γ at W_1 is the same as the referent of γ in W_2. On the received view of rigid designation, proper names, like Aristotle, are rigid designators.

[15] For all references to Church, see (Church, A., 1951).

[16] In his (1951), Church writes on page 104:

> To those who object to the introduction of abstract entities at all [in semantic analysis] I would say that I believe that there are more important criteria by which a theory should be judged. The extreme demand for a simple prohibition of abstract entities under all circumstances perhaps arises from a desire to maintain the connection between theory and observation. But the preference of (say) seeing over understanding as a method of observation seems to me capricious. For just as an opaque body may be seen, so a concept may be understood or grasped. And the parallel between the two

followed blindly.) Our starting points are what I understand to be certain uncontroversial features of meaning as use. Our conclusion will be the (form of) a theory which gives an account of semantical notions such as intension so as to provide an explication of the truth of modal claims (sentences prefixed with 'necessarily' or 'possibly'). Of course, we must engage in some sort of abductive reasoning ourselves, as I believe that every philosophical theory that poses something by way of ontology must. So it seems that the real difference between the metaphysical/more heavily abductive theories of modal semantics and the less heavily abductive theory we try to clear path for is what we take to be the more basic methodological starting points. Do we, for example, take intuitions about utterances of particular sentences as more basic starting points or do we take a systematic approach that emphasizes compositional semantics and an intelligible epistemology? The question is, of course, rhetorical. We purse the latter. My hope is that this approach can do without the ontology and handle most of the intuitions or explain them away.

Thorny Issue Four: the Relationship of Language Possession to Concept Possession.

The account of modal semantics we try to clear a path for is one which is properly linguistic (hence *conventionalist* in the sense of linguistic *conventions*), yet one for which we use concepts or conceptual mastery in explaining linguistic competence. Conventionalism about modal semantics is a view according to which all necessity is linguistic necessity, and so according to this view epistemic access to modal truths is guaranteed only for those beings who

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> cases is indeed rather close. In both cases the observation is not direct but through intermediaries – light, lens of eye or optical instrument, and retina in the case of the visible body, linguistic expressions in the case of the concept.

Rather than be concerned strictly with the "desire to maintain the connection between theory and observation", we might wish to bar from our ontology "concepts" by claiming, for example, that to say that a conceiver "grasps" or "possesses" a concept is simply *façon de parler* for our claim that a conceiver has *conceptual mastery* (a complex dispositional ability) with a certain predicate. I tentatively assert that the burden is on Church to show that we need to admit into our ontology something (and if so, what exactly) to account for this dispositional ability.

speak a language. However, one might hold that non-linguistic beings, such as higher animals, do have concepts and so are therefore capable of belief. One might further hold that animals are capable of having epistemic access to necessary truths if one were to hold that the relationship of concepts (perhaps in the case of animals concepts that are not expressed by a language terms) to one another was the seat of necessity. The account we clear a path for must deny that non-linguistic beings can have access to the truth or untruth of modal claims. This may be a thorny issue; discussion of concepts and their relation to linguistic entities is the subject of Chapter Seven.

Thorny Issue Five: Our Analysis May Not Be Meaning Giving, but Rather Only Truth Functional

Toward the very end of our investigation, we shall try to fit our progress in together with a larger, more general theory of meaning. Specifically, we shall try to situate what we have done into the context of a Davidsonian interpretive truth theory used in the context of a compositional meaning theory. Such a theory will have meaning theorems or "*M*-sentences" of the following form, ''S' in L means that p' where for 'S' we substitute the structural description of a sentence (i.e. we mention a sentence by way of a description of it) of the object language L, and for 'p' we substitute a metalanguage sentence whose meaning is the same as that denoted by the description that replaces 'S'. Since we shall focus extensively on the sentence operator 'necessarily' and try to show how it can be understood in terms of analyticity, we shall try to show that sentences of the following form are indeed M-sentences of a Davidsonian interpretive truth theory, ''Necessarily, S' in L means that it is analytic that S.' While we might be able to argue (of course, if the reasoning preceding Chapter Twelve goes through) that 'Necessarily, S' is true just in case it is analytic that S, it seems flatly false to claim that 'Necessarily, S' means the same as 'It is analytic that S' given that the phrases 'necessarily' and 'it is analytic that' cannot, at least at first glance, be substituted one for another in arbitrary sentences in which they occur. An analogy may be helpful here to see why I claim that these two terms cannot be the same in meaning. Consider the predicates ‘trilateral’ and ‘triangle.’ The two do not mean the same, as each term has to be with a different feature of straight-sided plane figures, be anything which is a trilateral is a triangle of necessity and anything which is a triangle is a trilateral also of necessity. The analogy with ‘necessarily’ and ‘is analytic that’ is not a perfect one: to be so ‘necessarily’ would have to do with a different feature of that to which it might apply (sentences or propositions) that does the phrase ‘is analytic that.’ We will build the case in this dissertation that ‘necessarily’ will be a generalized property of sentence as is ‘is analytic that,’ that they are necessarily co-extensive, and that we can analyze the concept of necessity in term of (something like) the concept of analyticity, but there are still differences in connotation (and differences in what the folk meaning of ‘is analytic that’ and the account of analyticity that we provide hereafter) that prohibit us from claiming that ‘necessarily’ means the same as ‘is analytic that.’

Given this difference in meaning, our analysis cannot be “meaning-giving”, but can serve to explicate the concept of necessity making use, *inter alia*, of the concept of analyticity. In particular, we want to show that there is an account of modal semantics on which there is a necessary equivalence between the truth of the sentence ‘necessarily, S’ and the truth of the sentence ‘it is analytic that S’ (modulo some emendations we offer for the notion of analyticity in this context). This may be a thorny issue for some who want more out of the sort of investigation into modal semantics than we get from that in which we are engaging. I submit that given our goal of trying to understand necessity in terms of analyticity, and our desire for providing a truth conditional treatment of meaning, this sort of explicating, yet non-meaning-giving analysis is the best we can hope for. We discuss this issue at greater length following the work we undertake in Chapter Twelve on trying to situate things into the interpretive truth theory.

CHAPTER 2
SELECTIVE REVIEW OF THE SEMANTICAL SYSTEMS OF *MEANING AND NECESSITY*

Introduction

In Chapter One, we gave a rough, informal characterization of an analytic-deflationary strategy for an account of modal semantics for certain sentences and termed the category of approaches to modal semantics to which it belongs ‘conventionalist’. I promised to spell out more thoroughly a specific analytic-deflationary strategy soon and, in the process of providing this spelling-out, to set the stage for pointing out an immediate problem this account of modality faces if the account is to avoid vicious circularity. (We will explicitly present and address this problem in Chapter Five and Chapter Eight.) I believe we can look to Carnap’s work on semantics and modality in his *Meaning and Necessity* to provide a firm base for the development of a conventionalist approach. A selective review of some of Carnap’s more salient themes will be our present work.

We shall present the basics of Carnap’s semantical systems in order to build up to his proposed account of a modal sentential operator ‘N’. I aim to provide a faithful characterization of his semantical systems, but I do not wish to undertake a scholarly study of Carnap’s work. Instead, I hope that if we get the fundamentals right, we can do Carnap justice while using his system as the basis for a model-theoretic reworking and generalization of Chapter Three. With this model-theoretic reworking, we will be in a position in Chapter Four to have an understanding of analyticity at least for a formal system that partially models our intuitive notion of meaning (intension).

With this development of this formal notion of analyticity, we can see more clearly how the conventionalist position could be an attractive one. Carnap has gotten us most of the way there; the reworking of his fundamentals should make the urge to understand necessity in terms of analyticity even more compelling. Of course, once the machinery that allows for interpretations of different sets of atomic sentences and negations of atomic sentences of the language to provide for intension is laid bare, it is obvious that we must be careful to acknowledge how exactly we choose to accept or reject such interpretations according to the purpose we have for them. As a look ahead to a bit of technical terminology, we say that an interpretation (in the model-theoretic sense) of the sentences of a Carnapian state-description (essentially a description of the state of the universe by way of a set of atomic sentences or negation of atomic sentences) is *admissible* if the interpretation is such that predicate terms are evaluated so as to be in line with what a cognizer who has the concept expressed by the natural language analogs of those terms has in mind for the meaning of those terms. (I ask the reader not to be alarmed. This is only a warm-up. We have much more explanation to get through. This introduction is only meant to set down some broad outlines.) The admissibility requirement is important for the reasons we have just hinted at: an account of semantics for modal claims is not acceptable if it is viciously circular – that is, if the analysis of modal notions (such as that expressed by the sentence operator 'necessarily') is such that the *analysans* make use (perhaps implicitly) of the very same notion (or a closely related notion) that occurs in the *analysandum*. If, in analyzing necessity in terms of analyticity, we must make use of the notion of necessity (or closely related notions) to give a reasonable characterization of analyticity itself, then our analysis is unsatisfyingly circular.

Of course, there are already idealizations of language which incorporate modal operators and which are not subject to objections about circularity. In particular, I have in mind systems of quantified modal logic (hereafter abbreviated 'QML'). The semantics for these systems are given traditionally in terms of "possible worlds". In part because they are idealizations, these formal systems are well behaved in that there is no concern over semantically defective predicates or other natural language difficulties. In addition, it is usually the case that formal languages themselves along with their semantics are taken to be models for how we might understand the symbolic modal operators '$\Box$' or '$\Diamond$' in terms of a (*given*) class of possible worlds the domains of which are provided explicitly along with an accessibility relation borne by pairs of those worlds to each other[1]. So these formal language idealizations do not provide exactly what we desire from a conventionalist account. But, I believe our enterprise is strengthened if we can show that the model-theoretic reworking we provide here is capable of supporting the formal language idealizations that are thought to approximate the modal operators. If we can show that our reworking of Carnap's system supports a system of QML, then I think we will have demonstrated that this sort of approach to modal semantics is in *no worse shape* than any account based upon the idealizations of these formal languages and their traditional possible world semantics. In Appendix A, we try to show that we can give the semantics for the language of QML with the model-theoretic reworking of Carnap we provide in the second main section of this chapter. There are technical differences, but from the work of Hanson and Hawthorne[2] we see that systems with semantics suggested in this chapter are well behaved and have the same technical utility as the traditional approach to semantics for QML.

Carnap's Semantical Systems and Modality

In *Meaning and Necessity*, Carnap is concerned with developing what he calls 'semantical systems' – essentially artificial languages (of first and higher order) with formal syntax whose

[1] Or, conversely, what the ordered pair consisting of (1) a class of possible worlds and (2) an accessibility relation would consist in given prior knowledge of truth-values of sentences in which '$\Box$' or '$\Diamond$' occurred.

[2] For all reference to Hanson and Hawthorne see (Hanson, W. H. & Hawthorne, J., 1985)

semantics are given intuitively without strictly formal characterization. In this section, I present the generic fundamentals for each of the semantical systems S_1, S_2 and S_3 together with some features specific to S_2 (whose language includes the modal sentential operator 'N'): their languages, (very briefly) their rules of inference, the interpretation of the languages of these systems in terms of extension (for *both* singular *and* predicate terms), and the interpretation of the languages in terms of intension (for which we must review state-descriptions and the "L–" notions).

Semantical Systems S_1, S_2 and S_3[3]

The semantical systems each have an artificial language with a common subset of vocabulary: variables, singular terms, predicate terms of first order, logical terms such as connectives and quantifiers, and the definite description and the predicate abstraction formula operators ('ι' and 'λ', respectively). And, for S_2, the artificial language has a sentence operator 'N' (we will define it shortly – for the present we can think of 'N' for 'N*ecessarily*'). The syntax and semantics of these languages is similar to that presented in a textbook on first-order predicate logic. There are also variables, singular terms and predicate terms of *higher-order* in these languages, but we won't do any exposition of how the semantics or rules of inference work for formulas containing these higher-order terms. (These semantics and rules of inference for these terms are analogous to the first-order terms, but there are complications to do with consistency of the systems with higher order terms and variables *even before* one notices that any system – with a usual sort of interpretation – in which quantification over functions and predicates is possible cannot be complete because of Gödel's first incompleteness theorem. John

[3] Actually, these are not quite Carnap's systems. For example, I do not have the same line up of logical connectives that Carnap does. I would like to indicate here that I depart in some respects from Carnap, but not in respects essential for understanding his proposal.

Myhill[4] has written a paper that is an excellent entrée into further discussion of the difficulties Carnap's systems face if they are to include higher order terms and variables. Early work by Donald Davidson[5] on Carnap's method of extension and intension is also helpful in regard to related issues.)

Language of the Systems S_1, S_2 and S_3

We give the vocabulary of the language of these semantical systems. There is a denumerable infinity of variables: 'x_0', 'x_1', 'x_2', ... There is a denumerable infinity of singular constant terms (individual constants): 'a_0', 'a_1', 'a_2', …There is a denumerable infinity of one and more place (first-order) predicate terms: 'P^1_0', 'P^1_1', 'P^1_2', … (one-place predicate terms – indicated by the superscript) and 'P^2_0', 'P^2_1', 'P^2_2' (two-place predicate terms), and so on. There are the usual first-order logic connectives and quantifier: '$\wedge$', '$\sim$' and '$\exists$', the definite description iota operator 'ι', the predicate abstraction lambda operator 'λ' and the grouping and formation symbols '(', ')', '$\langle$', '$\rangle$', '.' and ','. The formation rules for formulas follow directly and we provide the (informal) semantics for the well-formed formulas (termed 'WFFs') in this section. A completely formal treatment follows in the second section in we which we provide our model–theoretic reworking of Carnap's systems.

WFFs are defined recursively as follows. The base case is an atomic formula: $\ulcorner\phi^1(\xi_0)\urcorner$[6] is an atomic formula (recall that 'ϕ^1' is a metalinguistic variable ranging over one-place predicate terms 'P^1_0', 'P^1_1', 'P^1_2', etc. and 'ξ_0' is a metalinguistic variable ranging over the union of

[4] For all references to John Myhill see (Myhill, J., 1963).

[5] For all references to Donald Davidson see (Davidson, D., 1963).

[6] Recall that we use the characters '$\ulcorner$' and '$\urcorner$' to represent respectively opening and closing "quasi-quotes" see the list of abbreviations on page 4.

variables and constant terms), similarly $\ulcorner\phi^2(\xi_0, \xi_1)\urcorner$ is an atomic formula and, in general, the base case is given in sentences (1) and (2).

1. $\ulcorner\phi^n(\xi_0, \ldots, \xi_{n-1})\urcorner$ is an atomic formula
2. Any atomic formula is a WFF.

The recursive clause is complicated, but starts in sentences (3)-(5). For any WFFs Φ and Ψ, variable *x* and metalinguistic variable χ ranging over strings comprising concatenations of n-tuples of variables[7],

3. $\ulcorner(\Phi \wedge \Psi)\urcorner$ is a WFF
4. $\ulcorner{\sim}(\Psi)\urcorner$ is a WFF

The following further recursive rules (6)-(8) require some work-up. WFF Φ contains *n* variables just in case there is an n-tuple of variable terms such that each of the elements of the n-tuple is a substring of Φ. If Φ contains variable *x*, then *x* is free in Φ if there is a WFF Ψ that is a substring of Φ and Ψ contains *x*, and there is no WFF Ψ′ which has $\ulcorner(\exists x)\urcorner$[8] as a prefix of which Ψ is a substring.

5. If each *x* that is a member of the n-tuple the concatenation of each member of which is χ is free in WFF Φ, then $\ulcorner\langle\lambda\chi.\Phi\rangle\urcorner$ is a WFF (which has the same free variables as Φ), as is $\ulcorner\langle\lambda\chi.\Phi\rangle(\underline{\gamma_0}, \ldots, \underline{\gamma_{m-1}})\urcorner$ for $m \leq n$. If m < n, then, $\ulcorner\langle\lambda\chi.\Phi\rangle(\underline{\gamma_0}, \ldots, \underline{\gamma_{m-1}})\urcorner$ has each of $\{x_m, x_{m+1}, \ldots, x_{n-2}, x_{n-1}\}$ free.

6. If WFF Φ has single free variable *x*, then $\ulcorner(\iota x)(\Phi)\urcorner$ is a WFF. The set of all WFFs with this form make that which is referred to by 'D'. (Think the set of all *D*efinite *D*escriptions.)

7. If WFF Ψ has a free variable *x*′, and $\ulcorner(\iota x)(\Phi)\urcorner$ is a WFF then the string Θ which results from substituting $\ulcorner(\iota x)(\Phi)\urcorner$ for every occurrence of *x*′ in Ψ is a WFF. The free variables of Θ are those of Ψ except for *x*′ (it does not occur in Θ as all instances were replaced).

[7] For example, a specific n-tuple of variables is $\{x_0, x_1, \ldots, x_{n-1}\}$; in this case a specific value for χ is '$x_0x_1\ldots x_{n-1}$'.

[8] One might think that we should include $\ulcorner\langle\lambda x\urcorner$ and $\ulcorner(\iota x)\urcorner$ in the list of variable binding prefixes, we do not do so at this particular juncture as we are defining recursively WFFs in clauses and the clauses which explain the behavior of the predicate abstract operator 'λ' and the definite description operator 'ι' are yet to come.

8. Finally, if the language of the semantical system contains the symbol 'N', and Ψ is a WFF that is *not* a member of D, then $\ulcorner N\Psi \urcorner$ is a WFF.

We can define *sentences* (members of Σ) in the following way: if Φ is a WFF and Φ is not a member of D[9] and has no free variables, then Φ is a sentence.

One point of interest is that sentences which include the modal operator 'N' can be either of a "*de re*" or "*de dicto*" variety as for a sentence σ and formula Ψ with only x free, both $\ulcorner N\sigma \urcorner$ ("*de dicto*") and $\ulcorner (\exists x)N\Psi \urcorner$ ("*de re*") are sentences.

Rules of Inference

The only locus of substantial talk of rules of inference for the semantical systems of *Meaning and Necessity* comes in §1. Carnap has in mind the usual axiomatic development for these systems. For such a development, we might have either a finite set of axiom schemas (for which there will of course be available an infinity of actual axioms) along with rules of inference like *modus ponens* and perhaps *universal generalization* or a sort of natural deduction system in which there are several (intuitively validity preserving) rules of inference (and perhaps no axioms at all). It is interesting that not much emphasis is placed on the actual method of deduction for the formal systems. Instead the actual method of deduction is assumed as unproblematic and much more emphasis is placed on the actual semantical interpretation of the languages of the formal systems. This cavalier approach may seem less than cautious at first, but I think the emphasis on semantical interpretations of the languages of the formal systems S_1, S_2 and S_3 may be eventually vindicated (to a lesser extent) by the model–theoretic reworking we provide of Carnap's notions in this chapter along with and (to an even greater extent) by some work of Hanson and Hawthorne to do with the a new approach to intensional languages.

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[9] We must make this restriction because a definite description, that is, a WFF of the form $\ulcorner (\iota x)(\Psi) \urcorner$ (where has only x free) has no free variables, but is not a sentence, as we can see by noting that the English language definite description 'The tallest mountain' is not a sentence.

Designators and Extension

Obviously, Carnap is developing a *semantical*, rather than merely *syntactic*, system – the languages of the semantical systems are supposed to be *about* something. To develop the semantics for the languages in question, we can begin with the notion of a *designator* of which there are two fundamental kinds: singular (referring) terms and predicate terms. Informally, the terms 'Sir Walter Scott' and 'The author of *Waverly*' both designate individuals and so are singular referring term designators.[10] Formal analogs of such terms, an individual constant for the former and a definite description formed from the 'ι' operator, are each used to pick out unique individuals (though either may fail to do so). Predicate terms are designators which serve to pick out sets of individuals (extensions).

We provide only an informal treatment of Carnap's original semantics, and then sketch how the formal semantics might go based on informal treatment. Hopefully, this will be enough to set us on the right track and to motivate our work in Chapter Three. We will provide a formal treatment of the semantics in *Meaning and Necessity* with the use of explicitly model-theoretic techniques.

We can say that a name like 'Sir Walter Scott' might have as its formal analogue an individual constant such as 'a_2' and a definite description like 'The author of *Waverly*' has as its formal analogue something like '$(\iota x_0)(P^2{}_{99}(a_{12}, x_0))$' if we pretend that '$P^2{}_{99}(x_1, x_0)$' is the formal analogue of the relation expressed in English by 'x_0 is an author of x_1,' and 'a_{12}' is the formal language analog of *Waverly*. The expression '$(\iota x_0)(P^2{}_{99}(a_{12}, x_0))$' is read 'the unique individual such that that individual is an author of *Waverly*.'

[10] Of course, on the assumptions that there is an individual corresponding to the first name and that *Waverly* has a unique author.

Analogously, but perhaps artificially, predicate terms are said to designate[11] sets of such individuals in the domain the language is supposed to speak about. To give a flavor for the semantics of predicate and predicate abstract terms as we did for singular terms, we might represent 'is blue' formally as '$P^1{}_0$,' 'is green' as '$P^1{}_1$' and 'is cold' as '$P^1{}_2$' and so with predicate abstracts we can formally represent 'is blue or green' as '$\langle\lambda x_0.(P^1{}_0(x_0) \vee P^1{}_1(x_0))\rangle$[12] and 'is blue and is cold' as '$\langle\lambda x_0.(P^1{}_0(x_0) \wedge P^1{}_2(x_0))\rangle$'.)

With these basic notions, we can define extension implicitly. If two singular terms designate the same individual, then those two terms have the same extension. If two predicate terms designate the same set of individuals, then those two terms have the same extension. The extension of a sentence is its truth-value. There is room for disagreement[13] about what exactly the extension of a designator is (especially for singular terms), but since our interest here is not scholarly study of Carnap but rather to use the basic notions of his work to serve as the basis for our investigation, I will pass over these worries and take the intuitive notion of extension as acceptable. In our model–theoretic reworking, we will give a formal characterization that can be the subject of (perhaps more exacting) scrutiny.

State-Descriptions

Even though the question over what is to be, exactly, the domain of interpretation for the languages of his semantic systems is not given a definitive answer in *Meaning and Necessity*, it is clear that the atomic sentences of these languages are such that they can be used to provide the

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[11] To say that predicates *designate* may seem an odd choice of word, but I am trying to follow Carnap in his assertion that *predicators* (a general term meant to including predicates) are *designators* (§1.9)

[12] Where '$(P^1{}_0(x_0) \vee P^1{}_1(x_0))$' is an abbreviation for '$\sim(\sim P^1{}_0(x_0) \wedge \sim P^1{}_1(x_0))$'.

[13] For example, see (Davidson, 1963)

"state of the universe" of individuals about which they speak. Carnap refers to a specific class of atomic sentences which describe the state of the universe as a 'state-description' in §2,

> A class of sentences in S_1 which contain for every atomic sentence either this sentence or its negation, but not both, and no other sentences is called a *state-description* in S_1, because it obviously gives a complete description of a possible state of the universe of individuals with respect to all properties and relations expressed by predicates of the system. Thus state-descriptions represent Leibniz's possible worlds or Wittgenstein's possible states of affairs. (9)

Whatever the languages of semantical systems like S_1 are supposed to be about, the various state-descriptions (hereafter on occasion abbreviated 'SD') in those semantical systems indicate the predicates that hold of the individuals designated by individual constants and the relations that hold among individuals so designated, and do so as exhaustively as is possible given the predicate, relation and singular terms for the language in question.

Something else that's interesting to notice from Carnap's initial presentation of state-descriptions is the assumption that the atomic sentences are pairwise independent. From the presentation we're given of state-descriptions in §2, there seems to be no formal restriction about which atomic formulas are allowed given the inclusion of any other. For example, for predicate terms 'P^1_3', 'P^1_5' and two-place relation term 'P^2_4' and singular terms 'a_0' and 'a_1', a state-description that includes the sentences '$P^1_3(a_0)$' and '$P^1_5(a_1)$' might include either '$P^2_4(a_0, a_1)$' or '$\sim P^2_4(a_0, a_1)$'. This situation seems unexceptionable unless 'P^1_3' and 'P^1_5' were interpreted such that two sentences '$P^1_3(a_0)$' and '$P^1_5(a_1)$' together entailed '$\sim P^2_4(\mathrm{a}_0, \mathrm{a}_1)$'. (We have a clear example of this if 'P^1_3' is to be interpreted as 'is exactly three meters long' and 'P^1_5' is to be interpreted as 'is exactly five meters long' and '$P^2_4(x_0, x_1)$' is to be interpreted as 'the length of x_0 is greater than x_1.') In this situation, any state-description with both of the former atomic sentences could not include '$P^2_4(a_0, a_1)$' on pain of contradiction. Since Carnap means to be providing semantical systems, it seems that he must at least implicitly require that the set of sentences that is a state-description is consistent. What is happening here? Why were explicit restrictions not placed on the collections of atomic sentences (and negations of atomic sentences) to disallow such contradictions? It may be that the atomic sentences were only supposed to include basic properties, such as the exact length of individuals, from which "parasitic", relational properties and relations, such as 'is longer than' could emerge, but not themselves be included in the state-description.

This speculation seems misguided because it seems that unless a formal analogue of 'a_0 is taller than a_1' is among the atomic sentences of a particular language, it is difficult to see how any sentence which expresses this situation could be included in the language at all. More likely, it seems that Carnap assumes that there would be an implicit interpretation for the predicate and singular terms of the language for his semantical system. Since the sentences of the state-description are to describe the properties and relations which hold of and among particular individuals in a certain state of the universe, and on any reasonable assumption about any particular state of the universe it cannot be the case that a_0's length is 3m and a_1's length is 5m but a_0 is longer than a_1 on the usual meaning of the numerals, 'length' and 'longer than,' given the implicit interpretation we have for the terms of the language, a state-description wouldn't include any pair of sentences which are inconsistent. We will argue later that it is helpful to make these assumptions explicit. With our model–theoretic update, we will be able to do this and explicitly disallow the situation in which a state–description (or our interpretation proxies for them) is inconsistent.

L-Truth, Intensions and 'N'

Since a state-description is supposed to provide the state of the universe of individuals that are named by the individual constants of the language (to the extent that the state of this universe can be described with the vocabulary of the language), the collection of all state-descriptions is supposed to delimit the way that the universe might have been. With the notion of the collection of state-descriptions and ranges, we can introduce the notions termed 'L–truth' and 'L–equivalence' and use them to define intension implicitly.

Briefly, if a sentence σ is included in each state-description (in case σ is an atomic sentences or is $\ulcorner\sim\sigma'\urcorner$ where σ′ is an atomic sentence) or is true according to each state-description (on the usual recursive rules for truth for predicate logic), then σ is *L–true*. For predicate terms (or predicate abstract terms) ϕ and ϕ′, if (and only if) the sentence $\ulcorner(\forall x_0)(\phi(x_0) \leftrightarrow \phi'(x_0))\urcorner$[14] is true according to each state-description (§4), then $\ulcorner(\forall x_0)(\phi(x_0) \leftrightarrow \phi'(x_0))\urcorner$ is L–true and ϕ and ϕ′ are *L–equivalent*. For singular terms γ and γ′, if (and only if) in each state-description, the identity relation holds between γ and γ′ or both have no denotation, then γ and γ′ are L–equivalent. For any two (predicate or singular) terms, if these terms are L–equivalent then they have the same *intension*.[15] In general, intensions might be thought of as functions either from state-descriptions to individuals (in the case of singular terms including those formed with the ι-operator) or from state-descriptions to sets of individuals (in the case of predicate and predicate abstract terms). So intuitively, two terms have the same intension iff they pick out the same individual (singular terms) or set of individuals (predicate terms) in each state-description.

Finally, we can define the semantics for the modal operator. For Carnap, 'N' creates intensional contexts – contexts in which co-denoting terms might not be substitutable *salva*

[14] This is, of course, an abbreviation for $\ulcorner\sim(\exists x_0)(\sim(\sim(\phi(x_0) \wedge \sim\phi'(x_0)) \wedge (\sim \phi(x_0) \wedge \phi'(x_0))))\urcorner$.

[15] More work is done on an explicit formulation of intension for designators. Ultimately, the intension of a predicate term is claimed to be a *property* and the intension of an individual expression (individual constants and individual descriptions – those formed with the iota operator '$(\iota x)(\ldots x \ldots)$') an *individual concept*. I will not reiterate here Carnap's explanation of intensions in §3-5; rather, I'll hold off until we develop our model theoretic reworking of the theory of these sections. After we reformulate Carnap's basic notions, we will be in a position to see that the intensions of predicate terms and individual expressions can be given a purely set-theoretic (and I hope just as clean and intuitive a) treatment.

veritate. For any predicate (or predicate abstract) term ϕ and singular term (either constant or definite description) $\underline{\gamma}$, to assess the truth of $\ulcorner N(\phi(\underline{\gamma}))\urcorner$ we must consider the intensions of ϕ and $\underline{\gamma}$. Specifically, if $\ulcorner\phi(\underline{\gamma})\urcorner$ is L–true, then $\ulcorner N(\phi(\underline{\gamma}))\urcorner$ is true, false otherwise. If $\ulcorner N(\phi(\underline{\gamma}))\urcorner$ is true, then the truth of $\ulcorner\phi(\underline{\gamma})\urcorner$ is independent of how the world turned out (assuming that the class of state-descriptions tells us somehow exactly how the world could have turned out). Similarly, $\ulcorner N((\exists x)(\phi(x)))\urcorner$ is true iff $\ulcorner(\exists x)(\phi(x))\urcorner$ is L–true.

In an intensional context, variables free for that context (but perhaps bound outside it) range over *individual concepts* – functions from state-descriptions to individuals. In such contexts, we must consider the intensions of the predicates terms that occur. Keeping this in mind, if we consider the *de re* sentence $\ulcorner(\exists x)(N(\phi(x)))\urcorner$, and take the intuitive semantics for '$\exists$', we see that it is true if there in an individual concept which could be substituted into the following formula $\ulcorner N(\phi(\underline{c}))\urcorner$ such that the resulting sentence is true. This sentence is true just in case for every SD s, the substituend for $\underline{c}$ evaluated at s is such that it is in the extension of ϕ at s. But in this case, the sentence $\ulcorner N((\exists x)(\phi(x)))\urcorner$ is true, as this sentence expresses the L–truth of the informal 'something is ϕ.' So on Carnap's view, from the truth of the *de re* $\ulcorner(\exists x)(N(\phi(x)))\urcorner$ follows the *de dicto* $\ulcorner N((\exists x)(\phi(x)))\urcorner$.[16]

Conclusion

In this short chapter, we have tried to make clearer some of the salient notions of *Meaning and Necessity*. Doing this is required for the next step we shall take in Chapter Three: we shall rework and generalize Carnap's basic ideas in a model-theoretic idiom. Doing so will highlight the need for more qualification to be made about Carnap's claim that the sentences of an SD

[16] There cannot be something like an 'iff' here because even though if $\ulcorner N((\exists x_0)(\phi(x_0)))\urcorner$ is true there will be *some* function (whose name can be substituted in for '$\underline{c*}$') from state-descriptions to individuals such that in an intensional context '$\underline{c*}$ is P' is true, we're not guaranteed that there *is* an individual concept that names this function.

must be pairwise independent. It may be that Carnap has in mind languages which are such that it reasonably be assumed that the sentences of an SD are pairwise independent, but for the purpose to which we shall try to adapt Carnap's work we cannot reasonably assume this, and we shall not do so. The model-theoretic machinery will allow us to see some of the assumptions that seem to have gone into Carnap's work and appreciate how these assumptions give rise to a fundamental problem for the approach Carnap takes. Briefly, Carnap takes the collection of all SDs to tell us something about modal truths (with the 'N' operator) *and* something about the meaning of predicate terms (after all intension is defined as a map from SDs to extensions). In the model-theoretic update, I hope we shall be able to observe that such an approach is not workable unless *conceptual priority* is given to meaning notions of *intension* and *analyticity*. In other words, we must use the basic framework developed by in *Meaning and Necessity* to give an account of the intensions of predicate terms, and hence an account of analyticity for *de dicto* sentences, and then move on to giving an account of the sentence operator 'necessarily.' If we do not proceed in such fashion, I argue that an analytic-deflationary story about modal semantics will fall victim to a sort of vicious circularity.

CHAPTER 3
REWORKING AND GENERALIZATION OF CARNAP'S SYSTEM WHICH MAKES EXPLICIT USE OF MODEL-THEORETIC TECHNIQUES

Introduction

Carnap has articulated a powerful idea: that a class of linguistic entities can provide a plausible treatment of modal semantics. This notion is at the very core of the conventionalist analytic-deflationary approach to modality, I believe there are some difficulties with Carnap's development of and arguments for this sort of linguistic approach to necessity. In this chapter, we will try to expose some of these shortcomings and show what it would take to hold a conventionalist view in the face of them. To do this, I will rework and generalize Carnap's semantical systems with the use of model-theoretic ideas. Once this is done, I hope we shall be in a position to see some of the weak aspects of the presentation of *Meaning and Necessity* and to see what we might be forced to commit ourselves to if we wish to continue on the conventionalist path.

Carnap's Ideas Presented in, and Revised in, a Model-theoretic Idiom

We have seen that, because state-descriptions (as certain sets of atomic sentences and negations of atomic sentences) are supposed to describe the state of the universe of individuals which the languages "speak about", the languages of the semantical systems are to be interpreted. In this section, we aim to show that the formal semantic notion of an interpretation as a map from certain expressions of a formal language to individuals or sets of individuals in the domain of discourse can provide Carnap's notion of extension, and that we can approximate Carnap's notion of intension if we consider a certain class of interpretations for the languages of S_1, S_2 and S_3. In a sense, our use of interpretation might clear up what may have seemed obscure according to Carnap's presentation of formal semantics. Soon, we will be in position to see how we might understand analyticity at the end of our reworking.

Hopefully in our presentation and reworking of Carnap's ideas with the tools of model-theoretic formal semantics, we shall be able to detect with more easily places where Carnap's proposal is vague or less than robust. Specifically, our translation of his ideas into a specifically model-theoretic idiom will allow us to move off the implicit view (of Carnap) that the truth of atomic sentences of the SDs are independent of one another. Once we begin thinking of the *interpretation* of sentences of an SD rather than simply thinking of those sentences as syntactic entities, we will see that an "upper bound" on the size of the class of SDs can be placed with the use of the notion of consistency, which, because the sentences of an SD are to be interpreted is a properly semantic rather than merely syntactic issue.

Of course, by using model-theoretic techniques to explicate and generalize Carnap's work we run the risk of losing a main initial attraction of his approach. Carnap was able to dispense with an ontological commitment to possible worlds as physical or abstract entities because SDs were to represent, in as much detail as they were capable of, what these possible worlds *would be like were there to be any*. Because SDs were merely syntactic, no issue of what their sentences were to be interpreted over would ever come up. Once we start using model-theoretic formal semantic techniques, we are required to provide a domain that sentences of an SD are to be interpreted over. In other words, for the model-theoretic update to work, the sentences of an SD must be *about* something, and we must know what that something is. We will move away from the term 'SD' in favor of talk of an interpretation (we shall use the symbol '$\mathscr{I}$' to indicate an interpretation). For any SD, there is to be a corresponding interpretation; the interpretation is to provide all the information that was provided by the SD. But as things stand over the course of the next few chapters, an interpretation will provide much more information than the SD to which it corresponds; and this excess of information is not a good thing. The excess information is, of course, that the domain of interpretation is something we must have an ontological commitment to if we're to do a model-theoretic reworking of Carnap and stop there.

For a model-theoretic treatment to even get off the ground, we must acknowledge an ontological commitment to the domain over which the sentences of an SD are interpreted. And so, we should give at least a preliminary characterization of what we are, as a consequence, committed to. Now, if we are to make any progress in understanding analyticity for a formal language which is some simplified approximation of our own natural language, then the most likely candidate for those things which SDs are about *are* the very possible worlds that SDs were to describe. The SDs were to represent after all possible configurations of the universe as described by the atomic sentences of the language of the SD. But incurring an ontological commitment to any sort of mind-independent possible worlds as truth makers for the model-theoretic reworking we provide for SDs is really the last thing we want, as the conventionalist modal semantics for which we're clearing a path is to be deflationary and so as ontologically as conservative as possible. I argue that we will *not* have to admit possibilia into a domain with respect to which interpretations are defined, even though it *seems* as if we will with the model-theoretic update we are about to engage in.

To show why, I shall lay out the strategy we will employ for the remainder of this chapter and the next five. First, in the remainder of this chapter, we will show that an interpretation, thought of as a map from individual constant terms, predicate terms and sentences to members of a domains, sets of members of a domain and truth values, respectively, can provide at least as much information as a corresponding SD does. What are the domains of interpretation that includes those individuals which individual constant terms are interpreted to be? For the sake of this chapter, we can allow that each domain (of interpretation) comprises just the set of individuals in the possible world described by the SD to which an interpretation is to correspond.[1] The members of each domain populate universes that are as richly detailed as an imaginer might imagine given as long as it might take to do so. So far, a rather heavy ontological commitment has indeed been incurred. We shall finish this chapter by claiming that there is a class of admissible interpretations which roughly correspond to the class of SDs of *Meaning and Necessity*.

In what follows, we shall demonstrate how from this class of admissible interpretations – we can think of these as just functions from individual constant terms and predicate terms to individuals and sets of individuals at a possible world (as it is imagined) (one function – interpretation – per world), we can construct a single function I from indices (each of which is a member of an index set for the set of all admissible interpretations) and singular and predicate terms to individuals in a possible world and sets of individuals in a possible world respectively. Then we can generate a function I' which takes as input a singular or predicate term, an index and an individual which is a member of the domain of the interpretation which has that index and returns 0 or 1: 0 if the individual is not that picked out by the singular term, or not among those picked out by the predicate term and 1 if the individual is that picked out by the singular term or is among those picked out by the predicate term. We shall then argue that this function is exactly analogous to one which characterizes congnizers' abilities to sort given conceptual competence with concepts expressed by the predicate terms that are among the functions' arguments. Our only commitment will be to that which we must be committed to by a traditional view of concepts (as concept possession). And so what seemed to be our original heavy-duty ontological

[1] At this point, I'm agnostic on what individuals there are. In particular, I don't mean to take a stand on the question of (modal) actualism: an actualist would say that the only individuals there can be in possible worlds are those individuals that are in the actual world.

commitment to the ranges of our interpretations (the so-called "domains" of interpretation) was really just an intermediate step in passing from talk of possible worlds to talk of concept possession.

The road is a long one, and our route may become obscured along the way. I will offer sign posts to help us understand where we our along our journey. It may seem that we spend too much time meticulously grooming that part of the path that has been (hopefully) cleared and defining its precise edges over the course of the next five chapters, but I think this is not the case. I believe it is important to remember that once we have updated Carnap's system with the aid of model-theoretic ideas and then dispensed with what must underwrite a model-theoretic treatment (a commitment to the domain of interpretation) in favor of talking about the epistemically and ontologically respectable notion of conceptual mastery, if we have done our job well, we will be in a good position to see worries over what have been seen as insurmountable obstacles for conventionalist approaches – such as the problem of *de re* modality and quantifying into opaque context – simply melt away. If we haven't been careful with what we have said before we get there, then the melting will seem magical, but I assert, as forcefully as I might politely do, that the melting away is not magical, and if we have done our job, we will have earned it.

Interpretations Can Provide *Extension*

We have already given the vocabulary of the formal language. Let us consider a map, $\mathscr{I}$, from certain expressions of the language to members, sets of members of a domain of discourse or truth values. $\mathscr{I}$ is called an 'interpretation' for our language. If we let 'Γ' denote the set of individual constants 'D' the set of WFF formed with the 'ι' operator, 'Π^1' denote the set of (one-place) predicate terms, 'Π^2' denote the set of two-place predicate terms, (and in general let 'Π^n'

denote the set of n-place predicate terms), ‘Σ’ denote the set of sentences of the language and ‘Δ’ denote the set of individuals in the universe or domain of discourse, then schematically, we have:

1. $\mathscr{I}: \{\Gamma\} \to \Delta$

2. $\mathscr{I}: \Pi^n \to 2^{\Delta^n}$, ($\mathscr{I}$ maps n-place predicate terms to sets of n-tuples of individuals, in particular, $\mathscr{I}: \Pi^1 \to 2^{\Delta}$, that is, one-place predicate terms are mapped to sets of individuals.)

3. $\mathscr{I}: \ulcorner\phi^n(x_0, x_1, \ldots, x_{n-1})\urcorner = \mathscr{I}(\phi^n)$.[2]

4. $\mathscr{I}: \{D\} \to \Delta$ such that $\mathscr{I}(\ulcorner(\iota x)(\Phi)\urcorner)$ is the sole member of $\mathscr{I}(\Phi)$ iff $\mathscr{I}(\Phi)$ is a singleton and is undefined otherwise.

5. $\mathscr{I}: \{\ulcorner(\langle\lambda x_m x_{m+1} \ldots x_{n-1}\rangle.(\phi^n(\underline{\gamma_0}, \underline{\gamma_1}, \ldots, \underline{\gamma_{m-1}}, x_m, x_{m+1}, \ldots, x_{n-1}))\urcorner\} \to 2^{\Delta^{n-m}}$ such that $\mathscr{I}: \ulcorner(\langle\lambda x_m x_{m+1} \ldots x_{n-1}\rangle.(\phi^n(\underline{\gamma_0}, \underline{\gamma_1}, \ldots, \underline{\gamma_{m-1}}, x_m, x_{m+1}, \ldots, x_{n-1}))\urcorner = \{\langle\delta_m, \delta_{m+1}, \ldots, \delta_{n-1}\rangle \mid \langle(\mathscr{I}(\underline{\gamma_0}), \mathscr{I}(\underline{\gamma_1}), \ldots, \mathscr{I}(\underline{\gamma_{m-1}}), \delta_m, \delta_{m+1}, \ldots \delta_{n-1}\rangle \in \mathscr{I}(\phi^n)\}$.[3]

   AND

   $\mathscr{I}: \{\ulcorner(\langle\lambda x_m x_{m+1} \ldots x_{n-1}\rangle.((\exists x_0 x_1 \ldots x_{m-1})(\phi^n(x_0, x_1, \ldots, x_{n-1}))\urcorner\} \to 2^{\Delta^{n-m}}$ such that $\mathscr{I}: \ulcorner(\langle\lambda x_m x_{m+1} \ldots x_{n-1}\rangle.((\exists x_0 x_1 \ldots x_{m-1})(\phi^n(x_0, x_1, \ldots, x_{n-1}))\urcorner = \{\langle\delta_m, \delta_{m+1}, \ldots, \delta_{n-1}\rangle \mid$ there are some $\underline{\gamma_0}, \underline{\gamma_1}, \ldots, \underline{\gamma_{m-1}}$ and $\langle(\mathscr{I}(\underline{\gamma_0}), \mathscr{I}(\underline{\gamma_1}), \ldots, \mathscr{I}(\underline{\gamma_{m-1}}), \delta_m, \delta_{m+1}, \ldots \delta_{n-1}\rangle \in \mathscr{I}(\phi^n)\}$.[4]

6. $\mathscr{I}: \ulcorner{\sim}(\Phi)\urcorner = (\mathscr{I}(\Phi))^c$ (where Φ is a WFF and ‘$\mathscr{I}(\Phi))^c$’ denotes the *set complement* of $\mathscr{I}(\Phi))$ – an individual is in $\mathscr{I}(\Phi))^c$ just in case is it *not* in $\mathscr{I}(\Phi)$.)

7. $\mathscr{I}: \ulcorner((\Phi \wedge \Psi)\urcorner = (\mathscr{I}(\Phi) \cap \mathscr{I}(\Psi))$(where Φ and Ψ are WFFs)

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[2] This is a bit of technical detail to make sure we get the right result for predicate abstract terms in (5) and (8)-(10). As an example, for a one place predicate term ‘P^1’, $\mathscr{I}$(‘P^1’) = $\mathscr{I}$ (‘$P^1(x_0)$’). Which is, informally, the set of all things to which ‘is P^1’ rightly applies under $\mathscr{I}$.

[3] This looks to be a complicated characterization, but a simple example will make things clear. The formula ‘$(\langle\lambda xy\rangle.(P(x)$ & $R(x,y))$’ is satisfied by ordered pairs of individuals such that the first falls in the extension of ‘is *P*’ and such that the first bears relation ‘is *R*’ to the second. So in terms of our model-theoretic treatment $\mathscr{I}$(‘$(\langle\lambda xy\rangle.(P(x)$ & $R(x,y))$’) = the set of ordered pairs of objects such that the first is in $\mathscr{I}$(‘*P*’) and the ordered pair is in $\mathscr{I}$(‘*R*’).

[4] Again, this looks overly complicated, but an example helps make sense of it all ‘$(\langle\lambda x\rangle.((\exists y)(R(x, y)$ & $Q(x, y))$’ is satisfied by individuals which are such that there is another individual to which they bear relation R and to which they bear relation Q. In our model theoretic terms, $\mathscr{I}$(‘$(\langle\lambda x\rangle.((\exists y)(R(x, y)$ & $Q(x, y))$’) = the set of individuals such that there is some constant term ‘*a*’ such that ordered pairs the first member of which is a member of that set and the second is $\mathscr{I}$(‘*a*’) such that these ordered pairs are members of both $\mathscr{I}$(‘*R*’) and $\mathscr{I}$(‘*Q*’)

8. $\mathscr{I}$: $\ulcorner((\langle\lambda x_0 x_1 ... x_{n-1}\rangle.(\Psi^{i+k}(x_{i+0}, ..., x_{i+k}) \wedge \Psi'^{j+h}(x_{j+0}, ..., x_{j+h}))\urcorner$ (where $0 \leq i$, $j \leq n-1$, and $i+k$, $j+h \leq n-1$) $= (\{\langle\delta_0 , ... , \delta_{n-1}\rangle\} \mid \langle\delta_{i+0} , ... , \delta_{i+k}\rangle \in \mathscr{I}(\Psi^{i+k})$ and $\langle\delta_{j+0} ,..., \delta_{j+h}\rangle \in \mathscr{I}(\Psi'^{j+h}))$.

9. $\mathscr{I}$: $\ulcorner((\langle\lambda x_0 x_1 ... x_{n-1}\rangle.(\sim(\Psi^n(x_0, ..., x_{n-1}))))\urcorner = (\{\langle\delta_0 , ... , \delta_{n-1}\rangle\} \mid \langle\delta_0 , ... , \delta_{n-1}\rangle \in (\mathscr{I}(\Psi^n))^c)$.

