ABSTRACT

In this paper, I reconstruct Quine’s arguments against quantified modal logic, from the early 1940’s to the early 1960’s. Quine’s concerns were not technical. Quine was looking for a coherent interpretation of quantified-in English modal sentences. I argue that Quine’s main thesis is that the intended objectual interpretation of the quantifiers is incompatible with any semantic reading of the modal operators, for example as expressing analytic necessity, unless the entities in the domain of quantification are intensions, i.e. definitional entities. The difficulty is that it makes no sense to say of an ordinary object that it bears a property necessarily or contingently when the necessity or contingency in question is analytic. However, starting in 1960, Quine claims that quantified-in modal sentences can be coherently interpreted only as essentialist predications. When we say of an object that it necessarily F’s, we can only coherently mean that it essentially F’s. In the paper, I argue that adequately qualified the thesis is plausible. Two important qualifications are needed. The first is the assumption that satisfaction is an irreducibly predicative notion, making any explication of satisfaction in terms of truth inadequate. The second is the ontological rejection of purely semantic, i.e. merely definitional, entities. With these qualifications in place, Quine’s rejection of the combination of objectual quantifiers and semantic modalities can be upheld. In this way, we vindicate a qualified version of Quine’s conjecture that quantified modal logic is committed to essentialism.

1. Introduction

Quine’s stand against the interpretability of modal discourse is well known. Quine’s main target is quantified modal logic, specifically quantification across modal operators.

Sentences like “Something is possibly blue” or “Everything is necessarily self-identical”,

QUINE ON INTENSIONAL ENTITIES:
MODALITY AND QUANTIFICATION, TRUTH AND SATISFACTION

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which are symbolized with a quantifier binding a variable in the scope of a modal operator, as in “∃x◊Fx” and “∀x□(x=x)”, are claimed to be nonsensical.¹

In this paper, I reconstruct Quine’s arguments against modal logic, and argue that Quine’s main thesis is that the intended objectual interpretation of the quantifiers as ranging over entities, i.e. as “There is something such that” and “Everything is such that”, is incompatible with any semantic reading of the modal operators. Semantic readings are interpretations that make modal operators express at the object level corresponding metalinguistic predicates of sentences. The following are examples of semantic interpretations: Carnap’s interpretation of “Necessarily P” as “The sentence ‘P’ is analytically true”; Kaplan’s notion of logical necessity reading “Necessarily P” as “‘P’ is logically true”; but also Quine’s own favorite semantic ascent from “Necessarily P” to “‘P’ is proof-theoretically valid in system S”.² For Quine, the difficulty in interpreting this sort of sentence is that it makes no sense to say of an object that it bears a property necessarily or contingently when the necessity or contingency in question is semantic. Objects cannot suitably bear properties ‘semantically’.³ It is incoherent, not just false, to say of an object directly, i.e. independently of any characterization, that it is analytically, logically, provably, or a priori blue or self-identical. The underlying suggestion seems to be that while there are clear notions of logical, provable, or even analytic truth, there are no clear corresponding notions of logical, provable, or analytic satisfaction.

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¹ Concerning the interpretability of quantified modal logic, Barcan Marcus [7], Parsons [19] and [20], Kaplan [16], and Fine [13] and [14] argue that Quine is wrong. Burgess [8] and Neale [18] reverse the predominant trend and defend Quine.

² See Carnap [9], Kaplan [16], and Quine [29].

³ Unless they are semantic objects themselves, as will become clear in the course of the paper.
In what follows, I reconstruct Quine’s arguments for his famous thesis that quantification across a modal operator imposes an essentialist, as opposed to semantic, reading of the operator. When we say of an object that it necessarily $F$’s, we can only coherently mean that it essentially $F$’s. We will see how in its most general formulation this thesis can be, and has been,\(^4\) successfully rebutted. However, I will argue that adequately qualified the thesis is plausible. Two important qualifications are needed. The first is the assumption that satisfaction is an irreducibly predicative notion, making any explication of the same in terms of truth inadequate. The second is the ontological rejection of purely semantic (for example, merely definitional) entities. With these qualifications in place, we will see that Quine’s rejection of the combination of objectual quantifiers and semantic modalities can be upheld. In this way, we will vindicate (a qualified version of) Quine’s conjecture that quantified modal logic is committed to essentialism.

2. Substitutivity, Quantifying-in, and Modal Contexts

Starting in 1943, in “Notes on Existence and Necessity” [23], Quine charges that it is incoherent to quantify into contexts not open to substitution. Failure of substitutivity of co-referential expressions and incoherence of quantifying-in are the two marks of non-purely referential, opaque contexts.\(^5\) In particular, Quine claims that when the modalities are understood as strict logico-analytic, modal contexts are opaque.

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\(^4\) See [16], [13] and [14].