10. $\mathscr{I}$: $\ulcorner((\langle\lambda x_0 x_1 ... x_{n-m-1}\rangle.((\exists x_0 x_1 ... x_{m-1})(\Psi^n)\urcorner = (\{\langle\delta_0 , ... , \delta_{n-m-1}\rangle\} \mid$ there are $\underline{\gamma_0}, \underline{\gamma_1}, ..., \underline{\gamma_{m-1}}$ and $\langle(\mathscr{I}(\underline{\gamma_0}), \mathscr{I}(\underline{\gamma_1}), ..., \mathscr{I}(\underline{\gamma_{m-1}}), \delta_0, \delta_1, ... \delta_{n-m-1}\rangle \in \mathscr{I}(\Psi^n))$.

11. $\mathscr{I}$: $\ulcorner N(\Phi^n)\urcorner = \mathscr{I}(\Phi^n)$[5]

12. $\mathscr{I}$: $\Sigma \rightarrow \{\mathscr{T}, \mathscr{F}\}$ ($\mathscr{I}$ maps sentences to values of '$\mathscr{T}$' ("true") or '$\mathscr{F}$' ("false"))

The last clause needs explanation and expansion. The rules for "truth under an interpretation" are given recursively. The base clause for atomic sentences is given first. The recursive clauses follow.

13. For any ϕ^n and $\underline{\gamma_0}, \underline{\gamma_1}, \underline{\gamma_2}, ..., \underline{\gamma_{n-1}}$ (recall that $\underline{\gamma} \in \{\Gamma \cup D\}$), $\mathscr{I}(\ulcorner\phi^n(\langle\underline{\gamma_0}, \underline{\gamma_1}, \underline{\gamma_2}, ..., \underline{\gamma_{n-1}}\rangle)\urcorner) = \mathscr{T}$ iff $\mathscr{I}((\langle\underline{\gamma_0}, \underline{\gamma_1}, \underline{\gamma_2}, ..., \underline{\gamma_{n-1}}\rangle)) \in \mathscr{I}(\phi^n)$.[6]

14. For $\sigma_1 \in \Sigma$, if σ_1 is $\ulcorner\sim\sigma_2\urcorner$ for some $\sigma_2 \in \Sigma$ $\mathscr{I}(\sigma_1) = \mathscr{T}$ iff $\mathscr{I}(\sigma_2) = \mathscr{F}$.

15. If σ_1 is $\ulcorner\sigma_2 \wedge \sigma_3\urcorner$, $\mathscr{I}(\sigma_1) = \mathscr{T}$ iff $\mathscr{I}(\sigma_2) = \mathscr{I}(\sigma_3) = \mathscr{T}$.

16. If σ_1 is $\ulcorner(\exists x)\phi(x)\urcorner$, $\mathscr{I}(\sigma_1) = \mathscr{T}$ iff there is some individual constant γ such that $\mathscr{I}(\sigma_2) = \mathscr{T}$ where $\sigma_2 = \ulcorner\phi(\gamma)\urcorner$.[7]

17. If σ_1 is $\ulcorner\langle\lambda\chi\rangle.(\Psi)(\langle\underline{\gamma_0}, \underline{\gamma_1}, \underline{\gamma_2}, ..., \underline{\gamma_{n-1}}\rangle)\urcorner$, $\mathscr{I}(\sigma_1) = \mathscr{T}$ iff there $\mathscr{I}((\langle\underline{\gamma_0}, \underline{\gamma_1}, \underline{\gamma_2}, ..., \underline{\gamma_{n-1}}\rangle)) \in \mathscr{I}(\Psi)$.

We can now claim straightforwardly that the denotation of a singular term $\underline{\gamma}$ is $\mathscr{I}(\underline{\gamma})$ and that the designation of a predicate term ϕ is $\mathscr{I}(\phi)$ and so any two designating terms ζ_0 and ζ_1 are

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[5] This is a stub for the moment. We shall provide the truth conditions for sentences of both *de re* and a *de dicto* form which include the 'N' operator, but for the time being we need to be able to show that completely general WFFs with free variables can be interpreted over a domain.

[6] Rules for the truth of a sentences of the form $\ulcorner\langle\lambda x.\phi_0(x)\rangle((\iota x')(\phi_1(x')))\urcorner$ where ϕ_0 has only x free and ϕ_1 has only x' free can be given a straightforward recursive treatment also. We shall not do so here.

[7] The set of all individual constants (Γ) may have to be expanded to include γ if it does not already. This move follows Mates. For all references to Mates see (Mates, B., 1972).

co-extensive iff $\mathscr{I}(\zeta_0) = \mathscr{I}(\zeta_1)$. This all seems exactly in line with what Carnap lays out in the sections about extension.

Also, we see that given that the interpretation for the language can provide an implicit treatment of extension, an interpretation can *endorse* a sentence which is included in an SD in the sense that for $\sigma \in \Sigma$, if σ is included in an SD, then an interpretation $\mathscr{I}$ can be such that $\mathscr{I}(\sigma) = \mathscr{T}$. Since this endorsement is possible for each sentence of the SD, we might say that a certain interpretation can be such that it endorses the entire SD, or serves as a *proxy* for a state-description: an interpretation, $\mathscr{I}$, is a proxy for an SD, s_1, just in case for every sentence σ included in s_1, $\mathscr{I}(\sigma) = \mathscr{T}$.

Apart from simply providing proxies for state-description, an interpretation can forestall some of the difficulties that we canvassed earlier. Specifically, we saw that, informally, we might have a situation in which each of these sentences are included in a particular state-description: '*a* is exactly three meters long,' '*b* is exactly five meters long,' '*a* is longer than *b*,' and so the state-description would be "inconsistent", according to any expected understanding of the terms involved. This situation seemed to be something Carnap didn't want, and perhaps something he thought wouldn't arise given how he thought about the interpretation of the languages of his semantical systems, but which was nevertheless not explicitly disallowed by his presentation of state-descriptions. With interpretations serving as proxies for state-descriptions, we can explicitly disallow such behavior.

We do this, in part, with the following sort of restrictions. We give the formal presentation first and then an explication of the "interpretation" entailment relation denoted by '$\underset{i}{\Rightarrow}$'. Let $\boldsymbol{V_0}$, $\boldsymbol{V_1} \in \{\mathscr{T}, \mathscr{F}\}$. For any two members of a state-description σ_1, σ_2, if $\mathscr{I}(\sigma_1) = \boldsymbol{V_0}$ and $\mathscr{I}(\sigma_1) = \boldsymbol{V_0}$

$\underset{i}{\Rightarrow} \mathscr{I}(\sigma_2) = \boldsymbol{V_1}$, then $\mathscr{I}(\sigma_2) = \boldsymbol{V_1}$. In general for any *n* members of a state-description $\sigma_1, \sigma_2, \ldots \sigma_{n-1}$, if $\mathscr{I}(\ulcorner{\sim}\sigma_1 \wedge {\sim}\sigma_2 \wedge \ldots \wedge {\sim}\sigma_{n-1}\urcorner) = \boldsymbol{V_0}$ and $\mathscr{I}(\ulcorner{\sim}\sigma_1 \wedge \sigma_2 \wedge \ldots \wedge \sigma_{n-1}\urcorner) = \boldsymbol{V_0} \underset{i}{\Rightarrow} \mathscr{I}(\sigma_n) = \boldsymbol{V_1}$, then $\mathscr{I}(\sigma_n) = \boldsymbol{V_1}$. Since, it can be the case that σ is $(\ulcorner{\sim}\sigma_1 \wedge {\sim}\sigma_2 \wedge \ldots \wedge {\sim}\sigma_{n-1}\urcorner)$, a more general, and simpler, formulation of the interpretation entailment is to say that for sentences σ_1 and σ_2, if $\mathscr{I}(\sigma_1) = \boldsymbol{V_0}$ and $\mathscr{I}(\sigma_1) = \boldsymbol{V_0} \underset{i}{\Rightarrow} \mathscr{I}(\sigma_n) = \boldsymbol{V_1}$, then $\mathscr{I}(\sigma_2) = \boldsymbol{V_1}$.

The interpretation entailment relation (‘$\underset{i}{\Rightarrow}$’) is such that given a “partial” interpretation of ϕ_0 and ϕ_1 (an interpretation restricted only to Γ, ϕ_0 and ϕ_1), for singular terms $\underline{\gamma}$ and $\underline{\gamma'}$, $\ulcorner(\phi_0(\underline{\gamma})\ \&\ \phi_1(\underline{\gamma'}))\urcorner \Rightarrow_i \ulcorner\phi^2{}_2(\underline{\gamma},\underline{\gamma'})\urcorner$ iff the predicate ϕ_2 is such that given its understood meaning, γ and γ′ must bear $\phi^2{}_2$ given that γ *is* ϕ_0 *and* γ′ *is* ϕ_1. Again, we could go through the tedious, yet straightforward way to explicitly define $\underset{i}{\Rightarrow}$ recursively, but we shall not do so. (In fact, doing so will be redundant given the content of Chapter Seven.) The important thing to remember is that we are asserting that we can let interpretations go proxy for interpretations, and we can restrict these interpretations such that when so restricted they respect the intuitive meaning connections between the natural language predicates our artificial language predicate terms were to model. For instance, we want the interpretations to be such that if an individual falls under the extension of the artificial language predicate meant to model our natural language predicate ‘scarlet’ then the interpretation should be such that that thing also falls under the extension of the predicate term mean to model our natural language term ‘red.’ I hope I have demonstrated, at least in principle, that with the notion of the interpretation entailment relation that our interpretations can be restricted so as to maintain what we think of as the analytic connections between predicate terms. Later on, in Chapter Seven, we will add even more substance to this thesis. We will show that the interpretations are restricted by the conceptual repertoire of a conceiver who has all the appropriate conceptual competences. The present discussion is meant to show only that there are formal restrictions available to us which can be used to simulate the analytic connections between natural language predicate terms in the context of the formal language we develop in this dissertation.

One might fear that since we're trying to produce a rough and ready definition of analyticity in the reworking of Carnap in this chapter, that we shouldn't be making use of the phrases like 'the understood meaning of $\phi^2{}_2$' for fear of circularity. Such a fear might seem appropriate now, but once we put the interpretations we develop in this chapter on a more firm conceptual footing in Chapter 7, that fear will be soothed.

Since we do not have any guarantee that the atomic sentences are independent of each other (unless there's a background assumption on Carnap's behalf about the interpretations the predicate terms are to receive), it seems reasonable to restrict our interpretation proxies with $\underset{i}{\Rightarrow}$. An interpretation $\mathscr{I}$ restricted by $\underset{i}{\Rightarrow}$ will provide all the information that the state-description that it is a proxy for was meant to provide without the possibility of (unforeseen and unintended) inconsistencies given the intended meaning of predicate terms.

Two concerns for interpretations as proxies for SDs approach: Before we proceed, I would like to address a worry over whether the enhanced interpretations we have developed in this section are of the right sort to serves as proxies for Carnap's state-descriptions. Our concern over this issue will pursue and expand upon the proposal at the end of the last short section to insure that Carnap's state-descriptions were consistent.

Whereas state-descriptions are specified entirely syntactically–for each predicate term ϕ and each individual constant term γ of the language a state-description contains either $\ulcorner\phi(\gamma)\urcorner$ or $\ulcorner{\sim}\phi(\gamma)\urcorner$, and this is the case regardless of any *interpretation* that's provided for any predicate or individual constant–an interpretation, that is to provide the same information, seem to involve *more* than *just* syntax. A closely related worry is over whether our semantic proxy for state-descriptions can maintain the proper independence of atomic sentences. We have seen that the formal apparatus is available to guarantee that the interpretations that serve as proxies for state-descriptions are such that consistency-given-the-intended-meaning-of-terms can be maintained. And we have suggested that $\Rightarrow_i$ should be used to restrict our interpretation proxies. Are our interpretations too restrictive to serve as proxies for Carnap's state-descriptions? The atomic sentences of state-descriptions were to be independent of each other, for instance, whether or not a state-description contains '$\mathrm{P}^1{}_1(a_0)$' it may contain '$\mathrm{P}^1{}_{14}(a_0)$' *or* '$\sim\mathrm{P}^1{}_{14}(a_0)$'. But an interpretation might be such that $\mathscr{I}$('$\mathrm{P}^1{}_1$') = $\mathscr{I}$('$\mathrm{P}^1{}_{14}$'), so the situation in which $\mathscr{I}$('$\mathrm{P}^1{}_1(a_0)$') = $\mathscr{T}$ and $\mathscr{I}$('$\sim\mathrm{P}^1{}_{14}(a_0)$') = $\mathscr{T}$ is impossible. In that interpretation, the two atomic sentences are *not* completely independent of each other.[8]

There are two immediate responses to this sort of worry. First, even though they are provided purely syntactically, we have already seen that it is obvious that state-descriptions do describe *something*, in that one such "gives a complete description of a possible state of the universe of individuals with respect to all properties and relations expressed by predicates of the system"(9). Carnap has the reasonable assumption in the background that a universe of individuals cannot be "inconsistent". That is to say, for example, that for a universe of individuals it *cannot* be the case that, in our terms $\mathscr{I}$('$\sim P^1{}_{14}(a_0)$') =$\mathscr{I}$('$P^1{}_{14}(a_0)$') = $\mathscr{T}$, or in Carnap's terms a state-descriptions includes both '$\sim P^1{}_{14}(a_0)$' *and* '$P^1{}_{14}(a_0)$'.

[8] This situation might arise without being immediately obvious if predicates are defined in terms of others with the λ-operator. For instance, if the predicate abstract '$\lambda x(P^1{}_2(x)\ \&\ \sim P^1{}_3(x))$' is named '$P^1{}_{213}$' for short, so that, '$P^1{}_{213}(a)$' is true just in case '$P^1{}_2(a)\ \&\ \sim P^1{}_3(a)$' is, then a state-description might include both '$P^1{}_{213}(a)$' and '$P^1{}_3(a)$', but an enhanced interpretation $\mathscr{I}$ could not be such that $\mathscr{I}$('$P^1{}_{213}(a)\ \&\ P^1{}_3(a)$') = $\mathscr{T}$.

On the other hand, it doesn't *seem*, at first blush, that Carnap would like to disallow a particular state-description in which the extension of '$P^1{}_{14}$' is the same as the extension of '$P^1{}_1$' and that this state-description includes both '$P^1{}_{14}(a_0)$' and '$\sim P^1{}_1(a_0)$' – indeed this was one result of his assumption that for any two atomic sentences of the state-description, each of the pair is independent of the other. *But*, a state-description that included two such sentences should *not* be possible. Since the extension of '$P^1{}_{14}$' is exactly the same as '$P^1{}_1$', the set of sentences this state-description comprises should *not* contain *both* '$P^1{}_{14}(a_0)$' *and* '$\sim P^1{}_1(a_0)$', as '$P^1{}_1(a_0)$' makes the same "claim" as '$P^1{}_{14}(a_0)$'.[9] The independence of atomic sentences cannot be, for Carnap, absolute. What should be Carnap's implicit restriction on state-descriptions that describe only "consistent" states of the universe can be and is reflected in the interpretations we have provided as proxies.

Another situation that would be disallowed if we consider only consistent universes is the following. If the extension of the singular referring term 'a_0' is the same as the extension of the singular referring term 'a_{127}', then a state-description cannot include both (say) '$P^1{}_1(a_0)$' and '$\sim P^1{}_1(a_{127})$', otherwise the set designated by '$P^1{}_1$' would both include and not include that which is designated by 'a_0' (and 'a_{127}' since they designate the same individual). The enhanced interpretations we're considering as proxies for state-descriptions do not admit this situation either because if $\mathscr{I}$('a_0') = $\mathscr{I}$('a_{127}'), then, if $\mathscr{I}$('a_0') $\in$ $\mathscr{I}$('$P^1{}_1$') (that is $\mathscr{I}$('$P^1{}_1(a_0)$') = $\mathscr{T}$) then $\mathscr{I}$('a_{127}') $\in$ $\mathscr{I}$('$P^1{}_1$') (that is $\mathscr{I}$('$P^1{}_1(a_{127})$') = $\mathscr{T}$), otherwise $\mathscr{I}$('a_0') $\notin$ $\mathscr{I}$('$P^1{}_1$'), a contradiction.

The second response addresses the concern over whether more information is sneaked in by the interpretations than was originally present in the state-descriptions. Now it may seem at first that we could be able to determine some "analytic connections" among certain different

[9] Again, the same holds for the situation in which such inconsistencies occur less obviously with predicate abstracts.

predicates in the context of an *interpretation* that we could not determine from the mere *syntactic* presentation of a *state-description*. One might think that, for example, there is analytic connection between ‘is red’ and ‘is scarlet’ to be seen in virtue of how these predicates are interpreted, and that this connection *does not* emerge from the bare state-descriptions themselves which are supposed to indicate exactly which individuals are red and which are scarlet.

I think that given the previous discussion about what the state-descriptions are to represent, we should be able to see that the only “analytic” connections to be discerned from interpretations are those that could be determined from the state-descriptions. In the case of ‘is red’ and ‘is scarlet,’ one could see from a state-description of a consistent universe that if that state-descriptions contains the sentence $\ulcorner\psi(a_0)\urcorner$ then the state-description *must* contain the sentence $\ulcorner\phi(a_0)\urcorner$ (where ‘ψ’ represents something like the informal ‘is scarlet’ and ‘ϕ’ represents something like the informal ‘is red’) if the state-description is to accurately represent the state of the universe made up of the individual of the domain of discourse. All scarlet things are, after all, also red things.

This equivalence of information present in state-descriptions and interpretation proxies can be seen clearly when we consider the formal nature of the language at issue. The sentences of a state-descriptions each of which contain a predicate term ϕ, along with the designation of each of the individual constants of the language, explicitly provide the individuals of the domain of discourse to which the predicate applies. To find out if a certain individual named by ‘a_0’ say of the domain is ϕ, we check the state-description’s members until we find either the sentence $\ulcorner\phi(a_0)\urcorner$ or $\ulcorner\sim\phi(a_0)\urcorner$. We can find out just as much, but no more, with an interpretation proxy. Either $\mathscr{I}$(‘a_0’) is a member of the set picked out by ‘$\mathscr{I}(\phi)$’ or it is not. On the basis of the interpretation, we have no other information about the relationships of the interpretations of predicates other than this.

We should remind ourselves why this is so. As per usual with model-theoretic treatments of semantics, an interpretation $\mathscr{I}$ is a map defined *only* over individual and predicate constants *and* sentences of the language for which it is an interpretation. The values $\mathscr{I}$ takes over sentences of the language can be determined recursively given *only* the values of $\mathscr{I}$ on the predicate and individual constant terms of that language. The map $\mathscr{I}$ is not defined over expressions of the language such as '$(P^1{}_1 = P^1{}_3)$' for or '$(a_1 = a_3)$' and so no information is provided other than what sets and individuals are designated respectively by predicate and individual constant terms. We will argue later that any analytic connections between predicates (such as whether '$P^1{}_1$' has the same *intension* (to be defined soon) as '$P^1{}_3$') will be a result of certain properties of a certain *class* of interpretations we consider rather than a certain specific one.

Sets of Interpretations Can Provide *Intension*

In the last section, we have seen how an interpretation as we have defined it can be used to serve as a proxy for a state-description: the interpretation endorses as true all and only the sentences of state-descriptions while at the same time providing no more information than what was explicit or implicit in the state-description. Since we have the notion of a class of state-descriptions – simply a class of sets of atomic sentences and the negations of the atomic sentences, we have the notion of the corresponding class of interpretations – simply a class of functions as earlier defined that serve as proxies for the respective state-descriptions. As Carnap uses the notion of the class of state-descriptions in his explication of the L–truth and L–

equivalence and his implicit definition of intension, can we use the class of proxy interpretations to spell out this notion.

If we use Ω as an index set for the class of state-descriptions, then the class of interpretations ('$\mathscr{I}$') which are the respective proxies of these state-descriptions is $\{\mathscr{I}_\omega\}_{\omega \in \Omega}$. I (think 'Intension') is a map such that :

18. $\mathrm{I}: \Omega \times \Gamma \rightarrow \Delta$ (such that, for any $\omega \in \Omega$, $\mathrm{I}(\omega, \gamma) = \mathscr{I}_\omega(\gamma)$)
19. $\mathrm{I}: \Omega \times \Pi^n \rightarrow 2^{\Delta^n}$ (such that, for any $\omega \in \Omega$, $\mathrm{I}(\omega, \phi^n) = \mathscr{I}_\omega(\phi^n)$)
20. $\mathrm{I}: \Omega \times \Sigma \rightarrow \{\mathscr{T}, \mathscr{F}\}$ (such that, for any $\omega \in \Omega$, $\mathrm{I}(\omega, \sigma) = \mathscr{I}_\omega(\sigma)$)[10]

This gets the right result in terms of a model-theoretic reworking of the semantical systems as far as predicate and singular terms are concerned. First, Carnap does claim explicitly that the intension of a singular term is an *individual concept* which is a function from state-descriptions to individuals. Second, recall that intensions of predicates were defined with L–truth and L–equivalence: predicate terms ϕ_0 and ϕ_1 have the same intension iff $\ulcorner(\forall x)(\phi_0(x) \leftrightarrow \phi_1(x))\urcorner$ is L–true and two singular terms have the same intension iff they are L–equivalent (that is, the functions that are the individual concepts of these respective terms are identical). Third, I think we might cautiously generalize and claim that the intension of a predicate term is a function from state-descriptions to extensions, and that two predicate terms have the same intension iff the functions that are the intensions of these respective terms are identical. Finally, I am not sure if Carnap makes any comment about the intension of sentences, but it seems that it should be something like a formal analogue of *meaning* as understood independently from a specific extension. And, interestingly, the notion of intension we have provided here could be understood as a function

[10] I need have as its domain only what is outlined in (18)-(20) because, even though much more complicated expressions involving predicate abstraction and definite description term may be said to have intensions, the WFFs which occur in such expressions are "reducible" to expressions of the terms of (18)-(20) with the use of the recursive machinery that is analogous to the numbered sentences (5)-(10) of this chapter.

which "picks out" the situations in which a sentence is true.[11] This seems in line with commonplace claims that if one knows the meaning of a sentence (of course, to do this, one must have, at a minimum, the concepts whose application conditions are partially modeled by the intensions of the semantical constituents of the sentence) then one knows its truth conditions (that is, the circumstances in which the sentence is true). Intensions, so understood are "thinner" than meaning, but to know meaning one must know intensions.

"Admissible" Interpretations

The issue of exactly which class of sets of atomic sentences and negations of atomic sentences is to be considered state-descriptions is not addressed directly in *Meaning and Necessity*, but perhaps it should have been.[12] We have already surmised that since Carnap is developing systems whose languages are provided with formal semantics, the consistency of those systems is important. The languages of the systems are to be *about* something because we are to be able to construct state-descriptions from certain kinds of sentences of those languages. This assumption points to some restrictions on the class of state-descriptions, and we have suggested in the previous sections how some of these might be realized in terms of the interpretations that are to be proxies for state-descriptions. Very briefly, I would like to expand upon what we hinted at earlier. Since the notion of interpretation we have developed in the preceding sections was to be a *substitute* for the notion of state-description – for any state-description, there is a interpretation proxy for this interpretation that on which is true all and only the atomic sentences and negations of atomic sentences that were members of that state-

[11] Since interpretations were, after all, to serve just as proxies for state-descriptions.

[12] Carnap does, of course, provide a syntactical criterion that gives the complete class of SDs for his languages, but this syntactical criterion is so permissive that it allows every syntactically consistent (i.e. having both ~ and is disallowed) set of atomic sentences and negations of atomic sentences. I will argue that such a criterion is not restrictive enough because it cannot preserve, in a robust, epistemically perspicuous way, the analytic connections between certain predicate terms.

description – any restriction on interpretations will be a *de facto* restriction on the sort of state-descriptions there are. Since I believe the restriction we suggest would be welcomed by any reasonable investigation of modality, we will not spend too much time arguing for them.

Earlier, we tried to make it the case that interpretations were such that they maintained consistency for the semantical system whose language they interpreted. Let us say more about how we must explicitly require any interpretation of the language of these semantical systems maintains consistency. For example, if the language contains the two-place identity predicate (say it is 'P^2_0') that hold of all and only ordered pairs of identical objects, then the interpretation $\mathscr{I}$ must be such that it endorses each of $\mathscr{I}$('$P^2_0(a_0, a_0)$') = $\mathscr{T}$ = $\mathscr{I}$('$P^2_0(a_1, a_1)$') = $\mathscr{I}$('$P^2_0(a_2, a_2)$'), … but that if (say) $\mathscr{I}$('a_0') ≠ $\mathscr{I}$('a_1'), then it must be that $\mathscr{I}$('$\sim P^2_0(a_0, a_1)$') = $\mathscr{T}$. Other such examples are possible.

Also, to reiterate what we stated before, we must also require that if $\mathscr{I}$ is such that, for any two predicates ψ and ϕ $\mathscr{I}(\psi) = \mathscr{I}(\phi)$, then for any singular term γ, $\mathscr{I}(\psi(\gamma)) = \mathscr{I}(\phi(\gamma))$. And, in general, interpretations must be such that the restrictions outlined formally at the end of the section "An Interpretation Can Provide *Extension*" (and in the section following it) are enforced.

But it seems that aside from these unobjectionable restrictions, the class of interpretations must likely be limited even further, if we're to try to apply our investigations of the formal systems to the study of modal semantics for natural language. If the class of interpretations is to ground the truth of analytic statements (as the class of state-descriptions grounds the truth of sentences which include the modal operator 'N'), then, on a conventionalist view of modal semantics at least, this class of interpretations must take some sort of stand on controversial modal statements.

For example, if we were to take a conventionalist approach to modal semantics and assert that necessity can be explained roughly in terms of analyticity, then we would want this approach to account for the truth of statements such as ‘Necessarily, water is H_2O’ and ‘Necessarily, Aristotle was *not* a tea pot.’ These statements do *not seem* to be such as to be endorsed according to a notion of analyticity which is grounded by a class of interpretations which is restricted *only* by the sort of consistency worries we have addressed in the previous paragraphs. To endorse the intuitive truth of these modal statements, the class of interpretations must be whittled down yet further. I think such “whittling” is possible, and that we can indicate how to shape up the class of interpretations in such a way as to explicate the previous modal claims according to a conventionalist view, but I will not do so yet. We will leave that project for the next several chapters. At present, I want to only to draw our attention to the fact that the class of interpretations must be restricted in certain ways if we’re to get anything useful from the notion. I would like to coin the term ‘admissible interpretation’ to apply to all and only those members of the class of interpretations properly restricted (whatever the proper restrictions turn out to be).

Analyticity for atomic sentences of L and ‘N’: Once we have the notion of an admissible interpretation, we can finally make a proposal for what analyticity (relative to some formal language) comes to. Not surprisingly, analyticity is exactly analogous to Carnap’s ‘*N*’. Formally, we say that, relative to the language (L) of the semantical system we’re considering:

21. σ is analytic in L iff for each admissible interpretation, $\mathscr{I}_\omega$, $\mathscr{I}_\omega(\sigma) = \mathscr{T}$

An alternative formulation is (22):

22. σ is analytic iff for each admissible interpretation, $\mathscr{I}_\omega$, $\mathrm{I}(\mathscr{I}_\omega, \sigma) = \mathscr{T}$

Specifically in terms of the semantics we’d developed in our update of Carnap’s work, we have:

23. If σ_1 is $\ulcorner N(\sigma_0)\urcorner$ and $\omega' \in \Omega$, $\mathscr{I}_\omega(\sigma_1) = \mathscr{T}$ just in case for all $\omega \in \Omega$, $\mathrm{I}(\mathscr{I}_\omega, \sigma_0) = \mathscr{T}$

We might informally spell analyticity out in the following way. Our notion of intension 'I' was to spell out, in terms of all the way things might have turned out, how we correctly use designator terms. If a sentence is such that the sentence is true on every admissible interpretation, that is, every correct way of speaking about a particular actual or counterfactual situation, then the sentence is true simply in virtue of how we use the terms in question. This is just to say that the sentence is analytic.

There is of course a remaining bit of business to clear up with this sort of explanation of analyticity. Recall that Carnap gave the semantics of a sentence like $\ulcorner(\exists x)(N(\Psi(x))\urcorner$ by adverting to the notion of an individual concept over which '*x*' ranged because '*N*' created an intensional context. It seems that we must make an analogous move in terms of defining analyticity (in L) here, for how are we to make sense of the question of whether a formula with a free variable ($\ulcorner\Psi(x)\urcorner$) is analytic? The natural move to make (which is the move we make) is to say that a *de re* sentence informally given as 'There is something *x* such that it is analytic that *x* is Ψ' is true just in case there is an individual constant '*a*' such that '*a* is Ψ' is analytic.[13] We take this issue up in exhaustive (exhausting?) detail in Chapter Eleven.

Conclusion

In this chapter, we have made use of the model-theoretic notion of an interpretation as a map (i) from individual constants and definite descriptions of a language to individuals in a domain of discourse, (ii) from n-place predicate terms to n-tuples of individuals of a domain of discourse, from (iii) sentences of a language to a functional equivalent of truth values. We have

[13] It is interesting to notice that 'it is analytic that …' may serve to create a "meaning context" for variables bound outside its scope just as 'N' creates an intensional context for such variables. Just as an intensional context forces us to consider individual concepts over which the variable ranges, the "meaning context" may force us to consider the counterfactual situations in which the individual constant (or name) might be used rather than just how the individual constant (name) is used in the actual situation.) We will spell out in detail how to understand quantified sentences on the analytic-deflationary view in Chapters 10 and 11.

begun our update and generalization of Carnap's project by constructing these interpretations so that for any one of the SDs of the sort described in *Meaning and Necessity* there corresponds exactly one interpretation. Our move is possible because interpretations are such that one *could* straighforwardly "make true" all and only those sentences of an SD.[14]

In the course of showing how this is possible, however, we have noticed that the model-theoretic techniques we have used raise interesting questions about the supposed independence of the sentences of as SD. Of course, Carnap may have had something different in mind in his original notion of an SD (perhaps the predicates were to be such as to describe *prima facie* independent physical properties of an object like temperature and color), but I claim that we can use the notion he has developed in the service of an account of intensions for a formal language that is supposed to roughly approximate a natural language like English. But to do this, we must acknowledge that the sentences of an SD are not independent of each other. I've argued that the interpretations (one per SD) are such that they can reflect the appropriate dependencies. We started using the term 'Ω' as an index set for the class of SDs, and then made an implicit, unmarked slide into using it to indicate an index set of the class of corresponding interpretations. From now on we will be speaking about the interpretations that were originally supposed to be proxies for SDs. The once-merely-proxy interpretations will, no doubt, take on lives of their own and will take on properties that were not specifically bestowed upon the SDs in *Meaning and Necessity*.

One specific aspect of this new life that we will see over the next few chapters will result from our attempts to delimit, in the least problematic manner possible, the class of interpretations we allow. We have referred to the properly delimited class as the class of admissible

[14] I stress that one *could* do so because we will actually wind up with a smaller class of (interpretation proxies for) SDs, because Carnap did not rule out SDs that were not possibly true because of lexical meaning connections.

interpretations. More work must be done on just how this class should be carved out of all possible interpretations of the sort we have suggested.

Another major concern looms so far unaddressed in the background. The model-theoretic techniques we have used so far depend upon the existence of underlying sets ($\{\Delta_\omega\}_{\omega\in\Omega}$) each of which is a model of the sentences each of which an interpretation makes true. And, as things stand now, it seems that the properties had by the members of each of Δ_ω and relations borne by members to each other are what allows for the dependencies among sentences of the SDs to be accounted for. If we're committed to these underlying sets, then it seems that we're committed to something like a class of possible worlds, and as we are supposed to be clearing a path for a deflationary, ontologically parsimonious account of modal semantics, this commitment is undesirable perhaps even intolerable. I do not think we will be forced into such a commitment, but until we get more clarification and background out on the table, we must sit in the less-than-comfortable position in which we must hold for the time being that there are the underlying sets which are the models for each one of our interpretations.

CHAPTER 4
OUR GENERALIZATION OF CARNAP'S SYSTEMS LEADS TO A TREATMENT OF ANALYTICITY THAT IS CONCEPTUALLY PRIOR TO A TREATMENT OF NECESSITY

Introduction

To begin, let us review our progress so far. In Chapter Two, we rehearsed key elements of Carnap's proposal in *Meaning and Necessity*. In Chapter Three, we made explicit and extensive use of model-theoretic techniques to update and generalize his approach and to provide the groundwork for carving out an acceptable class of admissible interpretations. The tension between our review of Carnap in the former and the explicitly model-theoretic generalization of the latter should be obvious. Carnap is trying to squeeze modality out of meaning without resort to what is spoken about. We have claimed that to make sense of this idea, we must back the meaning notions with domains of discourse. It seems that we have "repaired" Carnap's original idea so well that it no longer functions as it is supposed to. Since we do want to clear a path for the view according to which modality is squeezed out of meaning, we must return to Carnap's original insight that meaning and necessity can be brought together, but there are detours to be taken in the new route to the ultimate destination.

In this chapter, some stock-taking is in order. We need first of all to clarify and differentiate the notions of possible worlds, state-descriptions and admissible interpretations and then to do some work to clarify the relationship of each to the others. What ontological commitments are incurred if we use possible worlds as the ground for the truth of modal claims? What commitments are there for state-descriptions as such? What commitments are there for a class of admissible interpretations as things stand now? We will try to answer these questions and from our answers it should be obvious that more must be said and more work must be done in order to build on the progress we have made in Chapters Two and Three to see how the path clearing we promised for an analytic-deflationary account of model semantics to be accomplished.

I assert that we want a "meaning" notion of analyticity that is conceptually prior to the modal notion expressed by the sentence operator 'necessarily.' What does this mean? Roughly, I would like us to develop a notion of analyticity that can be understood without a previous understanding of the modal notion expressed by 'necessarily' as a sentence operator. This may seem odd as our purported goal is to analyze 'necessarily' in terms of analyticity – and so on that score it may seem that the two notions are conceptually linked. What I am advocating here might best be put in terms of an analogy with arithmetic and modular arithmetic. One might understand arithmetic principles and perform arithmetic operations without any knowledge of modular arithmetic, but one would be unable to perform modular arithmetic operations (for an arbitrary modulo) without prior knowledge of arithmetic.

I believe that we are in a similar situation regarding analyticity and necessity. We shall try to show that analyticity can understood without an explicit knowledge of the modal notion expressed by the sentence operator 'necessarily.' And then, we shall have shown, if all goes well, by the very end of this dissertation, that the semantics for sentences of the form $\ulcorner N\sigma \urcorner$ and $\ulcorner (\mathcal{Q}x)N(\phi(x)) \urcorner$ can be provided with the more basic notion of analyticity.

Of course, doing so requires that we take quite a few things on board. For instance (and this might serve as a bit of long-range look-ahead), we might to forced into (i) a (perhaps reluctant) acceptance that any treatment of modal semantics which provides a workable epistemology of modal truths cannot be completely reductive[1] and (ii) a certain view of concepts (more likely a "deflationary" view of concepts as well best expressed by the locution 'conceptual

[1] See Chapter Five.

mastery')[2]. The path-clearing for conventionalist modal semantics comes at a price. Is the price low enough that we are willing to pay it? Whether we wish to buy or not, we should be in a position to say whether the goods are worth their price. In order to be in such a position, we must know the hidden costs of the path-clearing. I shall try to highlight these as clearly as I can.

On the Relationship of Possible Worlds, State-Descriptions and Admissible Interpretations

Now that we have finally given an initial characterization of analyticity (for sentences whose primary operator is not a quantifier – that is sentences in which quantification is not *into* an "opaque" context) in a language comes to in terms of admissible interpretations, a bit of clarification is possible, *and in order*, to help separate the notions of possible worlds, state-descriptions and admissible interpretations. Carnap introduced state-descriptions as (a certain kind of) sets of (a certain kind of) linguistic entities which were to represent possible worlds. Of course, his investigation is aimed at universes of individuals that can be adequately described with the formal languages he considers, so there's some distance between the possible worlds described by state-descriptions and the possible worlds that provide truth makers for modal statements in natural language. But the connection between possible worlds of David Lewis'[3] sort and what is represented by the state-descriptions of *Meaning and Necessity* is apparent.

Overview of the Differences and Our Commitments as Things Stand Now

By clarifying the relationship between possible worlds, state-descriptions and the class of admissible interpretations, we can see what our commitments are as things stand.

Bird's eye view of the situation

So where exactly do the admissible interpretations fit in? Recall from the last section that an admissible interpretation is a member of a class of interpretations, and that this class is

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[2] See Chapters Six, Seven and Eight.

[3] For all references to David Lewis see (Lewis, D., 1986).

restricted in certain ways. (The restrictions will be made explicit in Chapter Seven.) But each admissible interpretation is to be a proxy for state-description.[4] From these requirements on admissible interpretations, we can observe something about their features which may be helpful in understanding what admissible interpretations are not, and this observation deserves articulation. An admissible interpretation is supposed to provide all the information that a state-description does, but not necessarily more. Admissible interpretations are functions from linguistic expressions to individuals, sets of individuals and truth–values which are supposed to imitate "correct" linguistic behavior (or semantic use, formally speaking) *rather* than to describe situations in which we use the terms of the language differently than we actually do.

For example, consider two different members, ω and ω', of the index set of admissible interpretations, Ω, such that $\mathscr{I}_{\omega}(\phi) \neq \mathscr{I}_{\omega'}(\phi)$. Now in this situation, we do *not* want to assert the following. For an arbitrary member of $\mathscr{I}_{\omega}(\phi)$ (call it 'α') and an arbitrary member of $\mathscr{I}_{\omega'}(\phi)$ (call it 'α''), that α lacks the feature or features on the basis of which we would, given the usual meaning of our predicate terms, claim that it falls under the predicate ϕ or that α' lacks such a feature or features, and so claim that $\mathscr{I}_{\omega}$ and $\mathscr{I}_{\omega'}$ *simply represent different ways* we might use the predicate 'ϕ'. What we wish to say, rather, in this situation is that we hold fixed the ways we use 'ϕ' across every member of Ω: the two interpretations are supposed to represent two different situations in which, given our usual meanings of the term ϕ, the set of things which are ϕ is different; the set of individuals which are ϕ "in" ω is not the set of individuals which are ϕ "in"

[4] From these two assertions about admissible interpretations, we see that we're committed to the restriction of the class of possible worlds in some ways, but this is unobjectionable: the class of worlds which serve (in part) as the truth-makers for modal statements in Lewis' theory are restricted in at least one obvious way – these worlds include only those which are *possible* rather than all worlds *possible* and *impossible* alike.

ω'.[5] Different admissible interpretations *are* to represent different scenarios in which language is used in the same way. The function of admissible interpretations fits in with the notion of intension in the following way: the notion of intension we have developed in this dissertation is supposed to model (albeit only *partially*) our intuitive notion of meaning. Since a necessary condition on knowing the meaning of a predicate term is knowing when to correctly apply the term (and of course this knowledge requires that one who knows the meaning of the term *would be* able to correctly apply it in *counterfactual* scenarios), the different admissible interpretations are meant to provide counterfactual settings in which language can be used and show how the terms of the language would be used in these different situations if we were to use these terms to describe aspects of these situations.

So in a sense, admissible interpretations might be claimed to do double duty: to be proxies for, and descriptions of the way we speak with respect to, state-descriptions. One might argue that this double-task is too large: an interpretation cannot serve as a proxy for a state-description (that was in turn to represent a possible world) while exhibiting correct use of designating terms in the various counterfactual scenarios without the appearance of some sort of unpleasant circularity. I believe that the double-task for the class of admissible interpretations is not too big, but that the task must be *precisely* of this size and nature to provide a satisfying account of modal semantics. In so claiming, we call upon a fundamental tenet of the conventionalist approach: that meaning and modality must be intimately linked and that modality cannot be understood as conceptually prior to notions of meaning, intension or concept possession, but rather that the latter is conceptually prior to the former. We will have to wait until subsequent chapters to see the full argument for this assertion. Ultimately, to advocate a conventionalist modal semantics,

[5] There is, of course, a notion of constant domain versus variable domains here that must be addressed.

we must hold that meaning and modality are *not* conceptually separable, but that the former is prior to the latter. To do so, we must remain calm when confronted by the size or nature of the task of the class of admissible interpretations: to serve as proxies for state-descriptions *and at the same time* to provide a description of correct semantic use. The class of admissible interpretations will serve to provide descriptions of correct semantic use because they serve as proxies for the state-descriptions. For an arbitrary predicate term ϕ, the set of admissible interpretations is, *inter alia*, to provide exhaustively the conditions under which the use of ϕ is acceptable in describing arbitrary individuals. Hopefully, we will be in a position to see how modal semantics (for each of the sentence types we're concerned with) can be provided given our account of the class of admissible interpretations.

View from the battlefield

Once we step away from these high-view, strategic concerns, we come quickly to low-to-the-ground, tactical issues. An immediate worry is over whether everything we would like to speak about in these counterfactual scenarios must be named. We have the intuition that on the one hand if α is physical object, then, necessarily, α has a spatiotemporal location, but on the other that there's no requirement that there must be some singular expression γ in the language of the semantical system such that on some interpretation $\mathscr{I}_\omega$, $\mathscr{I}_\omega(\gamma) = \alpha$, but it seems that there must be a name for α (and indeed for every individual about which we make *de re* modal claims) if we're even to be able to attempt the sort of conventionalist strategy that we have been trying to lay the ground work for. There's more to be said about this issue, but I will not say much more in this dissertation.[6]

[6] A brief rough and ready suggestion for how to deal with this problem is to claim that any results that follow for the particular generic formal language we have developed and continue to develop hold for another generic language just like the one we shall have developed in this dissertation *except* for the fact that the new language contains one

Perhaps a deeper worry is over whether we have actually come to have any more insight into the status of modal statements from this sort of treatment – this concern came up at the end of the last section on "Admissible Interpretations". Does describing correct semantic usage help us at all in our understanding of modal claims? If so, how? To reiterate, I've hinted that the truth–value of $\ulcorner N(\sigma) \urcorner$ ultimately depends upon which state-descriptions there are – just as according to another sort of account of modal semantics the truth–value of of $\ulcorner \Box(\sigma) \urcorner$ depends on which possible worlds there are. We have tried to place a few restrictions on the admissible interpretations (mostly restrictions aimed at maintaining consistency of the semantical systems), but it doesn't seem that these restrictions are of the right sort to make the admissible interpretations such that they clearly endorse the truth of the claims that assert certain analytic connections that hold between certain predicate terms in virtue of the intuitive meanings of those terms. And the restrictions we have suggested are certainly not of the right strength to ensure the truth of substantive modal claims such as 'necessarily, water is H_2O,' and 'necessarily, Aristotle was not a teapot.' One important difference between possible-worlds approaches and the sort of approach we have developed here (and will continue to develop in the next section) is that whereas there is hope to restrict the admissible interpretations in such a way that the claims we want to be endorsed are endorsed, and that we can make the restriction in a way that doesn't make explicit appeal precisely to modal notion of necessity, restricting the class of possible worlds in a manner that makes no use of modal notions seems more difficult. If one cannot

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more semantically primitive singular referring term that term can be used to denote the individual that was unnamed in the original generic language. And the extensions of predicates for any admissible interpretation for that language can be adjusted accordingly to endorse the truth or falsity of any sentences in which those predicate are asserted to hold or not hold of the new individual so named. The same strategy can be used to expand the language we develop in this dissertation to include new predicate terms. The strategic notion is that anything or extension can be talked about with the appropriate language; we expand the language in obviously acceptable ways when we wish to talk about something as yet unnamed, or when we wish to make claims about the relations between sets of individuals which are not as yet the extensions of certain predicates under some admissible interpretation.

restrict the class of possible worlds in such a “non-modal” manner, then any hope for an informative reductive analysis of modal statements with these possible worlds which shows how modal knowledge is possible is dashed either by the viciously circular nature of such an analysis (if the class of possible worlds is restricted with appeal to modal notions) or the failure of such an analysis to provide insight into our knowledge of modal statements (if we simply take the class of possible worlds as theoretically *prior* to our investigation into modal semantics). That we do take the class of possible worlds as prior to any philosophizing about modal semantics, and simply focus on the utility in explication of modal statements that this class provides is suggested by Ted Sider.[7]

Differences in Ontological Commitment

As things stand, there should be serious worries over whether we can even claim to give an extensional account of intension I’ve proposed without immediate and serious regress and circularity problems. The set of admissible interpretations was to spell out meaning facts, but it looks as if we need meaning facts to classify a particular interpretation as admissible or not. I mean to resolve this tension over the next few sections (and in chapters after this one), but it is beneficial to hold with the tension and see what, precisely is making us nervous about our present situation. By working out the exact problem in detail, we will see a way to a resolution. We can begin to focus our concerns by noting what the ontological commitments of a modal realist approach (like a Lewisian possible worlds approach) versus a Carnapian state-description approach, versus the admissible interpretation approach we are trying to use in the effort to clear the path for conventionalism.

[7] For all references to Ted Sider see (Sider, T., 2003).

I've claimed that admissible interpretations do a double duty by providing proxies for state-descriptions while simultaneously demonstrating how designating terms would be used in presenting those state-descriptions. Of course, one may doubt whether this strategy (using admissible interpretations to give an account of modal semantics) can be successful. But even if we could see that it is be viable, one might be dissatisfied with such a strategy because, according to this approach, the truth of modal statements depends upon how designating terms of a semantical system *would be used* to describe a counterfactual situation *were* that situation to obtain. If we're to understand admissible interpretations as performing the "double duty", it is difficult to see how we could eliminate the subjunctive 'would be' from the last sentence. The fact that (for instance) a predicate ϕ would apply to γ if some situation were to obtain indicates a fundamentally dispositional character in the "base" in terms of which modal statements are analyzed.[8] On the other hand, if one were sanguine about ineliminable dispositional nature of the reductive base of the "admissible interpretations strategy", he might wonder whether this strategy incurs fewer ontological commitments than a "possible worlds strategy".

If we take one aim of *Meaning and Necessity* to be a reductive explanation of the modal operator 'N' such that its application conditions are given by certain features of all of the members of a certain class of state-descriptions, then we have an ontological commitment to the class of state-descriptions given that we desire a firm reductive base. In other words, on the assumption that our account of the modal operator is to be reductive, if we want to claim that $\ulcorner N(\sigma)\urcorner$ is true because the truth of σ is entailed by each state-description, then it seems we must

[8] A kind of semantic entailment may ensure that we could infer the correct application of predicates to individuals for most predicates which bear rich analytic connections to others. Specifically, in terms of an example, we could infer that the predicate 'triangular' applied to any individual to which each of the predicate 'plane figure', 'straight-sided' and 'three-sided' applied. So in this case, no fundamental appeal to dispositions must be made. But in the case of so-called "basic" predicates – predicates which are such that there application is not entailed by analytic connections in the way that 'triangular' is, then it seems that a fundamental appeal to the dispositions of cognizers is required for the analytic-deflationary path to be pursued.

admit that the state-descriptions into our ontology, rather than saying state-descriptions represent situations which merely *could have* obtained. We can this commitment as one to two sorts of *abstracta*: *sets* and *sentence types* (atomic sentences and the negation of atomic sentences).

We incur a slightly different commitment with our model–theoretic reworking. Since interpretations (functions from expressions to individuals, ordered tuples of individuals and truth values) served as proxies for state-descriptions and intensions were also explained as a function (from interpretations and expressions to individuals, ordered-tuples of individuals and truth values), we incur whatever commitments we take on board when we commit ourselves to the existence of these functions.

Furthermore, since we're committed to intensions only insofar as they partially model our use of language, it seems that there may be room (somewhere down the road) to argue that we do not really incur the commitment to the functions that are interpretations or intensions as these are only meant to approximate the way we use language. As a preview, I will assert in Chapter 7 that we need the notion of *concept possession* to restrict the admissible interpretations in a plausible way – I do not think this commits us to accepting *concepts* into our ontology, but the explanation of concept possession (in the way we will spell it out) seems to be *fundamentally dispositional* in character.

Promissory Note for the Ways in Which Interpretations Are Restricted

We have already placed some restrictions on interpretations (recall the '$\underset{i}{\Longrightarrow}$' operator of Chapter 3). We did so under the assumption that we knew what the terms were to mean, but we are using interpretations to give an extensional treatment of intensions of predicate terms. If we can underwrite this delimitation in a responsible way, then we can claim that all these restrictions hold and that there is no commitment to a domain of objects which the sentences are about (a set of possible worlds for instance). This will be our eventual goal, but as things stand in this section of this chapter, we are committed to the existence of those individuals in the domain of discourse of each $\mathscr{I}_{\omega}$, and so committed essentially to $\{\cup_{\omega\in\Omega}\Delta_{\omega}\}$ and some sort of "partitioning" of this set into discreet domains, one for each interpretation. Later, we will argue that we can make use of these interpretations without commitment to there being these individuals. We must first get clear on conceptual priority, meaning notions and modal notions.

On Conceptual Priority, Analyticity and Necessity

To illustrate the need for the conceptual priority of analyticity (to necessity) for a conventionalist analytic-deflationary view, it helps to contrast this view with other competitors with respect to "truth-making". I will consider a modal "realist" Lewisian view (views like Michael Jubien's[9] are similar in *this* particular regard – that is, with regard to the fact that modal claims are made true in virtue of extra-linguistic / extra-conceptual entities … this is not to say that Jubien's view is anything like Lewis' regarding any other particulars), a conceptualist view as presented by (but not necessarily advocated by) Amie Thomasson[10] and finally a generic conventionalist view.

Modal Realism and Truth-Making

I believe that David Lewis' position on modality hardly requires exposition as it has been so thoroughly examined in countless articles and philosophy seminars, but briefly Lewis postulates a metaphysical "multiverse" which consists of completely distinct entire worlds (complete *universes*) neither spatially nor temporally related to each other. If we call the multiverse '$\mathscr{M}$', then we say that for a sentence *S*, 'It is possible that *S*' iff for some member of

[9] For all references to Michael Jubien see (Jubien, M., 2009).

[10] For all referenes to Amie Thomasson see (Thomasson, A.L., 2005).

$\mathcal{M}$, *S* is true. So, for example, if 'It is possible that there is a building a mile high' is true then in some member of $\mathcal{M}$, there *is* a building that is a mile high. The sentence operator 'Necessarily' (or 'It is necessary that') is defined as the dual of 'it is possible that.' Since the members of $\mathcal{M}$ are called 'possible worlds,' we often hear the following slogan that encapsulates this realist approach to modal semantics 'It is possible that *S* iff *S* is true in some possible world.' So we might claim (with tongue a bit in cheek) that truth-makers reside in possible worlds for Lewis. The statement corresponds to a certain fact (that there is such a building some*where*(?)), and it is in virtue of this correspondence that the statement is true.

On a different view of modality, truth-makers for claims might be the relations borne by properties thought of, in a property-realist way, as abstract objects. On Michel Jubien's view (if I understand his thesis in its broadest terms) a modal statement is true because of certain relationships borne one to another by those properties which are instantiated by those things which are constituents of the proposition expressed by the sentence. So, for instance, a *de dicto* modal claim like 'Necessarily, every square is a rectangle,' is true because the property denoted by the predicate 'is rectangular' is such that it, in some sense "contains" the property denoted by the predicate 'is square.' In Jubien's terminology, the property of being square entails the property of being rectangular. Just as on Lewis' view, there's truth-making at work (albeit of a different kind).

If there really are possible worlds as Lewis describes, then if they are to be the ground for the truth of modal claims, and they themselves, are to have no modal properties (and so the sort of analysis he offers is *reductive*, that is, it aims to reduce the modal to the non-modal[11]), then

[11] We shall take up the topic of reduction and reductive analyses in the next chapter. It is enough to say here that modal semantics accounts for which a correspondence theory of truth is assumed are such as to be reductive in nature. That is, accounts of modality which assume that the truth of a sentence is had in virtue of its correspondence

they must be conceptually prior to every modal notion or related notions. The reason is that these worlds are what ground, non-circularly, all modal talk. If the possible worlds were not conceptually prior to modal notions expressed (for example) by the sentence operator 'necessarily,' then it might very well be that this modal notion was such that the class of possible worlds was delimited someway or other with the aid of this notion. One might say, for instance, that a certain world could not be among the class of possible worlds because it was necessarily the case that such a world did not exist. If such were the case then a modal notion would be involved in the decisions about which possible worlds were allowed. But since we were trying to use the class of possible worlds to explain in some significant way what makes modal statements true, then, if we used modal notions to delimit this class, we would clearly be offering a viciously circular explanation, as the explanation of what makes modal statements true would rest of modal notions.

If Lewis' view is right, then we cannot even understand any philosophical talk of modal properties, necessity or possibility, unless we first grasp the notion of possible worlds. The same goes, *mutatis mutandis*, for Jubien's view, a version of Neo-Platonism. He proposes an ontology comprising a certain kind of abstract object (properties) and concrete particulars. He colorfully describes the division between the two ontological categories in terms of "A Great Line of Being": concreta reside below it, properties above. For an individual of either category to fall under a certain predicate is for that individual to bear what Jubien calls the "instantiation relation" to the property (by definition, a resident *above* the Great Line of Being) the predicate "picks out". If one property is such that an instantiation of it requires the instantiation of another property, then we say that the first "entails" the first. On a certain conception of how we think

to something are likely to be such as to attempt to explain the modal in terms of that which is non-modal, i.e. they attempt to reduce the modal to the non-modal.

about the “lay of land” above the Great Line of Being, one might say that the second property “contains” the second.

Of relevance to our discussion of modal semantics is the observation that in terms of explanation of the truth or untruth of modal claims, our understanding of the properties residing above the Great Line of Being and their bearing certain “containment” relations to each other must come first, then an understanding of modal semantics. The properties and the relations they bear to each other must be taken as already existing and making true our modal claims if Jubien’s analysis is to be a reductive one. And so, these properties and the relations they bear to one another must be taken to be primitive and conceptually prior to the truth of the modal claims that follow. Just as on Lewis’ view, there is truth-making at work (albeit of a different kind than does the work for Lewis).[12]

Conceptualism and Truth-Making

On the other hand, one might hold that relationships borne to each other by concepts (*qua* constituents of thoughts contents that are common to thoughts of different thinkers) are the truth-makers for modal claims. Whether this view is substantially different from a property realist view depends upon how we understand the ontological status of concepts. On one hand, concepts may be understood as mind-independent *abstracta*, the relationships between which are what the truth of modal claims consists in. On this view, modal claims have truth-makers, so a correspondence theory of truth is at work: a modal claim asserts a certain relation that holds between the concepts expressed by the predicate terms of the sentence that expresses the modal claim, if the sentence corresponds to the relation borne by certain concepts to each other, then the

[12] Does the use of truth-makers in an account of modal semantics force one into some broad region of logical space as far as a theory of truth is concerned? My hunch is that if there must be something to which a modal statement corresponds for the statement to be true, i.e. a truth-maker, then one must go in for some sort of correspondence theory of truth. Professor Ludwig observes (correctly I believe) that in general, simply providing an account of the truth conditions for a claim is not to assert anything about the concept of truth, but only to use it.

modal claim is true, false otherwise. This position seems very close to a property realist version of modal realism. And so, on this version of conceptualism, the existence of concepts and the relationships they bear to each other must be conceptually prior to any notion of analyticity, a notion specifically to do with linguistic entities. No wonder, given that this version of conceptualism is backed by a sort of correspondence theory of truth.

A dilemma for modal conceptualism: On one hand there is the "concept realist" view of concepts we just canvassed: according to this view, the existence of concepts, the relations they bear to one another and their role as thought constituents is conceptually prior to modal claims as the former is required to make sense of the latter. On the other hand, one who wishes to hold a conceptualist view might take a sort of "concept anti-realist" stand on concepts. Concepts might be initially characterized as constituents of thoughts and then once the observation is made that two thinkers might be thinking the same thought, and that thoughts are somehow compositional (made up of discreet "re-combinable" subparts), one might reason, by a principle of abstraction, that concepts were these subparts which might be shared among thinkers. On this view, concepts come close to being the meanings of semantically primitive terms, where meaning is understood in terms of certain repetitive, regular patterns of use.

On the conceptual realist view, one might wonder whether we have epistemic access to all the concepts there are. Is every concept such that it has been, is or will be a constituent of the thought of someone? *Prima facie*, it doesn't seem so. Might not we have had a concept we actually do not? I assert tentatively that the concept realist view collapses into an "*abstracto*-realist" view of some sort; one according to which mind independent *abstracta* are the things that make true our modal claims. In any case, on the conceptual-realist view, it seems that the existence of concepts must be conceptually prior to a notion of analyticity.

On what might be called the "conceptual-antirealist" view, if we assume that concepts can be shared among thinkers only insofar as contents of thoughts can be communicated through language and that thoughts, and so the sentences that express those thoughts, are compositional in nature, then I believe that we can get away from a correspondence theory of truth, and give conceptual priority to analyticity. Of course, we do not want to abandon the notion of truth on the conceptual-antirealist view even though we will claim that a sentence is not made true by a correspondence to something or other. What is to underwrite our claim that a sentence is true according to such a view?

One thing we certainly do *not* wish to claim is that there is no relationship to anything non-linguistic that makes a sentence true on the conceptual-antirealist view. We can hold this view and still believe that "word-world" relations are, in part, that which guarantee the truth of certain sentences. According to this view, language is about something, often things which are not any sort of linguistic entities. It is the fact that language is about something combined with the fact that we use linguistic entities with certain regular, repeatable, meaning constitutive patterns that ensure the truth of sentences.

I urge us to consider whether the "conceptual-antirealist" view collapses into a healthy and moderate sort of conventionalism. I will try to sketch this view in the next few sections.

Conventionalism and "Truth-Making"

If we say that true sentences are true (at least in part) in virtue of our meaning conventions, things are not as crazy as they sound. This view can be taken to be equivalent to denying that there is anything a true sentence corresponds to that makes the sentence true. Sentences are true in virtue of meaning, and meanings might be determined by convention, but, on this view, it is not the case that true sentences correspond to conventions and these conventions (by themselves) are what make true sentences.

To see how this view might reasonably be made sense of, we might consider a deflationary view of truth. To put things in slogan form, we might hold that an arbitrary sentence like 'Snow is white' is true if and only if snow *is* white. In general, the sentences of a deflationary theory of truth are of the form

1. 'S' is true in L if and only if p.

where for 'S', we substitute a structural description of an object language sentence[13] that is a translation of the used metalanguage sentence substituted in for 'p.' (Sentences of the form of (1) satisfy Tarski's convention T.) There need be nothing that our true sentence corresponds to in virtue of which it is true, but given the work we have done in the previous chapters, we have a reasonable handle on how this sort of deflationary view might go in terms of the simplified characterization we have given of intensions for a formal version of a language like English. My hope is that a deflationary view of truth captures the correspondence intuition that a true sentence is true in part because it is about something (or some things), but that there need be no one thing to which a true sentence *corresponds* in order for its truth to be guaranteed.

Much later (in Chapter Twelve), we will try to fit what we have done (and hopefully will have done) in this dissertation into a larger general semantical theory of the sort developed by Donald Davidson in his work on truth-theoretic semantics, and expanded upon recently by Lepore and Ludwig (2005, 2007). But to get there, I argue that we will need to have done the following: (1) Provide the form of a theory which gives us an acceptable notion of intension for predicate terms (which we have already done), (2) expose exactly what we are committed to given that we desire to fill into that form the details of a theory which would provide us with a sort of "extensional" treatment of intensions for predicate terms (we are doing this in the present

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[13] If σ is a variable ranging over sentences, then $\ulcorner$'σ'$\urcorner$ could serve as a structural description of a sentence which might be substituted for σ.

chapter), (3) then argue that we can make good on this theory without commitments to *abstracta* to which our epistemic access is dubious. (We will do this over the next few chapters.) It will be easier to do (1)-(3) if we can make use of a deflationary theory of truth. I do not intend (nor do I believe we need) to investigate competing theories of truth over the course of this dissertation, but merely make use of one that best fits our purposes.

Deflationary theories of truth and the need for the conceptual priority of analyticity (intensions) to properly modal notions: For a deflationary theory of truth to provide us with knowledge of modal claims expressed as sentences of an object language for which we endeavor to provide the semantics, we must understand the meanings of the sentences of the object language for which we are trying to provide the theory. I argue that getting things right both in terms semantics and modality will require that we provide an account of understanding of the intensions of predicate terms. In order for the interpretive truth theory (into which we shall try to situated our work) to be usable for an analysis of 'necessarily' as a sentence operator, we must have an account of our knowledge of the intension of predicate terms. And so in this sense, we need an account of analyticity that is conceptually prior to an account of properly modal notions.

We will have such if we can give an account of epistemic access to the intensions of predicate terms, *inter alia*. If we can do so (and there will be much more to come on this topic in Chapter 6, Chapter 7 and Chapter 8), then we can appeal to a deflationary view of truth to give a univocal account of the truth of sentences of an object language which may or may not include modal operators. We endeavor to show that there can be truth without truth-makers, and so demonstrate that a deflationary view of modality is a viable option.

Can Conceptual Priority be Given to Analyticity so that an Account of Modal Semantics that is not Viciously Circular is Possible?

I hope and believe so, but there are immediate difficulties for this particular project. A careful look at and discussion of such difficulties is the goal for Chapter 5. Conceptual priority can be given to analyticity if we can show that epistemic access to intensions of predicate terms depends upon an actual ability that the speakers of a language have (i.e. conceptual mastery). We will attempt to use "concept mastery" talk to show how knowledge–how can be used to "build up" a class of admissible interpretations if we allow dispositions (to sort individuals according to conceptual mastery) in the base of our reduction. The resulting analysis will not be completely reductive as there may be some sort of modal elements (i.e. fundamentally dispositional elements) in that which the semantics of the operator 'necessarily' is reduced to. We shall have worked out a notion of our knowledge of intension that is conceptually prior to the modal notion expressed by 'necessarily' and we shall be in a position to see how any arbitrary *de dicto* modal claim is true on a conventionalist approach. All that will remain is a treatment of *de re* claims and quantification.

Conclusion

In this chapter, we have acknowledged that our reworking, clarification and generalization of Carnap's semantical systems and account of the semantics for 'N' has not come without a price. By doing what I think has been some constructive reparatory work, we have uncovered a lacuna in the foundation that underlies the conventionalist contention that necessity can be reduced to analyticity. To give an extensional / model-theoretic treatment of intension that is worthy of the name, we must, at least temporarily, assume that there are (sets of) objects picked out by the terms in the language for which we are trying to provide the semantics. I've tried to clarify the commitments we have made by our choice of this sort of treatment in the hopes that each one of the commitment that are unpalatable can be dispensed with once we have made our way further down the path we will be clearing. We are in a bit of an uncomfortable position at present, but please hold tight – we will work our way out of it.

To carry out the project of clearing a path for a conventionalist modal semantics, we need to show that an analytic-deflationary account of a sentence operator like ‘necessarily’ can be such that it is not viciously circular. In particular, we need to show that a satisfactory account of analyticity can be given which does not make use of the very modal notions that analyticity was meant to analyze. A challenge is to demonstrate that we can ensure that our knowledge of the intensions of predicate terms (and so a notion of analyticity for *de dicto* sentences) can be understood as conceptually prior to the modal notions expressed by the sentence operator ‘necessarily.’ Only if this conceptual priority is possible, can there be a conventionalist analysis that is not viciously circular possible. This conceptual priority is possible if we take on board a deflationary theory of truth so as to do away with a need for truth-makers (and so any sort of correspondence theory of truth). Turning to a deflationary theory of truth highlights the need for an account of the epistemology of the intensions of predicate terms and serves to anticipate the sort of general semantical theory that our work on the sentence operator ‘necessarily’ might eventually be fit into. Indeed, conventionalism, a deflationary theory of truth and a use theory of meaning seem to line up.

CHAPTER 5
CIRCULARITY AND REDUCTIVE ACCOUNTS OF MODAL SEMANTICS

Introduction

If a *reductive* account of modal semantics is to be successful in the sense of providing us with insight into how to understand the sentence operator 'necessarily,' the account must not be viciously circular. To see this, suppose that a proposed account aims to explain the semantics of 'necessarily' by reducing modal talk to some *reductive base* in terms of which we are to understand the truth conditions for sentences prefixed by this operator. If, in this account, the reductive base were such that its characterization required the same sort of (or even, in fact, very *similar*) modal notions as the very same which were to be accounted for to begin with, then it wouldn't be successful. It would provide only the *illusion* of understanding rather than any real insight.

In this chapter, we explore issues to do with reduction, modality and analyticity. Our broader concern is, of course, to clear a path for an analytic-deflationary approach to modal semantics of a conventionalist flavor. One of the prime motivations for an approach of this sort is specifically epistemological; we wish to give an account of the sentence operator 'necessarily' which makes plain a plausible route to a speaker's knowledge of modal truths. Such a promise will be honored only if we clear a path for an account of modal semantics that is not viciously circular. I believe that as things stood at the end of Chapter Four, the danger of circularity loomed (among other dangers) for the sort of approach we are trying to clear the way for. What was owed to a discerning and skeptical, yet not antagonistic critic was an account of how to characterize intension (and so specifically analyticity) in terms of an extensional or model-theoretic treatment that did not commit us to admitting into our ontology those individuals that we took to be in the domain of interpretation for the singular and predicate terms of the simplified formal language for which we were trying to provide semantics. We will provide such an account (or at least give it our best shot) in Chapters Six, Seven and Eight, but before we do so we must spend this chapter understanding what sort of analysis will be satisfactory for us. Unless we spend a few pages now on this background issue, the solution we propose in the subsequent chapters may seem deficient in that the analysis will include modal elements (more precisely elements fundamentally *dispositional* in nature – perhaps it is an open question whether dispositions can be characterized *only* in terms of non-categorical properties), and so the analysis we wind up proposing will not reduce the modal to the non-modal.

In this chapter we shall discuss other approaches to modal semantics that are specifically not deflationary. These approaches take the truth-makers for modal claims seriously and admit into their ontology those things which make true modal claims. In particular, we consider David Lewis' possible worlds and Armstrong's[1] states of affairs. But we do so not to consider the advantages and disadvantages of these views vis-à-vis an analytic-deflationary conventionalist view (even though such advantages and disadvantages may become apparent adventitiously), but rather to highlight the problem of circularity that haunts reductive accounts of modality. By seeing how circularity can threaten these "realist" views, we shall be able to see more easily how it also threatens (and perhaps even more potentially devastatingly) a view of the sort we are trying to make viable.

To help keep the dialectic clear, I shall say that my hunch is that we face a deep seated difficulty in the project to understand modality if we desire each of the following (all at the same time): (1) an account of modal semantics that reduces the modal to the non-modal, (2) an account of modal semantics that is not viciously circular (in the sense that the account uses the same

[1] For all references to Armstrong see (Armstrong, D., 1997).

notion in the *analysans* that was meant to be analyzed in the *analysandum*), (3) an account of modal semantics that makes modal truth epistemically accessible in a straightforward way without postulating that speakers have direct epistemic access to *abstracta* or other entities (such as Lewisian possible worlds or Armstrong's states of affairs) that are causally inert with respect to those speakers. I believe we cannot have an account of modal semantics that satisfies each of (1)-(3) simultaneously, and I hope that my reasons for holding this view will emerge over the course of this chapter. If my reasons for believing so are good ones, then we can see that one who holds a view on modal semantics must give up one of (1)-(3). A proponent of the analytic-deflationary view we are trying to clear a path for must give up (1). I think that someone who holds a Lewisian possible worlds view on modal semantics must give up (3). Obviously, no one wants to give up (2).

My feeling is that it is better to give up (1) than (3) because we do want a story about modality that makes modal knowledge possible because it does seem that we have such knowledge.

Some General Comments about Reduction, Modality and Analyticity

On the face of things, difficulties of this sort might seem to loom for a conventionalist approach. The conventionalism we outlined in the Chapters Three and Four was after all to be a *deflationary* approach – in particular we try to make sense of the sentence operator 'necessarily' without resort to any metaphysically robust notion of modality, without even resort to the notions of concrete or abstract possible worlds or various relations that might hold between Platonic properties and without resort to the doctrine of *essentialism* (that individuals have some of their properties essentially and others only contingently). The goal of a conventionalist semantics was to understand necessity as analyticity, so that the sentence 'Necessarily, *S*' is true just in case it is analytic that *S*. One might wonder if the conventionalist project we outlined in Chapter Four was meant to be reductive; if necessity is analyzed in terms of analyticity (*reduced* to analyticity?) then one might have a further concern over whether there were circularity dangers for the conventionalist account. Specifically, if necessity is reduced to analyticity, and if we must use the very modal notion of necessity in our characterization of analyticity, then we might be tempted to think that we hadn't given a satisfactory analysis of necessity to begin with.

Should We Rest Content Even If We Do Not Have a Satisfactory Analysis of Analyticity?

Of course, one might argue that if we could show that we provide a satisfactory semantics of sentences of the form 'Necessarily, *S*' by evaluating the whether *S* was analytic – whatever *analyticity* itself came to – then we could rest content. On this view, necessity would have been reduced to analyticity on this account, and whether or not *analyticity* could be spelled out without modal notions similar to those involved in our understanding of *necessity* or *possibility* would be a separate question, to be answered in another inquiry. We might say, for example, that a sentence is analytic if it is *entailed by true meaning sentences* and leave it at that. I am encouraging us to press further because I believe that through our reworking of Carnap's treatment in *Meaning and Necessity* we might make a proposal about how to understand analyticity. If we do so, we may realize that our understanding of analyticity involves certain modal notions. If the modal notion involved in analyticity could be only exactly that of necessity (which we'd set out to explain), then the conventionalist approach might be less than satisfactory. On the other hand, if there were some modal notions involved in the analysis of analyticity, but that these modal notions were *not exactly the same as* that of necessity, then our version of conventionalism might be informative, yet not completely reductive. That is, in the base upon which the semantics for sentences involving the sentence operator ‘necessarily’ rests might be some modal notions (like those involving certain *dispositional* aspects[2], for example).

Necessity Reduced to Analyticity Reduced to Necessity Reduced to Analyticity Reduced to . . .

There’s another problem for the analytic-deflationary approach if it so happens that we are unable to give an analysis of analyticity without the use of exactly the same notion of necessity we’d set out to give an account of. If such is the case, then in the reductive base of analyticity sits (this same notion of) necessity, which was to be explained in terms of *analyticity*, so it seems that there’s a deep, vicious circularity in the proposal to use analyticity to explain necessity because we are unable to spell out analyticity itself non-circularly. It is much to our advantage to make an effort to assess the prospects for analysis of analyticity by considering some worries over circularity in the general area of reductive accounts.

These general worries over whether analyticity can be accounted for non-circularly can be spelled out in terms of a specific issue regarding Carnap’s proposal for the semantics of ‘*N*.’ Briefly, whether ‘*N*’ applies to a sentence involved which state-descriptions there are, but it seems that to determine *which state-descriptions there are* involves the very modal notion of what is possible (or necessary, since the two are interdefinable). Since we have reworked state-descriptions as interpretations, and based our account of analyticity on Carnap’s ‘*N*’, if *modal* notions must delimit that set of state-descriptions (which indirectly provide the semantics for ‘*N*’), then since interpretations (as reworked state-descriptions) provide for the analysis of analyticity, if *meaning* notions must delimit the admissible interpretations then it looks like a

[2] Since dispositions are in the reductive base, we will not analyze them. My hope is that even though it may seem that dispositions may involve a modal element, this element is not exactly that which we express with the words ‘necessarily’ and ‘possibly’. Remember our analysis is not meant to be reductive, only informative. I am arguing that if we take certain dispositions as brute, then we can make a proposal for how to understand analyticity and from there we can understand the semantics of the sentence operator ‘necessarily’.

similar sort of worry over circularity holds for our characterization of analyticity. For how do we determine which interpretations are allowed other than by using what the terms (of the language) themselves *mean* to delimit the class of admissible interpretations?

We might simply claim that the *semantic facts* determine which interpretations are to be allowed. And this might be a good solution. This is essentially the strategy Carnap takes in appendix B of *Meaning and Necessity* when we develops the notion of meaning postulates. He proposes that we can present the analytic connections that hold between predicates by endorsing postulates such as '$(x)(B(x) \rightarrow \sim M(x))$' where we think of 'B' expressing the informal predicate 'is a bachelor' and 'M' expressing the informal predicate 'is married,' and requiring that those postulates are true in every state description. (One might think of these postulates as axioms in a system of derivation for the language whose semantics Carnap develops in *Meaning and Necessity* were any effort taken toward spelling out such a system of derivation.) As we discussed in Chapter Four, the notion of meaning postulates goes a distance towards providing something like our intuitive notion of what we mean when we use a certain predicate on a certain occasion, but one who takes up Carnap's meaning postulate approach would lack resources at the disposal of one who advocated the model-theoretic approach. In particular, one who advocates the model-theoretic approach can say *something* about what a predicate term like 'B' means by way of specifying what is in the extension of 'B' in a certain total circumstance. (Actually, we will claim something different, but equivalent, in Chapter Six and Chapter Seven: that we can specify if, in a certain "total" circumstance, a certain individual falls in the extension of 'B' or not.)

We can see a particular weakness of Carnap's meaning postulates approach if we consider Hilary Putnam's arguments based on the Löwenheim-Skolem Theorem in his (1980). He argues that by using the sort of techniques this theorem makes available to us, we can show that any consistent countable set of sentences of first order logic is not sufficient to ensure an the intended interpretation of the language of those sentences.[3] In light of Putnam's initial arguments, the outlook seems bleak for Carnap's proposed "meaning postulates" as the basis of an account of analyticity in the context of the modal systems developed in *Meaning and Necessity*. But we do not need Putnam's heavy-duty logical arguments and apparatus to show that Carnap's meaning postulates are not enough to secure the intended interpretation of the language. Think about the situation informally in the following way. The set of sentences of an SD, together with meaning postulates, form a consistent set (S) of sentences of a first-order language, so, by the (upward and downward versions of the) Löwenheim-Skolem Theorem S can be interpreted over a model whose domain is the natural numbers. Even though the sentence '(x)(B(x) → ~M(x))') was meant to be about the relationship of bachelors to those who are married, there is always an interpretation for them according to which, 'B' is *not* interpreted as 'is a bachelor' and 'M' is *not* interpreted as 'is married' because they are just interpreted as sets of natural numbers.

Interestingly, neither Putnam's nor our more pedestrian observation, become an immediate problem for the model-theoretic approach we develop in this dissertation; the basis of "admissibility" for the interpretations (which are to be proxies for Carnap's state-descriptions) has ultimately to do with how the predicates and singular referring terms, rather than sentences, are interpreted. Requiring that the interpretation of predicate terms and singular referring terms is the operative notion will allow to us claim that this interpretation is provided, if not for free at

[3] In brief, Putnam's strategy is to observe that Skolem's Paradox (which arises because that the Löwenheim-Skolem theorem shows us that there can be a *countable* model which makes true a formal language version of the sentence 'the power set of the natural numbers is *uncountable*') shows us that any consistent set of formal language sentences meant to express not only axioms of ZF – or any other theory of sets – but also to express empirical features of the world and operational constraints on how we take measurements is *not* enough to give us the intended interpretation of the word 'set', that most basic of terms, because this theory admits both of an interpretation on which all sets are constructible and of an interpretation on which there is a non-constructible set.

least at a reduced cost, by the conceptual repertoire of competent speakers of a natural language of which the formal language we develop here is meant to be a simplified model. Specifically, if 'P^1_{21}', is to be the formal language analog of the natural language predicate 'is a tree,' then whether a particular interpretation is admissible will depend in part upon if it makes true sentences in which 'P^1_{21}' occurs given that those with conceptual mastery regarding that which is expressed by 'is a tree' would assent to those sentences. In other words, our admissibility criterion will ultimately spelled out with the help of the conceptual abilities of speakers competent with the predicate and singular terms, rather than with only the austere tool of logical consistency as applied to a set of meaning postulates together with some set of sentences meant to express "empirical" claims.[4]

Another issue, unrelated to Putnam's concerns, also comes into view for the semantic facts approach. One should bear in mind that on this suggestion, semantic facts (perhaps expressed by meaning postulates) would underwrite modal claims (on the conventionalist approach). One might worry over what would be the ground for semantic facts and whether this ground involved some modal element or other (just as dispositions might involve some modal element of other).

What We Must Show for the Conventionalist Analytic-Deflationary Approach

Given all this, some of our time is well spent thinking about whether certain approaches to modal semantics can be both reductive and informative. I believe that there are difficulties for approaches to modal semantics that aim to reduce the modal to the *non*-modal (that is, which purport to show how to understand modal semantics in terms of a non-modal reductive base – in other words, a base that can be characterized without recourse to modal discourse). In order to do a satisfactory job in "clearing a path" for the conventionalist position we try to develop, we must

[4] This observation is exactly in line with Putnam's at the end of his (1980).

show that such difficulties are avoided by *our* approach – this will involve showing that the analytic-deflationary approach doesn't attempt to reduce the modal to the non-modal. We will see more clearly the problems that we avoid by considering two reductive realist approaches to modal semantics that face problems over circularity.

Three Separate, Yet Related, Projects to Investigate Modal Semantics and Specific Difficulties Faced by Reductive Accounts

Now, having said all this, let us set the stage for our demonstration that reductive accounts of modality face serious difficulties and that since the analytic-deflationary account is not (completely) reductive it need not face these problems. There are at least *three* separate projects involved in the effort to disentangle the circularity worries over the delimitation of the class of state-descriptions or admissible interpretations and a reductive account of modality. To get a clearer sense of the project we pursue in this chapter and in the remainder of this dissertation, we will say a bit more about each of the three and use them to outline our course.

The metaphysical issue

The *first* has to do with the *metaphysical* question of how a class of state-descriptions or whatever is to play the functional role of (Leibniz's) possible worlds or (Wittgenstein's[5]) states of affairs is to be delimited. If we held that there were real possible worlds, and that those could help us reductively explain the truth or untruth of the modal claims we were interested in, then we may be (I say *should be*) concerned with the worries Shalkowski[6] raises – which we will get to in a few pages.

[5] For all references to Wittgenstein see (Wittgenstein, L. 1961).

[6] For all references to Shalkowski see (Shalkowski, S. 1994)

The "semantic facts" issue (again)

The *second* issue has to do with an analogous concern for the analytic-deflationary approach: can we simply claim that semantic facts delimit for us the interpretations which were to serve as proxies for Carnap's state-descriptions, or should we try to say more about how the class of admissible interpretations is delimited? Depending on whether one takes a deflationary or a realist approach to an analysis of modality, one of these first two questions will be privileged over the other. For instance, a possible worlds theorist (a modal realist) keen to give a reductive account of possibility would take the pressing issue to be giving a non-circular account of how to reduce modality to a completely non-modal base, that is, the class of possible worlds delimited non-modally. The metaphysical issue takes precedence. On the other hand, if one argued for a deflationary approach to modality in which, for example, necessity is to be analyzed in terms of analyticity, then semantic issues would be more pressing. Specifically, if a linguistic community has come to use words in a certain way, so that there can be claimed to be facts about the correct (canonical) use of these words, that is, *semantic* facts, how do those semantic facts determine which interpretations are to be allowed? And can we explain this without appeal to modal notions?

The reduction issue

Now there remains the question over whether the analysis of modality is reductive (and if so, to what extent). Is the analysis such that the modal notion of necessity (or alternatively possibility) is explained in terms of non-modal notions? We have already hinted that there are troubles raised for the possible worlds theorist if he expects his analysis to be reductive. We are now in a position to address the third issue by adverting to the following question. Can an analytic-deflationary account be such that it makes use of no modal notions in the account it provides of analyticity? I believe that the analytic-deflationary account of analyticity for which we are trying to make room rests ultimately upon certain dispositions of concept possessors. I am not certain if dispositions are modal in nature, but they do seem such that they can be characterized *only* in terms of counterfactual situations (or subjunctive conditionals).

Two Approaches to Reductive Accounts: Metaphysical Realist Approaches and Analytic-Deflationary Approaches

In our assessment of circularity worries for modal semantics, we will consider two main types of accounts of modal semantics: metaphysical "realist" accounts and analytic-deflationary accounts. We have seen that possible worlds, state-descriptions and interpretations (of the sort we have developed in Chapter Two) are closely related; before we address each type of account specifically, I would like to demonstrate explicitly that worries over circularity are a trouble for both of these two approaches. To do so, let us consider a simplified class of state-descriptions. Recall that each member of which is to represent a distinct possible world on Carnap's view, and that for this class of state-descriptions there is a class of proxy interpretations. Even though this proposed class is extremely small and could never do the work that is required of *the* class of state-descriptions or possible worlds, by assessing it we should be able to see clearly a problem of circularity in reductive accounts of modal semantics for this small class that can be readily generalized in such as a way as to become a difficulty for the actual class of state-descriptions or possible worlds. Let our simplified class of state-descriptions be $\{\mathrm{sd}_1, \mathrm{sd}_2, \mathrm{sd}_3\}$ where:

1. sd_1: {'$\sim P^1{}_0(a_0)$', '$P^1{}_0(\mathrm{a}_1)$', '$\sim P^1{}_1(a_0)$', '$P^1{}_1(a_1)$', '$P^1{}_2(a_0)$' '$\sim P^1{}_2(a_1)$'}
2. sd_2: {'$P^1{}_0(a_0)$', '$\sim P^1{}_0(a_1)$', '$P^1{}_1(a_0)$', '$\sim P^1{}_1(\mathrm{a}_1)$', '$\sim P^1{}_2(\mathrm{a}_0)$' '$\sim P^1{}_2(\mathrm{a}_1)$'}
3. sd_3: {'$P^1{}_0(a_0)$', '$P^1{}_0(a_1)$', '$P^1{}_1(a_0)$', '$P^1{}_1(a_1)$', '$P^1{}_2(a_0)$' '$\sim \mathrm{P}^1{}_2(a_1)$'}

Now we have interpretations ($\mathscr{I}_1$, $\mathscr{I}_2$, $\mathscr{I}_3$) corresponding to $\mathrm{sd}_1 - \mathrm{sd}_3$:

4. $\mathscr{I}_1$: $\mathscr{I}_1$('a_0') $\notin$ $\mathscr{I}_1$('$P^1{}_0$'), $\mathscr{I}_1$('a_1') $\in$ $\mathscr{I}_1$('$P^1{}_0$'), $\mathscr{I}_1$('a_0') $\notin$ $\mathscr{I}_1$('$P^1{}_1$'), $\mathscr{I}_1$('a_1') $\in$ $\mathscr{I}_1$('$P^1{}_1$'), $\mathscr{I}_1$('a_0') $\in$ $\mathscr{I}_1$('$P^1{}_2$'), $\mathscr{I}_1$('a_1') $\notin$ $\mathscr{I}_1$('$P^1{}_2$');

5. $\mathscr{I}_2$: $\mathscr{I}_2$('a_0') $\in$ $\mathscr{I}_2$('$P^1{}_0$'), $\mathscr{I}_2$('a_1') $\notin$ $\mathscr{I}_2$('$P^1{}_0$'), $\mathscr{I}_2$('a_0') $\in$ $\mathscr{I}_2$('$P^1{}_1$'), $\mathscr{I}_2$('a_1') $\notin$ $\mathscr{I}_2$('$P^1{}_1$'), $\mathscr{I}_2$('a_0') $\notin$ $\mathscr{I}_2$('$P^1{}_2$'), $\mathscr{I}_2$('a_1') $\notin$ $\mathscr{I}_2$('$P^1{}_2$');

6. $\mathscr{I}_3$: $\mathscr{I}_3$('a_0') ∈ $\mathscr{I}_3$('$P^1{}_0$'), $\mathscr{I}_3$('a_1') ∈ $\mathscr{I}_3$('$P^1{}_0$'), $\mathscr{I}_3$('a_0') ∈ $\mathscr{I}_3$('$P^1{}_1$'), $\mathscr{I}_3$('a_1') ∈ $\mathscr{I}_3$('$P^1{}_1$'), $\mathscr{I}_3$('a_0') ∈, $\mathscr{I}_3$('a_1') ∉ $\mathscr{I}_3$('$\mathrm{P}^1{}_2$');

And we see that there interpretations are proxies for the state-descriptions because $\mathscr{I}_1$('$\sim P^1{}_0(a_0)$') = $\mathscr{I}_1$('$\sim P^1{}_1(a_0)$') = $\mathscr{I}_1$('$\sim P^1{}_2(a_1)$') = $\mathscr{T}$, $\mathscr{I}_1$('$P^1{}_0(a_1)$') = $\mathscr{I}_1$('$P^1{}_1(a_0)$') = $\mathscr{I}_1$('$P^1{}_1(a_1)$') = $\mathscr{I}_1$('$P^1{}_2(a_0)$') = $\mathscr{T}$ (exactly what we expect from a proxy for sd_1); $\mathscr{I}_2$('P $\mathrm{P}^1{}_0(a_0)$') = $\mathscr{I}_2$('$P^1{}_1(a_0)$') = $\mathscr{T}$, $\mathscr{I}_2$('$\sim P^1{}_0(a_1)$') = $\mathscr{I}_2$('$\sim P^1{}_1(a_1)$') = $\mathscr{I}_2$('$\sim P^1{}_2(a_0)$') = $\mathscr{I}_2$('$\sim P^1{}_2(a_1)$') = $\mathscr{T}$ (exactly what we expect from a proxy for sd_2); and finally, $\mathscr{I}_3$('$P^1{}_0(a_0)$') = $\mathscr{I}_3$('$P^1{}_0(a_1)$') = $\mathscr{I}_3$('$P^1{}_1(a_0)$') =$\mathscr{I}_3$('$P^1{}_1(a_1)$') = $\mathscr{I}_3$('$P^1{}_2(a_0)$') = $\mathscr{T}$, $\mathscr{I}_3$('$\sim P^1{}_2(a_1)$') = $\mathscr{T}$ (exactly what we expect from a proxy for sd_3).

Given this class of state-descriptions, we see that according to Carnap's view, the sentence '$N(\sim P^1{}_2(a_1))$' is true because every state-description (there are only three here) contains '$\sim P^1{}_2(a_1)$'. Also, '$N(P^1{}_0 \equiv P^1{}_1)$' is true because in each state-description every individual that is $P^1{}_0$ is also $P^1{}_1$ – in other words, '$P^1{}_0$' and '$P^1{}_1$' have the same intension. According to our proposal for analyticity in Chapter Two, the following sentences are analytic: '$\sim P^1{}_2(a_1)$' and '$(\forall x)(P^1{}_0(x) \leftrightarrow P^1{}_1(x))$'.

It is plain to see that on Carnap's view, what is necessary depends upon which state-descriptions there are. This dependence remains even if one takes the suggestions from Chapter Four for limiting the sentences of a state-description (by making certain restrictions on the admissible interpretations that are proxies for the state-descriptions) because even on the assumption that the sentences of a state-description are all pairwise independent, it seems that a state-description that is *not* among the class of SDs *might have been* among. This would-be member of the class might make it the case that the truth-value of a sentence prefixed by '*N*' might change. A related point is that even on the unrealistic assumption that the sentences of a state-description are pairwise independent, we do not want to allow every specifiable state-description as that would leave nothing necessary other than identity statements such as ‘$a_0 = a_0$’, and this result runs counter our intuitions.

Metaphysical “Realist” Reductive Accounts

I hope we can see that in terms of this “toy” example that the state-descriptions there are determine respectively which sentences are with ‘N’ as a prefix are true and which sentences are analytic as we have defined it in Chapter Two. This demonstration is a clear case of some much more general observations made by Shalkowski. Before we consider his general objection to reductive accounts of modal semantics, I would like to get out (extremely) bare bones version of two other approaches of the reductive sort: those of Lewis and Armstrong.

Reductionist modal semantics *à la* Lewisian possible worlds

Carnap has taken his state-descriptions to represent (as well as can a formal language) Leibnizian possible worlds, and so taken at least one step *away* from the realist view that the possible worlds (or residents of them) are *themselves* the truth-makers for modal statements. The movement away from the realist position is of course a feature of the analytic-deflationary approach of conventionalism; but one might also be tempted rather *toward* a metaphysical realist position as an approach to modal semantics. One position in the realist sector of this particular logical space regarding modal semantics is that of David Lewis. (Recall from Chapter Four that Lewis postulates a metaphysical “multiverse” which consists of completely distinct entire worlds (complete *universes*) neither spatially nor temporally related to each other. If we call the multiverse ‘$\mathcal{M}$’, then we say that for a sentence *S*, ‘It is possible that *S*’ iff for some member of $\mathcal{M}$, *S* is true.)

Reductionist modal semantics *à la* Armstrong's states of affairs

Armstrong's approach is closer to Carnap's than Lewis'. Modal semantics are explained in terms of 'states of affairs.' In a sense, Armstrong's states of affairs become modal semantic proxies for possible worlds. States of affairs are in turn built by conjoining *primitive* states of affairs. For example, $F(a)$ (a is F) represents a primitive state of affairs (as does $\sim F(a)$ – a is not F) – such primitive states of affairs are conjoined with all others such to form maximal sets of primitive states of affairs (simply *states of affairs*). I understand Armstrong's approach to modal semantics as endorsing the following general principle: 'Possibly S' is true if S is true in some state of affairs.

Difficulties for Metaphysical "Realist" Reductive Approaches

I only mention these approaches as they will help us see the difficulty for the analytic-deflationary approach.

Shalkowski's objections: Shalkowski maintains that there are two main *desiderata* for an account of modal semantics (p. 669):

> The first concerns the foundation or ontological ground of modality: What are the truth conditions of necessary truths? The second concerns how we can come to have justified beliefs about modally qualified propositions: What is our epistemic access to necessity? An adequate theory of modality must answer both of these questions. Neither the foundations of nor our knowledge of modality should be an utter mystery.

Given these *desiderata*, there are (at least) two main objections to the Lewisian and Armstrongian approach. If an account of modal semantics is to be *reductive*, then the truth of modal statements is to be ontologically grounded in non-modal facts. In this sense, the approaches of both Lewis and Armstrong are *prima facie* reductive attempts. Shalkowski argues that these two approaches (and reductive approaches in general) fail to satisfy both desiderata. He asserts that reductive accounts can fail in either one of two ways.

First, if the ontological grounds of modal statements are to lack all sort of modal character (including a modal dimension in their characterization), then it doesn't seem that these grounds are such that they can be characterized in a way that is satisfying from an epistemological standpoint. For example, for Lewis, the class of objects[7] that provide the ground for modal statements must be such that only *possibilia* (as opposed to im*possibilia*) are allowed as members of these objects: no object can include a round square.

One who takes this position faces a dilemma: either this class of objects (possible worlds) exists "prior" to our investigation of modal semantics, *or* our modal intuitions are taken to be "prior" to the characterization of the class of objects (possible worlds). If one grabs the first horn, it is puzzling why we have any modal knowledge at all: how are we acquainted with the mysterious class of objects that are the truth-makers for our modal claims? If we grab the second horn, it seems that our intuitions of what's possible must somehow circumscribe the class of objects that contain the truth-makers, and so the account is a failure as a reduction because the ground cannot be specified in a way that makes *no* use of modal notions.

What Shalkowski sees as the second failure (what I will call the "bottle caps in Hackensack" objection) has to do with the relevance of the ontological ground to the actual modal properties that are to be accounted for. We can put the objection in the form of a question: what is the relevance of Socrates' counterpart in some possible world being a carpenter to the claim that the actual Socrates might have been a carpenter? To put a fine point on it, we could say that perhaps the collection of *all the bottle caps in Hackensack* (and a particular relation on these bottle caps) is (are) such that they could be used to represent exactly the class of objects

[7] The 'objects' are possible worlds. Shalkowski uses this term so as not to be prejudicial.

(and the *accessibility* relation on these objects – possible worlds) that we take to provide the ground for modal statements.

Would facts about this collection of bottle caps be the right sort of thing to give us information about modal statements? If all the information presented by the class of objects that are to provide the ground for modal semantics is presented by the bottle caps in Hackensack and the relation they bear to each other, then it is hard to see how the answer could be 'no,' but it doesn't seem that we want to say that the bottle caps in Hackensack are the right sort of thing to ground our modal knowledge.

Reductive Analytic-Deflationary Accounts

The analytic-deflationary account we are trying to clear a way for here is not really affected by the bottle caps in Hackensack objection – the interpretations that are to be the proxies for the state-descriptions are about the things of which we make modal claims. But the first of Shalkowski's objections – that any hope for a reductive account which respects our epistemological *desideratum* is dashed because the objects that are to serve as truth-makers for modal claims must be delimited in a modal way if we are to have knowledge of possibility and necessity – does apply to the analytic-deflationary account we have developed so far. We recall that the interpretations we constructed in Chapter Two were to be proxies for state-descriptions; if state-descriptions are to represent possible worlds, then difficulties for possible worlds as a reductive account of modal semantics will be difficulties for the interpretation proxies also.