\(^5\) Quine’s terminology evolved from the 1943 “non-purely denotative” to “non referential” and “opaque” starting in 1953. The term “opacity” and its cognates are introduced in contrast to the Russellian term “transparency”, as it appears in Appendix C to [34], 2\(^{nd}\) ed., Vol. 1.
Quine also argues against existential generalization (EG) on non-purely designative occurrences of terms: “There is no such thing as Pegasus” is true, but “(∃x)(there is no such thing as x)” is false. The existence of non-existents does not follow from the non-existence of Pegasus. Similarly, EG fails in quotation contexts and when propositional attitudes are involved. For example, according to Quine, from “Philip is unaware that Tully denounced Catiline” it does not follow that “(∃x)(Philip is unaware that x denounced Catiline)”. This last sentence however is importantly different from “(∃x)(there is no such thing as x)”, which is false but perfectly meaningful. EG fails on empty names like “Pegasus”. Yet co-referential terms can still be substituted salva veritate in the context “There is no such thing as _”. Quine connects incoherence of quantification-in to failure of substitutivity of co-referential terms, because this failure is seen as indicative of a problem affecting the entire linguistic context in which the terms are set, not just the terms. EG holds on occurrences of terms that (i) have a reference, and (ii) occur in a purely referential context. It is the failure of the second requirement that results in semantic incoherence.

Concerning necessity, Quine writes:

Among the various possible senses of the vague adverb ‘necessarily’, we can single out one—the sense of analytic necessity—according to the following criterion: the result of applying ‘necessarily’ to a statement is true if, and only if, the original statement is analytic.\(^6\)

\(^6\) [23], p. 121.
According to the analytic interpretation of necessity, “9 is necessarily greater than 7” is true if and only if “‘9 is greater than 7’ is analytic”; but then, given the paradigmatic opacity of quotational contexts, it is only to be expected that contexts of necessity be opaque too.\(^7\) Hence, substitutivity and existential generalization fail in modal contexts, and quantification-in makes no sense. “Nine” and “the number of planets” may well refer to the same object, however they do not have the same meaning. This is why a statement containing one of these expressions may be analytic, while the other need not be. Consequently, from “9 is necessarily greater than 7” and “9 is the number of planets” it does not follow that “The number of planets is necessarily greater than 7” or that “(\(\exists x\))(x is necessarily greater than 7)”.

3. The Problem of Interpreting Modal Logic

At the time of “Notes on Existence and Necessity”, only propositional systems of modal logic had been developed, as in Lewis and Langford [17]. Quine’s considerations in 1943 must have sounded, and might have been meant, as a warning to any logician interested in combining modal propositional calculi and quantification. Quine was ringing an alarm: the device of quantification does not belong with the opacity of the modal operators. Nonetheless, soon enough quantified modal systems made their first appearance. Both

\(^7\) However, the mere equivalence of a sentence \(P\) in which an expression \(A\) occurs with some other sentence \(Q\) in which \(A\) occurs surrounded by quotes, is not sufficient to make \(A\)’s occurrence in \(P\) non-referential. After all, a sentence can always be rephrased meta-linguistically, as in Quine’s Giorgione example in [28], p. 141:

(i) Giorgione played chess,
which is equivalent to both
(ii) “Giorgione played chess” is true,
and
(iii) “Giorgione” named a chess player.
Barcan’s “A Functional Calculus of First Order Based on Strict Implication” [1] and Carnap’s “Modalities and Quantification” [9] were published in 1946. In these articles, the Lewis and Langford’s modal propositional systems are extended by the addition of axioms that connect quantification and modality. Moreover, Carnap supplements the syntactical development with semantic considerations and meta-logical results. Given these technical developments, what sense could still be made of Quine’s concerns?

Quine’s answer came promptly, in [24] “The Problem of Interpreting Modal Logic” (1947), [28] “Reference and Modality” (1953),8 and [29] “Three Grades of Modal Involvement” (1953). These three essays explicitly develop the interpretational problems to which Quine had previously made allusion.9

Quine starts his 1947 essay by saying

There are logicians, myself among them, to whom the ideas of modal logic (e.g. Lewis’s) are not intuitively clear until explained in non-modal terms. But so long as modal logic stops short of quantification theory, it is possible … to provide somewhat the type of explanation desired. When modal logic is extended (as by Miss Barcan) to include quantification theory, on the other hand, serious obstacles to interpretation are encountered—particularly if one cares to avoid a curiously idealistic ontology which repudiates material objects.10

8 [28] combines and extends [23] and [24].
9 Not only in [23] but already in [22].
10 [24], p. 43.
Quine claims to find modal terms unclear. The intended meaning of modal adverbs like “necessarily” and “possibly” evades him. A non-modal explanation is possible. Once again, the explanation is in terms of analyticity, defined in its turn in terms of logical truth and synonymy. The notion of synonymy is less clear than desired, yet

Even so, the notion [of analyticity] is clearer to many of us, and obscurer surely to none, than the notions of modal logic; so we are still well advised to explain the latter notions in terms of it. This can be done … so long as modal logic stops short of quantification theory.\textsuperscript{11}

So Quine’s 1947 problem of interpreting modal logic is the problem of interpreting modal logic under the analytic interpretations of the modalities once quantification is added. This is the formal version of Quine’s 1943 problem of making sense of quantification into opaque contexts.

Given the analytic interpretation, the result of prefixing the operator of necessity “□” to a statement “\( P \)” is true if and only if the statement “\( P \)” is analytically true.\textsuperscript{12}

However, so interpreted, modal operators are opaque, hence no sense can be made of statements with external quantifiers binding variables inside the operators’ scopes. In some cases, it is possible to equate a quantified-in modal statement to one with no quantification-in. For example, we can stipulate that “\( (\exists x)(x \text{ is round}) \)” is equivalent to “\( (\exists x)(x \text{ is round}) \)” with the quantification-in. This move is unobjectionable. However, it cannot be generalized.

\textsuperscript{11} [24], p. 45.
\textsuperscript{12} To accommodate the interpretation of iterated modalities, we must expand the original definition of analyticity to sentences predicating analyticity as in [9] and [10].
Quine points out that we cannot similarly move the modal operator out of “(∃x)(x is red and ◊(x is round))” since not all the bound occurrences of the variable “x” are originally in its scope. What sense can then be made of this last sentence? If we cannot lend it sense, how can we assign a truth-value to it?

We may understand Quine’s interpretive problem as follows. If the quantifier phrase in a sentence like “(∃x)◊(x is round)” cannot meaningfully bind the occurrence of “x” in the modal context, then it is semantically idle. The task is then to interpret the open sentence “◊(x is round)”. However, the embedded formula “x is round” cannot be true, a fortiori it cannot be analytically true. Open sentences can only be true under an assignment of values to their free variables. What we need is a criterion to assign a truth-value to an open modal sentence like “◊(x is round)” under an assignment of values to its free variables, namely a criterion to establish whether the corresponding non-modal sentence “x is round” under that same assignment is or is not analytically true. When is “◊(x is round)” true under an assignment to x? Obviously, we may answer this extensional question without addressing the interpretive concern. Quine’s concern however, as the title of his 1947 essay makes clear, is primarily interpretive.

To answer the extensional question, Quine considers the proposal that “an existential quantification holds if there is a constant whose substitution for the variable of quantification would render the matrix true.”¹³ Such a proposal effectively gives up the objectual interpretation of the quantifiers. The sentence “(∃x)◊(x is round)” is deemed true if there is a term “a” such that “◊(a is round)” is true, that is such that “a is round” is analytically true. We are thus reducing the truth conditions of an open sentence under

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¹³ [24], p. 46.
an assignment of values to the truth conditions of some corresponding closed sentence. Given that the notion of analyticity is defined for closed sentences, the reduction sanctions the extension of this notion to open sentences.

However, according to Quine, this proposal has queer ontological consequences. It leads us to hold that there are no concrete objects (men, planets, etc.), but rather that there are only, corresponding to each supposed concrete object, a multitude of distinguishable entities (perhaps “individual concepts,” in Church’s phrase). It leads us to hold, e.g., that there is no such ball of matter as the so-called planet Venus, but rather at least three distinct entities: Venus, Evening Star, and Morning Star.^^14

These undesirable ontological consequences arise because, in ordinary language at least, an object can be referred to by more than one expression, not all of them analytically equivalent. Hence, we end up attributing to one and the same object contrary properties, like being and not being necessarily $F$. This happens whenever only one of “$Fa$” and “$Fb$” is analytically true despite the co-referentiality of “$a$” and “$b$”. To avoid the contradiction, Quine suggests that “$a$” and “$b$” refer to different objects; but then at least one of them must refer to something other than its ordinary referent.

Quine’s example is the following. Let $C$ (congruence) be the relation that holds between Venus, the Morning Star, and the Evening Star, but not between any one of them

^^[24], p. 47.
and some other entity. Intuitively, \( C \) is meant to be the relation of identity. Then the following are true:

(1) Morning Star \( C \) Evening Star and \( □(\text{Morning Star} \ C \ \text{Morning Star}) \)

and

(2) Evening Star \( C \) Evening Star and \( ∼□(\text{Evening Star} \ C \ \text{Morning Star}) \).

By existential generalization we derive

(1E) \( (∃x)(x \ C \ \text{Evening Star} \ \text{and} \ □(x \ C \ \text{Morning Star})) \),

and

(2E) \( (∃x)(x \ C \ \text{Evening Star} \ \text{and} \ ∼□(x \ C \ \text{Morning Star})) \).

If (1E) and (2E) are both true, we must conclude that there are at least two different objects that stand in the relation \( C \) to the Evening Star, only one of which satisfies the predicate “\( □(x \ C \ \text{Morning Star}) \)”; but then \( C \) is not identity after all, since “Evening Star” and “Morning Star” cannot both refer to the planet Venus. The reasonable conclusion is that neither does. They refer instead to distinct individual concepts, and if constants in modal contexts do not have their ordinary referents, the variables inside
modal contexts range over individual concepts too. But then variables outside modal contexts must also range over concepts, witness cases like (1E) and (2E), where one and the same quantifier binds two occurrences of “x”, only one of them in a modal context. Quine’s conclusion is that the range of variables need just be the domain of concepts, given that “the ontology of a logic is nothing more than the range of admissible values of the variables of quantification.” It follows that quantified modal logic admits of the existence of conceptual entities alone, other entities being irrelevant to its formal interpretation.

If displeased by this purely idealistic ontology, we may include (material) objects too in the universe of discourse. To avoid the contradiction, we must then introduce two separate kinds of variables: (i) variables ranging over objects, which cannot appear free inside modal contexts, and (ii) variables ranging over individual concepts, which may appear free in modal contexts. Rules to connect the two domains of discourse must be provided.