The difficulty with circularity for analytic-deflationary reduction spelled out: The dependence of what is analytic upon which interpretations we allow is apparent. If it is analytic that, say, '$(\forall x)(P^1{}_0(x) \leftrightarrow P^1{}_1(x))$', we see that this is the case only because of the features of the interpretations we *do* consider. If we thought that the formal notion of analyticity we outlined in

Chapter Two bears similarity to the notion of truth in virtue of meaning for *natural language*, we might be concerned for reasons parallel to Shalkowski's first objection ("how to delimit and still reduce"). If analyticity for a natural language is defined in terms of a natural language analog of intension (recall an intension is a map from interpretations and terms to extensions), the notion seems to depend upon the (possibly arbitrary) choice of which interpretations there are. One might fear that the choice of which interpretations we consider depends upon some intensional or modal notions. We might hold that certain interpretations are allowed because terms so interpreted are interpreted *correctly* – or have their *usual meanings*. But this would be to admit as Shalkowski observes (see the quote below) that meaning is *modal* in nature. To use a notion (meaning) which modal in nature in the same respect as that which it is meant to explicate (modality) is clearly a specimen of the sort of vicious circularity we have admonished against. On the other hand, we might try to invoke a modal notion to say which interpretations are to be considered, but if we are to use the notion of analyticity to analyze the modal notion of necessity then clearly this move is also viciously circular. Indeed, Shalkowski picks up on this consideration toward the end of his paper (p. 686):

> Theories framed in terms of linguistic usage automatically satisfy the possibility condition[8] in an inoffensive way, but they can meet the exhaustiveness constraint[9] only by admitting that meaning is modal in nature, since there obviously could be more linguistic conventions than there are. That an expression means what it does involves not merely the fact that the expression has been or is being used in certain ways, but also the fact that it is permissible to use it in novel circumstances in some limited ways. That meaning is projectible, but restricted, is just the fact that it is possible to use the expression in certain ways and not in others and still accord with the conventions of a given language. Expressions with the same previous usage but different projections onto novel cases differ

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[8] Endorsing *only* those modal claims that we hold pre-philosophically to be true.

[9] Endorsing *all* those modal claims that we hold pre-philosophically to be true.

> in meaning. Thus, the story of meaning is, in the final analysis, a modal story and not the proper basis for the foundations of modality.[10]

If we wish to explain the natural language sentential operator 'necessarily' in terms of analyticity, then the dependence of the allowed interpretations upon the modal notion of possibility might seem to pose a problem. We set out to analyze 'necessarily' in terms of what is analytic, yet if the notion of possibility (or the *interdefinable notion* of *necessity*) is required to explain analyticity, then we are using the notion of necessity to analyze the operator 'necessarily.' Our efforts would have led us in a circle, and we wouldn't know more than when we started. In sum, the circularity comes if we assume if we expect meaning to be *both* defined in terms of the admissible interpretations *and* to delimit what the admissible interpretations are.

Conclusion

Shalkowski makes a strong case that accounts of modal semantics cannot be both reductive and satisfactory in terms of epistemology, and they persuade me. But he suggests also that what he calls "theories framed in linguistic usage" are not of the right sort to provide a proper "basis for the foundations of modality", and I do not agree with this point. I want to finish this chapter with a coda that recalls the assertion I made in the introduction. Recall that I claimed that one who held a coherent view of modal semantics could not take that view to be (simultaneously) (1) an account of modal semantics that reduces the modal to the non-modal, (2) an account of modal semantics that is not viciously circular (in the sense that the account uses the same notion in the *analysans* that was meant to be analyzed in the *analysandum*), (3) an account of modal semantics that makes modal truth epistemically accessible in a straightforward way without postulating that

[10] Of course, I disagree with the last sentence of this quote – but I think the source of this disagreement is that Shalkowski seems to hold on independent grounds that metaphysically realist approaches to modality (what we might call 'modal semantics') are preferable to deflationary approaches. Also, Kirk Ludwig observes that some of the bite could be removed from Shalkowski's criticism if the meaning of terms is fixed by communal intensions with respect to the use by members of the community of those terms.

speakers have direct epistemic access to *abstracta* or other entities (such as Lewisian possible worlds or Armstrong's states of affairs) that are physically causally inert with respect to those speakers. Perhaps the reasons the mutual incompatibility of (1)–(3) have become clearer in our rehearsal of Shalkowski's arguments. I hope so, but in case they haven't I would like to try once again to show the incompatibility of these three desiderata. It will help things to recall and reconsider some of the ground we covered in Chapter Four.

Recall that we suggested there that accounts of modal semantics that were specifically not deflationary, i.e. accounts that took modal "objects" seriously such as Lewisian possible worlds, Platonic properties residing above the great line of being and the like, were such as to be compatible, in a very easy and natural way, with a correspondence theory of truth. According to one of these views, the sentence expressing a modal claim is true because it *corresponds* to something – either a feature of some possible world or the relations of some Platonic properties. Given a correspondence theory of truth we can reasonably talk about the truth-makers for modal claims. If a non-deflationary view of modality is to avoid vicious circularity (the use of identical modal notions in *analysans* and *analysandum*), then no modal characterization of which possible worlds are to be allowed or which relations among Platonic properties are to be allowed is possible, otherwise the account is viciously circular. For example, if one claims that there is no possible world in which time runs backwards because it is simply not possible that time can run backward, then the use of possible worlds as a reductive base of modality is viciously circular. Possible worlds must be conceptually prior to modality on this view; the same goes for Platonic properties or states of affairs.

Now, the truth-makers for modal claims cannot bear any physical causal relation to the speakers who utter sentences that express those claims at least on the Lewisian approach or the

Platonic properties approach. On the former, two worlds can be distinct only if they are completely spatio-temporally distinct from one another. On the latter because Platonic properties would drop below the great line of being if they bore any physical causal relation to any physical thing and they'd cease to be the right sort of things to be the basis for modality. But a thinker might nevertheless have epistemic access to these truth-makers, but *only* if that thinker had perceptual abilities that outstripped any of the five senses, that is apprehension of those things which have no physical presence in the universe in which the thinker exists.

On the other hand, if one takes a deflationary view (most likely an analytic-deflationary conventionalist view), then one holds that modal truths are epistemically accessible because on this view sentences which express modal truths are just sentences which are analytic or whose truth can be shown to follow from an analytic sentence. So according to my "thesis" that it is not the case that each of (1)-(3) can be satisfied and if we do not want our analysis to be viciously circular, we must give up the view that the modal can be reduced to the non-modal. Why? Consider what would happen if on the analytic-deflationary view, the modal were reduced to the non-modal.

Doing so would mean that there was no modal dimension at all to the class of admissible interpretations, but rather that the class of admissible interpretations was considered primitive and prior to any conceptual ability had by users of a language. I argue that there are two ways we might understand the class of admissible interpretations as prior to any modal notions, both of which are unacceptable for us if we are partial to a parsimonious approach to modality which makes for a workable epistemology.

The first way: to take seriously the class of admissible interpretations, we must admit into our ontology a class of domains of interpretation each of which includes the members (individuals) of the domain of interpretation. On this first way of doing things, we must admit the members of each domain of interpretation into our ontology because the admissible interpretations were to be such that they spelled out in an extensional manner the notion of intension for predicate terms. If we try to reduce the modal (necessity) to the non-modal (a set of interpretations[11] that is specified with no recourse the words 'necessity,' 'possibility' or the notions underwriting our understanding of these terms), then at a minimum we must be able to appeal to the supposed reductive base. That is, we must be able to claim that there are, in fact, those things to which we have reduced the modal. Carnap's original suggestion could not quite carry this project out, unless there was some prior grasp of the intensions of the predicate terms, which, of course, seemed impossible given that providing this notion of intension seemed to be at least a secondary goal of Carnap's work. To follow through with the first suggestion, we must in effect claim that there is something like a class of possible worlds (or at least a class of things one for each admissible interpretation which is described in exhaustive detail by that interpretation). To do so, there can be no appeal to our prior held conceptions of necessity and possibility, and so no epistemic access is guaranteed to the domains of each interpretation, as they are in no way in causal interaction with us. (If they were they would be disqualified as candidates for modal features, as they would be part of the "actual" physical world.)

The second way: we could claim that the ranges of interpretations are sets (perhaps pure sets or sets of natural numbers) and then introduce another function (a so-called "embedding function") which takes elements of those sets to individuals in the world. Such a strategy would, *prima facie*, make a commitment only to sets *qua abstracta* and would have the added virtue of

[11] Interpretations in this sense are simply functions from one set (say Dom) to another set (say Rng). To have the proper sort of understanding of such functions, we must commit to the existence of the elements of the sets Dom and Rng.

being a proposal for providing the intended interpretation of a modal language with a decidedly "actualist" flavor (as only those individuals in the actual world are candidates for falling in the extension of a predicate). This sort of strategy is that taken by Christopher Menzel as explicated and adapted with a slight "nominalizing" modification by Greg Ray[12]. I believe that this sort of approach either doesn't make modality completely epistemically available (on Menzel's original approach) or is if not viciously, at least perceptibly less than virtuously, circular (on Ray's adapted approach). Let me say briefly why. To make sure that predicate terms are such that they have the same meaning across each interpretation, Menzel argues that each particular predicate term must be mapped to a single "relation-in-intension" and then embedded into the world. Ray changes things up a bit by observing that the meaning of predicate terms can be accounted for essentially pragmatically so there needn't be any requirement for Menzel's use of the notion of relations-in-intension as far as the argument's master structure is concerned.

On Menzel's approach, establishing the intended interpretation of a modal language depends upon our commitment to a class of relations in intension that can only be understood on the model of Platonic properties. Since these relations in intension are to be an essential part of the non-reductive base to which modal semantics is reduced and can bear no physical causal relation to us, we are not guaranteed epistemic access to modal truths on this approach. On Ray's adaptation, the intended interpretation of a modal language is essentially grounded on a explanatorily prior, pragmatically explicated, notion of knowledge of meanings or intensions of predicate terms. I've argued that meaning is essentially modal (or at least dispositional) in nature and that something like a class of possible worlds (class of admissible interpretations) is need to make sense of it. If this is right then Ray's analysis is subtly but undeniably circular at worst and

[12] For all references to Greg Ray see (Ray, G., 1996).

less informative than it could be, at best. I argue that it is much better to use an analog of the class of possible worlds – a class of admissible interpretations – to explain meaning (and so let it be that meaning is conceptually prior to modality) and then show how modality can "fall out" of meaning. We shall pursue this topic further in Chapters Seven and Eight.

CHAPTER 6
LOGICAL MANIPULATION OF THE INTERPRETATION FUNCTIONS IN PREPARATION FOR A TREATMENT OF THE ADMISSIBILITY CRITERIA IN TERMS OF CONCEPTS

Introduction

This short chapter is essentially a warm-up for what comes later in Chapter Seven. To focus the warm-up, we should recall that we are still under the threat of circularity and still under threat of ontological commitment to the ranges of each interpretation in the class of admissible interpretations. We will address these difficulties in Chapters Seven, Eight and Nine. To be in a position to do so, we must carry out a bit of "logical" manipulation of the functions which model our meaning notions which we used to generalize Carnap's treatment.

Beginning a Response to the Question over Circularity: The Admissibility Criteria for Interpretations Must Be Presented by Way of How the Extensions of Terms Are Specified.

Let us take a few paragraphs to develop some notions closely related to intensions as we defined them in Chapter Two. Our development may help assuage worries over the circularity problem for the analytic-deflationary account we have just canvassed. We have defined interpretations as maps from singular terms and predicate terms to individuals and sets of individuals in a domain of discourse.[1] These interpretations were to be proxies for state-descriptions and so were taken to be a set-theoretic way of specifying the more general notion of intension – a function from terms and interpretations to extensions. Essentially, intensions were functions created by "stitching together" various interpretations: the intension of a term was a function from interpretations to extensions (themselves a part of the domain of discourse of these interpretations) such that for an arbitrary interpretation, the intension assigned the extension of that term in the interpretation *to* that interpretation. In specific terms, the intension of ϕ is the

[1] Interpretations are defined over sentences of the formal language also, but I don't consider this part of the their domain here.

map that assigns the set of all that is ϕ under interpretation $\mathscr{I}$ to the interpretation $\mathscr{I}$. So in the way it was constructed, the map I was defined in terms of the various interpretations of $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$.

If we could provide intensions in a direct way – in a manner not dependent on the individual interpretations "stitched together" to form intensions – then we could use the collection of intensions for each of the terms of our language to create the interpretations themselves, and so use these intensions to define proxies for state-descriptions.[2] We might do this in the following way. Recall from Chapter 3 (18)–(20) that intension was a map from interpretations and terms to individuals or sets of individuals. Clearly, calling such a function an 'intension' was prejudicial, but helpful to understand what the function I is actually meant to do.

In the following, since we know which notion I was meant to capture, we will not use the word 'intension' but rather make use of only various formal devices. So consider the function named 'I′' defined in the following way with assistance from I (where 'Δ_ω' represents the domain of discourse of interpretation $\mathscr{I}_\omega$ and 'Δ' represents $\cup\Delta_{\omega\in\Omega}$ where Ω is an index set for the interpretations):

1. $\mathrm{I}'\colon \Omega\times\Delta\times\Gamma \to \{0,1\}$ s.t. for $\omega\in\Omega$, $\delta\in\Delta$ and $\gamma \in \Gamma$, $\mathrm{I}'(\omega, \delta, \gamma) = 1$ iff $\mathrm{I}(\mathscr{I}_\omega, \gamma)$ $(=\mathscr{I}_\omega(\gamma)) = \delta$.
2. $\mathrm{I}'\colon \Omega\times\Delta\times\Pi^1 \to \{0,1\}$ s.t. for $\omega\in\Omega$, $\delta\in\Delta$ and $\phi \in \Pi^1$, $\mathrm{I}'(\omega,\delta,\phi) = 1$ iff $\delta \in\mathscr{I}_\omega(\phi) = \mathrm{I}(\mathscr{I}_\omega, \gamma)$.
3. $\mathrm{I}'\colon \Omega\times\Delta^n\times\Pi^n \to \{0,1\}$ s.t. for $\omega\in\Omega$, $d\in\Delta^n$ and $\phi^n\in \Pi^n$, $\mathrm{I}'(\omega,d,\phi) = 1$ iff $d\in\mathscr{I}_\omega(\phi^n) = \mathrm{I}(\mathscr{I}_\omega, \gamma)$.

Essentially, I′ is a map from interpretations, a "super" domain of discourse and (singular and predicate) terms to 'yes' (1) and 'no' (0) that indicates which individuals of those domains either (1) are the denotatum of the singular term or (2) fall under the predicate expressed by the predicate term in question.

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[2] If we then assumed that the sentences of natural language are compositional in nature – the assumption that a sentence's semantic value (roughly *meaning*) is dependent upon the semantic values of its constituent parts (their *meanings*) and their mode of combination, then we might be able to determine quite generally the intensions of sentences as those interpretations on which the sentences were true.

At first blush, one may wonder why the domain of I' needs to be $\{\Omega\times\Delta\times\Gamma\}\cup\{\Omega\times\Delta\times\Pi^1\}$ rather than just $\{\Delta\times\Gamma\}\cup\{\Delta\times\Pi^1\}$. In particular, why must one dimension of I' be a particular interpretation whose index is a member of Ω? The short answer is that I' is to capture all the information present in $\mathscr{I}_\omega$ for each $\omega \in \Omega$ – if we consider the restriction of I' to $\{\omega'\times\Delta\times\Gamma\}\cup\{\omega'\times\Delta\times\Pi^1\}$ for a specific $\omega' \in \Omega$ then exactly when $\mathrm{I}'(\omega', \delta, \phi) = 1$ is $\delta \in \mathscr{I}_{\omega'}(\phi)$ and exactly when $\mathrm{I}'(\omega', \delta, \gamma) = 1$ is $\delta = \mathscr{I}_{\omega'}(\gamma)$ and so, with this restriction, does I' present the same information as is presented by $\mathscr{I}_{\omega'}$.

A more intuitive answer is that $\mathscr{I}_{\omega'}$ was to be a proxy for a state-description (which was in turn to represent a possible world) and so I' must have capability to represent each of those proxies. To elaborate a bit, if we have the individuals, $\delta_0, \delta_1, \delta_2, \ldots$, then given the singular term $\gamma \in \Gamma$ and one-place predicate term $\phi \in \Pi^1$, I' indicates that, given that each of $\delta_0, \delta_1, \delta_2, \ldots$ are part of the same "situation" or "scenario" (that is, they were to be part of the same proxy for a state-description), which of $\delta_0, \delta_1, \delta_2, \ldots$ is the designation of γ and which fall under the extension of ϕ. For instance, if, in the situation (call it 'ω') and $\mathrm{I}'(\omega, \delta_0, \phi) = 1$ and $\mathrm{I}'(\omega, \delta_0, \gamma) = 0$, then δ_0 is in ω and the individual (object) δ_0 *is* in the extension of ϕ but *is not* the individual (object) designated by γ. In this way, we can specify the quality of situation ω in terms of "distributions" of properties and relations across objects and indications of which objects are the *designata* of singular referring terms if we are provided with a domain of individual objects to begin with.

Finally, we can attempt to show how certain features of I' might be used to construct interpretations and how these features of I' might be used to allow and disallow certain interpretations (and so lead to a class of admissible interpretations). I' might be such that, for instance, from $I'(\omega, \delta_0, \gamma)=1$, it follows that $I'(\omega, \delta_1, \phi)=0$ or that from $I'(\omega, \delta_0, \phi)=1$, it follows that $I'(\omega, \delta_1, \phi)=0$ or from $I'(\omega, \delta_0, \phi)=1$, it follows that $I'(\omega, \delta_1, \psi)=1$ or from ($I'(\omega, \delta_0, \psi)=1$ together with $I'(\omega, \delta_1, \phi) = 1$) it follows that $I'(\omega, \delta_2, \gamma) = 0$ or any other number of complicated relationships between certain values of I'. In this most general way, we see that by providing I' with a certain structure (or in other words, restricting it in certain ways) makes it the case that only certain interpretations are "allowed" given that the restrictions on I' are restrictions on I and that together with the domain for each interpretation of $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$, I can completely determine the behavior of each of $\mathscr{I}_\omega$ for $\omega \in \Omega$.[3]

Given Δ ($=\cup\Delta_{\omega\in\Omega}$) we can directly construct interpretations given I': we first simply choose a subset of Δ and then choose an interpretation whose range is a countable subset of $\Delta \cup 2^{\Delta}$ (the set that is the union of Δ and the set of subsets of Δ) in accordance with the restriction imposed by I' (and so by I).[4] According to this strategy, the allowed or admissible interpretations are those whose ranges are chosen from Δ and whose assignments of members and sets of members of those ranges to singular and predicate terms *do not contradict* the features or restrictions placed (by whatever means) on I'. Of course, to make the whole strategy plausible, we must produce a reasonable way to structure and restrict I' – this project will be taken up in Chapter Seven.

After we do some work to provide a way to understand I', we will be able to say more about how we might go about restricting I', and we will be able to say a bit more about how to

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[3] Recall also that there were already some "consistency" restrictions (see Chapter Two, the sections entitled and "An Interpretation can Provide *Extension*", "Two Concerns for Interpretations-as-Proxies-for-State-Descriptions-Approach" and "Admissible Interpretations" for details) on each of $\mathscr{I}_\omega$ – these restrictions are naturally preserved by the structure and restrictions on I'.

[4] Actually a countable subset of $\{\Delta \cup 2^{\Delta} \cup 2^{\Delta^2} \cup 2^{\Delta^3} \cup \ldots\}$ to handle generally *n*-place predicates, but we will just deal with one-place predicates for discussion here.

understand the domain of I'. Hopefully, after some very basic and fairly non-committal work with concepts, we will be able to demystify this function.

Conclusion

In this brief chapter, we have put ourselves in a position to address some of the concerns raised in Chapters Four and Five by providing the technical apparatus to encode each of the admissible interpretations in a single function I'. We can transition between I', I and $\mathscr{I}_\omega$ in the perfectly straightforward way spelled out in Chapter 3 (18)–(20) and (1)–(3) of this chapter. Since we will be able to make transitions of this sort between I', I and $\mathscr{I}_\omega$, in the following, we may spell out our technical developments with any of these three technical devices (most likely in terms of either I' or $\mathscr{I}_\omega$).

Recall that we seek the eventual goal of underwriting the criteria for admissibility of interpretations in terms of conceptual possession (or conceptual mastery). How has our technical development of the relevant notions helped us in doing this? On one way of thinking about concepts, we might consider one who has conceptual mastery with the concept expressed by the predicate ψ to have the ability to sort those things which are called ψ from those things which are not called ψ. With I', we give the same information presented by $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$ in such a form that one who has I' can immediately and directly "read off" whether an individual, in a certain "universe" as described by an interpretation falls under a certain predicate or not. There still should be a bit of concern over circularity because we are still using the notion of an interpretation (state-description proxy) to give the meaning or intension of a predicate term. Specifically, the function I' is to be used as a sortal for which individuals fall under a certain predicate, but the function I' does so by using a class of interpretations which can we can only make sense of if we can somehow give the meaning or intension (even in terms of sorting ability) of predicate terms directly. We shall try to do this in Chapter Seven. In particular, we use Christopher Peacocke's[5] study of concepts to show how we might provide a "base level" grounding for the sorting ability that conceptual mastery comes to without recourse to specifically linguistic knowledge-that.

Using concepts in this manner will go some way toward soothing our fears over ontological commitments made in our model-theoretic reworking and generalization of Carnap's semantical systems. Conceptual mastery might be characterized as a dispositional ability: one has conceptual mastery regarding the predicate ψ just in case one is disposed, in the right conditions, to sort ψs from non-ψs. Of course this characterization is rough, ready and most likely circular, but it is enough to point us in the direction we will be heading in Chapter Seven. The characterization is circular because I', which is to be an account of the meaning or intension of a predicate term, does so only by "taking as input" indices of interpretations which themselves are to be proxies for SDs which are supposed to be descriptions of complete universes in which predicate terms are used to pick out extensions in those described universes with the usual meaning. Yet still I argue that with I' we have gotten something close to the right form to characterize conceptual mastery: I' is a function which takes as parameters a predicate term, an individual and an interpretation index and returns essentially 'yes' or 'no' (1 or 0). The output is of the right sort for a function to characterize a disposition to sort individuals; but we are still left with the fact that I' operates on a domain of individuals – in order to dispense with the ontological commitment we have incurred we must explain how to understand I' without a commitment to such individuals. We try presently to do so by review of a fairly non-controversial position on concepts (Peacocke's). One interesting development for this chapter

[5] For all references to Christopher Peacocke, see (Peacocke, C., 1992).

and all subsequent is the relative closeness of the sort of theory that used to provide the conceptual backing for our proposal for the intension of predicate terms and the *general* semantical theory–a compositional theory of meaning–into which we will much later try to situate our work. The notion of concept position we need to make our generalization of Carnap work in some sense depends upon the features of what are prerequisite to understanding a language on a particular view of meaning. My hope is that it will be comforting to see that the use of a conservative compositional theory of meaning very nicely “lines up” with the sort of model-theoretic update and generalization we have provided of Carnap’s work. I remain hopeful as well that we might go some distance toward responding on Davidson’s behalf to Dummett’s criticism that a theory of meaning should be a theory of understanding. (My hope is that we are filling in the very place where Dummett pointed out what may have been understood as a lacuna in Davidson’s work.)

CHAPTER 7
CONCEPTS UNDERSTOOD IN A PARTICULAR WAY AS THAT WHICH UNDERWRITES I′ AND MAKES IT EPISTEMICALLY PERSPICUOUS

Introduction

In this chapter, we try to show how the map I′, which, if we have been convincing in Chapter Six, was of the right *form* to be what gives a rough and formal characterization of intension of predicate terms, might be underwritten by a fairly uncontroversial view of concept possession. I shall present the case as using "concept talk" to underwrite "meaning talk"

By way of introduction, I should say what sort of concepts I have in mind for the underwriting process. It should be no surprise that we have in mind exactly those concepts – whatever we eventually come to settle on for what the word 'concept' means – which are expressed by predicate terms. For example, the concept expressed by the predicate 'is a tree' or 'is alive' are the sort that we will claim underwrites our use of I′. There are surely concepts that are grasped when one knows the meaning of the terms 'addition,' 'inflation' and 'transcendence,' but these are not the sort of concepts we shall discuss in this chapter. Perhaps, in the fullness of time and in the ripeness of philosophical investigation one might propose how to understand the meanings of such terms in terms of concept possession or possession of a number of concepts which bear particular (conceptual) relations to one another, but we will not do so here. We were set in motion in Chapter Three by the wish to update and generalize Carnap's semantical systems in the service of attempting to use his work in modality to provide an analysis of the sentence operator 'necessarily.' Carnap's SDs are meant to describe possible worlds in terms of some set of "basic" predicate terms. We do not have in mind something aimed at the foundations of physics quite as much as Carnap's work was, but nevertheless we are trying to give an account of the intensions of predicate terms for those terms that could be used to give a bear-bones description of a possible world. It might be that in the description of a possible world, one need not resort to terms like ‘inflation’ or ‘adjudication,’ but the application of those terms might be appropriate when speaking of the possible world that has been described in more basic terms. Indeed, such an outcome is one promise of the philosophical method of conceptual analysis: given that we describe a possible world in which people engage in such-and-such trading behavior with each other and use thus-and-such a currency to trade with, and if the situation arises in that world in which more and more currency is paid out and more and more currency is required for trades that required much less currency before, then we can claim in that possible world that for those economies in which trading has been thusly affected that there is inflation. Our claim is made possible because we can hope to give a conceptual analysis of that which is expressed by the term ‘inflation.’ So our job here should be only to show how certain basic terms can be underwritten with concepts of a certain form.

I have spent a fair amount of time worrying about the threats of circularity for an analytic-deflationary conventionalist account of modal semantics and the threat of a commitment to the existence of truth-makers for modal claims, for example a commitment to entities like Lewisian possible worlds, Platonic properties qua *abstracta*, etc. My *hope* is that in this chapter we can show that a view of concept possession can simultaneously ease both of these worries. My *fear* is that the way in which this view of concept possession allays these worries will be unacceptable given the usual demands on an account of modal semantics. Worries over circularity will be eased because our explications of the intensions of predicate terms will be grounded out in the dispositions of concept possessors, understood as a sort of knowledge-how instead of knowledge-that, rather than in a ground that is characterized only in strictly speaking modal terms, such expressed by ‘necessarily’ or ‘possibly.’ Our strategy for a treatment of the modal might be given schematically with the following where '$\Rightarrow_e$' is interpreted as 'explicated in terms of':

1. Modal Terms $\Rightarrow_e$ Intensions of Predicate Terms $\Rightarrow_e$ Dispositions of Concept Possessors

It is true enough that dispositions might be modal in nature, but the notion expressed by the term 'necessarily' is not identical to the notion of a disposition. The two are no doubt conceptually connected, but I believe that we can gain insight and understanding into the former with the use of the latter and that we can have an intuitive, pre-theoretical understanding of the latter because it seems that we are possessors of concepts, given that we are disposed to sort individuals correctly into, say, tables and non-tables (and so have the concept expressed by the predicate 'is a table'[1]). In sum, it seems to me that claiming that we, as speakers, *do* have a capacity for sorting which can be reasonably characterized in a normative fashion is entirely plausible. Indeed, radical skeptical scenarios aside, one would have to be irrational to deny that we can and do make judgments about whether certain individuals fall under certain predicates or not and speak intelligently and intelligibly with each other about whether these individuals do so fall and for the most part agree about our judgments. If we can proceed from this unobjectionable assumption, codified as "concept possession" and then explain the semantics for modal claims, then we have made progress.

[1] Kirk Ludwig observes that if for a concept expressed by the predicate (say) 'is C_1' then if there is another concept expressed by the predicate 'is C_2', and the extension of 'is C_1' is the same as the extension of 'is C_2' in all actual an counterfactual situations, then the ability to sort what is C_1 from what is not C_1 and the ability to sort what is C_2 from what is not C_2 is not enough fix precisely the concept deployed. For one could be deploying in this circumstance either C_1 or C_2. This observation is not merely formal as 'is triangular' and 'is trilateral' are two such concepts. We see that there is more to be said about these two concepts in particular and about "necessarily co-extensive" concepts in general once we realize that 'is triangular' and 'is trilateral' do not appear to be basic. Are there *basic* concepts which are necessarily co-extensive? Perhaps, and an investigation into whether there are or not may be an interesting project in its own right, but for our purposes in this dissertation, we need not concern ourselves with this problem. All we need for the conventionalist thesis is that to grasp a concept is to have some certain knowledge-how concerning the ability to sort individuals.

Because concept possession is a dispositional characteristic, we see how to ease any worries over the sort of ontological commitment I had asserted might be required to make sense of the model-theoretic update of Carnap. We had been worried that to give an extensional account of the intensions of predicate terms, there must be objects that are members of the sets that predicate terms were mapped to. We shall see here that a commitment to these objects is not required if we claim that to possess a concept is to be disposed to make a certain kinds of assertions about individuals be they *actually* presented or presented *only* by a certain mode of presentation in thought of representation strictly in thought. Of course, there may be worries over the commitments we are forced into to make sense of the similarities of individuals one to another or the similarities of modes of presentation of individuals (or of entire scenarios) one to another. Would we be committed to the notion of sets *qua abstracta* in this case? I am not certain, but I do hope and believe that worries over the ontological commitment required to account for similarities of these sorts is a different issue and one that might become less pressing once we realize that we *are* able to characterize, and speak about, similarities of individuals and modes of presentations of individuals. One guiding principle for the sort of approach we are trying to clear the path for in this dissertation is that we engage in a sort of "bottom up" strategy for explaining modal semantics. That is, we start by taking for granted abilities we actually have and then showing how we can use an understanding of those abilities to give an explication of the semantics for 'necessarily.' This approach is opposed to what I call the "scientific method" approach to philosophizing which I discus in Chapter Nine, and which I think is a method that does not give satisfactory results, as following it has led many into countenancing a robust notion of metaphysical necessity.

To follow through on the promise of starting from the bottom up, I believe we must ultimately move toward a use theory of meaning. When making a non-modal claim in which some aspect of "the world" is reported to be a certain way, such as when I say, "It is not raining anywhere in Gainesville, FL at 3:04PM Thursday, May 15, 2008" such a claim is true just in case it is not raining anywhere in Gainesville, FL at 3:04 Thursday, May 15, 2008 and so in this sense the claim is made true by a correspondence with some aspect of the world. To conclude on the basis of this reasoning that a modal claim such as the one expressed by "Necessarily, all green tetrahedrons are tetrahedrons," is true because it corresponds to some situation obtaining in all possible worlds (for example) is to partake in a sort of inference to the best explanation. One who takes this sort of line has assumed from the sort of "correspondence" that makes true non-modal claims together with the assumption that this modal claim is true (and so there are some true modal claims) that there must be something to which the true modal claims correspond and in that correspondence lies the truth of those modal claims. I argue that such an approach is not the right sort of approach to take. Rather we have tried to, and shall continue to try to build a theory of modal semantics (or at least provide the form of such a theory) out of basic primitives. We have tried to "build up" the theory rather than proceeding as the correspondence theorists do in the fashion of the scientific method. To make progress, we must abandon any sort of reliance on the correspondence theory of truth and indeed turn our backs on this sort of "scientific method" philosophizing. More on this in Chapter Nine.

Finally, we shall notice a comfortable snugness with which our proposed underwriting of meanings with concepts fits with another much more comprehensive, broad reaching and general project in the philosophy of language – that of general semantical theory, specifically an interpretive truth theory as compositional meaning theory. We try to use talk of concepts of the sort that might be expressed by predicates (‘is blue’ or ‘is a house’) to underwrite the function I' that was to provide directly the intensions of predicate terms. It seems reasonable to hold that there are at least some prerequisites to having a conceptual repertoire at all: one must have some sort of prior conceptualizing capacity to have any concepts of this sort at all. It is interesting that all the prerequisite conceptualizing capacity would be had by one who possessed a language. In other words, one who understands a language has enough conceptualizing power to have satisfied the conditions for the having of the concepts that are those that underwrite the intension of the predicate terms we have been so concerned about. This is interesting because much later, when we try to fit our work into a larger project of general semantical theories, the most natural candidate will be an interpretive truth theory as compositional mean theory. (And, I think, that for one who holds a Davidsonian interpretative truth theory as a compositional meaning theory, the sort of approach to modal semantics that we have tried to clear the way for here is the best candidate for providing an analysis of the sentence operator ‘necessarily’ in the context of that meaning theory.) On this sort of compositional meaning theory, one who knows a language already has enough conceptual ability and material to be in a position to have the sort of concepts that underwrite meanings. The analysis of ‘necessarily’ we have been undertaking here and the interpretive truth theory (and the deflationary theory of truth) “line up” together nicely, and, I would argue, this lining up is further evidence that an analytic-deflationary conventionalist approach to modal semantics is a viable one.

Concepts

But we must return to the situation on the ground as we left it at the end of Chapter Six. Do we have a reasonable way to structure / restrict I', while at the same time making the case that we incur no ontological commitment to elements in the ranges of each of the admissible interpretations? I think we do and I believe the way we can do this (no surprise here) is to appeal to concepts as expressing a dispositional sorting ability.

We Shall Attempt to Underwrite Meaning Talk with Concept Talk

We take the uncontroversial view that a speaker's linguistic competence with the predicate term ϕ is underwritten by the grasping of the concept expressed by ϕ and his knowledge that the predicate term expresses the concept in question. I begin by considering a view of Christopher Peacocke and then continue by trying to adapt that view for my specific purposes. Then I address the "foundational" issue concerning what sort of cognitive abilities a thinker must possess to grasp any concepts at all. Finally, I assess whether being able to speak and understand a language gives a speaker enough cognitive material to be in a position to have concepts.

Making use of a traditional view: a predicate expresses a concept under which things having a certain property are judged to fall by one who has the concept in question

We understand what is meant by 'concept' in the way suggested by Christopher Peacocke toward the beginning of his *A Study of Concepts*. On pages 7 – 8, Peacocke gives the possession conditions for the concept red.

> The concept red is the concept C to possess which a thinker must meet these conditions:
>
> 1. He must be disposed to believe a content that consists of a singular perceptual-demonstrative mode of presentation m in predicational combination with C when the perceptual experience which makes m available presents its object in a red′ region of the subject's visual field and does so in conditions he takes to be normal, and when in addition he takes his perceptual mechanisms to be working properly. The thinker must also be disposed to form the belief for the reason that the object is so presented.
>
> 2. The thinker must be disposed to believe any content of any singular mode of presentation k not meeting all the conditions on m in (1) when he takes its object to have the primary quality ground (if any) of the disposition of the objects to cause the sort of experiences of the sort mentioned in (1).

To give a gloss on Peacocke's treatment of the possession conditions for the concept of red, we must begin by noticing that the concept in question is certainly a perceptual one. To spell out the possession conditions of red Peacocke makes use of ‘C’ as a variable that includes the concept red in its range – ‘red’ could have been used, but the use of ‘C’ highlights that the account is not circular. Even though ‘red′’ is the present in (1) and (2), it designates something other than what is picked out by ‘red,’ namely ‘red′’ picks out a certain phenomenal property or sensation that is caused by red objects on normally functioning perceptual mechanisms in normal conditions. Now according to (1), the thinker (let us call him ‘Thomas’ for convenience), if he’s to possess C, must be disposed to believe a proposition (or content) that consists of “a singular perceptual-demonstrative mode of presentation m” such that m is C “when the perceptual experience which makes m available presents its object in a red′ region of the subject’s visual field” in “normal” conditions. What does this mean? If Thomas possesses C, then when he is presented (when he takes himself to be in normal conditions and his perceptual system to be working normally) with an object that causes red sensations, then Thomas will come to believe a certain proposition or content. What is the content? The content consists of a visual presentation m that is a mode of presentation of the object in question in “predicational combination” with C, roughly that expressed by the sentence ‘that which is presented by m is C.’ The content is a ‘perceptual-demonstrative mode of presentation’ because a specific object is picked out (or demonstrated) – the mode of presentation is of a specific object – and, of course, the content is perceptual in that it is visual. When will Thomas come to believe such a content? Exactly when the perceptual experience he has which is the mode of presentation of m is such that it presents m in a red′ (again ‘red′’ represents the phenomenal property which sensations as of those caused by red things in normal conditions) part of the visual field. Furthermore, Thomas must form those beliefs about the object presented by m because of the character of m. (It is not entirely explicit in Peacocke’s presentation whether with ‘m’ he intends to indicate a kind of mode of presentation or whether he means ‘m’ and ‘k’ to be used as variables which are to range over modes of presentation all of a certain kind. He does seem to use ‘m’ to indicate a mode of presentation of a certain kind – a perceptual-demonstrative mode of presentation – but it is implicit that there might be another mode of presentation of the same kind, call it ‘$\underline{m}$’, which is such that Thomas is *not* disposed to believe the singular content expressed by $\underline{m}$ in predicational combination with C. Similarly for k and $\underline{k}$, of the same kind, but different in that Thomas is not disposed to believe that singular content expressed by $\underline{k}$ in predicational combination with C.) But (1) characterizes only the aspect of possessing the concept that accounts for instances when Thomas is actually presented with a red object.

Thomas must also be able to make certain judgments about red things when those things are not visually presented to him or are so in other than normal conditions. In such cases, according to (2), if Thomas is disposed to believe propositions or contents consisting roughly of ‘k is C’ (where k is any singular mode of presentation not meeting all the conditions on m) if k is of an object α which he takes to have the “primary quality ground” that makes α such that it would satisfy (1) if it were presented in the manner outlined in (1). In other words, if Thomas is somehow presented with an object or represents an object to himself (perhaps even in conversation, remembering or in some other reflection or imagination), then if the manner of presentation of the object is k and the object presented by k is such that Thomas believes the object to have the feature or quality that makes it the case that an object which has that feature or quality appears to be red in normal conditions, Thomas will be disposed to judge warrantedly k to fall under C. Conversely, if Thomas is presented with an object or represents an object to himself and the manner of presentation of the object is k and the object presented by k is such that Thomas does not believe the object to have the feature or quality that makes it the case that an object which has that feature or quality appears to be red in normal conditions, Thomas will be disposed to judge warrantedly k *not* to fall under C, even if the object *does* have the feature or quality that would cause it to appear red in normal conditions.

Peacocke provides us with a *prima facie* non-circular, worked-through analysis for the possession of the concept red. A first thing to notice is that possessing C gives Thomas at a minimum the ability to distinguish (or sort) thing he believes to be red things from things that he does not believe to be red in actual (clause (1)) and counterfactual (clause (2)) circumstances (given that he's not mistaken or in error) in that possessing the concept C disposes Thomas to judge warrantedly that an object presented by m or k is C given that Thomas believes that the object presented by m causes a deployment of red′ with respect to m or that Thomas believes the object presented by k has the feature or quality that makes it the case that such as object would cause a deployment of red′ in appropriate circumstances. If an object is presented by a mode of presentation <u>m</u> (of the same type as m but such as to be different from m with regard to the appropriate respect on the basis of which Thomas in is an epistemic position to judge that which is presented by m to be C) such that <u>m</u> does not meet condition (1) or <u>k</u> (of the same type as k but such as to be different from m with regard to the appropriate respect on the basis of which Thomas is in an epistemic position to judge that which is presented by k to be C) such that <u>k</u> does not meet condition (2), then Thomas would be disposed to withhold the judgment that the object presented by <u>m</u> or <u>k</u> is C given his beliefs about that which is presented by <u>m</u> or <u>k</u>.

Now, with Peacocke's analysis as a model, I would like to try to sketch very briefly some general conditions on concept possession (or conceptual mastery). But first, I will offer a few general words about the notion of concept as I use it here. The related notions of concept, concept possession and conceptual mastery are inextricably bound up with the notion of judgment (by a cognizer who possesses the appropriate concept or has appropriate conceptual mastery). In particular, I claim that one who (alternately) possesses the concept expressed by the predicate ‘is F’ or has conceptual mastery with that which is expressed by the predicate ‘is F’ has the ability to judge correctly whether an individual named by ‘a’ is such as to fall under the concept expressed by ‘is F.’ In other words, to have conceptual mastery with ‘is F’ is to be able to judge correctly, in appropriate circumstances, whether ‘a is F’ is true or is untrue. Moreover, to have conceptual mastery with that which is expressed by ‘is F’ is have the disposition to make such judgments (*correct* judgments) on the basis of certain features or distinctive characteristics had by the individual named by ‘a’. Finally, these certain features or distinctive characteristics must be those very features on the basis of which the cognizer who has conceptual mastery with the predicate ‘is F’ is disposed to judge correctly that ‘a is F’ is true or is not true.

If a reader were left nonplussed by Peacocke’s talk of ‘modes of presentation,’ especially in light of the ambiguity over whether the ‘m’ and ‘k’ were to be used to stand for different kinds of modes of presentation or simply variables ranging over modes of presentation, I would share that reader’s perplexity. Specifically, I would claim that even in the absence of any lack of clarity to do with the exact function of ‘m’ and ‘k’, there is a bit of obscuring done by the phrase ‘mode of presentation’ itself. To do a bit more explication of the notions of concept, concept possession and conceptual mastery, I believe it helpful to try to understand this curious phrase. What exactly is a mode of presentation supposed to be? Since we are trying to sketch out the conditions under which a competent cognizer will correctly judge an individual to fall under a certain concept, and the cognizer must consider, in some manner or other, the individual about which a judgment is to be made, it seems that a mode of presentation of that object will be a particular manner in which that cognizer thinks about, imagines, represents to himself or otherwise is presented with the object either by apprehending that object with the senses or by considering the object in a merely imagined situation. There must be some conceptual space between the individual (which may or may not fall under a certain concept) that a cognizer is presented with or represents to himself and any particular concept that that individual might fall under; we are after all trying to separate, conceptually, that which might fall under a concept (the individual) and that under which the individual might fall (the concept). But doing so is often exceedingly difficult in the abstract, especially if we are trying to give a characterization of concept possession for concepts we might call ‘basic,’ that is, concepts which cannot be analyzed further. I have more to say about this in Chapter Eight, but for the time being I would like to illustrate the difficulty we have for giving an acceptable characterization of concept possession in the abstract in virtue of the sheer variety that one finds in the types of modes of presentations. It certainly seems that an individual might be presented (or represented by himself) to a cognizer by way of a description of that individual. So a description, perhaps given by the understood utterance of a sentence in a language that the cognizer understands, is certainly a legitimate mode of presentation. And a description of any individual involves the attribution of features to that individual the having of which may be grounds for the correct judgment that individual falls under certain other concepts the falling under of which may or may not be relevant to some questions about whether this object falls under other concepts, and so on. The web of relationships borne to each other by the concepts possessed by a sophisticated cognizer is most definitely an intricate one. My hope for this short chapter of this dissertation is not to map the infinitely complex inter-looping tangles of a web of conceptual relationships, but rather to argue that a competent cognizer does have a set of exceedingly complicated multi-track dispositions which allows that cognizer to sort individuals with regard to, and because of, the features had by those individuals into the set of things that fall under a certain concept or the complement of that set.

Having made these general remarks, let us return to Christopher Peacocke's account of a certain concept to do primarily with visual modality and to our adaptation of his account to our purposes in the remainder of this document.

The account from Peacocke above was specifically of a concept to do with visual modalities; when I try to give the more general account, we might be in danger of having to accommodate so many other sorts of concepts that we wind up with only a necessary condition on the possession of a concept (or the having of conceptual mastery regarding what is expressed by a predicate term). But of the range of different concepts this sketch is supposed to accommodate will be restricted to those which, to use Peacocke's phrase, can be placed in predicational combination with singular constituents of the propositions or contents. Despite the fact that this account may only be enough for a necessary condition on concept possession (mastery), I believe that will suffice for the role we need concept possession to play in a larger story. As a warm up, I offer the following. Suppose we want to offer a very primitive necessary condition on the concept expressed by the predicate 'is a dog.' We could roughly say that a thinker possesses the concept expressed by the predicate 'is a dog' if that thinker can, when presented with individual objects (either by being in the physical presence of those individuals or being given descriptions of those individuals), make warranted judgments about which of those things were dogs and about which of them were not dogs and do so on the basis of the features had by those individuals. Now we have just tried to give a necessary condition on concept possession of the concept expressed by the predicate 'is a dog' and we have used the very predicate we have just mentioned. Is the proposal circular? No, because the predicate 'is a dog' is mentioned in the *analysandum* but used in the *analysans*. Of course, there are concepts which are not expressed by predicates, but to try to give a necessary condition of the possession of *those* concepts would be exceedingly difficult because there would be no predicate available to be *used* in the *analysans*. At any rate, in this dissertation we are concerned with underwriting the intensions of terms of a language with conceptual competencies, so we need not be concerned with concepts which are not expressed by predicate terms. With this warm-up, let us move ahead to a general necessary condition on concept possession.

The concept expressed by the predicate 'is F' is the concept C′ to possess which a thinker must meet these conditions:

2. (1′.) He must be disposed to believe a content that consists of a (singular) mode of presentation *m′* in predicational combination with *C′* when the condition, circumstance or situation which makes *m′* available presents its object as having the certain features F_1, F_2, . . . , F_n. The thinker must also be disposed to form the belief for the reason that the object is so presented.

3. (2′.) The thinker must be disposed to believe any content of any singular mode of presentation *k′* not meeting all the conditions on *m′* in (1′) when he takes its object to have features F_1, F_2, . . . , F_n.