To sum up, in 1947 Quine presents an impossibility result for quantified modal logic. He considers three desiderata for modal logic – indeed for any logic – and argues that modal logic cannot satisfy all three of them conjointly. They are

(a) The universal applicability of existential generalization;
(b) A natural domain of quantification, i.e., the range of the variables has to include (at least and perhaps ideally at most) objects, as opposed to individual concepts;

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15 [24], p. 48.
16 I set aside Carnap’s complex semantics where variables have a double range of both intensional and extensional values. In this I follow Quine who dismisses this complication as irrelevant to his main concern.
(c) No invidious distinctions among variables, i.e., any variable whatsoever may occur in any matrix whatsoever.

In [24] Quine concedes that an intensional interpretation of quantified modal logic is tenable if we are willing to give up either (b) or (c).\textsuperscript{17} But if the problem was interpretative to start with, the suggestion seems to be not only that in this way we can eliminate the contradiction, but also that we can make sense of the idea of an individual concept being necessarily, that is analytically, $F$. Notice however, that if (1) and (2) are true and “Morning Star” and “Evening Star” refer to two distinct individual concepts, the relation $C$ is not identity. $C$ is instead co-referentiality. The co-referentiality of two distinct concepts need not be an analytic matter (i.e., need not hold by definition), while the co-referentiality of a concept with itself holds analytically.

In [28], “Reference and Modality” (1953), Quine still claims that one way of reconciling quantification and modality consists in limiting the range of discourse to intensional entities like individual concepts.\textsuperscript{18} Interestingly, Quine suggests that this restriction solves the problem because an intensional entity can be referred to only in analytically equivalent ways. If this is the case, it cannot happen that one term verifies a modal matrix that another term for the same entity falsifies. Notice moreover that under the assumption that intensions can be referred to only in analytically equivalent ways, we can preserve the intended interpretation of “$C$” as identity and still retain $\text{EG}$. In this

\textsuperscript{17} See also Church [12].
\textsuperscript{18} Cf. also what Quine writes to Carnap: “I agree that such adherence to an intensional ontology, with extrusion of extensional entities altogether from the range of values of the variables, is indeed an effective way of reconciling quantification and modality.” (In the 1956 edition of [10], p. 197).
interpretation, (1E) is false, but so is (1). No value assigned to “x” verifies the open sentence “(x = Evening Star and □(x = Morning Star))”, but it is also the case that no singular term in place of “x” produces a true sentence. This 1953 solution is preferable to the 1947 suggestion insofar as it preserves the intended interpretation of “C”.

It may seem that Quine’s 1953 solution of the paradox consists in solving the problem of quantification-in by first solving the problem of substitution, which brings us back to the fact that Quine always took the incoherence of quantification-in and the failure of substitutivity as two aspects of one and the same problem. It looks as if finding a way for substitutivity to apply – even if just by the radical restriction to entities whose names are all analytically equivalent – will afford also a coherent interpretation for quantification-in. In Section 7, I challenge this natural conjecture. But to do so, I must first introduce an alternative solution to Quine’s paradox.

5. Replies to Quine’s 1947 Problem

Surprisingly, it was Alonzo Church, the famous intensional logician, who first suggested (though he did not embrace it) an alternative ‘non-intensional’ solution to Quine’s interpretational problem. He did so by means of Russell’s theory of descriptions:

It is objected that sentences ‘◊(the number of planets < 7)’ and ‘◊(9<7)’ would be judged to have opposite truth values, whereas the terms ‘the number of planets’ and ‘9’ denote the same number, and the two sentences should therefore be interdeducible by substituting one term for the other.

On the basis of *Principia* or of Quine’s own *Mathematical Logic* …,
however, the reply to this is immediate. The translation into symbolic
notation of the phrase ‘the number of planets’ would render it either as a
description or as a class abstract, and in either case it would be construed
contextually; any formal deduction must refer to the unabbreviated forms
of the sentences in question, and the unabbreviated form of the first
sentence is found actually to contain no name of the number 9.\(^{19}\)

One question looms large: Why did Quine never consider Church’s Russellian
solution? This is particularly puzzling, given Quine’s endorsement of Russell’s theory of
descriptions and his unwavering rejection of conceptual, intensional entities. The answer
to this question turns out to be instructive.

Smullyan is the first to embrace a Russellian solution, in [36] (“Review of ‘The
Problem of Interpreting Modal Logic’” (1947)) and [37] (“Modality and Description”
(1948)). One year later, Fitch endorses and develops Smullyan’s neo-Russellian position
in [15] (“The Problem of the Morning Star and the Evening Star” (1949)).

According to Smullyan and Fitch, the paradox is generated by the lack of a clear
distinction in the category of singular terms. Once the distinction between proper names
and definite descriptions is attended to, no paradox remains, provided that names and
descriptions are properly analyzed in a Russellian way.

Without examining the details of Smullyan’s and Fitch’s replies, we can illustrate
the core idea of their solution. Terms like “Morning Star” and “Evening Star” can be
regarded either as definite descriptions or as proper names. If they are descriptions, then

\(^{19}\) Church [11], p. 101.
they are contextually ‘analyzed away’ from the sentences in which they occur in the well-known Russellian way. Given the presence of a modal operator, the descriptions can take either a narrow or a wide scope. In both cases however, once the descriptions are analyzed away, the resulting sentences will contain no singular terms, hence questions of substitutivity and of existential generalization will not even arise.

On the other hand, if “Morning Star” and “Evening Star” are proper names, then

\[(1^*) \text{Morning Star} = \text{Evening Star} \land \Box(\text{Morning Star} = \text{Morning Star})\]

is true, but

\[(2^*) \text{Evening Star} = \text{Evening Star} \land \neg \Box(\text{Evening Star} = \text{Morning Star})\]

is false, contrary to Quine’s assessment. According to the neo-Russellians, genuine co-referential proper names must be synonymous. Thus, if “Evening Star” and “Morning Star” are genuine names, the sentence “(Evening Star = Morning Star)” is indeed analytically true and “\(\neg \Box(\text{Evening Star} = \text{Morning Star})\)” is false.

If the neo-Russellians are right that co-referential genuine names are synonymous, then problems of substitutivity into modal contexts analytically understood seem to be solved in exactly the same way as in Quine’s 1953 proposal of quantifying only over entities that have only analytically equivalent names. The Russellian solution in fact extends to all entities the alleged semantic privilege of concepts. As a consequence, we can assign truth conditions to quantified-in modal matrices, without ever attributing
contrary properties to one and the same object. We can reduce the case of an object being analytically $F$ to the case of a closed sentence “$Fa$” – with “$a$” any one of the object’s genuine names – being analytically true. The Russellians too seem to hold that when no problems of substitutivity arise existential generalization is unobjectionable. Surprisingly enough, at the heart of the opposite intensional and Russellian solutions we find exactly the same core insight; but then why does Quine endorse the intensional instead of the Russellian solution?

6. The Shortcomings of the Russellian Solution

There are three problems with the Russellian solution to Quine’s paradox. The first, and most obvious, is that proper names in natural language do not function in the Russellian way and perhaps no singular term at all does. I take Quine to have made at least the first of these two points in his 1961 “Reply to Professor Marcus”:

We may tag the planet Venus, some fine evening with the proper name ‘Hesperus’. We may tag the same planet again, some day before sunrise, with the proper name ‘Phosphorus’. When at last we discover that we have tagged the same planet twice, our discovery is empirical. And not because the proper names were descriptions.\textsuperscript{20}

Clearly, if names of the same object were synonymous, the discovery would not be empirical. To this however the Russellians can reply that indeed most proper names are

\textsuperscript{20}[31], p. 327.
not genuine, and must be considered disguised descriptions to which the first horn of their solution applies.

The second problem of the Russellians however concerns descriptions, and in particular descriptions with wide scope, as in the following Russellian representation of (1):

\[(1RW) \exists x \exists y \forall z ((Mz \leftrightarrow z = x) \& (Ex \leftrightarrow z = y) \& (xCy) \& \Box(xCz))\]

In (1RW) we quantify across a modal operator. So, to make sense of (1RW), we must first make sense of quantifying in:

[W]hat answer is there to Smullyan? Notice to begin with that if we are to bring out Russell’s distinction of scopes we must make two contrasting applications of Russell’s contextual definition of description. But, when the description is in a non-substitutive position, one of the two contrasting applications of the contextual definition is going to require quantifying into a non-substitutive position. So the appeal to scopes of descriptions does not justify such quantification, it just begs the question.\(^{21}\)

We see then that according to Quine, the Russellian analysis of descriptions eliminates \textit{at most} problems of substitution, not of quantifying in.\(^{22}\) Even problems of substitution are

\(^{21}\) Quine [34], p. 338.
\(^{22}\) According to Burgess [8] this is the main point of Quine’s reply to the Russellians. Instead, I will argue that a more worrisome problem affects the Russellian solution.
solved only under the controversial assumptions that proper names are either disguised descriptions or synonymous whenever co-referential. The question now becomes: Why does Quine not think the same of the intensional solution? After all, the fact that concepts have only synonymous proper names seems also to beg the question, given that the problem of quantifying into a non-substitutive position remains to be dealt with in sentences like

\[(1*E) \exists x(x = \text{Evening Star} \land \Box(x = \text{Morning Star}))\],

and

\[(2*E) \exists x(x = \text{Evening Star} \land \neg\Box(x = \text{Morning Star}))\].

To answer this question, recall Quine’s 1947 proposal designed to eliminate problems of quantification-in: An existential quantification holds if there is a constant whose substitution for the variable of quantification renders the matrix true. Following this proposal, Russellian proper names can be used to assign truth-values to quantified-in modal matrices, with no risk of contradiction. But then Russellian logicians ought to be as well placed as the intensionalists in solving problems of quantification.

For the sake of argument, let us grant the Russelians the kind of names they need. In the following Section, I argue that even with synonymous proper names at their disposal the Russelians cannot solve Quine’s interpretive problem of making sense of

\[23\] [24], p. 46.
quantification into modal operators analytically understood. In my mind, this is the third and deepest problem of the Russellian solution to Quine’s paradox. It is a problem that does not affect the intensional solution when we similarly grant the synonymy of coreferring terms. If I am right about this, we can make sense of Quine’s perplexing intensional stand.