4. (3′.) An individual's having the features F_1, F_2, . . . , F_n is considered by the thinker an adequate distinctive characteristic (or "quality" in Peacocke's terms) ground for that individual to be F (that is, such that *C′* correctly applies to it).[2]

Now the first question we should ask is whether this account is circular. I maintain that it is not immediately circular – the symbol 'F' does appear in both the analysans ("the concept expressed by the predicate 'is F'") and the analysandum ("adequate ground for that individual to be F") but is mentioned in the analysans and is used in the analysandum. So in terms of the form of the account (or necessary condition), the circularity is no more than to say: 'snow is white' is

[2] I do not mean (2)-(4) to be a characterization of a necessary condition on the possession conditions of just perceptual concepts (as Peacocke has done for red), but rather a general condition on concept possession in general.

true iff snow is white.[3] Even so, one may wonder whether the account is informative. I argue that it is because from it we see that how the thinker is able to judge warrantedly, on the basis of the presentation of a certain individual as having certain features ($F_1, F_2, \ldots, F_n$), a certain content consisting the concept C' in predicational combination with the mode of presentation of an individual. In terms of how we have accounted for the possession of the concept C' it doesn't matter that it is expressed by the predicate 'is F.' All that matters is that one who possesses the concept can warrantedly judge a certain content to be true on the basis of whether the individual (which is a constituent of the proposition that is the content) is presented as possessing certain features. We must also make the unobjectionable claim that certain predicates are satisfied by objects with certain specific features. Also, we make the further unobjectionable claim that predicate terms and concepts can be related by the "expresses" relation. Specifically, if an individual α has features $F_1, F_2, \ldots, F_n$, then the predicate 'is F' applies to α, and if that predicate expresses the concept C' then the possession conditions are exactly those which are given by 1′ and 2′ above. Of course, it is a contingent matter which predicate expresses the concept C', but once a predicate does, we can understand linguistic attributions as conceptual attributions.

[3] One might worry over whether I have used a description (the features $F_1, \ldots F_n$) to denote the concept and that description is used in the characterization of the concept in question, and so object that the necessary condition I have in fact offered is, after all, circular. This interlocutor might further propose that I should merely drop (4) to eliminate the circularity. The situation is complicated – perhaps a bit clarification would help. In (2)-(4), I have tried to characterize the following: if a thinker possesses C', then the thinker will believe that m' is C' if m′ is presented to the thinker as having certain features and the thinker comes to believe that m' is C' on the basis of his believing it to have those features (similarly for k') and that the having of those features is adequate grounds for thinking that the predicate 'is F' applies to that individual. The features $F_1, \ldots F_n$ are *not* meant to serve as a description of C', they are not even in general such that a thinker can articulate them. They are rather merely those features on the basis of which the thinker comes to have beliefs involving the concept C'. I aimed at no more than the spelling out of the claim that thinkers deploy concepts on the basis of features had by the individuals under consideration for whether a concept applies to them or not.

A prerequisite "logical" framework

A question that has arisen is whether there is a basic set of fundamental cognitive abilities the having of which is required to possess any concepts at all (given our approach to the problem). We should address this question because if our particular approach requires basic, fundamental cognitive abilities that an individual is unlikely to have even when we intuitively claim that this individual possesses concepts, then our approach should be rethought. If on the other hand, these basic abilities are such as to be likely had by one we'd intuitively attribute concept possession to, then the approach we have sketched is a viable one. So, what representational cognitive abilities – ways of think about individuals – must one have in order to possess any concepts at all? Here are some (I hope) non-controversial proposals.

5. Any potential concept possessor must have the ability to think about those things that may fall under a concept or not. Those "things" might be called 'individuals,' 'entities' or 'subjects.' In other words (and not to use the following term with any metaphysical "loading"), the potential concept possessor must be able to think of individuals as property bearers or property "havers".

6. Any concept possessor must have the ability to consider in some generality a *feature* (*characteristic* or *quality*) on the basis of the having of which an individual might be judged to fall under a concept. In other words (and not to use the following term with any metaphysical "loading"), the potential concept possessor must be able to think of determinable properties that might be had by individuals.

7. Any concept possessor must also have the ability to think about in a similar amount of generality a specific respect (or aspect) which a thing can have a feature. Respects in which a thing can have features may well be independent of each other. A thing might have a specific feature (being spherical) with regard to a certain respect (shape in the this case), this feature is independent of features relative to other respects of the thing

8. Any concept possessor must have the notion expressed by the logical '~' sentence operator (alt. some notion equivalent to logical negation) in order to think about the candidate entities (see (5) above) as *not* falling under the concept.

Now of course, there are others such as SOME, ALL, and AND.

Aid from a compositional meaning theory?

If we hold that a meaning theorist can use a meaning theory to represent a language speaker's competence with the use of words, then we may get some basic "logical" framework material and structure simply in virtue of this knowledge. To help get this point out, consider, for instance, a section from Lepore's and Ludwig's (2007 Chapter 1, §4.2.) in which they offer an interpretive truth theory (entitle 'truth$_0$') for a very simple language. I relate here a recursive axiom for truth$_0$ and the rule of inference for the truth$_0$ theory that intuitively captures our notion of universal quantification.

> RC2 ('`and`'). For all formulas ϕ and ψ, $\ulcorner(\phi$ `and` $\psi)\urcorner$ is true$_0$ if ϕ is true$_0$ and ψ is true$_0$.
>
> Universal Quantifier Instantiation: For any sentence ϕ, variable v and singular term β, Inst(ϕ, v, β) may be inferred from UQUANT(ϕ, v) (Where 'Inst(ϕ, v, β)' is read as 'the result of replacing all instances of the free variable v in ϕ with the singular term β' and 'UQUANT(ϕ, v)' is read as 'The universal quantification of ϕ with respect to v.'

If RC2 and Universal Quantifier Instantiation represent a speaker's competence with words, the speaker has in his logical conceptual prerequisite tool kit a notion analogous to that which is expressed by the first order logic sentence operator '&' and that which is expressed by the first order logic quantifier '($\forall$x)'. In other words, a competent speaker has gotten (for free, just by knowing the language) something in his basic conceptual tool-kit – the notion of 'and' and 'for all.' From these together with RC1 (the truth$_0$ recursive axiom for '`not`'), we get the notion of 'some.' Perhaps from these basics we have enough material to claim that a cognizer with these basic concepts has the primitive notion of a collection – all the things that a certain predicate is true of.

More aid than we thought? Does implicit knowledge of a truth theory for a language give us the entire prerequisite logical framework?

To claim that a speaker knows a language must we claim that he grasps (albeit perhaps incompletely) at least one concept expressed by a predicate term? I believe the answer is 'yes.' If so, then to be this sort of minimal speaker, one must have the prerequisite logical framework, because to grasp that concept the speaker must have the notion of a *thing* that may fall under a concept, the notions of a *feature* with regard to a certain *respect* the having of which is the warrant for claiming that the predicate that expresses this concept correctly applies to that thing.

A promissory note for Chapter Nine

A conventionalist claims that the truth of modal claims lies in linguistic convention. Haven't we seen here that it is the relationship of concepts (whatever they are) rather than sentences as used to convey meaning that lies at the root of modal semantics? I will argue later that this is not the case.

Now We Are in the Position to See Conceptual Backing by Way of Concepts for Our Stitched Together Map of Intensions

Given our account of (at least a necessary condition on) the concept *C′*, I want to suggest a formal approximation for concept possession. Consider the map *con*, such that for $\mathscr{M}$ the set of (re)presentations of entire worlds, $\Delta_{\mathscr{M}}$ the set of individuals of those worlds, and $\mathscr{C}$, the set of concepts:

9. *con*: $\mathscr{M} \times \Delta_{\mathscr{M}} \times \mathscr{C} \rightarrow \{0, 1\}$ where for $m \in \mathscr{M}$, $c^* \in \mathscr{C}$, $\delta_{\mathscr{M}} \in \Delta_{\mathscr{M}}$, $con(m, \delta_{\mathscr{M}}, c^*) = 1$ iff one who possesses c^* is disposed to warrantedly judge true the content (or proposition) consisting of c^* in predicational combination with *m* where *m* is *of* $\delta_{\mathscr{M}}$

Given that our account of concept possession is successful, all *con* gives us is a generalization of this notion to arbitrary concepts, individuals and representations. Let $\mathscr{C}_{\Pi 1}$ be the set of concepts that are expressed by predicates (recall that 'Π^1' was to stand for the set of one-place predicates).

Now we can see an isomorphism between I' restricted to $\{\Omega \times \Delta \times \Pi^1\}$ and *con* restricted to $\{\mathscr{M} \times \Delta_{\mathscr{M}} \times \mathscr{C}_{\Pi 1}\}$: if *m* is a (re)presentation of the world which corresponds to index ω and the predicate ψ expresses the concept *c**, then $con(m, \delta_{\mathscr{M}}, c^*) = \mathrm{I}'(\omega, \delta, \psi)$.

We now have the appropriate conceptual backing of I' restricted to $\{\Omega \times \Delta \times \Pi^1\}$. A similar backing is possible for I' restricted to $\{\Omega \times \Delta^n \times \Pi^n\}$ for $n \geq 1$ with the appropriate substitution of '$\Delta_{\mathscr{M}}^n$' for '$\Delta_{\mathscr{M}}$' and '$\mathscr{C}_{\Pi n}$' for '$\mathscr{C}_{\Pi 1}$' in the right places. It is interesting to note that while there is a sort of implicit restriction on the nature (or perhaps "size") of a (re)presentation m* for the 1-place predicate case, there can be no such restriction for the general case of an n-place predicate. We think of a representation of an individual as a representation of that individual in the larger context perhaps of an imagined scenario and so we think of the representation of *that* individual as only a "small part" of an imagined counterfactual scenario or "possible world" so conceived. In general, a representation of an n-tuple of individuals for an arbitrary $n \geq 1$ cannot be "small" in this sense. In the most general case, an arbitrary representation must be such that it represents entirely a complete imagined scenario or counterfactual situation because it must be capable of representing an n-tuple of individuals for arbitary *n*. This does seem like a lot to swallow, for how could a finite cognizer possibly imagine a completely detailed counterfactual situation given the cognizer's finiteness? More needs to said about this possibility later, but I think we can satisfy ourselves until we say more about this possibility by noting that even though no finite cognizer could imagine the presentation of an infinite universe, we can get at the notion of what is conceivable in an ideal sense by thinking about what a finite conceiver might be able to present or represent to himself if given an infinite amount of time. Admittedly, the notion of a "completely detailed representation of an entire counterfactual situation" is fantastic on its face, but I believe we can understand what this means if we consider how finite cognizers represent to themselves parts of a possible world (perhaps only the parts that present a single object) and then think how they might imagine entirely the whole "world" in which the individual they've presented to themselves was situated. In addition to this evidence, I believe that the notion of a completely conceived entire counterfactual world is more plausible, given our actual imaginative powers, than either Lewisian possible worlds or a region above the "Great Line of Being" copiously filled with Platonic properties.

Conclusion

In this chapter, we have tried to give a sort of (ultimately) non-linguistic basis for our knowledge of the intensions of predicate terms. We have appealed to the notion of concept possession to show how the map I' might be understood to give the extension of predicate terms directly in a non-circular, yet not completely reductive way. The notion of concept possession rests on the notion of dispositions to make certain judgments on the part of cognizers. And so, one who requires a completely reductive analysis of modality, that is, an explication of the modal entirely in terms of the non-modal would be dissatisfied with this approach. I shall argue in Chapter Nine that the desire for a completely reductive account of modality is motivated by the adherence to the correspondence theory of truth and the background assumption (perhaps implicit or unacknowledged) that philosophizing should follow an abductive, scientific method approach. As Ivana Simic has put it, the desire for a reductive story about modality is an implicit desire for an *explanation* of modal facts rather than a desire for an *explication* of the truth of some sentences which express modal claims. The latter desire is had by a theorist who wishes to start from basic principles, such as that we employ words to indicate objects, and use certain meaning constitutive patterns of use, and show how an account of modal semantics can be had from these basic assumptions with little use of abductive reasoning. This is a sort of apodictic approach to philosophizing that I believe to be just as respectable as the abductive approach.

In Chapter Eight, we shall engage in a very rough and ready effort to provide a taxonomy of concepts of particular importance to the path clearing for conventionalist modal semantics. I believe our efforts will pay a dividend in the demonstration of how members of families of concepts and their relationships to one another are on all fours with our notions of analytic connections between certain members of families of predicate terms. I hope that we will accumulate more evidence for the claim that the relations of concepts mirror the relations of understood meanings of predicate terms and that this conceptual structure makes obvious an epistemology of modal claims: we come to know modal truths by coming to possessing the concepts the predicates of our language express and seeing the conceptual connections between those concepts. Later we will argue that we can dispense with the notion of concept as something we must admit into our ontology, but for the time being its important to see the epistemic deliverances of concepts and their connections.

Our taxonomizing will also help us to see how we might very reasonably place unobjectionable restrictions on the map I' in order to ensure that it endorses just those *de re* modal claims that we pre-theoretically hold to be true. By observing how conceptual connections can be used to provide information about and a certain level of structure for the map I', we should be able to warm ourselves up to the idea that just as the map can be structured and restricted in terms of the set of individual it assigns to predicate terms, the map can also be structured and restricted to the individuals assigned to singular referring constant terms relative to the assignments made to predicate terms. Such restrictions will allow us to claim that certain *de re* modal claims are true or false without a commitment to any sort of metaphysical thesis about the nature of those individuals that are referred to by those singular referring constant terms. Some may take the fact that our treatment of *de re* modal claims is thus mute on substantive metaphysical issue as a liability, but I believe one who takes seriously the analytic deflationary conventionalist approach will see this possibility of silence as a virtue; we shall have made modal semantics safe, in a modest sense, for the absence of metaphysical assumptions about essence. That we can give an account of modal semantics without a commitment to those theses that the abductive method seems to require is further evidence that this approach is a viable one.

CHAPTER 8
TAXONIMIZING KEY (FAMILIES OF) CONCEPTS

Introduction

Our taxonomy is, of course, by no means meant to be exhaustive, but rather only meant to show that the analytic connections between property terms can be backed up in a plausible manner. If the approach we are clearing the way for here can be shown to be a viable one, then perhaps this sort of taxonomizing can provide the framework for more lengthy investigations into the relations borne to each other by concepts among certain families.

At the risk of providing a possible spoiler for what follows, I should say that our initial examination of our concepts, concept families and their relationships will be used as a lead-in to our investigation of the problem of *de re* modality. Since we have placed the class of admissible interpretations on a firm if dispositional footing, we can use these functions from word to object with relative impunity and profligacy. In this chapter, we shall endeavor to show that conceptual connections understood in an informal pre-theoretical way can be understood to place restrictions on the "images" under our interpretations of predicate terms relative to one another. For example one who is competent with the concepts expressed by the terms 'is red' and 'is scarlet' recognizes the conceptual connection between the two; namely a connection we can express with the claim that anything scarlet is red. Similarly for the concepts expressed by the terms 'has a color' and 'is red'; a connection between the two can be expressed with the claim that anything that is red has a color. We will use our intuitive notions of conceptual connections to place restrictions on the admissible interpretations of the following sort. For all $\omega \in \Omega$, and one-place predicate terms ϕ, ϕ', and ϕ'', $\mathscr{I}_\omega(\phi') \subseteq \mathscr{I}_\omega(\phi)$ and $\mathscr{I}_\omega(\phi'') \subseteq \mathscr{I}_\omega(\phi')$ if for ϕ'' is substituted 'is scarlet' and for ϕ' is substituted 'is red' and for ϕ is substituted 'has a color' or 'is colored'

Our Strategy: A Very Brief and Incomplete Survey of Concepts by Way of Concept Possession and Conceptual Connections

We have suggested that the notion of concept possession can provide the right sort of backing for I′, and with such backing we can see a way to give a non-circular account of modal semantics that is conventionalist in that it uses (essentially *linguistic*) interpretation proxies for state-descriptions. We should do a bit to survey the territory in order to get a feel for how the conventionalist modal semantics We are trying to clear a path for might be underwritten by concept possession and conceptual connections spelled out in terms of concept possession: by looking at a few different sorts of concepts, we will be positioned at least to say how the possession conditions of one concept may be related the possession conditions of others.

Survey of Different Sorts of Concepts: Abstract Objects

One obvious way to begin a discussion of the concept of *ABSTRACT OBJECT*[1] is to note that no physical object can be an abstract object: physical objects are *contingent* and *have a spatiotemporal location*, abstract objects are *necessary existents* and *are not spatiotemporally located*. The class of physical objects is completely distinct from the class of abstract objects. One might object with the observation that there are certain kinds of abstract objects, sets in particular, that might include physical objects as members. Is the set whose members are the chairs in the Griffin-Floyd Philosophy Library at 1PM on April 7th, 2009 an abstract object even though its members are contingent particulars? I am not sure what to say about this particular issue, but for the meanwhile I hope we can be satisfied with the observation that the philosophical "work" done by abstracta is different than the philosophical work by physical objects. Since these two sorts of things perform different theoretical functions, we should admit

[1] I'll use italicized 10-point font for words which designate the concepts of that which are expressed by those words ('*DOG*' will name the concept of dog) but sometimes, for emphasis, I'll use 'concept of *X*' ('concept of *DOG*') to indicate these concepts.

both into our ontology and would do well to hold that there is no overlap between the abstract and the physical.

Given that what we have just said is palatable, we can notice another difference between abstract objects and physical objects by examining the *rôle* the type / token distinction plays for each of these two broad categories. Consider the number one (that named by ‘1’). There seems to be only one number one – the one that exists necessarily in every possible world. So anything that is of the type of the number one will be the number one – the only number one. Since there is a type of the number one and only (necessarily) a single token of that type, the type / token distinction is certainly not as useful as the type / token distinction for physical objects, or at least its uses are different. The same goes with other abstract objects like the property of being red. The property of being red is a necessary existent, so it exists in every possible world. There is only one property of being red. But presumably, there is type that the property of being red is of. The situation looks to be analogous with the number one.

To explain the possession conditions of *ABSTRACT OBJECT* we must invoking the notion of necessary existence and so involve modal notions. Also to understand the notion of abstract object as opposed to physical object one must understand the type / token distinction – something that is useful for understanding physical objects, but not for abstract objects (or at least useful in a different way).

Another *prima facie* difference between abstract objects and physical objects is that at least for abstract objects which are used in mathematics or other technical disciplines, the modal properties of these objects are exhausted by their relations spelled out in terms of the theory in whose sentences their names are constituents (or to put it another way – which is about these abstract objects). For example, we might use the numbers (as the referents of the numerals) to explain the truth of a mathematical statement like ‘9 > 7’ and since the true statements about the numbers are true of necessity, it seems that modal properties (not including those had in virtue of their being abstract objects) of these *abstracta* are completely exhausted in terms of the functional role they play in the technical disciplines in which they are used.

One might even make the case that *abstracta* such as the numbers are the truth makers for statements which are true in virtue of meaning: we choose to the numerals ‘0’, ‘1’ and ‘2’, etc. to spell out a theory of arithmetic (for instance). That ‘9 > 7’ is true is simply a matter of how we choose to use these symbols in the context of that theory, and what statements and methods of inference we sanction within that system. So to understand how the numerals are used, what statements we take to be true made with the numerals and related notions in the practice (for the sake of the discussion) of arithmetic, is to know something of what is true of those individuals which the numerals refer to (that is, the numbers). That is to say the rules for making assertions (inferences or “axiomatic” claims) are completely spelled out for the terms whose referents are *abstracta* like the numbers (or sets, functions, etc.) in terms of the theory for which the relationships of the referents of the singular terms of the theory are truth-makers.

Survey of Different Sorts of Concepts: Logical / Abstract / Set-Theoretic Relations

Another concept closely related to *ABSTRACT OBJECT* is the concept of *ABSTRACT RELATION*. We can begin by noting that abstract relations hold between certain abstract objects, and so a cognizer (let us call him Ralph) who possesses a concept which is a determinate of the determinable of the concept *ABSTRACT OBJECT*, could correctly token the concept of a specific abstract relation when two abstract objects did, in fact, bear a certain relation to each other. For example, if Ralph possessed the concept of *SET MEMBERSHIP*, then for any individual (or set) α and set *A*, Ralph could correctly determine (assuming he has enough information) whether or not

α is a member of the set A. A similar, analogous story can be told if Ralph has the concept *IS GREATER THAN*.

What, specifically, is required for the possession of one of this sort of concepts? A necessary condition on having a determinate concept of the determinable *ABSTRACT RELATION* is possession of the concept(s) that are of the type of which the *relata* of the concept in question are determinates. For example, if Ralph possesses the concept of *SET MEMBERSHIP*, then Ralph must have the concept of *SET* and the related concept of *ELEMENT* (*OF A SET*). It doesn't seem that Ralph must possess the concept of the determinable category of which the specific concept he possesses is a determinate – that is, Ralph does not need to possess the concept *ABSTRACT RELATION* in order to have the concept of *SET MEMBERSHIP*. And, of course, Ralph must have the crucial bit of knowledge how – he must be disposed, under certain conditions and given the right amount of information, to judge warrantedly when the set membership relation holds between two individuals (sets can be considered individuals).

It is interesting to observe that Ralph could be such that he learned about set theory in a strictly formal sense: Ralph only knows about sets by way of learning about Zermelo-Frankel set theory (ZF), say. In this case, it might be that Ralph has only a formal notion of *SET*, *ELEMENT* (*OF A SET*), and *SET MEMBERSHIP*. Ralph still has the concepts in question, but his grasp on these concepts is had only by his learning of the formal definitions, properties and behaviors of the abstract objects whose interaction is outlined by the formal theory which he's come to know. In this rather odd situation, the possession conditions of Ralph's concepts are entirely spelled out in terms of the axioms and rules of inference of ZF, and so the notion of set membership and the meaning of 'is an element of set' (as taken to express the concept of *SET MEMBERSHIP*) are provided by this formal theory. In this case, the possession of the concept of *SET MEMBERSHIP* can be determined by verifying Ralph's knowledge of the formal theory in which these notions are explicitly and implicitly defined. I take this to be evidence that, at least for some concepts that are determinates of the determinable *ABSTRACT RELATION*, the possession of those concepts can be had in virtue of knowing a formal theory which provides an explicit or implicit definition of the meaning of the predicates (again of the formal language) which expresses the concepts under consideration.

Survey of Different Sorts of Concepts: Physical Object

The most basic category of concepts under which fall the inhabitants of the world around us is that of physical object. What precisely is involved in the possession of the concept of a physical object? Quine (p. 171, 1960) has offered a very liberal proposal for understanding of what constitutes a physical object: a physical object "comprises simply the content, however heterogeneous, of some portion of space-time, however disconnected and gerrymandered." I encourage us to help ourselves to Quine's proposal, and after we become accustomed to it that we offer a slight modification. His proposal is satisfying, on one hand, because things which we pre–philosophically consider physical objects are physical objects; the old saw, chestnut, armchair and table of the philosopher's drawing room are physical objects. But, on the other hand, his proposal for physical object also has the (at first strange) consequence that a region of spacetime might not be contiguous, and so a region of spacetime might include exactly the armchair and the table; and so what one might call the 'armchair–and–table' is also a physical object. This result seems unobjectionable after a minute: if we tried to individuate physical objects along the lines of our convention about them, we would already have prejudiced our concept talk in favor of a certain metaphysical view about the individuation of physical objects.

On Kirk Ludwig's suggestion, I would proffer one modification of Quine's proposal for what constitutes a physical object, so as to be more in line with our ordinary notion. It seems reasonable to think that physical objects persist through time, so they are probably not the Quinian occupiers of spacetime, but rather four-dimensional spacetime "worms" which are such as to be continuous (in some appropriately loose understanding of that term) regarding their three-dimensional spatial location with respect to time. I hope that such a modification of Quine retains some of the flexibility of his original account, but captures a bit more of our ordinary notion of physical objects.

So it seems that to possess the concept of physical object a cognizer must have the yet more basic concepts of *REGION*, *SPACE*, *TIME* (or *SPACETIME*), and *MATTER* (or *MATTER*/*ENERGY*). Possession of each of the concepts requires the possession of the concept of *SHAPE*, *LOCATION* (or *POSITION*) and *CONSTITUTION*. I am tempted to say not much more about these concepts, as they may be basic (or close to basic) and only (inter)definable in terms of each other. For example, it seems right to say that any physical object must have a location in spacetime, but that individuals which are not physical objects (if any there be) such as numbers, properties or relations (abstract objects) or jealousy and bitterness (mental objects) cannot have a spatial (or spatiotemporal) location.

By way of noticing another difference between the physical and the abstract, we see that physical objects are also such that they are not types, but tokens. There are types of physical objects (such as spherical objects), but an individual that is a physical object is a token.

Survey of Different Sorts of Concepts: Feature / Aspect

There are, of course, certain ways individuals can be; and the way an individual is in a certain respect may or may not have a bearing on the way an individual is in other respects. For example, an individual (a tree, say) may have bright green (as opposed to dark green) leaves, but whether the tree is tall has or not need not have any bearing on the color of its leaves. There are several locutions that express the notion of the ways individuals can be: an individual *a* can be a certain way, *a* can have a certain property, *a* can have a certain feature, and so on. The phrase 'ways a thing can be' seems too imprecise; and the invocation of 'property' talk seems too fraught with metaphysical suppositions and provocative, so to talk about the notion that is expressed by each of these, I will use 'feature.' To speak of the certain *respect* in which an individual is a certain way or other – or has a certain feature – which may or may not be independent from other respects in which the individual is a certain way, I will use the term 'aspect.' So, we could say that whether *a* has feature *F* is a question of a certain aspect of *a*, this question of the certain aspect of *a* – *a*'s *F*-ness – may or may not be independent from another aspect of *a* – whether or not *a* has feature *G* (*a*'s *G*-ness). For example, a rock might be dark gray or light gray and might be igneous or sedimentary – the rock has different features relative to certain aspects. In this example, the rock might be a particular shade of gray which is just to have a certain feature relative to a certain aspect of the rock (its color). The rock might be of a certain formation type, igneous or sedimentary, which is to have a certain feature relative to another aspect of the rock (how it was formed). Since a rock's color is related to its formation process, these two features of different aspects are not independent. There are, of course, features with respect to different aspect which *are* independent; the rock's size is independent of its color because rocks of any color can be broken so as to be of a whole range of sizes.

If we try to generalize these observations and think about what would be required for possession of certain concepts that express the notions of features that can be had by individuals and the aspects of the individuals that those features describe, we might propose the concept of *FEATURE / ASPECT*. What are the possession conditions for the concept of *FEATURE / ASPECT*? The cognizer who possesses the concept of *FEATURE / ASPECT* must know that individuals can be certain ways, that is have certain features, and that these ways of being or *features* are such that only a certain respect or *aspect* of individual is described or made determinate by the having of feature. For example, a cognizer might come to know that the physical object he is presented with is spherical. He can know that the object is spherical and think of the object as spherical *and also know* that the object's shape is independent of other of the features of the object – such as the object's size or color because he possesses the concept of *FEATURE / ASPECT*, and knows that concepts such as *SPHERICAL*, *SMALL*, and *GREEN* are such that if the locutions 'is a feature / aspect,' 'being spherical,' 'being small' and 'being green' express the obvious concepts or name the properties that are picked out by the obvious concepts, then sentences like 'being spherical is a particular feature / aspect,' 'being small is a particular feature aspect' and 'being green is a particular feature / aspect' are true in virtue of the conceptual connections between the concepts at issue.

Survey of Different Sorts of Concepts: Similarity

Even with our initial and incomplete sketch of the concept of *FEATURE / ASPECT*, we can understand the possession conditions of a concept that is closely related to the notion of feature / aspect, the concept of *SIMILARITY*. As a first cut, we can say that a cognizer has the concept of *SIMILARITY* if one understands how two or more individuals can share a common feature to do with a single of their aspects. More precisely, if one possesses the concept of *FEATURE / ASPECT*, then one may realize that (say) two individuals each have some feature that determines a certain of their aspects, and that this shared feature causes the individuals to resemble each other in this particular way. For example, the cognizer who has the concept of *FEATURE / ASPECT* might realize that while individual *a* is red and large and *b* is green and small, both *a* and *b* are spherical and so share a feature and resemble each other with regard to a certain feature that determines an aspect of a and b. One who possesses the concept of *SIMILARITY* will also be aware (given that this cognizer possesses other relevant concepts) that certain features of two individuals *a* and *b* may be similar but not be the same feature. For example, *a* may be spherical but *b* may be *ovoid* but *nearly spherical*, and so *a* and *b* may be similar but not share exactly the same feature, but merely share features that are such that the having of those features results in certain kind of resemblance between *a* and *b*. Possession of the concept of *SIMILARITY* may also require possession of a relational concept (*IS SIMILAR TO*) which is correctly applied to two entities which fall under the concept of *FEATURE* / *CONCEPT* such just in case these entities bear a relation of similarity to each to other and these entities determine the same aspect of the individuals which fall under these concepts respectively.

Survey of Different Sorts of Concepts: Category

If one has the concept(s) of *SIMILAR* / *SIMILARITY*, and the concept of *SET* (and related notions) one has met the prerequisites to possess a particular concept of *CATEGORY*. A cognizer possesses the concept of *CATEGORY* if he can group individuals into sets based on their similarities and dissimilarities. For example, if individuals *a* and *c* both have feature *F*, but individual *b* does not, then if a cognizer possesses the concept *F*, then the cognizer is in a position to think of *a* and *c* belonging to a category (perhaps the category of things which are *F*) to which *b* doesn't belong. The cognizer notices that *a* and *c* are similar to each other in a way in which *b* is not similar to either *a* or *c*. If *b* and *c* both have feature *G*, but individual *a* does not, then if a cognizer possesses the concept of *G*, then the cognizer is in a position to think of *b* and *c* belonging to a category to which a doesn't belong. Just like the last case, the cognizer notices that *b* and *c* are similar to each other in a way in which *a* is not similar to either *b* or *c*.

Since We are leaving concerns over vagueness aside in all of our considerations here, we can say that for any set of individuals a single category (of the sort we have been considering) partitions the set into two distinct subsets – a subset of individuals who belong to that category (perhaps empty) and a necessarily distinct subset of individuals who *do not* belong to that category (also possibly empty). But it may also be the case that a collection of three or more categories partitions a particular set without remainder; for example the categories indicated by '$(-\infty, 0]$', '$(0, 1]$', '$(1, +\infty)$' partition without remainder the real numbers. There are infinitely many ways to exhaustively partition the real numbers, as there are for any infinite set of individuals.

Survey of Different Sorts of Concepts: Determinables and Determinates

In philosophical discourse, we speak often of determinables and determinates: we say that *red* is a determinate of the determinable *color*; *scarlet* is a determinate of the determinable *red*; and *scarlet*$_{17}$ (just to give it a name) is a determinate of the determinable *scarlet*. What can we say about the concept of *DETERMINATE* and the concept of *DETERMINABLE*? First, it seems that if one has the concept of *DETERMINATE* then he must also have the concept of *DETERMINABLE* given that they are defined in terms of each other. Perhaps, there's only a single concept maybe the concept of (for lack of a different phrase) *DETERMINABLE/ATE*.

What, intuitively, is going on here? Regarding determinates and determinables, we have the idea of a broad category which applies to, in virtue of a set of general features had by, a class of individuals under consideration. The category marked out by these general features is the determinable under which all of these individuals fall. In this particular category are more narrow subcategories which apply to, in virtue of a more specific set of features had by, and as a consequence increasing similarities (with respect to some feature or other) shared by, a class of individuals each of which already fall under the larger category. For example, individuals which have a color (have the determinable property of having a color) are some color or other (have a determinate color); individuals which are red (a determinable of which there are determinates) are some shade of red or other (have a determinate shade of red); individuals which are scarlet (again, a determinable of which there are determinates) are some shade of other of scarlet (have a determinate shade of red).

So to have the concept of *DETERMINABLE/ATE* one must have the notion of (a certain kind of) category (categories) into which into which individuals are placed on the basis of similarity, and in which there are further categories into which individuals can be placed on the basis of more fine-grained similarities. One who possesses the concept of *DETERMINABLE/ATE*, must know that individuals can be grouped according to similarity of a certain sort or other, but individuals which can be so grouped and be such that they have features which allow for further grouping ("subgrouping") on the basis of similarities of the same sort that allowed for the original grouping to be made. Possessing the concept of *DETERMINABLE/ATE* requires at least possession the concepts of *SET / SUBSET*, *FEATURE / ASPECT* and *SIMILARITY* is required for the concepts of *NATURAL KIND* and *ARTIFACT* (among the many others we do not canvas here, of course).

Survey of Different Sort of Concepts: Primary Qualities

Let us consider various concepts of the so-called primary qualities. The hallmark of a particular primary quality is the independence of the quality's existence from any particular observations of an individual which has the particular quality. The determinate qualities of the determinable feature of *having a shape* are primary qualities; so if an individual is square, then its quality of squareness is a primary quality. What are the possession conditions for a primary quality like squareness? One who possesses the concept of *SQUARENESS* must possess various other concepts of the features that are had by individuals who have the property of being square: to name a few the concept of a *PLANE* / *GEOMETRICAL FIGURE*, the concept of *RIGHT ANGLE*, perhaps the concept of *LINE*, perhaps *STRAIGHTNESS* and so forth. Perhaps one who has the concept of *SQUARENESS* must also have the more general determinable concept of *SHAPE*.

There are other primary qualities that we might consider such as number or configuration. But we can assert that having any specific primary quality concept such as *SQUARENESS* does involve other more basic concepts we have already canvassed – such as concepts of *PHYSICAL OBJECT* and *FEATURE* / *ASPECT*. To be a physical object seems to require having a spatiotemporal location as well as a certain shape; to have a primary quality such as a certain shape requires that the a certain aspect of an individual have a certain determinate feature.

Survey of Different Sorts of Concepts: Secondary Qualities

We have surveyed at bit of the territory regarding the concepts of various primary qualities. It would be beneficial to our survey to consider a representative few of the concepts of the so-called secondary qualities. Of course, traditionally the having of a specific color or other is to have a secondary quality – a quality or property the having of which is somehow dependent upon the observer of that very quality or property. So what are the possession conditions of a concept like *RED*? We can start with some observations about the fundamental conceptual repertoire required to identify an individual as (having the property of) being red. For a cognizer to rightly think about an individual as having the property of being red, one must first of all have the ability to understand that individuals can have an appearance that is perceived visually; one will most likely be capable of having visual perceptions and will be able to see. We should be reluctant to claim that a cognizer without the ability to have visual experiences of certain sorts (those experiences that are *as of* having a visual perception) now or in the past could have the concept of *RED* or would at least have a concept different from the concept *RED* than a cognizer who could have (had) such experiences would have. The cognizer without the capability for visual experiences might understand enough about the physical world to realize that light waves can be reflected off of the surfaces of objects and that light waves are of certain frequencies and that the perceptual mechanisms of sighted creatures are such that light waves of different wavelengths are perceived in different ways, but this does not seem like enough for the sightless cognizer to have the same concept that is had by the sighted cognizer. And the experientially capable cognizer must realize at least a few of these details to count as having the concept *RED*; he must realize that only individuals which have visible surfaces (or surfaces which are, in principle, capable of being visible with his normal visual perceptual apparatus) are those qualified to be such that they can fall under the concept *RED*. In the recognition that only individuals with visible surfaces are such that they can fall under the concept *RED*, there's already quite of a bit of conceptual repertoire in play. One who possesses the concept *RED* must realize that those individuals that fall under it must be physical objects with facing surfaces that are (at least in principle) able to be visually perceived. Also, it seems that one would have the concept of *FEATURE* / *ASPECT* because a red square is different from a red disk in that it is differently shaped, it is color is similar.

Perhaps it is not necessary for one to possess the concept of *SIMILARITY* – that we have outlined before – *specifically with regard to the secondary qualities*. We can illustrate this with the following thought experiment; it is logically possible that everything in a particular cognizer's environment could have been the exact same shade of red. This unfortunate knows that things seem a certain way to him, and may even have a way of describing what their appearance is (even though this seems unlikely), but does not realize that they could look any other way. Since he does not realize that things could look another way, there is not (yet) any specific notion of similarity among any of the secondary qualities that are color qualities. If he were to see something of a color other than the shade of red he is seen for his whole existence, then he might come to have the notion of difference and similarity along the dimension of the secondary quality of color. It is interesting also that a cognizer needn't have linguistic capacity for sorting the color concepts which he possesses. An artist has certainly many more color concepts (understood as the ability to make color discriminations) than she has words for colors.

Survey of Different Sorts of Concepts: Natural Kinds

The notion of a natural kind draws on much of the conceptual *material* that we have surveyed in last few short sections. If a kind *K* is such individuals which are of that kind (that is, *are* K) are distinguishable from individuals that are not *K* in a way that conforms with a distinction of the natural world, then *K* is a natural kind. For example, the distinction between inanimate and animate objects is such that ‘animate object’ can be considered a natural kind term. Those individuals to which the term applies (like the oak tree on the other side of the apartment complex or the neighbor’s dog Rex) are such that their structure and function is markedly different in specific ways from individuals to which the term does not apply (like the computer I am typing on right now or the couch I am sitting on), and that these specific differences are such that the constituents of the world can be categorized with these terms and such categorization is independent of the particular desires and intentions of the cognizers who use these natural kind terms. The possession of concepts that are of natural kinds is very demanding – a cognizer must have an extensive conceptual repertoire together with the proper conceptual connections among the various members of that repertoire to possess natural kind concepts. To possess a certain specific natural kind concept K, seems to require at least having the following concepts. He must have the concept of *PHYSICAL OBJECT* because those things that fall under natural kind concepts are physical objects, and one must realize this to have the concept in question. He must certainly have the concept of *SIMILARITY* given that members of the natural kind bear similarities – this is how the kind is marked off). He must perhaps also have the concept of *DETERMINATE/ABLE*; members of certain natural kinds are often members of other broader natural kinds – for instance a specific species of tree might form a natural kind, any member of this particular natural kind will also be a member of the broader natural kind formed by plants, terrestrial beings, living beings, etc. Perhaps he must even have the (previously uncanvassed) concept of *INDIVIDUAL*; we saw from our example of the natural kind formed by a specific species of tree that the members of that natural kind are marked out by the fact that they are individuals, that is, certain specific trees of that species are members of the natural kind because members of the kind have certain characteristics had in virtue of their structure, function and functional organization. These characteristics are such that only individuals – separate *organisms* as differentiated by these sorts of specific structure and function and functional organization – could have these characteristics. One who has a natural kind concept will likely have the concept of *CATEGORY* as well given that it is often the case that natural kinds *E*, *F* and *G* are such that any member of any one of these kinds is a member also of natural kind *K* and so *E*, *F* and *G* might be thought to be categories of the kind *K*.

Survey of Different Sorts of Concepts: Artifacts

Finally, we spend some time thinking about what the possession conditions are for a concept of something that is an artifact. Let us consider specifically the concept of *EYEGLASSES* for the sake of our overview. I choose this specific type of artifact because, even though it is certainly logically possible that an object with an organization and constitution identical to a certain pair of eyeglasses could come to exist even if there had never been any people to make artifacts, it is not *prima facie* ridiculous to claim that we might not refer to that individual as a pair of eyeglasses, simply because it wasn't created in the "right" way and does not play the "right" sort of functional role in the activities of humans. Of course, that's controversial, but let us limit our discussion of eyeglasses by saying that a cognizer has the concept of *EYEGLASSES* only if the cognizer applies this concept to those things which are indeed artifacts.

One who correctly applies the concept must have the capability of understanding (at least) two broad notions – one captured roughly by the concept of *MANUFACTURED OBJECT*, which applies to those things that are constructed, manufactured or made by a creature capable of manipulating it environment to certain complex effects and the other roughly captured by the concept of *PURPOSE* – the use to which an object is put. With these two notions in mind, one could understand how a specific physical object, like one which is a pair of eyeglasses, could have a teleology and functional role such that is could rightly fall under the concept *EYEGLASSES*. Of course, as with the concepts of the natural kind terms, a huge prerequisite conceptual repertoire is required along with the panoply of conceptual connections between the members of that repertoire. To recognize the commonality between any two different pairs of eyeglasses, a cognizer must have the concepts of *SIMILARITY*, *CATEGORY*, *DETERMINATE/ABLE*, *FUNCTION*, *FUNCTIONAL ORGANIZATION*, and *INDIVIDUAL* among a host of others.

Survey of Different Sorts of Concepts: Conclusion

Now I hope we will see that we have come to the place at which we wanted to arrive. To possess the concept *C* is to possess a dispositional sorting ability. If the concept of *C* is expressed by the predicate 'is C,' then a cognizer who possesses it has the appropriate dispositions so as, in the right conditions and with adequate information, to be able determine whether an individual is C or is not C. Of course, one can possess the concept *C* without knowing that the predicate 'is C' expresses the concept in question. In fact, it could be the case that a cognizer possessed a concept that was not expressed by any predicate of the cognizer's language (or any language for that matter). In such a situation, I believe it would be difficult to characterize that cognizer's sorting ability in a non-circular way. But we need not fear. To give a non-circular account of the possession conditions for this (as yet unexpressed) concept, we should consider a language exactly like the cognizers except that it contains an additional predicate term 'ϕ*' say. (In terms of the system we have set up we can easily do so since we model natural language with a formal one in which there are a denumerable infinity of predicate terms.) Then we say that a necessary condition on possessing the heretofore unexpressed concept is to be able to sort ϕ*s from non-ϕ*s. The predicate terms in the account of concept possession is doing no work other than to provide some linguistic handle for the concept in question. In this sense, the predicate term is not *essentially* built in to the account of concept possession.

We can simply assume outright that on the view we are advocating for concepts (of a certain sort[2]), they are sortals: a necessary condition on possessing C is to be able (given enough information about the individuals in question and the situations in which those individuals are embedded) to sort individuals into two groups – those which fall under C and those which do not. We have seen that concepts may be such that they can be used to create different classes of three or more categories into which one who possesses those concepts which create the categories can group individuals. For example, if $\mathscr{A}$, $\mathscr{B}$ and $\mathscr{C}$ are categories such that if an individual is of the right sort to belong to one of these categories then if it falls under the concept A then the individual belongs to category $\mathscr{A}$, if an individual falls under the concept B then it belongs to category $\mathscr{B}$, and so on. Then one who possesses each of the concepts A, B and C can sort the individuals (given enough information of course about the individuals and the situation in which it is embedded) that are of the right sort to belong to one of these categories into these categories without remainder; given enough information about an individual I_1 and the situation in which I_1 is situated, the possessor of the concept of A can determine whether I_1 falls under the concept A or not, if so I_1 belongs to category $\mathscr{A}$, if not I_1 belongs either to categories $\mathscr{B}$ or $\mathscr{C}$ or is not the

[2] We have been considering explicitly only those concepts that can be expressed by predicate terms such as 'is ϕ' in sentences like 'γ is ϕ'. There are other concepts expressed by terms such as '&' which are not obviously sortals, but rather properly logical. We have not been concerned with such concepts in this chapter.

right sort of thing to belong to either of these categories. If I_1 falls under *B*, then 'it belongs to category $\mathscr{B}$, if not then it belongs either to $\mathscr{C}$ or is not the sort of thing to belong to either $\mathscr{A}$, $\mathscr{B}$ or $\mathscr{C}$. Finally, if I_1 falls under *C*, then it belongs to category $\mathscr{C}$.

If concept possession is characterized, very roughly, by the ability had by the possessor to sort individuals into two groups (given that the conditions are right and various skeptical scenarios are ruled out), those who fall under the concept and those who do not, then we should be able to represent the relations between concepts with binary trees. So perhaps (and this is merely a suggestion for future research) binary trees could be used to represent the structure of I'.

Conclusion

And finally, we can see how we can make use of the relationship of concepts (the possession of one of which is thought of as an ability of a certain sort) to restrict the members of the class of admissible interpretations.

1. For the predicate terms ϕ and ϕ' (of arbitrary number of places), if the concepts expressed by ϕ and ϕ' are such that one who has conceptual mastery with regard to both of the concepts expressed by these respective terms has also the disposition to assert (under the appropriate conditions[3]) that any individual which he judges to fall under ϕ also falls under ϕ', then for all $\omega\in\Omega$, $\mathscr{I}_\omega(\phi') \subseteq \mathscr{I}_\omega(\phi)$ and is warranted in his judgment by the conceptual competences in question.

If what we have said earlier in this chapter, then with repeated application of this principle for the (families of and members of those families of the) concepts expressed by the predicates we have surveyed in this chapter will impose the sort of structure on $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$ that reflects our intuitions about the connections between concepts. My hope is that by "working our way down" from the most general terms "*ABSTRACT OBJECT*" to the least general (we have surveyed) such as

[3] Of course, much will have to be filled in here as 'appropriate conditions' is just about as expandable placeholder as can be. I do believe that enough could be packed into to get things right.

“*ARTIFACT*”, we can provide a detailed structure for the class of admissible interpretations, and do so in a way that requires only the basic notion of conceptual mastery.

Of course, the “problem” of *de re* modality still lingers; no matter how much structure we place on the *predicate terms* of our language by ensuring that the class of admissible interpretations mimics the connections we take there to be between the concepts expressed by the predicates of the sentences of a state description, unless the a predicate applies only to a single individual, so far we have no way to restrict the members of $\{\mathscr{I}_{\omega}\}_{\omega\in\Omega}$ to reflect the intuition we might have the a certain individual falls under a certain predicate as a manner of meaning. This issue may at first seem to be a troubling one because whereas conceptual relationships can be understood in terms of the characteristics of features had in common by objects (and so whether or not these objects fall under certain predicates on the basis of those characteristics or features), when we speak about de re modal claims, we do not necessarily speak of the characteristics or features had in common of objects what is under consideration is a single object, the *res* or thing, that the claim is about. Or at least so things seem before we begin a more comprehensive, thought out and subtle investigation into the issue.

We will address the so-called “problem” of *de re* modality in Chapter Ten. In the next, Chapter Nine, we will return to some matters that might not have quite been resolved yet.

CHAPTER 9
LINGERING CONCERNS AND A POSSIBLE DIRECTION FOR FUTURE RESEARCH ON A CLOSELY RELATED TOPIC (TWO-DIMENSIONAL SEMANTICS)

Introduction

We have provided the form of the theory which an analytic-deflationary conventionalist approach to modal semantics might take. We have also gone a little way toward showing how some actual flesh might be placed on the skeletal form. There are questions that still remain and objections to be anticipated and for which reply must be begun. In Chapter Nine, we try to respond to two issues of importance.

First, I bring up (again) what I believe to be an important feature of the theory whose form we have tried to give. There may still be worries over circularity, and even if those who worry about vicious circularity have been persuaded by the previous chapters, I feel there may still be a bit of concern over the non-reductive nature of our account. I address these worries in the following section.

Second, there's an 800 lb. gorilla in the room any time we speak of modal semantics which goes by the name 'Two-Dimensional Semantics.' Toward the end of this chapter, we shall try to engage this beast so as to have a reasonable and rational discussion with him. My hope is that our project need not be seen as incompatible with the Two-Dimensional framework and intuitions.

Have We now Shown that We Can Prevent Vicious Circularity in the Deflationary Reduction if We Take this Approach?

We have argued that the omnibus I' can be used to provide the set of admissible interpretations each one of which is supposed to be a proxy for a Carnapian state-description. One of the difficulties for other approaches to modal semantics was that the class of possible worlds or states of affairs was such that it could only be delimited in a manner which provided satisfactory epistemological results by making use of the very modal notions for which it was meant to provide the semantics. Why does not the approach based on I' face the same sort of difficulty?

We claim that the structure of I' could be provided if we had a detailed and specific account of concept possession conditions and the conceptual connections between the members of our conceptual *armada*. Since the fulfillment of the obligation incurred by our promissory note on the structure of I' would be secured if we provided such an account of concepts and their connections, we can say that the aim of our analytic deflationary approach to modal semantics is *not* a completely reductive one. This is so because it may be the case that concept possession can be explained *only* in terms of certain *dispositions* of a possessor of the concept. Even if there is some sort of ineliminably dispositional element to the story about the concepts that provide the structure of I', we are not in the same situation that the Lewisian or Armstrongian is in. First off, we have not claimed to provide a reductive account of modal semantics. Second, it is unlikely that the modal notions we set out to provide the semantics for are *precisely the same* that turn up in the account of dispositional features of concept possession. The modal notion expressed by 'necessarily' is, as we have spelled things out, a linguistic one; to be able to understand this notion one must be able to understand a language of which it (or a translation of it) is a term. The most fundamental notion for the conventionalist account (that of concept possession) need not be an ability which the cognizer must have a language to possess. For example, some sort of cognizer of a very primitive sort, might have the capacity for sorting squares from non-squares, but might not have any language capacity at all. Conversely, anyone who is actually able to speak a language must have the capacity to sort on the basis of at least one predicate (see Chapter Seven, "Aid from a Compositional Meaning Theory (An Interpretive Truth Theory)?"), but this is enough to show that the notion expressed by 'necessarily' is distinct from that of a cognizer's dispositions to sort (his sorting ability) in the most basic sense. Does this show that our understanding of dispositions does not rely on a prior understanding of necessity and possibility? Timothy Williamson[1] argues that our knowledge of counterfactuals expressed by subjunctive conditionals (statements of the form 'if it were the case that *r*, then it would be the case that *s*') is a specific cognitive capacity which we exercise in *a priori* and *a posteriori* contexts and is what provides for our knowledge of the truths of modal statements. He writes,

> In some loose sense, we may well have a special cognitive faculty or module dedicated to evaluating counterfactuals. It would have significant practical utility. If we wanted, we could call it 'intuition', although it would not in general be a priori. What seems quite unlikely is that we have a special cognitive faculty or module dedicated just to evaluating counterfactuals whose antecedents are incompatible with their consequents: the case is too special. Yet that is the crucial case for the metaphysical modalities. It is far more likely that the general cognitive capacities that enable us to evaluate counterfactuals whose antecedents are compatible with their consequents also enable us to evaluate counterfactuals whose antecedents are incompatible with their consequents, and therefore the metaphysical modalities.

This is not to say that we can reduce modality to something non-modal. Our offline capacity to evaluate counterfactual conditionals is modal in the sense that it is an ability – a multitrack disposition. Such multitrack dispositions can only be reduced to the non-modal if there were some categorical base in terms of which they could be reductively explained.

How Far can the Reduction Go? The Ultimate Reductive Base and the Commitments this Strategy Incurs

This sort of account blocks the kind of vicious circularity that would result from using Carnap's intensions to completely reductively explain a natural language analog of the sentential operator 'N.' On the account we have developed so far, interpretations are classified as admissible on the basis of the whether a competent semantic user who possesses concept *C*

[1] For all references to Timothy Williamson see (Williamson, T., 2005).

would find acceptable atomic sentences of the form $\ulcorner\phi(\gamma)\urcorner$ where 'ϕ' and 'γ' are predicate and singular referring terms of the language, respectively, and ϕ expresses *C*. Granted, there is *dispositional* character to this (or any) ability, so if there is a *modal* aspect to dispositional properties, then the account does not even purport to offer a completely reductive analysis.

It seems that there is an inescapable appeal to the dispositional character of concepts, but if Williamson's point goes through, then we can explain modal knowledge in terms of knowledge of a certain kind of counterfactuals even if we cannot provide a reductive account of modality. There may, however, be another way to approach the problem in which we appeal only to the notion of semantic entailment rather than to the use of subjunctive conditional statements to express counterfactuals.

We take to be basic knowledge of meaning in the sense of competence. Of course, when we talk about knowledge of meaning and what it implies, we use language, and what the language we use means determines what follows from someone's knowing the language. It follows, *inter alia*, that if that person believes that γ has certain features and considers whether γ is ϕ, he will come to believe that γ is ϕ, assuming that he believes the having of the features that γ does are conditions sufficient for the application of the concept expressed by 'is ϕ' and that he considers the question whether the concept expressed by 'is ϕ' applies and so comes to believe it does. From this it follows that if he were to come to believe all of the above, then he would come to believe that γ is ϕ. By walking through this process, we have shown that we have derived our result from just an underlying semantic entailment: an individual's having of certain features semantically entails that that individual is ϕ. In sum, wherever we would have appealed to subjunctive conditionals such as, 'if x were the case, y would be the case,' we can instead appeal to the claim, 'that x is the case entails that y is the case.'

A Final Word to Allay Fears about Dispositions in Our Reductive/Explicative Base

Even though the base which the modal operator ‘necessarily’ is reduced to is dispositional in our account of modal semantics in analytic-deflationary style, I do not think we should despair. I do not think the ability of one to who has the concept expressed by the predicate ‘is ϕ’ needs to be accounted for with full-blown modal realism. As I have tried to show, all we really need is an account of idealized total representations (imagined counterfactual scenario). True, there is quite a bit of idealization in our account: a completely imagined counterfactual scenario is such as to be impossible for a finite conceiver given a finite time, as is the notion that a finite conceiver in a finite time could even identify, in the context of this sort of imagining, specific, arbitrary individuals presented in this imagining. I grant that it is all rather far-fetched, but not so far-fetched as to be something of no value: a finite conceiver could not do those things just mentioned, but a finite conceiver, just like one of us could do so if given arbitrarily long and sufficient memory resources. And then again, we are engaged in a project of analytic philosophy – idealization is our mothers’ milk. In the face of all these implausibilities, I stand firmly behind the assertion that what we have done in the forgoing is at least as plausible than metaphysical realist suggestions for modal semantics. Everything we have suggested is something an ideal cognizer could do; for Lewisian possible worlds or Platonic properties I am uncertain how any sort of epistemic access to modal knowledge is possible. Since we do believe that we have modal knowledge, I think our non-reductive, yet epistemically perspicuous account of modal semantics is a better alternative even though we are committed to some admittedly wildly fantastical (from where a philosophical layman sits) notions in our account. Our notions are tamer than what must be countenanced by a metaphysical realist, and better in terms of epistemology, too.

Concepts Versus "Quality Grounds" of Chapter Seven

Should we include the generalized concept possession condition number 3′ (numbered sentence (4) in Chapter 7) in our analysis of concept possession? If we do include it, one might wonder why we are so obsessed with concepts instead of certain qualities or features which might be had by each one of a class of individuals: if these qualities or features are really what cause individuals to be sorted by what we have been calling concepts, why cannot we simply speak about a class of properties as reified qualities of features that objects might have on the basis of which they might be sorted into the groups that we think of as being those sets of things which fall under certain concepts. Taking this sort of reified quality / feature approach might be attractive with regards to the traditional analytic project of "getting to how things are in themselves", but it has an immediately distasteful consequence. Recall that it was the cognizers epistemic relationship to the features or qualities had by certain individuals that was the key aspect of *our* account of concept possession; if we drift away from this epistemic relationship toward a more ontological focus on properties *qua* these reified features, we risk pairing with our account of modal semantics an obscure epistemology. Cognizers may have epistemic access to an individual with certain features, but, once we move to considering in full generality a class of properties as reified qualities, we are no longer guaranteed epistemic access to those properties. To be of any use at all, this class of properties must include *all* properties, even ones that correspond to features that no cognizer will ever recognize in any individual, even ones that are such that the features they correspond to will never be causally interactive with any cognizer. So, for consistency, this class of properties must be thought of as abstract and not causally interactive at all with cognizers. On this approach we have rejected desideratum (3) of the conclusion of Chapter Five, as the properties *qua* reified features/qualities collapses into a Platonic account of modal semantics, and so this approach would make epistemology of modal truths much less than transparent.

Conventionalism versus conceptualism redux: the worry over whether the qualities should be the ground for the intensions of predicate terms rather than concepts the possession of which allows us to sort objects on the basis of those qualities leads us to another puzzle that comes up in the path clearing for conventionalism. Shouldn't modal semantics ultimately be grounded in relations of concepts rather than simply linguistic convention? Whereas concept possession is characterized by the ability of cognizers to characterize correctly individuals on the basis of their features or qualities, and so one concept (perhaps as a *façon de parler* if the underlying notion is to be that of conceptual mastery which of course is just this sorting ability) can be characterized as distinct from another on the basis of what kind of sorting the two concepts actually do, linguistic convention seems arbitrary. Could not 'cat' have meant what is meant by 'bat'? The concepts on the basis of which a cognizer sorts are intimately related to the very job in which they assist, the meanings of terms in a language are just arbitrary matters of "convention" so to speak. Since meanings are in this sense arbitrary and concepts do the actual work, why should we be trying to clear a way for conventionalism rather than conceptualism? Our previous response was that if our notion of conceptualism were such that concepts were considered to be abstract entities such that it might be that there was a concept that was never grasped by any cognizer, then the view collapsed into a sort of Platonism and faced the troubles that the Platonistic view faced.

Some Words on Two-Dimensional Semantics

And now to the 800lb gorillas in the room that goes by the name 'Two-Dimensional Semantics.' We should have at least something to say about this view, given that the view we have developed in this dissertation is not one that is *prima facie* compatible with a two-dimensional approach. We shall consider, very briefly, what I take to be a typical, mainstream two-dimensional view and show how it is in fact compatible with the analytic deflationary view.

David Chalmers[2] writes that a primary intension is a function from "scenarios" to extensions, a secondary intension is a function from possible worlds to extensions, and a two-dimensional intension is a function from which can be recovered a primary and secondary intension. Let us focus on the primary and secondary intensions by way of a familiar example. The primary intension of 'water', in the mouth of the speaker who is "at the center" of the scenario, is watery stuff, the stuff that plays the usual water role in the contexts in which We are speaking (nonscientifically) or the stuff with the superficial features had by water in the actual world. The secondary intension of 'water' is H_2O. In an arbitrary speaker-centered world (alternatively, "scenario", or even perhaps "speaker-centered counterfactual circumstance"), the extension determined by the primary intension of 'water' is the stuff whose superficial characteristics are those had by water in the actual world. Primary intension is supposed to track epistemic possibility (given a certain way we have of speaking) – we have "automatic" epistemic access to the superficial features of water given that we are competent with the term 'water.' In an arbitrary possible world (we let "speaker-centering" drop out of the picture in the case of secondary intensions because we are trying to get at metaphysical possibility – something that is, on Chalmers' view, not necessarily epistemically accessible), the extension determined by the secondary intension of 'water' is H_2O. Whether something falls in the extension determined by a secondary intension is not to depend upon speakers and their epistemic access given that secondary intension is supposed to track features of individuals (or kinds of individuals) independent of how cognizers think about those individuals or kinds. That is, the secondary

[2] For all references to David Chalmers see (Chalmers, D., 2006).

intension is supposed to track metaphysical necessity. Primary and secondary intension are not thought to coincide because of the intuition that it is *epistemically possible* that water could have turned out not to have been H_2O, but it is *metaphysically necessary* that water is H_2O.

As the two-dimensional framework that Chalmers has set up takes seriously possible worlds to explain secondary intension[3], we cannot immediately fit our sort of semantic approach into the Two-Dimensional framework, but if we assume that an interpretation (in our sense of the word we have developed herein) can play, in a satisfactory way, the functional role of a possible world, we might say that the secondary intensions of terms is that which places some of those restrictions which form the criterion of admissibility for an interpretation. Specifically, the secondary intension of ‘is water’ is a function from possible worlds to everything which is H_2O in those possible worlds; we use this secondary intension to place the following requirement on any admissible interpretation $\mathscr{I}$ of index ω: $\mathscr{I}_\omega$(‘water’) is all the H_2O and only H_2O at circumstance ω. In accord with the role it is to play in Chalmers’ Two-Dimensional framework, secondary intension can be understood to correspond roughly to the semantic facts that place appropriate restrictions on our interpretations. Similarly, primary intensions can be thought of as reflecting a particular speaker’s knowledge of meaning (or lack thereof). Put somewhat artificially with the use of the terminology we have developed so far, the primary intension of ‘is water’ might be thought as what a passable, but not completely competent, and unreflective speaker *believes*, implicitly, that $\mathscr{I}_\omega$(‘water’) is. To be explicit, an uneducated and unreflective speaker or merely an unreflective one living before 1750 CE might believe that $\mathscr{I}_\omega$(‘water’) is just the watery stuff he finds in the situation ω. A more reflective and circumspect speaker might

[3] I believe there are serious problems with doing this as I have mentioned in Chapters Five, Six and Seven, but I shall not rehearse these criticisms here.

hold rather that $\mathscr{I}_{\omega}$(‘water’) is stuff in situation ω that has a certain property (perhaps unknown to him, but discoverable through empirical investigation) and is such that it satisfies a certain description associated with the term ‘water.’ In this case, the associated description might be something like ‘the watery stuff around here’ or a sentence or two that describes water’s superficial characteristics. If this speaker were even more thoughtful (and had some facility with reasoning and argumentation), he might come to believe that he didn’t have the concept expressed by the predicate ‘is water’ at all, but rather only knew the associated description satisfied by anything having the property had by everything falling under the concept expressed by ‘is water.’ According to this line of reasoning, a speaker’s knowing the primary intension of ‘is ϕ,’ say, can be thought of as that speaker’s knowing the associated description satisfied by those things in a certain circumstance ω which are in the extension of the secondary intension of ‘is ϕ’ in circumstance ω.[4]

Conclusion: an “Apodictic” Approach to Modal Semantics versus an “Abductive” Approach

By way of conclusion, I would like to say more about the distinction I have alluded to, but never spelled out in its entirety, over the previous sections and chapters. The distinction is between what I have called (I hope not inopportunely) the abductive / “scientific method” approach and the apodictic / “axiomatic method” approach. The names for the opposing sides of the distinction come from what I see as an approach to philosophizing in which, in accord with the first side entities or relationships are postulated to explain, in a metaphysically robust way, the truth of claims that we hold intuitively (pre-theoretically) to be true. On the opposing apodictic side, an idealized (formalized) account of the actual abilities (and presumed epistemic

[4] I follow Kirk Ludwig’s argumentative strategy here in §1.6.3 of his (2003).

access to the intensions of predicate terms) had by speakers is used to “build-up” a philosophical view that provides the *form* of a theory in which an account of modal semantics can be fashioned. Of course, the apodictic method makes modal semantics epistemically available at the price of lacking a robust metaphysical story that explains modal properties and identities in terms of the way “things are in themselves” without being conceptualized by cognizers. I would assert, but will not offer further argument for the thesis here, that for an account of modal semantics one can have either a metaphysical robustness that explains (or at least purports to) the way things are in themselves without a guarantee of epistemic access (this is the abductive method) or a guarantee of epistemic access with no claim whatsoever of metaphysical robustness (this is the apodictic method).

A possible philosopher (let us call him ‘Phil’) who will one day become a Lewisian possible world realist might hold that the sentence expressing a certain modal claim is true. For instance, he or she might claim that (13) is true and that (14) is a faithful paraphrase of (13).

1. There could be a six-legged, four-eared dog.
2. It is possible that there is a six-legged, four-eared dog.

Phil wonders why this sentence is true and reasons in the following way. Non-modal sentences such as ‘the cat is on the mat at time t_0 and place p_0,’ are true just in case the cat at place p_0 *is* on the mat at time t_0, and so, since the truth of a non-modal sentence is explained by its correspondence to a state of affairs or situation, Phil reasons, the truth of the modal must be explained by a correspondence to a state of affairs, that is, there is a truth-maker for all truths non-modal and modal alike. The difficulties over what sort of things the truth-makers for modal sentences are is what prompts postulation of possible worlds and properties as reified features and members of ontology.[5] We should keep in mind that the postulation of these sort of entities and relations as truth-makers is inference to the best explanation, that is, *abductive* reasoning. I believe, as I have claimed earlier in Chapter Four that modal realism in the form of Lewisian possible world theories and property realism line up in that they are all essentially abductive approaches to modal semantics.

In the specific context of two-dimensional semantics, one might use the abductive approach in the explanation of the metaphysical necessity of statements whose negations seem epistemically possible. The example we discussed in the preceding section was similar to the claim that water is H_2O. The claim is metaphysically necessary (according to the two-dimensionalists), but that water is not H_2O is epistemically possible. How to explain the metaphysical necessity if we have no guaranteed epistemic access to the secondary intension of 'water'? We might posit either (1). That the deep structure of what is called 'water' around here (this universe) is the seat of the fundamental determiner of what counts as water, rather than the superficial features of what is called 'water' around here, and so the secondary intension of 'water' is determined by abductive reasoning. Or (2), we might hold (another posit) that the deep structure of a quantity of matter is that which is responsible for superficial features of that

[5] One might wonder whether the analytic-deflationary conventionalist account of modal semantics we have developed appeals to a "correspondence" of the following sort: 'Necessarily, S' is true because there are certain facts about meaning that the sentence corresponds to in virtue of which it is true. Perhaps we could say that meaning facts make it the case that it is analytic that S, and this is the correspondence that makes true the claim 'Necessarily, S'. I think this characterization gets things backward. A more profitable way to think about things would be the following. We engage in certain meaning constitutive patterns of use of predicate terms, but our patterns of use are not simply syntactical; we use words to semantic effect. That is, there are "word-world" connections. These meaning constitutive patterns of use guarantee that some sentences (say S* among them) are true in every circumstance in which they could be uttered. In other words, these sentences are analytic – roughly true in virtue of meaning. From this we reason, that, given the analysis we have proposed for 'necessarily', 'Necessarily, S*' is true. Do we say that our meaning constitutive patterns of use are the truth-maker for 'Necessarily, S*'? It sounds odd to claim this, but if we persist in doing so, we must realize that to do so is *not* to say that there is a single fact *in virtue of which* the sentence is true, but rather that our customary usage, along with a compositional semantical theory, *explains* why the sentence is true. On the analytic-deflationary approach, we start with assumptions about meaning and show how we can argue that certain modal claims are true. On a modal realist approach, we begin with the hunch that a certain modal claim is true and then theorize about what it is in virtue of which the claim is true (alternatively, what is that fact without which it would be the case that the claim would be false).

quantity of matter and then assume that upon which the superficial features supervene (or course, as a matter of necessity) is the property which is picked out by the secondary intension of a natural kind predicate term. The first is a semantical assertion, the second a metaphysical thesis. Either way, we must engage in a sort of inference to the best explanation if we are to satisfy both of our intuitions about water.

On the other hand, lining up with the approach to modal semantics we have been path-clearing for is the so-called apodictic or axiomatic approach. Why do we use these terms? We do so because in this method, we start from a basis and reason from this basis to generate the form of a theory. We start from the following "premises" and try to work toward a theory of modality reasoning in "deductive" fashion from these premises. One premise we start with is that competent speakers know the intensions of predicate terms of their language, and that this knowledge is essentially knowledge-how: knowledge that allows the speaker to use terms to indicate individuals of a certain sort in actual or counterfactual situations. Another premise (that will become more obvious toward the end of this dissertation) is that language is compositional in nature and that the meaning of a sentence can be calculated from the meanings of its constituents and their mode of combination and that speakers have the dispositional ability to imagine counterfactual scenarios and sentences which might be uttered in those imagined circumstances. We try to reason from these starting points to a "conclusion" which is the framework for theories about modal semantics. This framework is meant to be a structure which can show how modal semantics is possible and might be carried out given our desire not to make any more ontological commitments than necessary and what we take to be bedrock assumptions about how we use language to communicate.[6]

[6] One could argue that the apodictic approach could very well be such that an advocate of it may eventually use possible worlds (or some other modal realist tool) in order to explicate semantics. I have tried to show that even

One might have wondered whether any philosophizing about metaphysics in general, ontology in specific, requires an abductive approach. After all, any time we philosophize about what there is and come to a conclusion, however tentative it is, that we have reasoned using inference to the best explanation. With regard to the external world (that presumably exists independently from us cognizers) there is always a distance between perception and reality, hence the sense of the term 'veridical' applied to perception and chance for skepticism to get started. I hope we have not been openly hostile to metaphysics in favor of epistemology, but it is my wish that we have engaged in a minimum of abductive reasoning about what there is in the effort to carry this project through. My desire has been to admit into our ontology only what is required to make sense, in an acceptable, non-circular fashion, of the words of our language. We, too, much engage in abductive reasoning, as must any philosopher; I hope we can do so in a manner than has beneficial results regarding an epistemology for modal semantics.

We conclude our arguments to clear a path for analytic-deflationary conventionalist approach for statements which are not explicitly of the *de re* variety. Chapter Ten and Eleven are devoted to showing that difficulties for such a treatment in dealing with *de re* modal claims are not insurmountable. In Chapter Ten, we lay out the problem for the conventionalist and try to prune off some branches of possible solutions for the conventionalist in handling the problem of de re modality. In Chapter Eleven, we propose a technical apparatus for dealing with modal claims that allows us to endorse everything we want to without making a commitment to essentialism. Of course, in Chapter Eleven, we do *not* get *something* for *nothing*: we get no profound and substantive insights into the Truths of High Metaphysics; the only reason that our proposed semantics endorses *de re* modal claims is that the use of certain classes of singular

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though such an advocate could do this, that nobody pursuing the analytic-deflationary approach must make use of modal realist notions (such possible worlds).

referring constant terms is restricted in certain ways such as to make those *de re* modal claims come out true according to this theory. This is *not* to say that these terms are such that their associated *senses* are sufficient to secure their respective references; rather these terms are object introducing[7], and so could be given reference clauses in an interpretive truth theory as compositional meaning theory for the language for which we are trying to give an analysis of the sentence operator ‘necessarily,’ but are such that they can legitimately be used to refer only to objects which fall under various predicates in various counterfactual situations.

Then, much later in Chapter Twelve, we will try to fit everything we have done together with a general semantical theory after we explain how a conventionalist approach can accommodate “quantified into” sentences.

[7] See Ludwig (2007).

CHAPTER 10
THE PROBLEM OF *DE RE* MODALITY

Introduction

Any sort of approach to modal semantics that seeks to understand necessity in terms of analyticity faces the problem of *de re* modality. Briefly, the difficulty for such a view is that while analyticity is a *semantical* or *meaning* (and more generally a *conceptual*) notion, some sentences seem necessarily true, but not so in virtue of meaning. On the face of things, a conventionalist who wishes to assert that 'necessarily, *S*' is true must claim it is analytic that *S* and so faces a difficulty: if it seems to us that 'necessarily, *S*' is true, but *S* is not the sort of sentence which could be analytic, the conventionalist view is not satisfactorily comprehensive because it cannot give the right result for this sentence.

In this section and the following two, we sketch out the problems a conventionalist approach faces over sentences of a certain form which seem to be true of necessity, but not true in virtue of meaning, and in the remainder of the chapter, develop a response to these problems on behalf of the conventionalist using the framework we have begun in the preceding chapters.

By way of introduction to this set of issues, let us first note that there are, of course, sentences of the form 'necessarily, *S*' in which *S is* obviously analytic, these are not the sort of sentences that pose difficulties (at least of the *de re* variety) for the conventionalist. For example, we can say that the following sentence is analytic:

1. If something is a closed trilateral plane figure with straight sides, then it is triangular.

because of the respective meanings of the predicates 'is a closed figure,' 'has straight sides,' 'is trilateral' and 'is triangular' and the manner in which the sentence is composed by the combination of these predicates. We say unproblematically in this case that prefixing this sentence with 'necessarily' results in a true sentence by the lights of the forgoing chapters.

But there are sentences whose form is *not* that of universal quantification, a subset of *these* is a problem class for analytic-deflationary modal semantics – specifically sentences of the form $\ulcorner\gamma$ is $\phi\urcorner$ where for γ a singular referring constant term is substituted and for ϕ a predicate term is substituted. On the face of things, if we held a particular view about how the referent of a singular term is secured, then it is easy to see how we might have trouble understanding how such a sentence could be analytic. In particular, if we hold that at least some singular referring terms are *directly referential* (let us say that the term '*a*' is among those), then it seems that the sentence '*a* is *F*' could not be analytic, as there could not be the right sort of semantic content associated with '*a*' to allow even for the possibility of the analyticity of '*a* is *F*.' Let us say a bit more about why this is so.

An oft-repeated way of characterizing the view that at least some singular referring terms are directly referential is to say that directly referring terms are those that serve to contribute *only* their referents to the proposition expressed by the sentence in which they occur. So, if we advert to the previous example, on the assumption that '*a*' is directly referring and the referent of '*a*' is (the non-linguistic individual) Abe (whatever *that* is), then in the proposition expressed by '*a* is *F*', '*a*' contributes only Abe. Assuming that no meaning or conceptual content is associated with non-linguistic entities (like Abe), there simply is not enough of such content to allow for the possibility that '*a* is *F*' is analytic (assuming that it is not analytic that everything is *F*). There cannot be conceptual material associated with the directly referring singular term '*a*' as it serves (semantically speaking) simply as a pointer to its referent.

The problem for the sort of analytic-deflationary account of modal semantics we are developing is that, pre-philosophically we *do* hold that certain sentences of the form $\ulcorner$necessarily, α is $\phi\urcorner$ where a directly referring singular term is substituted for α *are* true, and *prima facie* it seems that the conventionalist position cannot endorse such sentences because we cannot understand how $\ulcorner\alpha$ is $\phi\urcorner$ could be analytic given the difficulties we have just canvassed. For a specific example, if We are persuaded by Kripke's intuition pumps, we hold that the following sentence is true:

2. Necessarily, Aristotle is human.

If, in this sentence, the only semantic function 'Aristotle' serves is the contribution of a referent to the proposition the sentence expresses, how can it be a matter of meaning alone – and hence *analytic* – that Aristotle is human?

The notion of direct reference is not the only ingredient in this recipe for trouble for the conventionalist. To show us how what is picked out by a directly referring singular term might have a certain property *essentially*, Kripke introduces the notion of a *rigid designator*. The term can be explained in the following way. If we use possible worlds as a helpful heuristic for making sense of modal discourse, and assert that the claim

3. Aristotle might not have been the teacher of Alexander.

is true just in case in some possible world, Aristotle was *not* the teacher of Alexander, then a singular referring term is a *rigid designator* just in case it picks out the *same* individual in each possible world in which is denotes anything at all. According to Kripke, proper names *are* rigid designators, and so 'Aristotle' picks out the same individual in each possible world (however it is we are to understand those, and however we are to understand the notion of sameness across possible worlds).

Now we can glimpse why we might think that (2) is true, but how it *cannot* be the case that 'Aristotle is human' is analytic and so see how difficulties arise for conventionalism. If we hold that 'Necessarily, *S*' is true for sentence *S* just in case it is true that *S* in *each* possible world and that the sentence *is* true in each possible world, and, in addition, *S* is '*a* is *F*' where '*a*' is a directly referring rigid designator with no associated semantic content, then the referent of '*a*' must be *F* (on the view of modality we have assumed for the sake of argument), but it is not analytic that the referent of '*a*' is *F* because there is not enough semantic content associated with the term to make the statement '*a* is *F*' true as a matter of meaning alone. The conventionalist seems stuck in an impasse.

Rigid Designation and Metaphysical Necessity

In sum, *if* we assume a direct reference thesis for semantically unstructured singular referring terms[1], that proper names are semantically unstructured and that they are rigid designators, then the proper name 'Aristotle' picks out the same individual, without the benefit of semantic content, in any counterfactual circumstance in which it designates. *If* we also understand the truth of the sentence, 'necessarily, Aristotle is a person' in terms of possible worlds, then the sentence is true just in case in every possible world *P* the referent of 'Aristotle,' if it exists in *P*, is a person. In this case, Aristotle is essentially human. And in general, on these assumptions, if there is a true sentence of the form 'necessarily, *a* is *F*' in which '*a*' is a proper name, then the referent of '*a*' is *F* in each possible world in which the referent of '*a*' exits, and *a* is essentially *F*.

[1] We can continue to play fast and loose with what we're actually committed to by holding this thesis, but at this point I'll suggest that instead of simply holding that directly referential singular terms serve only to contribute their referent to the proposition expressed by the sentence in which they occur, we might assert that within the context of a compositional meaning theory based on an interpretive truth theory like the one spelled out in Lepore's and Ludwig's (2007) a directly referring term is one which receives a reference axiom in the meaning theory. Specifically, for a singular referring term α, if 'ref('α') = *O*' is the reference axiom for α, then the term α is directly referring. A better term for the category of such terms is 'object introducing' as such an appellation avoids the confusion that the 'directly' of 'directly referring' might incur; a term might be object introducing but there may be conceptual content associated with it. Such terms could still be given the reference axiom treatment in an interpretive truth theory, but there may be certain restrictions on how these terms are used to introduce object, i.e. restrictions on *what sort* of objects they might introduce.

What, exactly, are the Problems for Conventionalism? What is Unacceptable for a Conventionalist?

If such is the case, what exactly is unpalatable to a conventionalist? Briefly, if the referent of ‘*a*’ is *F* in each possible world in which it exits and ‘*a*’ has no semantic content, then, on this “folk” way of understanding modality, ‘necessarily, *a* is *F*’ is true, but ‘*a* is *F*’ cannot be analytic as there is no semantic content to ‘*a*’ other than its non-linguistic referent. Now, if some singular term could pick out the same individual in every possible world where that individual exists without the aid of any sort of feature had by this individual, or any sort of descriptive content associated with the singular term itself, *and* this individual had some property in *each* of these possible worlds (other than properties which apply to all objects – like the property of being self-identical), then it does not seem that the having of this property by the individual could reasonably be ascribed to any of our conventions about how to refer to this individual. Indeed, it *does not seem* that this individual’s having of this property would be *analytic* (a matter of semantical assignments alone), yet it *does seem* that the having of the property would be *necessary*, given that, by the set-up of the situation, this individual (when it exists) must have the property. So the conventionalist *cannot* accept that we can use a singular referring term to pick out the same individual across possible worlds unless some relevant feature (or features) of that individual is (are) required to secure the referent or there is semantic content somehow associated with the name (perhaps not enough content to secure the referent of the name).

The problem of Essentialism and what would be required for conventionalism to avoid it: as we have suggested a related problem for a conventionalist approach to is that of metaphysical essentialism. According to the example we have sketched so far, if, in fact, (2) is true, then we can claim that Aristotle is essentially human. This claim is tantamount to saying that there are modal features[2] of certain individuals – in this case the individual picked out by 'Aristotle' – that can evade semantic characterization. This is so because a particular individual can be picked out with a directly referring term and a true modal claim can be made of that individual using that term. The truth-maker for the modal claim must reside in the individual so picked out rather than in any semantic feature of the name used to refer to the individual in discourse because the semantic contribution of the directly referring term is just the contribution of the referent to this discourse.

For a conventionalist account of modal semantics to succeed, one who holds it must be able to endorse, in a manner that is not *ad hoc*, the truth or falsity of each modal claim that is intuitively true or false respectively (or show why We are mistaken to hold pre-philosophically those claims true or false).

Does the Notion of Rigid Designation Presuppose the Existence of Essential Properties?

In preparation for showing how conventionalism can endorse sentences of the type we want it to, let us take a closer look at the notion of rigid designation on the assumption that reference is direct for some singular referring terms. I want to suggest that the drawing of the metaphysical conclusion that essentialism is correct on the basis of the semantic phenomenon (rigid designation) can only be the result of begging the question for essentialism or begging a closely related question: one over the issue of how to understand the phrase 'same individual in any possible world in which the term designates anything.'

To see this, we will continue to make use of the possible worlds heuristic, but we will get away from Kripke's examples about objects that fall under familiar kinds (which I believe to be

[2] If an individual has the property of possibly being green or has the property of necessarily being green, then it has a modal feature or property.

prejudicial in favor of the conclusions he draws). So let us consider the matter purely formally in terms of a simplified example.

Consider a directly singular referring term '*c*' and the map, ***ref***, from singular referring terms and possible worlds to referents, such that ***ref***('*c*', w) is the referent of '*c*' in w. Consider four possible worlds w_0, w_1, w_2, w_3 and assume that ***ref***('*c*', w_0) = ***ref***('*c*', w_1) = ***ref***('*c*', w_2) and ***ref***('*c*', w_3) is undefined. Since, according to the our definition of the map ***ref***, the referent of '*c*' at each of these possible worlds is the *same* individual, *except* in that world in which there is not the individual ***ref***('*c*', w_3) (because ***ref*** is not defined for this argument), and by stipulation, '*c*' is a directly referring term, by Kripke's lights '*c*' must be a rigid designator. But, simply on the basis of the foregoing together with the notion of rigid designator, on the face of things, nothing prohibits us from claiming that at w_0, ***ref***('*c*', w_0) has *only* intrinsic properties $\mathcal{P}_0$, $\mathcal{Q}_0$ and $\mathcal{R}_0$, at w_1[3], ***ref***('*c*', w_1) has *only* intrinsic properties $\mathcal{P}_1$, $\mathcal{Q}_1$ and $\mathcal{R}_1$, and at w_2, ***ref***('*c*',w_2) has *only* intrinsic properties $\mathcal{P}_2$, $\mathcal{Q}_2$ and $\mathcal{R}_2$, and for $i, j \in \{0, 1, 2\}$ and $i \neq j$, *any merelogical combination* of $\{\mathcal{P}_i, \mathcal{Q}_i, \mathcal{R}_i\}$ is *completely distinct* from *any merelogical combination* of $\{\mathcal{P}_j, \mathcal{Q}_j, \mathcal{R}_j\}$. On this example, there is no property that is essential to the individual picked out by '*c*.' And so, if everything in this example is workable, we can conclude that just because an individual may be picked out by a rigid designator, that individual need not have any essential properties.

To try to assure ourselves that the example is persuasive, we should consider the places where one might object. Should we be permitted simply to stipulate (as we have done) that the referent of '*c*' (*ref*('*c*')) is *the same* individual at the various possible worlds We are taking into account *while at the same time* stipulating that ***ref***('*c*', w_0) has *no properties* in common with

[3] In addition, of course, to those properties which are had by every individual – the property of being self identical, for example. Properties had by every individual aren't usually candidates for essential properties of an object.

ref('c', w_1) or *ref*('c', w_2) (and similarly for the referent of 'c' at w_1 and w_2). How can what is referred to with 'c' be the same across a range of possible worlds if the individual has completely different properties in each world of this range? This situation seems to fly in the face of how we use actual names: the thing we mean to pick out with the name 'Bobby' might have been slightly different (Bobby might have had curly, red hair instead of straight, black hair or he might have been much smarter than he is), but to imagine a possible world (or counterfactual situation) in which we refer to a certain volcano with the term 'Bobby' seems bizarre (to say the least). Agreed, this situation does seem vastly at odds with how we actually use proper names, but, unless some restrictions are spelled out how to understand 'the same' of the definition of rigid designation, it is not disallowed given our provisions for *directly referring singular constant term*, *rigid designator* and *possible world*.

So how are we to understand this 'the same'? We might claim that an individual can only be considered one and the same in different possible worlds if, at each possible world, the individual has some set of properties or other. But to do this would be to claim that for a directly referring singular constant term to be a rigid designator, that is, for the term to refer directly to the same individual in any possible world in which it refers to anything, the term must pick out an object which has a certain set of properties. If an individual has a certain set of properties in each possible world in which the individual exists, then, by definition, that individual has those properties essentially. And since this commitment to essentialism is required for an object to qualify as the same individual across possible worlds, this formulation of rigid designator requires a commitment to essentialism. The doctrine of essentialism is not *argued for* with the help of this notion of rigid designation, only *reasserted* in somewhat different guise.

But, of course, it could be the case that some rigid designator, ‘*d*’, say, simply happened to be such that for each possible world w_i *either* ***ref***(‘*d*’, w_i) is not defined *or* ***ref***(‘*d*’, w_i) has property expressed by ‘is *P*.’ In this case, ‘necessarily, *d* is *P*’ is true in the absent any prior assumption about essentialism. We shall see later on in this chapter that the conventionalist will face difficulty endorsing the truth of this sentence unless we make some other assumptions about the function of directly referring singular terms. Alan Sidelle sketches the assumptions a conventionalist must make if he is to hold on to the notion of rigid designation on page 67 of his (1989), “If transworld identity is not a matter of mind-independent modal fact, a term cannot be both rigid and purely ostensive (which is the double duty [most] rigid designators are supposed to serve in most treatments).” For the conventionalist, transworld identity (or *any* modal property, for that matter) is not to be a matter of mind-independent modal fact (a condition which could include on a broad understanding the case in which transworld identity will be explained in terms of semantic and conceptual facts, rather than strictly in terms of what might be called “metaphysics proper” – the truths of which are *altogether* independent of *any* semantic or conceptual facts) and so a term cannot be both rigid and purely ostensive (that is, serving to pick out a referent with no semantic or *meta-semantic*[4] content whatsoever) because to allow this is to provide for the possibility of truth of a sentence like ‘necessarily, *d* is *P*’ without the possibility of a conventionalist explanation of its truth.

A related tangent–epistemic access to modal truths and modal seemings in the context of realist versus conventionalist approaches: while We are on the topic, let us pursue a brief aside and consider how allowing for the truth of a sentence like the preceding (‘necessarily, *d* is *P*’) leads us to modal skepticism given the account of modal semantics that endorses this claim is

[4] This may be a good term for the content provided by the competence one has with what Ludwig calls ‘category names’.

to be of the properly metaphysical stripe *and* reductive.[5] To avoid circularity, the class of objects (possible worlds) that provide truth-makers for modal claims such as the preceding must be ontologically independent of our conceptualization. This means that if such an account of modal semantics is to be noncircular and reductive, we are not (indeed *must not be*) guaranteed epistemic or "conceptual" access to these objects. But if this is the case, and some rigid designators are purely ostensive (*purely referential*, in Kit Fine's[6] terms who follows the use of Quine (1976)), then there's no way, in general, to know whether what is picked out by '*d*' has a certain property or other in a certain possible world. And so, as a consequence of this situation, our knowledge of the truth of the sentences of the form ⌜necessarily, γ is ϕ⌝ in which any purely referential rigid designator is substituted for γ is *not* guaranteed. If we pursue this line we must be comfortable with modal skepticism, at least for some *de re* modal claims. In this dissertation, We are trying to clear a way for a theory of modal semantics according to which we *are not* forced to be comfortable with this sort of modal skepticism.

Just to tie up a bit of one loose end, recall that I said that we were not (and *cannot* be) *guaranteed* epistemic access to the class of objects (possible worlds) which are the reductive grounds for our modal claims because a guarantee of such epistemic access would be tantamount to a concession that the class of objects to be the reductive grounds was not mind-independent. In particular, we cannot be guaranteed epistemic access to those individuals picked out in the class of possible worlds by directly referring terms. However, it may be that we do have epistemic access to these individuals by some one off freak accident or ability. Even if such were the case, I do not think that such a situation should be comforting to one who holds the view that

[5] Shalkowski's and other's admonishments of reductive accounts of modal semantics are canvassed in Chapter Three, Chapter Four, Chapter Five and Chapter Six.

[6] For all references to Kit Fine see (Fine, K., 2005).

a class of mind-independent objects can be the reductive ground for modal claims given that this person is not happy to hold a view which may lead in a few short steps to modal skepticism. Even if we have epistemic access to the particular individual so named, there's likely to be another individual for which we do *not* have epistemic access – after all we are not guaranteed access. One who holds the conventionalist view, on the other hand, attempts to treat the problem of *de re* modal claims in such a way that the knowledge we believe ourselves to have is guaranteed, and in so doing attempts to give an account on which we are guaranteed to have the knowledge of *de re* modal claims that we believe ourselves to have.

Regardless of whether one holds the conventionalist view or a realist view, we have intuitions that certain *de re* modal claims are true and that we know this. On the realist view, we are forced to hold that we are *not* guaranteed knowledge of the truth of these claims. It is my hope that the conventionalist view will be able to endorse the claims we believe are true, and will be able to show that, given that we know a language in which these sort of claims are made, our knowledge of these claims *is* guaranteed. If one did not have any intuitions about the truth of certain *de re* modal claims, then he would not feel the pull of any sort of explanation of their truth – either realist or conventionalist. And it seems likely that for claims about which we have no intuitions, we would not be tempted to claim that we had some sort of epistemic access to the truth-makers for those claims. For if epistemic access is some kind of view into the realm of metaphysics proper (some sort of faculty for the apprehension of Platonic properties or some sort of epistemic access to the situations on near and distant possible worlds), then how might we have this sort of knowledge without having the hunch that these claims are true? The situation would be similar to knowing a theorem of mathematics, but not having the hunch that the sentence that expressed the theorem was true. Such a situation would be very odd indeed. In any case, as a look-ahead, we can comfort ourselves with the goal of a conventionalist modal semantics regarding *de re* claims: the conventionalist will seek only to provide a semantics for *de re* sentences such that it endorses the intuitions we have about the truth or untruth of such sentences.

Now we return to the difficulty of *de re* modality for a conventionalist account. The problem of providing an endorsement of *de re* modal claims that are *prima facie* true is a pressing one for the conventionalist. I believe that we can accommodate the notion of rigid designation within the conventionalist, Neo-Carnapian framework we have developed in the Chapter Two and Chapter Three and possibly use this notion to affirm most of the *de re* sentences we consider whose primary operator is 'necessarily.' (But, to anticipate our approach, I think the notion of rigid designation will not be useful in giving a conventionalist account of the semantics of *de re* modal claims. In particular, the notion of rigid designation together with an explication of the semantics of the modal *de re* sentences we are concerned about can be subsumed under a more general thesis about how we should circumscribe the use of directly referring singular terms in the natural language we partially model with our set of admissible interpretations.)

Possible Conventionalist Responses to the Concern over *De Re* Modality.

What are the options for the analytic-deflationary account of modal semantics? A first cut might be to reformulate the notion of rigid designation in terms of our conventionalist framework.

The reformulation will likely be long and arduous. First, note that we can spell out rigid designation using only the sentence operator 'necessarily' without the notion of possible worlds. To warm up, and as a reminder of what has gone before, here's a formulation *with* possible worlds:

4. A '*c*' is a rigid designator iff for any individual *x*, if '*c*' refers to *x*, then for each possible world *w*, if *x* exists in that world, then '*c*' refers to *x* in *w* and for any individual *y*, if *y* exists in *w* and *y* is not identical to *x*, then '*c*' does not refer to *y* in *w*.

Let us try to do the same thing with only the operator 'necessarily':

5. '*c*' is a rigid designator in a language *L* iff for any individual *x*, if '*c*' refers to *x*, then ***necessarily***, if *x* exists, then '*c*' refers in *L* to *x* and for any individual *y*, if *y* exists and is not identical to *x* then '*c*' does not refer in *L* to *y*.

One hurdle has been jumped: possible worlds talk is not necessary, only the sentence operator 'necessarily' is needed. Now, it may be that we *could* carefully formulate a version of rigid designation within the framework we have developed in preceding and see what we could do to show that the analytic-deflationary account handles all that we want it to, but given the doubt we have over whether there are any apparently essentialist consequences that result from the truth of *de re* modal claims *in the absence of* background essentialist assumptions in the formulation of rigid designation, I discourage us from doing so. Instead, we will try to show how the analytic-deflationary approach can endorse *de re* modal claims without making use of any notion of rigid designation. To this end, we have the following.

A preliminary proposal: one might hold[7] that there are certain *properties* that are had *essentially*. This suggestion is *not*, on its face, tantamount to essentialism[8] – the notion that some *individuals* have certain properties *essentially* – because the current proposal is about the features of *properties* rather than features of *individuals*[9]. Specifically, if an object *O* has the property

[7] Thanks to Chris Lubbers for this proposal.

[8] As an aside, we note that there are some properties that are had by all individuals (such as the property of being self-identical) but our commitment to this fact is not a commitment to essentialism. To hold an essentialist view, one would have to believe that there was an individual which had a property the lacking of which would constitute its failure to remain that same individual AND that this property was NOT one that was had by every individual. For example, an essentialist might think that the individual who is Aristotle must have the property of being a person if that individual is to (continue to) be identical to Aristotle, but must also hold that there are individuals which do not have the property of being a person essentially.

[9] Such a claim is, on the face of things, *de qualitas* (of a property) rather than *de re*.

expressed by 'is *F*' and this property is one of the special class of properties, then *O* has this property necessarily. If '*a*' directly refers to *O*, then sentence 'necessarily, *a* is *F*' is true. No notion of rigid designators or essentialism seems to be required to endorse the truth of the modal sentence.

But what's really at work here? If *O* has the property expressed by 'is *F*' and this property is such that those individuals which have it have it of necessity, then does not that mean that those individuals which *happen to have* this property are such that (to dip into the possible worlds heuristic for illustration purposes) there is no possible world in which one of those individuals does not have it, that is, each of those individuals has it *essentially*? This solution may mark out a class of properties as different and so may purport not to be essentialism, but it seems that essentialism is a *consequence* of this sort of view, and We are at pains not to accept essentialism as the consequence of any approach we may take toward clearing a path for conventionalist modal semantics.

Conclusion

Even though the (unsatisfactory) proposal does have essentialism as a consequence, we do have the intuition that drives us to this sort of proposal. Indeed, if we were constrained to a sort of "material mode" of philosophizing, we would wish to say that since we do use the name 'Bob' to refer to a person, and we have the intuition that Bob must be a person, else he would not be so-called. This intuition leads us, on the material mode of thinking, to the failed proposal, that is, into thinking that for some properties (of which the property of being a person is one) anything which has that property has it necessarily. But there is another way of thinking about this intuition if we switch to the "formal mode" of philosophizing.