7. Semantic Necessity and Objectual Quantifiers

My proposal is as follows. The restriction of the domain of quantification to entities with only synonymous names solves Quine’s paradox only if the entities in the domain are intensional. To understand why this is the case, we must be clear on the nature of Quine’s 1947 suggestion that we can make sense of quantified-in modal matrices by appeal to the analyticity of corresponding closed sentences. In my interpretation, Quine’s concern is not simply to provide truth conditions for quantified-in modal sentences, but to lend sense to them. In addition, I submit that Quine did not take his own criterion as sufficient in and of itself to make sense of analytic predication. Why so?

Recall that Quine’s challenge is to make sense of quantification ordinarily understood into a modal operator of analytic necessity. But then Quine’s criterion cannot be a proposal on how to interpret the quantifiers. As an interpretation, the criterion would provide a substitutional reading of the quantifiers, not Quine’s preferred objectual interpretation.

Armed with Russellian proper names for ordinary objects, we may apply Quine’s criterion and provide truth conditions for sentences like
(3) \((\exists x)\Box(x \text{ is round}).\)

(3) is true just in case there is a constant “a” such that “a is round” is an analytic truth. This however is not enough to make sense of the idea that the object a is, in and of itself, analytically round. Satisfying Quine’s 1947 criterion and avoiding contradictory predications is neither necessary nor sufficient to interpret sentences like (3). It is surely not sufficient since it does not provide the quantifiers with their intended objectual interpretation; but it is also not necessary given that constants are not essential to the question under consideration, which is how to make sense of quantification into opaque contexts. This question remains open whether or not we have constants in the language.

In other words, even if failure of substitutivity and incoherence of quantifying-in are the two characteristic marks of opacity, we may still be in the position to solve only one of the problems. Failure of substitutivity depends also on singular terms, not just on the opacity of modal contexts. In a language with only analytically equivalent co-referential names, or with only one canonical name per object, or in the extreme case with no names at all, problems of substitution do not arise. However, the meaningfulness of quantification into opaque contexts is not thereby achieved.

In 1947 and 1953, Quine’s main concern is the coherence of quantification into modal contexts, not substitutivity:

But the important point to observe is that granted an understanding of the modalities … and given an understanding of quantification ordinarily so
called, we do not come out automatically with any *meaning* for quantified modal sentences …

Referential opacity remains to be reckoned with even when descriptions and other singular terms are eliminated altogether.

My answer is that this kind of consideration is not relevant to the problem of essentialism because one doesn’t ever need descriptions or proper names. If you have notations consisting of simply propositional functions (that is to say predicates) and quantifiable variables and truth functions, the whole problem remains. The distinction between proper names and descriptions is a red herring. So are the tags.

Let us focus then on the sheer problem of quantification. In my view, the interpretative advantage of quantifying over intensions consists in the fact that with this restriction in place we can (i) read the quantifiers objectually (they range over intensions, but an objectual reading of the quantifiers does not imply that the entities in the domain of quantification be objects), and at the same time (ii) interpret the modal operators analytically. This is because talk of intensions is primarily talk of meanings and of their analytic connections. I conjecture that, despite appearances, Quine’s hypothesis that

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24 [28], p. 150, emphasis added.
26 Quine [32], p. 142.
intensions have only analytically equivalent names is chiefly ontological rather than semantic. It concerns the nature of intensions:

The requirement that any two names of \( x \) be synonymous might be seen as a restriction not on the admissible objects \( x \), but on the admissible vocabulary of singular terms. So much the worse, then, for this way of phrasing the requirement; we have here simply one more manifestation of the superficiality of treating ontological questions from the vantage point of singular terms. The real insight, in danger now of being obscured, was rather this: necessity does not properly apply to the fulfillment of conditions by objects (such as the ball of rock which is Venus, or the number which numbers the planets), apart of special ways of specifying them.\(^{27}\)

The crucial point is that according to the intensional interpretation, the special ways of specifying regular objects like Venus are themselves entities, namely individual concepts. These special entities – as opposed to stubborn matter-composed objects that can be referred to in non-analytically equivalent ways – are essentially definitional entities.\(^{28}\) If so, what looks like the attribution of a modal property to a regular object under a way of specification is really the direct attribution of the modal property to the way of specification itself, i.e. it is the attribution of an analytic property to the intension

\(^{27}\) [28], p. 151.
\(^{28}\) Cf. [30], p. 197.
itself.\textsuperscript{29} An intension is necessarily $F$ if it is $F$ by definition. So, to say of an intension that it itself, independently of any specification, is analytically $F$ makes sense because of the definitional nature of intensions.