We might think that there is something about the *name* 'Bob' which requires that it be used to pick out objects of a certain sort. Is this tantamount to making the controversial claim that proper names have senses? Yes and no. On the suggestion we offer in Chapter Eleven, proper names will have associated senses in that they can be used only to refer to objects that fall under certain predicates, but, and this is a big but, the conceptual content associated with proper names (for example) will *not* be enough to secure the referent of the name.

CHAPTER 11
TECHNICAL APPARATI TO ENDORSE THE *DE RE* MODAL CLAIMS WE FAVOR, POSSIBLE OBJECTIONS AND RESPONSES

Introduction

We can use restrictions of exactly the sort mentioned in the conclusion of Chapter Ten – that is, explicit restrictions on how proper names are used to refer to individuals in a language – to provide an analytic-deflationary conventionalist approach with a way to endorse *de re* modal claims. In this chapter we shall try to capture the intuitions that drove the failed proposal to the effect that *de re* claims were essentially *de qualitias* claims, by switching to "formal mode" and claiming that the use of names is restricted in certain ways. Before we dive into this, we should take a moment to recall the relationship of the three sorts of maps we have used to give our model-theoretic generalization of Carnap. The set of admissible interpretations, $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$, was to be such that, given that Carnap's state-descriptions are restricted by concerns over consistency and concerns about the "analytic" relationships of certain predicates to certain other predicates, each member of $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$ is a proxy for a Carnapian state-description. The map I is "built from" $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$, so that an index and term are arguments to I and the result is an individual or set of individuals that are picked out by (in the case of singular terms) or fall under (in the case of predicate terms) the term in question. We could say that I presents the information found in each of $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$, in a different, perhaps handier, format. (Of course, the existence of I depends upon a definitive characterization of the index set Ω.) Finally, the map I' presents all the information of I (and hence each of $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$) in yet a different format. The map I' takes as parameters a term, an index ω and an individual in the range of $\mathscr{I}_\omega$ and returns either a "yes" or "no" just in case either (for a singular referring term) the individual is picked out by the term at that index according to $\mathscr{I}_\omega$ or (for a predicate term) the individual is among the set of individuals picked out by $\mathscr{I}_\omega$. The map I' was supposed to put things in the right format for understanding intensions in terms of conceptual competence. With the use of $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$ we can understand how we might think of the "possible world indices" that are the members of Ω: each member of Ω is something like an entire universe as imagined by one with complete competence regarding all the predicate terms of the language we are dealing with. We have just explained in relatively few words the relationships borne by any of $\mathscr{I}_\omega$, I, or I' to each other. We can develop our theory for the semantics of *de re* modal claims with regard to any one of these (sets of) maps and easily generalize the theory to the other (sets of) maps.

Now we dive in. It is interesting to note that while we have taken considerable pains to delimit the class of admissible interpretations with regard to how we specify the extensions of predicate terms at various indices and what the (set theoretic) relations between extensions of predicate terms are which bear certain "meaning" or "analytic" relations to each other, we have made no restrictions on singular referring constant terms across different admissible interpretations. Doing so will be our project in this chapter. Hopefully, we shall see that some very natural restrictions can be placed on singular referring constant terms and that those restrictions can be exactly the ones that endorse all and only those *de re* modal claims that we hold pre-theoretically to be true.

Topological / Linguistic-Use Restrictions

Even though the last proposal of Chapter Ten fails to satisfy our requirements, there's a useful kernel in this way of approaching the problem: we can largely adapt the suggestion that some properties are such that they are had of necessity to the Neo-Carnapian framework we have developed in previous chapters by imposing certain strictures on the semantical system which is to model, partially, our notion of intension. The basic idea is to restrict the interpretations which were the constituents of the map I' of Chapter 3 with the use of a three-place relation of predicate and singular terms (call it '$\mathscr{R}$'). As a preliminary, note that no ontological commitment is incurred by $\mathscr{R}$ – it is merely an explicit way of representing the manner in which we would like the map I' to restrict implicitly its assignment of directly referring singular terms to individuals relative to its assignment of sets of individuals to predicate terms. Let us provide some motivation for the relation before we spell out the technicalities. The intuitive idea behind $\mathscr{R}$ can be illustrated in the following.

Say we pick out a certain individual with a directly referring singular term ('*a*') and the sentence, '*a* is red' is true (because the referent of '*a*' *is* red). It seems intuitive that the (thing itself which is named by) ref('*a*') *must* be a physical object: it makes no sense to claim that this individual is red unless that object is indeed physical. It is odd to say that, for example, 'ref('∅') is red.' It is important to notice here that the intuitions we are trying to pump here are *de re* in[1] in the following way: given that the *thing* picked out by the object introducing term '*a*', that is, ref('*a*'), we are asserting that it makes little sense to claim that ref('*a*') is anything other than a physical object. To attempt to use the semantically primitive '*a*' to denote an abstract object runs counter our intuitions about the "correct" way to use the term '*a*.' I would like to underscore here that we are making a claim about the *relationship* (relative to our correct use of that term) of the semantically primitive term '*a*' and those individuals which might be picked out by that term. We are *not* making the weaker, *de dicto* claim, 'It is necessary that if a thing is red, then it is a physical object.'

[1] It might be just a bit awkward to call the claim we're making here '*de re*' because we are actually making a claim about a certain class of semantically primitive singular referring terms, so maybe '*de relatio in denotatio*' is perhaps more accurate (yet considerably less catchy). The claims we make will be such that they make true certain *de re* claims we wish to endorse.

Similarly, if we pick out an individual with the directly referring term ‘*b*’ and the sentence ‘*b* is a successor ordinal’ is true (because the referent of ‘*b*’ *is* a successor ordinal) then ref(‘*b*’) *must* (at the very least), given our customary way of using singular referring terms, be an abstract object: it is nonsense to claim ‘ref(‘Ernie’) is a successor ordinal,’ given that we normally use the semantically primitive term ‘Ernie’ to pick out human beings. The same goes for this example as for the previous: we are *not* making the *de dicto* claim, ‘It is necessary that if a thing is a successor ordinal, then it is an abstract object.’ but rather something much more like a *de re* claim about how the semantically primitive singular referring term ‘*b*’ is correctly used.

The intuition about a rather general feature of language that I am trying to highlight with these examples can be put in the following way. I believe that we use singular referring terms, like proper names, in a specific way. When we use such a term to refer to an actual individual, we are bound, by our “normal” use of this term and terms like it, to refer only to individuals of certain kinds with that term when we speak counterfactually about how things might have been. Given that we use a name like ‘Boots’ to refer to my actual cat, I assert that we use the name ‘Boots’ to refer *only* to individuals of a certain kind when we speak about counterfactual situations which describe the way the world might have been. I am not exactly certain where to draw the line about just how much freedom there is for what type of individual this is, but I think we can safely say that this line is between the following extremes. Given that we refer to my cat with the name ‘Boots’, then we might speak about a counterfactual situation in which Boots has ginger fur instead of black and white fur and use the term ‘Boots’ to refer to my cat. And given that we refer to my cat with the name ‘Boots’, then we *cannot* use the term ‘Boots’ to refer to anything *other* than a physical object. It just wouldn’t make sense to say that we could conceive of a situation in which ‘Boots’ referred to the 118, 219th prime number while claiming that we were using all of our singular referring terms in an acceptable way – our use of 'Boots' in this case wouldn't be in line with our general practices for using names.

The proposal is that our use of proper names is such that their use is restricted in certain ways when we speak about counterfactual situations about how the world might have been. In other words, there are "meaning facts" or "use facts" about certain semantically primitive singular referring terms that are spelled out in terms of patterns of meaning constitutive use of these terms. We will spell out a way to model these restrictions given the formal model we have set up in the previous chapters over the next few paragraphs. I believe one virtue of the way we set things up is that we do *not* have to take a stand on the precise restrictions for how these terms function with regard to our formal model; we show merely that our model *can* reflect such restrictions. This sort of approach is different from both Ludwig's (2007) approach to handling de re modal claims and different from Sidelle's (1989) approach.

Our approach provides a generalization of Ludwig's suggestion of category names, in that the present approach shows how the use of singular terms might be restricted in more general and flexible manner. Whereas a category name must refer to an object of certain kind in any discourse; our method of restricting admissible interpretations allows for a name to refer (in a counterfactual situation) to an object of different (but likely similar) kind than the one of the individual it actually refers to. We have enough flexibility to fill in the detail later about just what the exact restrictions are.

Our approach is different from Sidelle's in that our "truth-makers" for *de re* modal claims are not the conventions we actually have, but rather can be *selected* from among certain ways we might have used (in accord with some set of "use norms") singular referring terms. I believe this approach allows for a bit more generality and flexibility than Sidelle's account.

The big picture representing this sort of approach is that using the structure that we have created as a generalization of Carnap's work, we can capture formally the manner in which our *intentions*, *norms* and *habits* with regard to semantically primitive singular referring terms shape our use of such terms. The *explicit* topological restrictions of the omnibus function I′, can capture the *implicit* restrictions there are on the use of such terms relative to the manner in which they are correctly used.

Having given some background, let us flesh in the details. A technical presentation will make things easier. The relation $\mathscr{R}$ provides the means to formalize the ways in which we normally *use* directly referring terms. (There are, of course, *de re* modal claims which we might wish to endorse which require an even *tighter* restriction on I′'s assignments of directly referring singular terms relative to it is assignment of certain sets of individuals to certain predicate terms. For example, we might want our semantic theory to endorse the truth of our old friend, the sentence: 'Necessarily, Aristotle is a human being. We can use the relation $\mathscr{R}$ to enforce these sort of restrictions also. We see this after the technical presentation of the relation.)

1. Let the relation $\mathscr{R}(\Pi^1\times\Pi^1\times\Gamma)$ be such that for any predicate terms ϕ and ψ, and singular referring constant term γ, IF $\mathscr{R}(\phi, \psi, \gamma)$, THEN, if there is an $\omega^* \in \Omega$[2], such that $\mathscr{I}_{\omega^*}(\gamma) \in \mathscr{I}_{\omega^*}(\phi)$, then for *each* other $\omega \in \Omega$, $\mathscr{I}_{\omega}(\gamma) \in \mathscr{I}_{\omega}(\psi)$ if $\mathscr{I}_{\omega}(\gamma)$ is defined.[3]

By substituting 'is red' for ϕ, 'is a physical object' for ψ and '*a*' for γ, we get the first intuitive result of the preceding. By substituting 'is a successor ordinal' for ϕ, 'is an abstract object' for ψ and '*b*' for γ, we get the second intuitive result of the preceding.

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[2] For a review of the precise characterization of I′ and its relation to the set $\{\mathscr{I}_{\omega}\}_{\omega\in\Omega}$, see Chapter Six.

[3] There are easy generalizations of R to triples the first two members of which might be of arbitrary arity, but these generalizations may be of only marginal interest for our purposes. For example, let $\mathscr{R}^n(\Pi^n, \Pi^n, \gamma)$ be such that for any n-place predicate terms ϕ^n and ψ^n, IF $(\mathscr{R}^n(\phi^n, \psi^n, \gamma))$, THEN if there is an $\omega^* \in \Omega$, such that $\mathscr{I}_{\omega^*}(\gamma)$ is included in a member of $\mathscr{I}_{\omega^*}(\phi^n)$, then for each other $\omega \in \Omega$, $\mathscr{I}_{\omega}(\gamma)$ is included in a member of $\mathscr{I}_{\omega^*}(\psi^n)$, provided $\mathscr{I}_{\omega}(\gamma)$ is defined.

So what about that old standby, ‘Necessarily, Aristotle is a human being? We can accommodate what intuitions we have here by substituting ‘is a person’ for *both* ϕ *and* ψ and ‘Aristotle’ for γ and holding that $\mathscr{R}(\phi, \psi, \gamma)$. Specifically, we hold that $\mathscr{R}$(‘is a person,’ ‘is a person,’ ‘Aristotle’), and so, as we have defined it, we have: if there is a $\mathscr{I}_{\omega*}$ such that $\mathscr{I}_{\omega*}$(‘Aristotle’) $\in$ $\mathscr{I}_{\omega*}$(‘is a person’), then for *each* other $\mathscr{I}_{\omega}$,$\mathscr{I}_{\omega}$(‘Aristotle’) $\in$ $\mathscr{I}_{\omega}$(‘is a person’) if $\mathscr{I}_{\omega}$(‘Aristotle’) is defined. This is tantamount to restricting I' so that anything that it assigns to ‘Aristotle’ in a specific scenario considered counterfactual circumstance is such that that individual is included in the set assigned by I' at that scenario (or mode of presentation) to the predicate ‘is a person.’

We can now state explicitly the conditions under which sentences of the form $\ulcorner$Necessarily, $\psi(\gamma)\urcorner$ are true on the conventionalist approach of understanding necessity as analyticity given our development of the relation $\mathscr{R}$: a sentence of the form $\ulcorner N(\psi(\gamma)\urcorner$ (a formal language approximation of $\ulcorner$Necessarily, $\psi(\gamma)\urcorner$) is true in L (a generic language of which the features had that class We are investigating in the dissertation – see Chapter Two) just in case for *each* $\omega \in \Omega$, $\mathscr{I}_{\omega}(\gamma) \in \mathscr{I}_{\omega}(\psi)$ if $\mathscr{I}_{\omega}$ is defined for γ; which is true just in case $\mathscr{R}(\psi, \psi, \gamma)$.

If we require I'’s assignments to directly referring singular terms relative to its assignments to predicate terms to conform with $\mathscr{R}$, then we have a way of restricting I' so that specific *de re* modal statements are endorsed. Is the truth of the *de re* modal statements we want to “come out” true a matter of analyticity or meanings alone? Not quite in the same way that true *de dicto* modal claims are a matter of meanings alone, but we will see in the following that features of the *use* of language (as partially modeled by I') lead to the endorsement of the *de re* modal claims.

Some comments are in order. The first is an acknowledgement of debt to the insightful, but ultimately unsatisfactory solution of Chapter Ten. The suggestion there was that certain *properties* are such that they are had *essentially*: if individual ref(‘*a*’) (the semantically primitive singular referring, object introducing term ‘*a*’ picks out this individual) happens to have the property expressed by ‘is *P*’ then ref(‘*a*’) is *P* necessarily.[4] This basic idea is one that we try to preserve in the restrictions we place on I' by insisting that it conform to the restrictions in force because of $\mathscr{R}$. The problem with that unsatisfactory solution was that it made modal properties (that were the truth-makers for *de re* modal claims) inherent to *individuals*, independent of how we refer to them. In contrast, the present proposal aims to endorse the same claims but seeks to do so by stipulating *how* the singular terms (names) that refer to the individuals *are to be used* relative to *how* certain predicate terms *are to be used*.

We should also note that the present proposal has been fashioned to be mostly of a piece with the strategies of Ludwig (2007) and Sidelle (1989) in their respective dealings with the problem of *de re* modality in articulating parts of a conservative or conventionalist modal semantics. Consider Ludwig’s proposal of category names as part of a solution to the problem of *de re* modality. In the context of a compositional meaning theory, a category name is a directly referring singular term whose reference axiom is such as to ensure that the name picks out an individual of a certain kind. (Category names may be so called because they are used to refer *only* to individuals of a certain kind or *category*.) For example, ‘Aristotle’ is a category name given the following reference axiom:

2. (*C*) ‘For any x, if $x = A$ and x is a person, then ref(‘Aristotle’) = x.’[5]

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[4] To be clear, as I understand it, the suggestion was *not de dicto* about the saying ‘*a* is *P*’, nor exactly *de re* but rather “*de qualitas*” about the property P.

[5] (Ludwig, 2007) page 6.

Where '*A*' is directly referring singular term that is *not* a category name whose referent is Aristotle. On this view, anytime a competent speaker uses the name 'Aristotle' the speaker refers to an individual which is a person. Since the reference axioms are to govern our use of names even when we speak of counterfactual situations about the way things might have been, *even in modal contexts*, a competent speaker uses the name 'Aristotle' to refer only to an individual which is a person. I assert that holding $\mathscr{R}$('is a person,' 'is a person,' 'Aristotle') and insisting that I' conform to the restriction from $\mathscr{R}$ forces the same result on us.

If this is right, then it seems that we have the tool to capture generally the characteristics of category names with the relation $\mathscr{R}$. Presumably, strings like 'Joe', 'Billy' and 'Ned' are also category names which are used to refer to persons; let us call the set of category names used to pick out persons 'Γ_{Cp}' (so 'Aristotle' $\in \Gamma_{Cp}$, 'Joe' $\in \Gamma_{Cp}$, …). Now then, we can hold that for each $\gamma \in \Gamma_{Cp}$, $\mathscr{R}$('is a person,' 'is a person,' γ). This claim should be such as to endorse all the *de re* modal claim that would be endorsed by holding each of 'Joe', 'Billy', 'Ned', 'Aristotle', etc. as category names in the context of a compositional meaning theory based on an interpretive truth theory because in any interpretation $\mathscr{I} \in \{\mathscr{I}_{\omega}\}_{\omega\in\Omega}$, $\mathscr{I}(\gamma) \in \mathscr{I}$('is a person').

We turn next to Sidelle's treatment of *de re* modal claims in the context of a defense of conventionalism. He asserts on page 77 that,

> The conventionalist is claiming that we cannot make any sense of modality, of essential properties, or of identity across possible worlds independently of our conventions. … So it is not as if, as is required for this [*contra* conventionalist] realist worry to get going, there are facts about who's who in various possible worlds and our conventions then merely determine which of these things are to be called by the same name or fall under the same predicate, but rather that these decisions (or at least some of them) determine who's who. If a name is used rigidly, the things to which it applies are *thereby* identical. We may explain how we can generate truths *de re*, then, by saying either that our conventions do not merely regulate how we talk, or by saying that the metaphysical facts on which the possibility of *de re* truths depends are not separable from how we talk. However we describe it, the conventionalist is able to produce *de re* modal truths because, on this view,

> our conventions cut a lot deeper than our [realist] opponent (above) gives them credit for, and they can do so because it is not merely the modal facts that result from our conventions, but the individuals and kinds that are modally involved. (original emphasis)

Sidelle is going further than I wish to both *strategically* and *tactically*. Strategically, he goes further by saying that we may not be able to understand modal features (modal facts, modal properties and transworld identity) as having their origin in anything other than our conventions. I do not say that we cannot understand modal facts as having their origin in anything other than our conventions. We might be able to understand modal facts as having their origin in modal and essential properties. I claim that it *suffices* for us to make sense of the semantics of the *de re* modal claims to make use of the generalization we have carried out of Carnap's work together with the *de re* restrictions we place on $\{\mathscr{I}_\omega\}_{\omega\in\Omega}$ with the relation $\mathscr{R}$. If, as we have suggested, we can make sense of the semantics of those sentences in the way we have proposed in this chapter and Chapter Ten, then realist explanation for the origin of modal facts seems explanatorily otiose and epistemologically suspect. And he goes further tactically, by trying to give a satisfactory account of rigid designation in a conventionalist *milieu* – I doubt we need to do so (as I have indicated earlier in Chapter Ten). But he is brushing up against the notion that the intentions with which we use a term are important in restricting what *sort* of individual is picked out by the term in a modal context. If Sidelle found our approach in the previous chapters appealing and in line with his aims here, then I think he would find the restriction of I' by means of holding that certain predicates and singular terms bear $\mathscr{R}$ to one another to be compatible with his approach to the requisite conventionalist endorsements of *de re* modal claims that are intuitively true.

Finally, in order to allay worries that may have come up over whether we have actually said enough about which specific predicates and singular terms are to bear relation $\mathscr{R}$ to each other, I would like to reiterate the modesty of the scope of our project here. Unlike Sidelle, we are trying simply to clear a path for conventionalist modal semantics and show that such an approach is viable among other possibly realist approaches to modal semantics. I argue that we have shown how certain modal *de re* sentences of traditional interest and puzzlement could be reasonably endorsed in the context of the theory we have developed in the preceding chapters. We haven't (nor should we have) undertaken to give a detailed treatment of exactly which (sorts of) predicates and (sorts of) singular terms bear $\mathscr{R}$ to one another; simply to have shown that I' can be restricted to get what we desire out of our semantical theory is enough.

Exploration of the Topological / Linguistic-Use Proposal

Of course, there are questions of, challenges for, doubts about, and possible extensions and refinements of the approach we have outlined. I will consider three in this section. First, we will consider whether a direct reference theory is really compatible with the restrictions placed on I' by taking seriously $\mathscr{R}$. Then, we will consider how effectively this approach can deal with names (like 'Sherlock Holmes') which denote fictional characters. Finally, we will consider what been recently called 'description names'[6] as another possibility for dealing with certain *de re* modal claims.

Can We Hold that Category Names are Directly Referential?

Let us mark a distinction by the use of another term for certain singular referring terms. If such terms serve the function of introducing into the proposition expressed by the sentence in which they occur and the terms are semantically primitive, in the sense that one could not understand such terms by understanding sentences in which those terms did not occur, let us call those terms 'object introducing' following Ludwig (2007). Such terms may have an associated

[6] (Ludwig, 2007) pages 3-5.

sense (such as a category), but because they are semantically primitive in the forgoing sense, this associated conceptual content is not sufficient to determine the referent of such a term.

Names of Fictional Characters

There are two broad strategies available to one who holds this view with regard to the names of fictional characters like ‘Sherlock Holmes’: pragmatic and semantic. On the pragmatic side, one could hold that fictional discourse is to be understood in roughly the same way that non-fictional discourse is but that we hold that such discourse is not to taken seriously in the same sort of way that non-fictional discourse is. Such is John Searle’s[7] line. On this view, we need not say much more because the modal semantic theory we develop is not that which does the work of explaining how we understand proper names as used in fictional discourse. If an opponent were to challenge our semantical story on the basis that it does not afford us an appropriate way of dealing with names of fictional characters, yet she held a Searlian view of the logical status of fictional discourse, then we do not have to seriously consider (that particular aspect of) her criticism. More likely, one who challenged our view would hold that a theory of semantics should be that which explains how we are to make sense of names of fictional characters. We turn presently to this concern.

On the semantic side, one would try to account, in terms of a general semantic theory, for fictional names. There are two sorts of categories under the heading of semantic treatment of fictional names. The first is a sort of complex logical form with which we might give an account of the “truth” of the sentence ‘Sherlock Holmes is a detective’ by understanding the sentence in the context of, or in relation to, some work of fiction relative to which the truth or falsity of the sentence should be assessed. More specifically, suppose that we are given a body of discourse in

[7] For all reference to John Searle see (Searle, J., 1975).

which the name 'Sherlock Holmes' features, for instance this body might be the text of Sir Arthur Conan Doyle's *The Hound of the Baskervilles*. Now our general semantical theory (especially the one we have been boosting here – a Davidsonian interpretive truth theory as compositional meaning theory) is supposed to indicate to us how to understand the meaning of sentences given that we understand the meanings of their constituent words and the (grammatical) mode of combination of those words. Given that we understand the meanings of the sentences that form this body of text, we could respond affirmatively to the question, "Is Sherlock Holmes a detective given what you've read in *The Hound of the Baskervilles*?" This specific case suggests a general treatment in which determining the truth of 'Sherlock Holmes is a detective' should take the following approach: the sentence is true just in case, if we use 'B' as a variable to range of bodies of text (narratives), and the 'IN' to stand for the three place relation that holds between bodies of text, semantically primitive terms and predicate terms such that IN holds of B_1, N_1, φ_1 just in case $\ulcorner N_1$ is a(n) $\varphi_1 \urcorner$ is true relative to B_1[8] then

$(\exists B)(IN(B,$ 'Sherlock Holmes', 'detective')

In this case, the sentence does not look to be *de re* after all, or if it is *de re* ("*de Fabula*" specifically), then, it is rather about (the contents of) a body of text (hence "*Fabula*") instead of about what might have been named by 'Sherlock Holmes.' So, on this sort of approach to the names of fictional characters, we mustn't modify our account of modal semantics.

[8] One who is able to understand the sentence $\ulcorner N_1$ is a(n) $\varphi_1 \urcorner$ must be in a position to know that N_1 is an object introducing term which is strictly empty. The sentence 'Santa Claus is fat,' is strictly speaking *meaningless* because the semantically primitive singular referring term 'Santa Claus' is empty; since it serves a meaning function of being an object introducing term, yet doesn't introduce any object into the proposition expressed by this sentence. We understand the semantic role played by 'Santa Claus' as being the same sort as played by 'George W. Bush'. Understanding the semantic role played by semantically primitive object introducing terms, understanding the role of predicate terms like 'is a detective' and understanding the grammatical mode of combination of those two sorts of terms are all that is required to understand the sentence 'Sherlock Holmes is a detective.'

On the other side, we might deal with fictional names as names of a special sort. Now either, fictional names are such that they *actually have* referents, just not *actual* referents (referents of a different ontological status that which is named by ‘George W. Bush’ or ‘3’), or fictional names are such that they work, not as object introducing terms, but rather as terms which signal that they are significant in some sort of meta-fictional way. On the first option, we would hold that a sentence such as ‘Sherlock Holmes is a detective’ contains an ordinary predicate ‘is a detective’ – it is just the case that this predicate applies *both* to physical objects *and* objects that have the ontological status of fictional characters. This approach would require that we take the domain Δ_ω of a specific interpretation with index ω, to contain the individuals denoted by proper names of actual people such as ‘George W. Bush’ and ‘Socrates’ and individuals which are denoted by proper names of fictional characters such as ‘Sherlock Holmes.’

The important observation to make is that whatever sort of tack we take in addressing this problem, it seems that the framework we have developed in previous chapters (and the beginning of this one) will be suitable for that particular tack: if we choose pragmatics, then we need do nothing, as these pragmatics allow us to remove the explanation of the semantics of ‘Sherlock Holmes is a detective’ from those sentences we need be concerned about; if we choose a properly semantical tack, then such a sentence is not even *de re*; on the special names / ordinary predicates tack, we need simply expand the domain Δ ($= \cup_\omega \Delta_\omega$) to include fictional entities that are the referents of fictional names.

Description Names (Such as the Numerals)

Finally, we might gain insight into the relative amount of satisfaction we should take from the use of $\mathscr{R}$ as a way to ensure that the analytic-deflationary account endorses certain *de re* modal claims by contrasting it with another way they may be handled. Category names are not the only tool developed by Ludwig in his 2007; he also uses *description names* to explain how a conservative, epistemologically responsible approach to modal semantics could account for the truth of certain *de re* modal claims. Description names are introduced to show specifically how we may understand *de re* sentences in which quantification is into the scope of a modal operator (sentences of the form $\ulcorner(\exists x)\Box\phi(x)\urcorner$) – where we take this sentence to be a typical formalization – in the usual idiom formalization idiom '$\Box$' – of a natural language sentence involving the sentence operator 'necessarily'). Even though we do not take up this issue until Chapter Twelve, we should assess the strategy we developed so far for *de re* modal claims by comparing our technique to one that made key use of description names.

Briefly, the idea is that if conceptual content were present in virtue of how each of a class of singular referring terms provided its referent, then those terms could be directly referring, but, because of this conceptual content, we could see the analyticity of certain sentences in which these terms occurred. A description name is so-called because it provides a definite *description* which picks out an individual.[9] If, in the context of a compositional theory of meaning for a specific object language, we can give reference axioms for singular terms, and if those reference axioms are such that they induce certain properties or relations on or among the referents indicated by the axioms, then we can claim that these properties or relations follow from how these terms secure their respective referents as a result of facts about the meaning theory itself –

[9] Such names might do so in virtue of their syntactic features rather than any conceptual content associated with their semantic features (as names, rather than definite descriptions, they are semantically unstructured). We can advert to the numerals for an example. The string of characters that is a numeral reveals the relative position in the number line of that which it refers to. A cognizer competent with the numerals need appeal to no other conceptual content than what is encoded by syntactic features to understand what each numeral refers to.

specifically, features of certain of the reference axioms of that meaning theory. It sounds complicated, but an example helps explain.

Ludwig uses the numerals and numbers as an example of how to understand the quantified sentence '$(\exists x)\Box(x > 7)$'. In providing the semantics for such a sentence, we have reference axioms for each numeral '0', '1', … given in terms of the successor relation (and the addition relation, the multiplication relation and a concatenation function) that might go like this

For any numeral n, if

3. (a) n='0' then for any x, if $\sim(\exists y)(\text{successor}(y)=x)$ & $(\exists z)(\text{successor}(x)=z)$, then ref('0') = x,

4. (b) n='1' then for any x, if x is the successor of 0 (that is x=successor(0)), then ref('1') = x,

5. (c) n='2' then for any x, if x is the successor of 1, then ref('2') = x

…

6. (k) $n \neq$ '0', $n \neq$ '1', $n \neq$ '2', … $n \neq$ '9', then for all j, if L(n, j), then the x such that x = SUM(0, j, ref(n_i) × 10^i) is such that ref(n) = x.[10]

Since we have, by the *meaning* of the successor relation and the greater than relation, $\text{successor}^m(n) > n$ (for any m > 0), it is analytic (or at least a matter of the application of meaning statements alone) that $\text{successor}^2(7) > 7$, that is, '9 > 7' is analytic. And so, on the conventionalist reading of '☐', '☐(9 > 7)' is true also. Since the sentence has a *de re* form, the sentence '9 > 7' is analytic, and these names refer directly, it seems that there must be conceptual content associated with the names and it is had in virtue of the way in which the referents of these names are fixed.

[10] Where in (k), 'L(n, j)' is read as 'n is the concatenation of j numerals each of which are assigned a reference axiom of (a) – (j)' (let us call this class of special numerals the '*1-placers*'), and 'SUM(0, j, ref(n_i) × 10^i)' is read as 'the sum of ref(n_0) × 10^0, ref(n_1) × 10^1, … ref(n_j) × 10^j' where n_0 is the 1-placer suffix of n, n_1 is the 1-placer suffix of the numeral which, if prefixed to n_0 would result in n, n_2 is the 1-placer suffix of the number which, if prefixed to $\ulcorner n_1 \frown n_0 \urcorner$ would result in n, etc. Description names are given much more thorough treatment in (Ludwig, 2007). I just wanted to get out the gist here so we can see the main ideas of how the argument goes.

In general, it seems that the manner in which we use numerals to refer to the numbers provides us with the sort of information that allows us to see the analyticity of a certain class of sentences in which the numerals occur. We see, by understanding how the numerals work, that '9 > 7' is true in virtue of semantic assignment alone. So at least for the numbers, names do provide some content that allows us to detect analyticity in certain cases on the basis of how we use those names to refer to individuals.

It is obvious that description names are a subspecies of category names – the category that the numerals belong to is given implicitly in these axioms with our use of the successor function. The successor function is defined only for the natural numbers. But the numerals, and description names in general, are certainly a *special* subspecies of category names. To be competent with the numerals is to know a great deal (an infinite amount, actually) about the numbers and their modal properties. Indeed, one might very plausibly argue that the numbers' modal properties are exhausted by the conceptual material present in the numerals' reference axioms. In other words, one might plausibly claim that the *only* modal properties had by the numbers can be reduced to the truth or falsity of *de re* modal claims involving the greater than, lesser than and equal to relations. Given the strength of this position, then one might wish that we could assimilate all category names to the treatment we have provided for description names. To see if such is possible, we should take a moment to see what is added to the knowledge one has if one is competent with a class of mere category names if one is, in fact, competent with description names.

The description names are such that the reference axioms determine a referent no matter what the context is in which they are used. This is likely because the numbers are abstract objects – necessary existents whose properties are had necessarily. Our use of the numerals to refer to the numbers is completely stipulative, and that which is a referent of a number like such as ‘1’ is an abstract object and so in virtue of so being has all of its (non-relational) properties of necessity (and has none accidentally). If the conceptual content presented with the reference axioms for the numerals is sufficient to provide one who is competent with the numerals with all the modally relevant facts about the numbers, perhaps such is the case because the numbers are *abstracta* and our use of the numerals is completely stipulative. It is the conceptual content that one who is competent with those names, and that is presented in the reference axioms for those names, from which all of the modal properties of the referents follow. It is not immediately obvious that category names of other sorts (like ‘Bob’ and ‘Ned’) are such that one who is competent with those names knows all of the modally relevant properties about the referents of those names.

Perhaps we have this intuition because the referents of ‘Bob’ and ‘Ned’ are contingent entities with what we might call accidental features. But we do have the intuition that certain *de re* modal claims expressed by sentences that include category names are true (‘Necessarily, Aristotle is human.’) The important thing to notice is that in this chapter we haven’t taken a metaphysical stand on whether or not Aristotle is essentially human, but rather developed the part of semantical theory on which we restrict names such as ‘Aristotle’ so that they can only be used to refer to individuals of a certain kind (in the case of ‘Aristotle’ human beings), and so enabled ourselves to endorse the *de re* modal claims that we find intuitively true. Now the conceptual content had by being competent with category names such as ‘Aristotle’ is not enough to uniquely determine its referent (because it is not enough merely to know that the referent of ‘Aristotle’ is a human being in order to know *which* human being is the referent of the name), but whether the conceptual material associated with those category names is such that all the modally relevant properties are known by one who is competent with the name is certainly an open question. And whatever do turn out to be all of the modally relevant properties of the referents of the category names (if there are any others at all), it is quite easy within the framework we have developed here to let $\mathscr{R}$ be such that it places the appropriate restrictions on the names in question.

To do so, we would require there to be Ludwigian description names of the sort we have described for (contingently existing) *concreta* as well as (necessarily existing) *abstracta*, as we wish to make *de re* modal claims about the former as well as the latter. For the approach to be fully general, we must be guaranteed that such names would always be available for any modal claim the truth of which we wish to explicate, but there seems to be at least *prima facie* doubt as to whether we could have such a guarantee. Research into the availability of description names is a starting point for future work.

Conclusion

We have seen that there are resources for one who holds the analytic-deflationary account to deal with the problem of *de re* modality. By generalizing the intuition that some category of object to be denoted is associated with some names, we can restrict the map I' so that it mimics our use of such names. The possibility for a more convincing treatment exists in the description names, but I caution that we should be judicious in claiming that there are enough of these names to "go around" in the modal discourse we'd like our theory to explicate. We have yet to deal with quantification into modal contexts, and we should feel urgency over this issue, as we have tried to understand necessity in terms of analyticity. How are we to even understand the question of whether an open sentence could be analytic relative to an assignment? This is one topic of Chapter Twelve. After we have dealt with quantification, we shall endeavor to fit our work in with a larger project of a more general nature. We shall try to place what we have done with the context of a compositional meaning theory.

CHAPTER 12
SKEPTICISM THAT MEETS QUANTIFIED MODAL SENTENCES, A PROPOSED CONVENTIONALIST TREATMENT OF THEM AND HOW OUR WORK MIGHT FIT INTO A GENERAL SEMANTIC THEORY

Introduction

So far, we have addressed all the issues that we laid out for ourselves at the beginning of our path clearing save two, one specific the other very general: first, the semantics for quantified sentences in which quantification is "into" a modal context, and, second, how to situate the work that has been as our fairly narrow focus in this dissertation into the broader philosophy project of a general semantical theory. We address first the more specific issue and then take on the more general one. After doing this, we shall fashion remarks to conclude this investigation and gesture toward directions for feature research.

Our Conventionalist Proposal for Sentences of the Form $\ulcorner(\mathcal{Q}x)\Box(\phi(x))\urcorner$.[1]

We have focused on the how to understand what it means for universally quantified sentences of the form $\ulcorner(\forall x)(\phi(x) \rightarrow \psi(x)\urcorner$ to be analytic and *de re* sentences of the form $\ulcorner\psi(\gamma)\urcorner$ to be analytic, and so argued that we can clear a path for a conventionalist reading of the sentence operator 'necessarily' for sentences of that form. It is no surprise that for a sentence *S* of either form, we try to clear a path for showing that 'Necessarily, *S*' is true just in case *S* is analytic. Specifically, in the first case, $\ulcorner\Box(\forall x)(\phi(x) \rightarrow \psi(x)\urcorner$ is true just in case $\ulcorner(\forall x)(\phi(x) \rightarrow \psi(x)\urcorner$ is analytic (as we have spelled that notion out in Chapter Three through Chapter Eight); in the second case $\ulcorner\Box\psi(\gamma)\urcorner$ is true just in case it is analytic that $\ulcorner\psi(\gamma)\urcorner$ (as we have spelled this out in Chapter Ten and Chapter Eleven). In this chapter, we shall demonstrate how a conventionalist

[1] In the following, we use '$\Box$' to denote a quasi-formal language analog – in a philosophers' shorthand – of the sentence operator 'necessarily' in natural language sentences.

has tools for understanding the semantics of sentences of the forms $\ulcorner(\exists x)\Box\psi(x)\urcorner$ and $\ulcorner(\forall x)\Box\psi(x)\urcorner$. I will call sentences of these forms 'quantified modal sentences.'

Kit Fine's Assessment of the Prospects for Making Sense of Quantified Modal Sentences

Of course, we wish our sketch of a theory of modal semantics to accommodate sentences of this form also, but *prima facie*, the situation seems grim for a conventionalist approach. Our difficulty can be seen by reviewing the skepticism with which quantification "into" a(n) (opaque) modal context has been regarded. To lay out the pitfalls of the territory we must negotiate in order to provide a treatment of quantified modal sentences in which we understand necessity as roughly analyticity, I rehearse Kit Fine's arguments.

There Are at Least Two Reasonable Ways of Making Sense of Quantified Modal Sentences

Fine suggests that quantified modal sentences, that is sentences of the form $\ulcorner(\mathcal{Q}x)\Box\psi(x)\urcorner$ can be intelligible to us in one of two ways. A prerequisite for understanding Fine's claim is the notion of a *substitution instance*. If $\ulcorner\psi(x)\urcorner$ is a formula with only one free variable (or 'open sentence'), a substitution instance of $\ulcorner\psi(x)\urcorner$ is the sentence that results when we write the formula and substitute for every occurrence of 'x' an occurrence of some constant (say) 'a'. We indicate the sentence that results from so substituting 'a' for 'x' by '$\psi(x/a)$'.

First option: logical satisfaction

The first way according to which a sentence of the form $\ulcorner(\mathcal{Q}x)\Box\psi(x)\urcorner$ might be intelligible is if the formula $\ulcorner(\mathcal{Q}x)\Box\psi(x)\urcorner$ can be "logically satisfied".[2] There are, in turn, two ways this might happen. First, the formula (with only 'x' free) $\ulcorner\psi(x)\urcorner$ might be such that $\psi(x/a)$ is a (classically) valid sentence: for example, if $\ulcorner\psi(x)\urcorner$ were '$x = x$', '$F(x) \vee {\sim}F(x)$' or '$(\forall y)(F(y)\rightarrow(F(y) \vee F(x))$'. Second, the predicate substituted for the metalinguistic variable $\ulcorner\psi\urcorner$ of

[2] I borrow Kit Fine's terminology here.

the original sentence could be 'is self-identical' or another such predicate that is satisfied by every individual.[3]

We shall not give any more consideration to this first sort of satisfaction as sentences of this sort do not pose a difficulty for the conventionalist, but we must consider another way in which quantified modal sentences might be intelligible so as to be able to make sense of all the sentences which involve the sort of content in which we are interested in this project.

Second option: essentially, essentialism or analyticity

To explain the second way quantified into sentences might be satisfied, we need some terminology. The quantifier in the sentence '$(\exists x)Fx$' is ***objectual*** if we understand the proper suffix of this sentence ('Fx') to name a propositional function, relative to the language of which this expression is a formula, from objects to propositions expressed by sentences that result by substituting a purely directly referring singular terms for 'x' in the formula. This general strategy is laid out in 1.

1. Fx_{OQ}[4]: {objects} $\rightarrow$ {propositions expressed by $F(x/a_1)$, $F(x/a_2)$, …}

(where 'a_1', 'a_2', … have no associated conceptual content and are object introducing (in Ludwig's (2007) terms) or are purely directly referential (in Fine's (2005) terms) to members of {objects}.)

On the other hand, the quantifier in the sentence '$(\exists x)Fx$' is ***autonomous*** if we understand the proper suffix formula ('Fx') to be a function from expressions types[5] to a certain class of expression types (sentence types).

[3] There is a problem with this formulation because the individual constant would have a bearer and so we could infer from the sentence, 'Necessarily, a is a' that something exists. I shall not dwell on this issue.

[4] The function's subscript 'OQ' should make clear this function is one we take 'Fx' to name when objectual quantification is in force.

[5] Autonomous quantification is best understood as a *genus* of which there may be several *species*. In a particular species of autonomous quantification, the domain may be restricted to a certain subset of expressions. Substitutional quantification is a species of autonomous quantification.

2. Fx_{AQ}[6]: {expression types: $\beta_1, \beta_2, \ldots$ } $\rightarrow$ {sentence types $F(x/\beta_1)$, $F(x/\beta_2,)$ …}

(Just to be clear, a token of type $F(x/\beta_1)$ is of the sort to be true or false if understood when uttered or read on a specific occasion because it is a *sentence* token.)

Semantic uniformity is a relation that can hold between a quantified sentence and a substitution instance of that sentence. There is semantic uniformity between '$(\exists x)Fx$' and $F(x/a)$ just in case the term 'a' plays the same semantic *rôle* in the latter as does the variable 'x' in the former. Specifically, in the case of objectual quantification, there is semantic uniformity between '$(\exists x)Fx$' and $F(x/a)$ just in case there is a specific *object* – the denotatum of 'a' – where 'a' is a purely directly referring singular term (that is, a referring singular term with no associated senses of any sort) such that the propositional function Fx_{OQ} applied to this object yields a proposition that includes the denotatum of 'a'. (This sentence (type) that is the result of the propositional function Fx_{OQ} applied to the object that is the denotatum of 'a' is expressed by the sentence (type) $F(x/a)$.) On the other hand, under the assumption of autonomous quantification, there is semantic uniformity between '$(\exists x)Fx$' and $F(x/a)$ just in case the string β (= 'a') is such that $F(x/\beta)$ ($=Fx_{\mathrm{AQ}}(\beta)$) is an expression type that is a sentence type. A ***proper substitution instance*** – $F(x/a)$ – of '$(\exists x)Fx$' is one in which there is semantic uniformity between the latter and the former for either reading of the existential quantifier.

In a similar fashion, we can apply the same terms to sentences that include '$\Box$'. In particular, on an objectual reading of the existential quantifier, there is semantic uniformity between '$(\exists x)\Box Fx$' and $\Box F(x/a)$ just in case there is a purely directly referring singular term 'a' such that the propositional function $\Box Fx$ applied to the denotatum of 'a' yields a proposition that

[6] The function's subscript 'AQ' should make clear this function is one we take 'Fx' to name when autonomous quantification is in force.

contains this object (that is expressed by the sentence 'necessarily, *a* is *F*'). And, in case of autonomous quantification, there is semantic uniformity between '$(\exists x)\Box Fx$' and $\Box F(x/a)$ just in case there is a string β (= '*a*') such that $\Box F(x/\beta)$ is a grammatical expression that is a sentence. (This happens when the (autonomous quantification) function $\Box Fx$ is defined on '*a*'.)

Fine asserts that the truth condition of '$(\exists x)\Box Fx$' on the objectual reading of the existential quantifier is *different from* the truth condition of '$(\exists x)\Box Fx$' on the autonomous reading of the quantifier and *vice versa*. To repeat in other words, the "truth-maker" for '$(\exists x)\Box Fx$' on an autonomous reading of the quantifier is distinct from the "truth-maker" for '$(\exists x)\Box Fx$' on an objectual reading of the quantifier.

The quantified sentence '$(\exists x)\Box Fx$' is true on an objectual reading of the quantifier iff there is some *object*, the denotatum of '*a*' such that necessarily *it* is *F*. This way of understanding '$(\exists x)\Box Fx$' is to understand it in the strictest *de re* sense; the truth of the sentence depends upon the *object denoted by* '*a*'. That the denotatum of '*a*' is so denoted is of no real consequence to the truth of the sentence $\Box F(x/a)$.

On the other hand, '$(\exists x)\Box Fx$' is true according to the autonomous reading of the quantifier iff there is a string '*a*' which if substituted into the formula $\ulcorner F\alpha \urcorner$ is such that the resulting sentence $F(\alpha/a)$ becomes analytically true, that is, just in case there is an relationship between the conceptual material associated with the term '*a*' and the concept expressed by the predicate '*F*' which *guarantees* the truth of $F(\alpha/a)$.

The sentence '$(\exists x)\Box Fx$' could be true on one reading of the quantifier but not on the other because on the first, objectual, reading of the quantifier, '*a*' must be a mere "tag" for it is denotation; the truth of the sentence on this reading presumably has something to do with the properties of the denotatum of '*a*', and on the second, autonomous reading of the quantifier, there must be conceptual content associated with the expression (that is the name) ‘*a*’ of the right sort to guarantee the truth of $F\alpha/a$.

Our modest conventionalist *desiderata* and treatment of quantified modal sentences on the model of Benson Mates’[7] treatment of quantified non-modal sentences

According to the account we have provided in Chapter Ten and Chapter Eleven, semantically primitive singular referring terms are *object introducing*: they serve to “load” objects into the propositions expressed by the sentences in which they occur. These terms are also such that there is conceptual material associated with each name. (That is, there is associated conceptual material *if* we think that the restrictions placed by $\mathscr{R}$ on the sort of objects semantically primitive terms can be used to refer to in each of $\mathscr{I}_{\omega\in\Omega}$ associate conceptual material with these terms.) If an interlocutor were to hold us to the standard of strictly objectual quantification in Fine’s terms, then he would be dissatisfied by what we will propose here (and will probably also be dissatisfied with the treatment we offered in the previous chapters).

We desire something different of our treatment of quantification. What we desire something along the lines of what Kaplan (1968) has developed. What we desire from our treatment of quantification is not that names are purely directly referring in Fine’s sense, but (1) that quantification be *univocal* in both modal and non-modal contexts and (2) that we be able to see that the truth of sentences of the form $\ulcorner(\mathcal{Q}x)\Box\psi(x)\urcorner$ follows from the truth of sentences which themselves are true in virtue of meaning. Since we should agree with Fine that quantified sentences are intelligible if there is a single proper substitution instance, a univocal treatment of quantification will require that variables play the same semantic *rôle* in both sentences of the form ‘$(\exists x)\Box Fx$’ *and* of the form ‘$(\exists x)Fx$’.

[7] For all references to Benson Mates see (Mates, B., 1972).

To set things up, let us advert to the treatment Benson Mates provides on his page 60 for truth under an interpretation for existentially quantified sentences.

> Let $\Im$ and $\Im'$ be interpretations[8] of (formal language) *L*, and let β be an individual constant; then $\Im$ is a β–variant of $\Im'$ if and only if $\Im$ and $\Im'$ are the same or differ only in what they assign to β. (This implies, be it noted, that if $\Im$ is a β-variant of $\Im'$, then $\Im$ and $\Im'$ have the same domain.)
>
> …
>
> 9) if ϕ[9] = $(\exists\alpha)\psi$[10], then ϕ is true under $\Im$ if and only if $\psi\alpha/\beta$ is true under at least one β–variant of $\Im$.

One thing to notice before we being to spell out our proposal for quantified *de re* modal statements, is that Mates gives the truth-under-an-interpretation conditions for quantified sentences in terms of interpretation variants – interpretations just the same as the original except in what they assign to a single constant term – and the truth of sentences that are the result of substituting in that name, for which the interpretation may vary, to the formula that is a proper suffix of the quantified sentence under consideration. We wish to set out *absolute truth conditions* for *languages* under an intended interpretation (rather than simply interpretations) that include the sentence operator 'necessarily'. Whereas Mates considered β–variants of a certain interpretation, we must consider (something analogous to) a β–variant of the language under our consideration. Having said so, let us present our proposal.

Let *L* and *L′* be languages of the sort whose semantics we have considered in the preceding chapters (both languages include the sentential operator 'N' which is represented in the quasi-

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[8] An *interpretation* in Mates' use is a map from the language's constant terms to individuals in the domain and from the language's predicate terms to sets of individuals in the domain.

[9] For 'ϕ' can be substituted any sentence of L.

[10] For 'ψ' can be substituted any formula of L.

formal philosophers' shorthand as '□'). Let the set of singular referring constant terms of each language be called respectively, 'Γ' and 'Γ′'.

3. L' is a γ–variant of L just in case $\gamma \in \Gamma'$ and either $\Gamma' = \Gamma$ or $\Gamma' = \Gamma \cup \{\gamma\}$ and Γ' and Γ are exactly alike in every other respect.

For (4.), let ϕ be a sentence variable for L, and ψ a formula variable.

4. If $\phi = \ulcorner(\exists\alpha)\psi\urcorner$[11], then ϕ is true in L if and only if $\psi\alpha/\gamma$ is true in at least one γ–variant of L.

In particular if ϕ = '$(\exists x)\mathrm{N}(F(x))$', then ϕ is true if and only if, '$\mathrm{N}(F(a))$' is true in at least one a-variant of L. Also, if ϕ = '$(\forall x)(\mathrm{N}(F(x))$' (another sentence of L), then ϕ is true if and only if '$\mathrm{N}(F(x))$' is true in every a-variant of L.

Now since we have explicated the conditions under which a sentence of the form $\ulcorner\mathrm{N}(\psi(\beta))\urcorner$ is true in L, given the preceding we have the conditions under which sentences of the forms $\ulcorner(\exists x)\mathrm{N}(\psi(x))\urcorner$ and $\ulcorner(\forall x)\mathrm{N}(\psi(x))\urcorner$ are true in L.

Finally, we have semantics for each of the basic forms we sought: *de dicto*, *de re* with singular terms in the scope of the modal operator and quantified sentences in which quantification is "into" the scope of a modal operator.[12]

[11] In this case, ψ has at most α free.

[12] There are (at least) two further complications for this approach. First, one may wonder whether (and how) on this approach we can endorse the sentence, 'every physical object is such that necessarily it has a spatio-temporal location'. There is the obvious *de dicto* reading of this sentence: 'It is necessary that every physical object has a spatio-temporal location', and a less obvious *de re* reading: 'If *x* is a physical object, then necessarily *x* has a spation-temporal location'. I am uncertain whether the *de re* reading makes a problem for the conventionalist analytic-deflationary approach because qualifiers are placed on the sort of individuals over which *x* can range outside the scope of the modal operator. The antecedent of the conditional, 'if *x* is a physical object …' delimits that over which *x* ranges – it can range only over physical objects. So, even on the *supposed de re* reading, the claim still seems to be *de dicto* in that it is a claim about the relationship of the predicates 'is a physical object' and 'has a spatio-temporal location'.

The second worry is over whether there are enough, but not too many, members of Γ that are such that they bear $\mathscr{R}$ to certain predicates (call these 'category names' for short). If there are no such names, then there would be no true *de re* modal claims relative to that language. If every name is a category name, then every *de re* modal claim would be true. As this point, we should recall our purpose for the formal language we have developed in this work. We mean our formal language to *model* a natural language like English. Since the formal language is meant only to be a model for natural language, it follows that the members of Γ which bear relation $\mathscr{R}$ to some pair of predicates

We have cleared a bit of the path for a conventionalist modal semantics; what remains to be seen is whether we can make our work fit in with that of the broader philosophy of language community. Specifically, we desire to see if we can situate our proposal for the semantics of the sentences involving the modal operator ‘N’ into a general semantical theory, i.e. theory of meaning.

Fitting Things into a General Semantical Theory

First, we will provide a very brief review to give some context to our efforts to situate our specific work into the broader context of meaning theories.

What We Have Done So Far

We have developed a generalization of the approach of Carnap in *Meaning and Necessity* to modality and meaning that made use of state-descriptions. Our admissible interpretations of sets of atomic sentences were to be such as to provide, when considered in a class, an extensional treatment of the intensions of predicate terms. Ours is an effort in the arena of semantics to provide a workable notion of analyticity in terms of the framework we have developed as the generalization of Carnap.

We have suggested a semantics for the object language operator ‘N’ when it occurs in sentences of the form ⌜NS⌝ where for ‘S’ is substituted a sentence that is *de dicto* (such as ‘$(\forall x)(P_1(x) \rightarrow P_2(x))$’ or *de re* (such as ‘$P_1(a)$’ for ‘$a$’ a singular term). We have also proposed semantics for sentences of the forms ⌜$(\exists x)$N$(\psi(x))$⌝ and ⌜$(\forall x)($N$\psi(x))$⌝ where $\psi x/a$ is a sentence.

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of the formal language should be analogs of those names which are what Ludwig (2007) calls category names. So we should construct a specific formal language of the sort whose generic form we have developed here which is such that it includes among Γ analogs of all and only the names of the natural language we wish to model. In particular, those names of the natural language we take to be category names should be such that their formal language analogs bear the relation $\mathscr{R}$ to pairs of predicates. In short, the natural language we model, and the level of comfort speakers have with its expansion to include new category names, should dictate what category names the formal language includes as analogs.

The semantics for these sentences are given in terms of analyticity for our notion of it as previously developed.

Now, I've presented these object language sentences as involving the (object language) symbol 'N' with the understanding that we interpret 'N' as the (natural language) modal sentence operator 'necessarily.' The (formal) language under consideration for which We are trying to provide semantics for 'N' is supposed to be a much-simplified version of a natural language (which might be regimented with the use of paraphrase) like English. (We have been considering, at the most fundamental level, only "atomic" sentences – those of the form $\ulcorner\phi^n(\langle\gamma_1, \ldots, \gamma_n\rangle)\urcorner$ and trying to carve out a class of admissible interpretations with respect to those sentences.)

The bulk of our effort has been devoted to providing the semantics for 'N' with the hope that in so doing, we would be able to clear a path for conventionalist modal semantics a project directed toward the (general) goal of understanding necessity as analyticity and specifically giving the semantics for sentences in which occurs 'N' in terms of our characterization of analyticity.

Our Broader Goals

Our efforts have been narrowly focused: on making precise, more substantive and robust a specific proposal for analyticity and giving the semantics for a specific modal operator of the object language 'N.' Our project might be viewed as important more generally if we could use what we have done here in the service of a general semantical theory. That is, if we could situate our work in the context of a broad-ranging project in the philosophy of language project which is itself aimed at explaining the meaning of arbitrary sentences of a language under consideration, then the work of this dissertation seems relevant to the larger philosophical context and community. So we will now try to place our work in the context of a theory of meaning to make it of use to others involved in the larger philosophy of language project.

General Semantical Theories

As we said earlier, a *general* semantical theory aims to provide the meaning of any sentence of an object language under consideration. There is, of course, a diversity of views on this subject – the most fundamental differences among which lurk in what ontological status a semantical theorist takes *meanings* to have. Some hold that meanings of sentences are the *propositions* that are expressed by the sentences we understand, and so, as such, these meanings are necessary existents. Others hold that talk of a sentence's *meaning* is analogous to talk of a board's *length*, and so is only convenient shorthand for a relation with regard to a certain sort of similarity.

If each of a pair of boards is of the same length, we could say, in a sort of formal mode, that the relational predicate 'is as long as' applies to the ordered pair consisting of those two boards. The relation expressed by the predicate 'is as long as' is, in fact, an equivalence relation on the set of boards because it is *reflexive* (one board is as long as itself), *symmetric* (if board A is as long as board B, then board B is as long as board A) and *transitive* (if A is as long as B, and B is as long as C, then A is as long as C). So as a convenience, we might speak of a board's length as shorthand for an indication of which is-as-long-as-equivalence class the board is a member of. A board "has length" 7' just in case it belongs to the is-as-long-as-equivalence class of boards each of which is such that it is as long as a board which is shaped exactly like a tape measure extended to 7.'

Just as talk of having a certain length can be made sense of even if we do not think there are any such things as *lengths*, but rather only equivalence classes relative to the predicate 'is as long as,' a semanticist of the second sort (one who does not automatically assume that a sentence's meaning is itself something which is of a certain ontological category) might hold that talk of meaning is analogous to talk of lengths. Specifically, such a semanticist might hold that to say that a sentence has a certain meaning is just to say that the sentence is the *same in meaning*, or *means the same as*, another sentence. In formal mode, we could say that the relation expressed by predicate 'means the same as' or 'means that' is an equivalence relation: the relation is reflexive because a sentence means the same as itself, that is, 'means the same as' or 'means that' holds of the ordered pair $\langle \Psi, \Psi \rangle$ (where 'Ψ' is a sentence variable), the relation is symmetric because if 'means the same as' holds of $\langle \Psi, \Phi \rangle$ then it holds of $\langle \Phi, \Psi \rangle$, and the relation is transitive because if 'means the same as' holds of $\langle \Psi, \Phi \rangle$ and $\langle \Phi, \Delta \rangle$, then 'means that same as holds of $\langle \Psi, \Delta \rangle$. Now, if we could somehow generate theorems of a meaning theory of the form of (5):

5. 'means the same as' holds of $\langle \Psi_{OL}, \Psi_{ML} \rangle$

(where 'Ψ_{OL}' represents an arbitrary sentence of the language under consideration – the object language, and 'Ψ_{ML}' represents an arbitrary sentence of the language in which the theory is presented (the metalanguage – which we assume the theorist to understand), then we would have satisfied a semanticist of the latter sort, if we assume that the semanticist is interested primarily in a theory of meaning which allows one who understands the meaning theory and the language in which the meaning theory is given (the metalanguage) to understand sentences of the language of which the meaning theory is a meaning theory (the object language).

Our project is of course aimed at clearing a path for conventionalist modal semantics; a major motivation for this project is the desire to understand sentences with modal operators without the use of possible worlds, propositions qua *abstracta*, essential properties or other explanatory devices which would themselves require a place in our ontology. It is in line with our aims to opt for the approach that would please the second sort of semantic theorist. We should, and do, choose to understand talk of meanings as shorthand for talk about sameness of meaning.

Compositional meaning theories

So the sort of semantical theory in which talk of meanings is considered analogous to talk of lengths is that sort within which we will try to situate our work. Given what we have done so far, we should desire another feature of the general semantical framework in which we'd like to place our work, namely *compositionality*.

We have tried to carve out a notion of the intensions (explained "extensionally") of predicate terms and argued that we can place restrictions on the use of semantically primitive singular terms to make true *de re* modal sentences involving those terms. The notion of analyticity we have developed is such that whether or not a sentence is analytic depends upon the constituent predicate and singular terms of that sentence. Since whether or not a sentence is analytic depends upon its constituent parts and their mode of semantic combination, we should want the meaning theory in which we try to fit our work to be similarly compositional. As Lepore and Ludwig state in their (2007),

> A compositional meaning theory for a language *L* is a formal theory that enables anyone who understands the language in which the theory is stated to understand the primitive expressions of *L* and the complex expression of *L* on the basis of understanding the primitive ones. (p. 18)

Since we have made use of the notion of conceptual ability to underwrite our explanation of intensions of predicate terms, it is only natural that we would wish our proposal for analyticity to be such that one who has conceptual mastery with regard to the predicates occurring in a sentence which is analytic can understand the sentence *as* analytic on the basis of understanding the predicate and singular terms of the sentence (the sentence's primitive expressions) given that the meaning of a complex expression (a sentence) is determined by the meanings of the constituent parts.

Indeed, we have proposed semantics for the sentence operator ‘N’ which indicate that the operator makes a specific and predictable contribution to the semantics of the sentences in which it occurs. The semantics we have proposed are such that the semantical contribution of ‘N’ are “regular” in all sentences in which the operator occurs, that is, the contribution is systematic and the operator’s behavior should be able to be understood in a compositional fashion.

A compositional meaning theory seems to be our most likely candidate.

An interpretive truth theory used in the service of a compositional meaning theory

Finally, we have been doing work in formal semantics, specifically, model-theoretic semantics. We have developed semantics for the sentence operator ‘N.’ Our development of these semantics was guided by the desire for a theory which made available an obvious and workable epistemology for sentences in which the operator appeared. We want the general semantical framework within which we situate our project to be such that it is a theory of understanding meaning. So we should be happy with “theorems” of the form of (6):

6. *s* means that *p*.

Where for ‘*s*’ is substituted a structural description of an object language sentence and for ‘*p*’ is substituted a metalanguage sentence. But how can we get here? All we have done so far is provided a formal semantics for atomic sentences and sentences of the form $\ulcorner(\mathcal{Q}x)(\mathrm{N}(\psi(x)))\urcorner$, and formal semantics only provides recursive and model-theoretic rules for determining whether a sentence of the object language is true in that language (under the intended interpretation). We have provided only extensional *truth-theoretic* information in our investigation. But Donald Davidson has suggested a way to use the merely extensional truth-theoretic tools we have been developing in the service of compositional meaning theory. The suggestion is to let theorems of a purely extensional sort do the work of a compositional meaning theory; specifically, that sentences of the following form could be the theorems of a meaning theory that makes statements about the truth theory. The predicate 'is T' will be explained in a moment.

7. *s* is *T* if and only if *p*.

Lepore and Ludwig have (2007) explained and clarified the suggestion. They write:

> We have seen above that the real achievement of a theory which assigns meanings to expressions comes to no more than that they match object language sentences with metalanguage sentences alike in meaning. Davidson's suggestion was that this could be achieved without meanings by noticing that a truth theory which meets Tarski's Convention *T* achieves the same result. Tarski's Convention *T* requires that an adequate theory of truth for a formal language have as theorems all sentences of the form [(7)] above in which '*s*' is replaced by a structural description of an object language sentence, a description of it as formed out of its primitive meaningful components, and in which '*p*' is replaced by a metalanguage sentence that translates it. If we know that a sentence of the form [(7)] is one of these theorems, then we can replace 'is *T* if and only if' with 'means that' to yield a true *M*-sentence. (p. 28)

As I understand it, the operative notion in Tarski's convention *T* is that of *translation*: if sentence ψ of the metalanguage is a translation of object language ϕ, then ψ and ϕ have the same meaning and a structural description of ϕ could be substituted for '*s*' and ψ could be substituted for '*p*' in (7). How do we guarantee that our truth theory for the object language satisfies Tarski's convention *T*, that is, how do we guarantee that ψ is a translation of ϕ? To begin the answer, we note that each of the semantic primitives – predicate terms, singular terms and sentence operators in our case – will be assigned axioms in the truth theory for the object language which provide an interpretation of these terms into the metalanguage which is truth preserving; this truth-preserving interpretation is a kind of translation from object language to metalanguage of semantic primitives. These assignments are expressed by "base" axioms in the truth theory. Since ψ and ϕ are sentences, we need to use various recursive axioms of the truth theory, in addition to the base axioms, such that we proceed in stages to produce in the last stage a sentence of the form ''ϕ' means that ψ in the metalanguage' – that to the left of 'means that' is to be considered the LHS of the stage and the that to the right is to be considered the RHS. (Of course, I simplify the process greatly for the purpose of this exposition. See Lepore and Ludwig's 2007 pp. 34-39 for details) This procession in stages will be such that it constitutes a canonical proof of this sentence where a canonical proof of a sentence which meets Tarski's condition T (or a 'T-sentence') is a finite sequence of sentences of the metalanguage which ends with the T-sentence in question, each of which is such that no semantic vocabulary is introduced on the RHS, and each member of which is either a base axiom of the truth theory or is such that it is derived from a previous sentence by one of a finite number of recursive axioms for the truth theory.

An example helps clarify this. Let the object language under consideration be a tiny "sub-language" of Serbo-Croatian (call it 'S-C'): in it are only one proper name and one predicate term. 'Dečko' is the proper name of S-C, and the predicate term of S-C is 'je pokvaren.' The predicate is satisfied by the same individuals which satisfy the (English) metalanguage predicate term 'is rotten.' An object language reference axiom is given in (8).

8. R1. $\mathrm{Ref}_{S\text{-}C}$('Dečko') = Dečko

And an object language truth ('$\mathrm{truth}_{S\text{-}C}$') axiom for an atomic formula (essentially the "translation" of the predicate 'je pokvaren' to the metalanguage) is:

9. B1. For all names α, $\ulcorner\alpha$ je pokvaren$\urcorner$ is $\mathrm{true}_{S\text{-}C}$ iff $\mathrm{Ref}_{S\text{-}C}(\alpha)$ is rotten.

If a sentence of the form (10)

10. *s* is $\mathrm{true}_{S\text{-}C}$ if and only if *p*.

is such that it is derived from base axiom R1 and a single application of truth axiom B1, then this sentence meets Tarski's convention *T*. Sentence *p* is a translation of *s* which is obtained by insuring that complex *p* has the same semantic structure that the complex *s* has and that the corresponding semantic primitives of *p* are translations of those of *s*. Explicitly,

11. ‘Dečko je pokvaren’ is $\text{true}_{\text{S-C}}$ if and only if Dečko is rotten

satisfies Tarski’s convention *T*. And so, since ‘Dečko je pokvaren’ has the same semantic structure as ‘Dečko is rotten’ and the corresponding parts make identical meaning contributions to that of each respective complex, we can say that the latter translates the former and can claim the following as a meaning theorem:

12. (M) ‘Dečko je pokvaren’ means that Dečko is rotten.

How What We Have Done Might Fit in

Let us illustrate how our proposal might fit in with an interpretive truth theory with an example of such a theory for a generic formal language L of the sort we have developed the semantics for earlier. We will give the truth_{L} axiom for the sentence operator ‘N.’ Since we have given the semantics for “quantified into” sentences of the form $\ulcorner(\mathcal{Q}x)(\mathrm{N}(\psi(x))\urcorner$ in terms of the sentences of the form $\ulcorner\mathrm{N}(\psi(a))\urcorner$ and γ–variations of L, we need consider only sentences of the latter form when providing our truth_{L} axiom.

13. For a sentence *S* of the form $\ulcorner\psi(a)\urcorner$, $\ulcorner\mathrm{N(S)}\urcorner$ is true_{L} iff it is analytic that p.

Where we replace ‘p’ with a metalanguage translation of ‘S’, just as is to be expected in the interpretive truth theory. So far, so good, but what are we to make of ‘it is analytic that p’? We want (13) to be a interpretive axiom, so the string that lies to the right of the biconditional ‘iff’ must be *used*. But we also would like to be able to understand the sentence to the right of the biconditional using the tools we have developed regarding the notion of analyticity.

Our suggestion is to assert that a necessary and sufficient condition on the truth of an utterance of ‘it is analytic that p’ is that *A*(‘S’) where σ is in the extension of predicate *A* iff for each $\omega \in \Omega$, $\mathscr{I}_\omega(\sigma) = \mathscr{T}$, that is, under each admissible interpretation σ is true.

Problems for and Questions about the Approach We Have Tried to Clear the Path for

There are myriad questions and perhaps a few outright problems for the approach to modal semantics we have outlined. We are winding things to a close here, our path-clearing work having been finished. The following are issues of pressing importance but not issues that we have the capacity to develop in this work. Perhaps future research can be undertaken to address these concerns.

We have given a semantical (truth–conditional) analysis, not a “meaning–giving” analysis

First off, we may have immediate doubts as to the plausibility of (13): does ‘N’ (or ‘necessarily’ in something closer to English) really *mean* ‘it is analytic that’? On our proposed treatment, the truth conditions of ‘□S’ are the same as the truth conditions for ‘it is analytic that p’ (where for ‘p’ we substitute a metalanguage translation of the sentence of L named by ‘S’, given our treatment of analytic), but do not we have a word that translates more precisely ‘N’, namely ‘necessarily’ as used in English? In response to this, I can only say that if we have in fact provided a serviceable semantical, truth-conditional analysis of ‘necessarily,’ then we must be satisfied with this much. To try to provide a “meaning-giving” analysis of ‘necessarily’ which participated in the same sort of “extensional” flavor we have made use of throughout this document, would, I believe, be close to impossible, because the gap between *analysandum* (‘necessarily’) and *analysans* (that which ‘necessarily’ is analyzed into in a meaning-giving way) would be so narrow that any proposal would be unsatisfactory. To preserve the meaning of ‘necessarily’ in the *analysans* of would be to preserve the “intensional feel” of the term. To do that would be to give up on a kind of “extensionally” flavored approach. Doing so would be at odds with the spirit of understanding modal semantics in a conventionalist analytic-deflationary way.

Is ‘I am here now’ analytic in English? If so, is it necessarily the case that I am here now?

The theory we have sketched in this and the preceding chapters is not one which treats indexical terms such as ‘I,’ ‘here’ and ‘now’ or demonstrative terms such as ‘that.’ Luckily, the general semantical theory into which We are trying to fit our project is such that it provides a treatment of context sensitive languages, and so provides for meaning contributions to come from the speaker of a particular sentence, its place and time of utterance and that which the speaker of sentence demonstrates (if anything) when he utters the sentence. Given the fact that (1) for the interpretive truth theory (as compositional meaning theory) into which We are trying to fit the present work, the fundamental bearer of (sameness of) meaning is that of a sentence utterance, (2) that strictly speaking for every utterance there must be an utterer and (3) the utterer of any sentence is where he is when he utters the sentence he utters; it seems that it is a matter of meaning alone that the sentence ‘I am here now,’ is analytic in English. And if we restrict what an utterer may reasonably demonstrate during his utterance of a sentence (and appropriately restrict the size of the area which may be considered part of what the utterer means with an utterance of ‘here’), then the sentences, ‘That$_{\text{(as demonstrative)}}$ is here now,’ and ‘That$_{\text{(as demonstrative)}}$ is close now,’ are both analytic. Of course, it should be obvious that it is only a *contingent* matter of fact that the utterer is where he is when he says what he says, and that the physical objects of the speakers immediate environment are in that location only as a matter of *happenstance*. In these particular cases, there’s a gulf between that which is analytic and that which is necessary. So, an account of modality that treats utterances of sentences as the primary bears of meaning must offer some sort of explanation for this gulf. An explanation might begin with something like the following.[13]

There are contingent matters of fact about utterances of sentences which do not themselves seem to contribute anything to the semantic value of those utterances: one must be speaking when one utters something, if one utters a sentence, one must be speaking a language, one must utter a certain number of syllables, must utter a certain number of words, etc. As a matter of happenstance, it is the case that those contingent features of the bearers of meaning make true certain expressions of those bearers given that they are always expressed in a certain manner. We want our theory to analyze necessity in terms of intensions (as we have given an account for them) and meaning constitutive patterns of use, but we do not want to consider as necessary those statements whose truth in guaranteed simply by the (contingent) manner in which they are expressed. The sentences ‘I am here now,’ ‘I am speaking now,’ ‘That is here now,’ and ‘That is close now,’ seem to true as a (contingent) matter of how they are expressed. Indeed, it is part of the meaning constitutive pattern of use of the words ‘I,’ ‘now,’ ‘here,’ ‘close’ and (for some sense of the demonstrative) ‘that’ to indicate the speaker, relative positions in space and time which are near to the speaker when he speaks and objects which are demonstrated respectively, but only a contingent feature of those words an the concepts that they express that makes true the preceding sentences.

We might leave it at that and claim that only sentences that are not true simply by contingent matter of fact about how they are expressed are candidates for analyticity, but this leaves us with the unsatisfactory result that we have the modally loaded term ‘contingent’ used

[13] Kirk Ludwig observes that there is a difference between true-at-all-indices and true-in-virtue-of-semantic-content. We wish to employ the latter to analyze necessity, but there are concerns with indexical and demonstrative terms that I try to say a few preliminary words about in what follows.

to mark of those candidates for analyticity – and analyticity was to be that which analyzed the modal concept of necessity for us.

I will make another suggestion which is possible because the account of intension and meaning constitutive patterns of use is an extensional one. The proposal is first to "translate" (in a completely truth-conditional way (that is to offer a sentence whose truth conditions are identical which has now context sensitive elements such as 'I,' 'now,' 'here,' 'close' or 'that') those sentences which look to be made true in virtue of meaning because of contingent matters of fact about how they are expressed into sentences which are not made true in the same way, then to check to see if the "translations" are such that they are true as a matter of intensions or meaning constitutive patterns of use. For example, I might translate the sentence, 'I am here now,' as 'Jesse Butler is in the northeast corner of the third floor of Library West at 12:30 PM, March 24th, 2008.' Since our semantic account was to be extensional, if one sentence is true as a matter of meaning alone, then so should the other be, but this is clearly not the case. Sentences such as 'Everything that is scarlet is red,' or 'Aristotle is a person,' are still analytic in English if we follow this suggestion, because they do not contain any context sensitive elements to begin with.

Our account treats 'N' as a (generalized) property of sentences, rather than as a sentence operator *per se*

Finally, we understand 'N' as a property to sentences, as its capacity as sentence operator is understood exclusively on the basis of whether certain sentences which are prefixed by 'N' are true or untrue: even though sentences of the form $\ulcorner(\mathcal{Q}x)(N(\psi x))\urcorner$ are given semantics, and so *prima facie* it seems that 'N' is a sentence operator, such sentences are given semantic values by determining whether there are substitution instance of them of the appropriate sort. I am uncertain what the benefits and liabilities are for our approach given this result, although such a result sits well with a *sententialist* view in philosophy of language, like that put forward recently by James Higginbotham[14], according to which the complement clauses following 'that' refer to themselves.

Conclusion

Finally, we take a moment to reflect on the goals of this project, to what extent progress has been made toward those goals, and in what areas more effort should be put towards shoring up claims that have been made.

Our approach has been to develop a system of modal semantics that takes inspiration from those developed in *Meaning and Necessity*. We have tried to show that the challenges posed by circularity, the problem of *de re* modality and a uniform treatment of quantification can be met by the conventionalist analytic-deflationary approach. Of course, our arguments are not conclusive and could be strengthened. In particular, more depth could be taken in the treatment of concepts, their relations and the parallel structures of intensions and concepts. Also, our treatment of the topological/linguistic use restrictions we have placed on particular classes of singular terms according to which our account is to be able to endorse *de re* modal claims is only the basic outline of such restrictions. More tempting evidence for this thesis would be an actual demonstration of such restrictions for actual classes of singular terms of a natural language we wish to model. Finally, our brief outline of the use of model theoretic techniques in aid of a conventionalist modal semantics within the larger project of providing a compositional meaning theory is just a sketch. Ideally, we could be able to seamlessly integrate these two complimentary projects. In the future, I hope to engage in research on these and related topics.

[14] For all references to James Higginbotham see (Higginbotham, J., 2006).

APPENDIX A
OUR MODEL-THEORETIC REWORKING AND GENERALIZATION OF CHAPTER THREE AND SYSTEMS OF QUANTIFIED MODAL LOGIC

In this appendix, we provide a sketch along with a few details about how the class of admissible interpretations could be used to play a role functionally identical to that played by the class of possible world in a typical system of quantified modal logic. The plan is the following. First, outline, very briefly, the material used to give semantics for the system of modal logic of Fitting & Mendelsohn. Second, show how a class of interpretations, understood as in the Chapter Three, can take the place of possible worlds in this semantics (provided that we can make sense of an analogue of the notion of an accessibility relation between possible worlds[1]). Third, notice that on the view that a class of interpretations can take the place of a class of possible worlds, we seem committed to the existence of just a single (analogue of a) model structure with which to give semantics for intensional operators. This single model structure creates tension because validity is usually defined in terms of a *class* of model structures (and all the models of each of those model structures). Finally, take comfort in the conclusions of the research of Hawthorne and Hanson which shows that an understanding of validity in terms of a class of model structures rather than a single model structure (*the* class of possible worlds) is poorly motivated, and that the basic properties of completeness and compactness can be demonstrated for systems of quantified modal logic whose semantics are given in terms of single model structure rather than a class of model structures.

[1] Ironically, it seems that class-of-interpretations analogue of the accessibility relation that holds between pairs of worlds may be more intuitive. As we will see soon, one interpretation might be "accessible" relative to another if the way of speaking on the first is acceptable given the second.

Outline of the Traditional Formal Approach

A typical example of a traditional approach to semantics for quantified modal logic is that taken by Fitting & Mendelsohn. They outline a version of a traditional (Kripkean) approach in which the domain of the model is constant. I will present their semantics very briefly as a point of comparison for the system that we have developed based on Carnap's work. They consider a augmented frame with constant domains – essentially a class of possible worlds, an accessibility relation between those worlds, and a domain of discourse for the frame – represented symbolically as '$\langle \mathcal{G}, \mathcal{R}, \mathcal{D} \rangle$' where '$\mathcal{G}$', '$\mathcal{R}$' and '$\mathcal{D}$' represented the class of worlds, the accessibility relation and the domain respectively (p. 95). If $\omega_1, \omega_2 \in \mathcal{G}$, we say that ω_1 bears relation $\mathcal{R}$ to ω_2 ($\omega_1 \mathcal{R}\, \omega_2$) iff ω_2 is *accessible* from ω_1. The members of $\mathcal{D}$ are thought of as *residing in* possible worlds like ω_1, ω_2, etc. So naturally, an interpretation $\mathcal{I}$[2] is a map from (1) ordered pairs of predicate letters (like 'P') and worlds to sets of n-tuples the members of which are in $\mathcal{D}$, so example, $\mathcal{I}(P, \omega_1) = \{\langle d_1, d_2, d_3\rangle, \langle d_{109}, d_{233}, d_{12}\rangle\}$ where 'P' is a predicate letter, $\omega_1 \in \mathcal{G}$ and each of d_1, d_2, d_3, d_{109}, d_{233}, and d_{12} are in $\mathcal{D}$ and (2) singular terms and worlds to members of $\mathcal{D}$. One can think of the interpretation of a predicate term are giving the extension of the predicate at a particular world, and can think of the interpretation of a singular term as indicating which individual is picked out by that singular term (be it a constant term or the result of an iota operator). A constant domain model then $\mathcal{M}$ is the four-tuple $\langle \mathcal{G}, \mathcal{R}, \mathcal{D}, \mathcal{I} \rangle$. A varying domain model (which we might represent as $\langle \mathcal{G}, \mathcal{R}, \mathcal{D}', \mathcal{I} \rangle$) is similar except that the domain of the model '$\mathcal{D}'$' is the union of each of the domains of the each member of G. Formally, if we call the domain of the world ω (that over which the universal quantifier ranges) '$\mathcal{D}_\omega$', then the

[2] This notion of interpretation is different from, but similar to, the notion of interpretation we have developed in the first part of this paper.

varying domain $\mathcal{D}' = \{\cup\ \mathcal{D}_\omega \mid \omega \in \mathcal{G}\}$. Finally a valuation '$v$' is an assignment of free variables to values in the domain (either $\mathcal{D}$ or $\mathcal{D}'$), so we have:

1. If R is an n-place relation symbol, $\mathcal{M}, \omega \Vdash_v R(x_1,\ldots, x_n)$ iff $\langle v(x_1), v(x_2), \ldots , v(x_n)\rangle \in \mathcal{I}(R, \omega)$.
2. $\mathcal{M}, \omega \Vdash_v {\sim}X$ iff it is *not* the case that $\mathcal{M}, \omega \Vdash_v X$
3. $\mathcal{M}, \omega \Vdash_v X \mathbin{\&} Y$ iff $\mathcal{M}, \omega \Vdash_v X$ *and* $\mathcal{M}, \omega \Vdash_v Y$
4. $\mathcal{M}, \omega \Vdash_v \Box X$ iff for every $\omega' \in \mathcal{G}$, if $\omega\ \mathcal{R}\ \omega'$ then $\mathcal{M}, \omega' \Vdash_v X$
5. $\mathcal{M}, \omega \Vdash_v \Diamond X$ iff for some $\omega' \in \mathcal{G}$, $\omega\ \mathcal{R}\ \omega'$ and $\mathcal{M}, \omega' \Vdash_v X$
6. $\mathcal{M}, \omega \Vdash_v (\forall x)\Phi$ iff for every x-variant w of v in $\mathcal{M}$, $\mathcal{M}, \omega \Vdash_w \Phi$
7. $\mathcal{M}, \omega \Vdash_v (\exists x)\Phi$ iff for some x-variant w of v in $\mathcal{M}$, $\mathcal{M}, \omega \Vdash_w \Phi$
8. $\mathcal{M}, \omega \Vdash_v \langle\lambda.\Phi\rangle(t)$ iff $\mathcal{M}, \omega \Vdash_w \Phi$ where w is the x-variant of v such that $w(x) = (v\bigstar\mathcal{I})(t, \omega)$. (Where we associate with each term t a value in ω, denoted by '$(v\bigstar\mathcal{I})(t, \omega)$' in the following way. If x is a free variable, $(v\bigstar\mathcal{I})(x, \omega) = v(x)$. If c is an individual constant $(v\bigstar\mathcal{I})(c, \omega) = \mathcal{I}(c, \omega)$. If f in an n-place function symbol, then $(v\bigstar\mathcal{I})(t, \omega)(f(t_1, \ldots t_n), \omega) = \mathcal{I}(f, \omega)((v\bigstar\mathcal{I})(t_1, \omega),\ldots, (v\bigstar\mathcal{I})(t_n, \omega))$. If $\mathcal{M}, \omega \Vdash_{v'} \Psi x$ for *exactly one* x-variant v' of v, then $(\iota x)(\Psi x)$ designates at ω, with respect to v, and $(v\bigstar\mathcal{I})((\iota x)(\Psi x, \omega))) = v'(x)$.

How Our Model-Theoretic Reworking Can Support the Traditional Approach

Now for every $\omega \in \mathcal{G}$, let '$\mathscr{I}_\omega$' be our interpretation proxy for ω. The interpretation proxy is a map from expressions to elements of the (varying or constant) domain which imitates the traditional interpretation I. So first we stipulate that for any individual d in ω, such that for some individual constant expression γ, $\mathcal{I}(\gamma, \omega) = d$, then $\mathscr{I}_\omega(\gamma) = d$. Second, we need the notion of a relation $\mathcal{R}'$ that holds between interpretation proxies that imitates the relation $\mathcal{R}$ that holds between worlds. Specifically, let $\mathscr{I}_\omega\ \mathcal{R}'\ \mathscr{I}_{\omega'}$ iff $\omega\ \mathcal{R}\ \omega'$. Given all this we have (where the sequence 'v' is just as before):

1a. If R is an n-place relation symbol, $\mathscr{I}_\omega \Vdash_v R(x_1,\ldots, x_n)$ iff $\langle v(x_1), v(x_2), \ldots , v(x_n)\rangle \in \mathscr{I}_\omega(R)$.[3]

2a. $\mathscr{I}_\omega \Vdash_v \sim X$ iff it is *not* the case that $\mathscr{I}_\omega \Vdash_v X$

3a. $\mathscr{I}_\omega \Vdash_v X \,\&\, Y$ iff $\mathscr{I}_\omega \Vdash_v X$ *and* $\mathscr{I}_\omega \Vdash_v Y$

4a. $\mathscr{I}_\omega \Vdash_v NX$ iff for every $\omega' \in \mathcal{G}$, if $\mathscr{I}_\omega \mathcal{R}' \mathscr{I}_{\omega'}$ then $\mathscr{I}_{\omega'} \Vdash_v X$

5a. $\mathscr{I}_\omega \Vdash_v \sim N\sim X$ iff for some $\omega' \in \mathcal{G}$, $\mathscr{I}_\omega \mathcal{R}' \mathscr{I}_{\omega'}$ and $\mathscr{I}_{\omega'} \Vdash_v X$

6a. $\mathscr{I}_\omega \Vdash_v (\forall x)\Phi$ iff for every x-variant w of v, $\mathscr{I}_\omega \Vdash_w \Phi$

7a. $\mathscr{I}_\omega \Vdash_v (\exists x)\Phi$ iff for some x-variant w of v, $\mathscr{I}_\omega \Vdash_w \Phi$[4]

8a. $\mathscr{I}_\omega \Vdash_v \langle\lambda.\Phi\rangle(t)$ iff $\mathscr{I}_\omega \Vdash_w \Phi$ where w is the x-variant of v such that $w(x) = (v\bigstar\mathscr{I}_\omega)(t)$. (Where we associate with each term t a value in the range of $\mathscr{I}_\omega$, denoted by '$(v\bigstar\mathscr{I}_\omega)(t)$' in the following way. If x is a free variable, $(v\bigstar\mathscr{I}_\omega)(t) = v(x)$. If c is an individual constant $(v\bigstar\mathscr{I}_\omega)(c) = (\mathscr{I}_\omega)(c)$. If f in an n-place function symbol, then $(v\bigstar\mathscr{I}_\omega)(f(t_1, \ldots t_n)) = \mathscr{I}_\omega(f)((v\bigstar\mathscr{I}_\omega)(t_1),\ldots, (v\bigstar\mathscr{I}_\omega)(t_n))$[5]. If $\mathscr{I}_\omega \Vdash_{v'} \Psi x$ for *exactly one* x-variant v' of v, then $(\iota x)(\Psi x)$ designates on $\mathscr{I}_\omega$, with respect to v, and $(v\bigstar\mathscr{I}_\omega)((\iota x)(\Psi x))) = v'(x)$. (A simpler way might be to say $(v\bigstar\mathscr{I}_\omega)((\iota x)(\Psi x))) = (\mathscr{I}_\omega)((\iota x)(\Psi x)))$ if the interpretation $\mathscr{I}_\omega$ is defined over formulas formed with the iota-operator.

If the preceding is correct, then, on the face of things, the set of interpretations $\{\mathscr{I}_\omega\}_{\omega\in\mathcal{G}}$, the modal operator 'N' and the relation $\mathcal{R}'$ that holds between certain pairs of these relations can provide the usual semantics for the formal language with the intensional operators '$\Box$' and '$\diamond$'.

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[3] Specifically, If R is an n-place relation symbol, and $a_0, \ldots , a_{n-1}$ are individual constants, $\mathscr{I}_\omega \Vdash$ ('$R(a_0, \ldots , a_{n-1})$') iff $\langle\mathscr{I}_\omega(\text{'}a_0\text{'}), \mathscr{I}_\omega(\text{'}a_1\text{'}), \ldots , \mathscr{I}_\omega(\text{'}a_{n-1}\text{'})\rangle \in \mathscr{I}_\omega(\text{'R'})$.

[4] We might be able to give the semantics for 7a. by using a Matesian-style semantics in which no reference was made sequences but only to the truth of sentences which were the result of various individual constants substituted for variables in the formula Ψ. The Matesian-style 7a (call it '7a′') might go: $\mathscr{I}_\omega \Vdash (\exists x)\Psi$ iff for some interpretation $\mathscr{I}_{\omega'}$ which is exactly like $\mathscr{I}_\omega$ except possibly with regards to what it assigns to the individual constant γ, $\mathscr{I}_{\omega'} \Vdash \Psi x/\gamma$.

[5] We haven't developed interpretations to include functions like f in their domain, but this could be done easily and straightforwardly in set theoretic fashion similar to how interpretations were defined for n-place predicate terms.

The Approach of Hanson and Hawthorne in "Validity and Intensional Languages"

Pleasing technical results (such as completeness) have been provided for some intensional languages by using Kripkean possible world semantics. One difference in the traditional, Kripkean approach is that semantics for these intensional languages is given in terms of a class of model structures and all the models for each of these model structures. In the approach that Carnap begins and that we have developed (albeit in a somewhat different manner than has Carnap) in this paper, one interpretation proxy is to stand for a single model. (As we have just seen this does not change typical semantics for such languages at all.) But on this suggestion for the formal semantics of intensional languages, there is only a *single* class of interpretation proxies, and so semantically accounting for properties of sentences (like validity) cannot be exactly analogous to the traditional, Kripkean account. This situation may seem unsettling at first, especially because a completeness result for an intensional semantic system like those in *Meaning and Necessity* would allow us to pay less attention to an axiomatic (or "natural") treatment of the deduction procedure for such systems. If we cannot recycle Kripke's work on the semantics for quantified modal logic systems, then if wanted to make legitimate (in a technical sense) the systems we have developed from Carnap and take for granted the truth preserving character of the semantic symbols we have make use of (namely '$\Vdash$' and '$\Rightarrow$'), we would be forced to develop a formal treatment of a axiomatic deduction system for these systems and then find a proof of completeness for this system.

Fortunately, we do not have to break all this new ground because the technical results of Hanson and Hawthorne show that semantics can be provided for intensional languages in such a way that only a single model structure is used, that this semantics is intuitively just as appealing as was Kripke's original, and that similar formal results are available given this semantics and a usual axiomatic development of a deduction system for these intensional languages. In short, with a single model structure, they show that for any sentences σ and σ', $\sigma \mid\!- \sigma'$ (σ' is derivable from σ) iff $\sigma \models \sigma'$ (σ semantically entails σ'). We finally see that Carnap was correct in paying little attention to deduction method of his semantical systems in §1.

The Relationship between $\mathcal{R}$ and $\mathcal{R}'$

Very briefly, we conclude with a comment on $\mathcal{R}'$, the relation that held between any two interpretations $\mathscr{I}_{\omega 1}$ and $\mathscr{I}_{\omega 2}$ just in case that for the state-descriptions they represent respectively $\omega_1\ \mathcal{R}\ \omega_2$. In the development of our notion of intension ("A Set of Interpretations Can Provide Intension"), we stipulate that each interpretation of a particular class[6] is used to define intension as a map between expressions and individuals or sets. If the interpretations are to be proxies for state-descriptions (as we have argued they should be), then, since the interpretations essentially describe correct semantic use in actual and counterfactual situations, if We are to hold on the idea that intension is a (partial) model for how we use words to mean things, any interpretation must be "accessible" from any other. These interpretations taken together are to circumscribe our use; one's mastery of the language means that one has access to each of these interpretations. I believe we can take this observation as evidence that for any two members $\mathscr{I}_{\omega}$ and $\mathscr{I}_{\omega'}$ of the class of admissible interpretations $\mathscr{I}_{\omega}\ \mathcal{R}'\ \mathscr{I}_{\omega'}$. This implies that the class of state-descriptions or possible worlds that the interpretations serve as proxies for is such that the worlds are fully connected by the accessibility relation. This commitment may be support for or evidence against this account we have presented in this appendix and in Chapter Two and Chapter Three.

[6] We canvassed ways in which this class was to be restricted in a subsequent section by developing the idea of an "admissible" interpretation.

APPENDIX B
A PROPERLY SEMANTICAL DIFFICULTY FOR METAPHYSICAL REALIST REDUCTIVE ACCOUNTS THAT IS AVOIDED BY THE ANALYTIC-DEFLATIONARY METHOD

In spite of the difficulty of Chapter Five, we see that the approach We are trying to clear a path for has an obvious advantage over realist approaches to modal semantics. Another worry for approaches like Lewis' and Armstrong's has to do with whether these sort of "metaphysical" approaches to understanding modality are at bottom helpful in terms of modal *semantics*. One may have the hunch that meaning (or intension) and modality are closely related because for one to know the meaning of a term is to know in which circumstances it is appropriate to use the term; and knowing what circumstances are the appropriate ones for the term's use does not just involve whatever circumstances turn out to be to the actual ones. If I know the meaning of the predicate 'is a mountain,' then I know when to call a particular landmass a mountain in actual or counterfactual circumstances. In other words, in any possible world in which I were confronted with a mountain, if I were competent with the predicate 'is a mountain' I would call the particular mountain 'a mountain.' If we assume that objects (possible worlds) of a certain class serve as the truth-makers for our modal statements, then we must assume that we can unproblematically use our words to describe the constituents of those objects (worlds) and their arrangements, the predicates that hold of those constituents and the relations that hold among them.

Indeed, it seems that we must assume that the class of objects is not to be used to provide us any information about intensions; if it were, then it does not seem like we'd have the right sort of truth-makers in these objects. For example, on a Lewisian approach, we assess the claim 'It is possible that there is a mountain 15 miles tall,' by determining if there is a mountain of such height on any planet in a possible world accessible from the actual world. To do this we must know exactly what is to fall under the predicate 'is a mountain' in arbitrary possible worlds, else we cannot determine whether there is such a mountain on a planet in such a possible world. In short, possible worlds cannot tell us about semantics (specifically intensions) as well as modality *if* an account of modality is to be explanatorily *prior to* an effort to an explication of intensions.

One may hold that metaphysical concerns over modality should be considered primary and our talking about them secondary, but if one is in the business of holding (or trying to develop) a compositional theory of meaning, then holding this "primacy of metaphysics view" with respect to modality does seem to cause tension. For if meaning is to understood in terms of truth conditions spelled out by truth-makers in terms of possible worlds, then how are the worlds themselves supposed to indicate the compositional feature of language? There may be recourse to spelling out the intensions or meanings of terms needed to do a compositional semantics in terms of possible worlds, but then it seems We are back to either Shalkowski's first objection or (if we choose Armstrong's approach) a puzzle over what the connection between a primitive state of affairs like *Fa* and the semantics for our predicate term '*F*' and singular term '*a*'.

Either the semantics for the predicate term '*F*' mirrors the "modal" behavior of the *F* of the state of affairs or it does not. If it does not, our intuitions about our modal claims are mysterious, if it does, it seems We are stuck with Shalkowski's first objection again: the account cannot be reductive if We are to have proper epistemic access to modal facts. Why not just go with the dispositional / linguistic / analytic-deflationary approach? The preceding is only a rough sketch of the dialectic – and while it still needs development, but I think we can see that semantics and modality are closely related.

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