In contrast, even under the Russellian hypothesis that standard objects have only analytically equivalent names, it still makes no sense to say of one of them that it is analytically or by definition so-and-so. At most, we can reduce such talk to talk of closed sentences being analytically true. The Russellian proposal does not hypostatize the ways of specifying objects, hence it must reduce talk of objects being analytically $F$ to talk of sentences being analytically true. Hence, it makes no sense of quantification \textit{ordinarily understood} into modal contexts analytically interpreted, because it makes no direct sense of the notion of \textit{analytic predication}. On the contrary, intensions literally can be said to be as they are by definition, thereby lending sense to ordinary quantification into analytic contexts, even if at an admittedly dear ontological price. If this is the case, we understand why Quine paradoxically allied with the intensionalists. Even under the hypothesis that proper names of the same object are analytically equivalent, the Russellites do not achieve the reconciliation of quantification and the modalities that Quine was looking for, as long as their objects are ordinary objects and not definitional entities.

\textit{8. The Paradox Regained}

Starting in 1960 however, Quine rejects the intensional interpretation of modal logic. He does not concede anymore that it is a way of reconciling the modalities and quantification. Intensions – if there are any – are not different from all other entities. As

\textsuperscript{29} I am here glossing over the crucial distinction between bearing an analytic property and satisfying a property analytically.
long as there is at least one contingent truth, we may form two non-analytically equivalent names of one and the same intension:

Actually, even granted these dubious entities, we can quickly see that the expedient of limiting the values of variables to them is after all a mistaken one. It does not relieve the original difficulty of quantifying into modal contexts; on the contrary, examples quite as disturbing as the old ones can be adduced within the realm of intensional objects. For, where A is any intensional object, say an attribute, and ‘p’ stands for an arbitrary true sentence, clearly

\[
(35) \quad A = ([\text{the}]x)[p \land (x=A)].
\]

Yet, if the true sentence represented by ‘p’ is not analytic, then neither is (35), and its sides are no more interchangeable in modal contexts than are ‘Evening Star’ and ‘Morning Star’, or ‘9’ and ‘the number of planets’.

Or, to state the point without recourse to singular terms, it is that the requirement … “any two conditions uniquely determining \( x \) are analytically equivalent” … is not assured merely by taking \( x \) as an intensional object. For, think of ‘\( Fx \)’ as any condition uniquely determining \( x \), and think of ‘p’ as any non-analytic truth. Then ‘\( p \land Fx \)’ uniquely determines \( x \) but is not analytically equivalent to ‘\( Fx \)’, even though \( x \) be an intensional object.\(^{30}\)

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\(^{30}\) Quine [28], pp. 152-3 of the 1961 revised version.
Quine’s point can be made more intuitively. An intension can be specified by a contingent trait, e.g., as “Frege’s favorite intension” or as “the intension most often mentioned by Quine”. Assume that the attribute of numbering the planets satisfies the latter property. It is then true that this attribute is the intension most often mentioned by Quine. Nonetheless, Quine might have chosen different examples in his writings, so this particular attribute need not be the one he mentions most. If intensions can be specified by means of contingent features – and if they have contingent features, why not? – then they can be specified in non-analytically equivalent ways. We are back to the 1947 paradox. For, assume The-Evening-Star-Intension\(^{31}\) to be Frege’s favorite intension, it is then true both that

\[
\text{(4) The-Evening-Star-Intension} \sqsubset \text{Frege’s favorite intension and } \Box(\text{The-Evening-Star-Intension} \sqsubset \text{The-Evening-Star-Intension}),
\]

and that

\[
\text{(5) Frege’s favorite intension} \sqsubset \text{Frege’s favorite intension and } \neg \Box(\text{Frege’s favorite intension} \sqsubset \text{The-Evening-Star-Intension}).
\]

By existential generalization, we obtain (4E) and (5E), respectively

\[
\text{(4E)} \ (\exists x)[(x \sqsubset \text{Frege’s favorite intension}) \text{ and } \Box(x \sqsubset \text{The-Evening-Star-Intension})]
\]

\[
\text{(5E)} \ (\exists x)[(x \neg \sqsubset \text{Frege’s favorite intension}) \text{ and } \neg \Box(x \sqsubset \text{The-Evening-Star-Intension})]
\]

\[^{31}\text{“The-Evening-Star-Intension” can be taken as an abbreviation of “The intension expressed by the description ‘The Morning Star’ ”.}\]
Intension])];

(5E) (∃x)((x C Frege’s favorite intension) and ~□(x C The-Evening-Star-Intension)].

If we adopt Quine’s 1947 criterion that an existential quantification holds if there is a constant whose substitution for the variable of quantification renders the matrix true, then the truth of (4E) and (5E) follows from the truth of (4) and (5), respectively. However, if C is identity and the quantifiers are interpreted objectually, (4E) and (5E) cannot both be true, given that they attribute contrary properties to one and the same object.

9. The Hierarchy of Intensions

Naturally, there are ways of solving the paradox, but they are all inadequate in Quine’s eyes. First, we may adopt a substitutional reading of the quantifiers, thus taking, against his own intentions, Quine’s 1947 criterion as an interpretation of the quantifiers. Alternatively, we may follow Quine’s 1947 strategy and reinterpret “C” as co-denotation, thereby letting the quantifiers in (4E) and (5E) range over second-order intensions. With a vast array of intensional entities – intensions of object, intensions of intensions of objects, and so on – at our disposal, we may combine the objectual interpretation of the quantifiers with the analytic interpretation of the modal operators. However, once again this is done at the price of the intended interpretation, this time of “C”, which cannot be
read as identity. Why does Quine not extend in this way his 1947 proposal to cover these new cases?

It is clear that in 1961 Quine would regard the proposed reinterpretation of (4E) and (5E) as involving a confusion of use and mention. When we reinterpret “C” as co-denotation, we have to reinterpret the expressions that flank it too. “The-Evening-Star-Intension” and “Frege’s favorite intension” are not anymore taken at first sight as describing one and the same first-order intension, but rather as referring to their own meanings. Under such a reinterpretation, the descriptions in question (or the meanings they express) are mentioned rather than used, and C is not the object-level relation of identity, rather the meta-level relation of co-denotation.  

10. Two Interpretive Puzzles

At this point however we are left with two puzzles. First, Quine does not extend the 1947 solution to higher-order intensions. Why not? One may conjecture that Quine somehow did not notice the hierarchical way out of the problem. This conjecture however seems not to do Quine justice, and is in my eyes to be rejected if possible. Alternatively, we may suppose that Quine realized only in 1961 that the 1947 solution required a reinterpretation of C. This is however hard to believe, given that Quine’s 1947 paper is already focused on the intended interpretation of modal logic. It seems then that in 1947 Quine had already conceded to the intensionalist solution a reinterpretation both of “C” and of the terms flanking it. It may be supposed that in 1947 Quine’s focus was on the

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32 On the connection between reinterpretation of the identity sign and confusion of use and mention, see Quine [31], pp. 323-7.
33 This is Kit Fine’s hypothesis in [13] and [14].
most perplexing consequence of this meta-linguistic re-interpretation of modal sentences, namely, that we quantify over intensions rather than ordinary objects. Quine’s point in 1947 seems to be the following. Let us give the modal logicians the re-interpretations they need, and see what follows from that. If what follows is paradoxical enough, we do not need to further argue against the reinterpretation of C. The fact that modal logicians endorse an exclusive idealistic ontology is certainly more puzzling than their reinterpretation of C. On the other hand, once they have already abandoned concrete reality, climbing up the stairs of intensions seems almost inevitable.

But this makes only more puzzling the fact that Quine did not point out the possibility of solving in this way the higher-order paradox. Once an intensional interpretation of modal logic is already endorsed as viable, there is no reason to stop short of higher-order intensions. The critical step is the one from objects to individual concepts, not from first-order to second-order concepts.

The second puzzle is that Quine does not uphold the 1953 intensional interpretation in the face of the problem of non-synonymous names for intensions. Quine’s 1953 proposal lets C be identity as long as intensions are assumed to be specifiable only in analytically equivalent ways. This solution of course is exactly what seems to be ruled out by the realization that intensions can be specified in non-synonymous ways. But is it? We have seen that Quine was critically aware of the distinction between problems of substitution and of quantification. He used such a distinction against the Russellians, who can interchange names but can make no sense of objects bearing properties analytically. Why not use it in defense of the intensionalists? After all, the fact that intensions have names that cannot be substituted salva veritate in
modal contexts does not seem to change the fact that it makes sense to say of an intension in and of itself that it bears a property analytically, that is in virtue of its own definition.

11. The Stubbornness of Intensions

Once again, these puzzles are solved if we take seriously Quine’s remark that it is superficial to treat “ontological questions from the vantage point of singular terms”. The fact that intensions can be referred to in non-synonymous ways may appear to be an insight about singular terms or more generally about semantic ways of specifying intensions, be they name-like or predicative. But why should the ‘discovery’ that intensions can be named in non-synonymous ways carry any weight concerning the problem of interpreting quantified-in modal sentences? We have already seen how Quine took the question of names and descriptions as marginal to his main interpretive concern. So, setting names and semantic specifications aside, what is the real interpretive problem? In what follows, I argue that Quine’s recognition that intensions have non-analytically equivalent specifications encapsulates a fundamental ontological insight on the nature of intensions.

Recall Quine’s rejection of the Russelian solution. We have seen how in that case the exclusion of non-synonymous co-referential names eliminates the contradictions, and yet is not sufficient to make sense of the idea that regular objects bear properties analytically. In other words, from the fact that the sentence “a is F” is analytically true, it does not follow that the object a satisfies “F” analytically. Non-definitional objects do not bear properties analytically. That is why solving the problem of substitutivity is not sufficient to solve problems of quantification. But similarly it is also the case that solving
problems of quantification does not guarantee a solution to substitutivity problems. So, the fact that intensional objects may be specified in non-analytically equivalent ways should not preclude the possibility that it makes sense to say of an intensional object that it is analytically $F$.

Let us reconsider Quine’s claim that

... the requirement … “any two conditions uniquely determining $x$ are analytically equivalent” … is not assured merely by taking $x$ as an intensional object. For, think of ‘$Fx$’ as any condition uniquely determining $x$, and think of ‘$p$’ as any non-analytic truth. Then ‘$p \land Fx$’ uniquely determines $x$ but is not analytically equivalent to ‘$Fx$’, even though $x$ be an intensional object.$^{34}$

This claim can be interpreted in two ways. In a weak interpretation, Quine is indicating only that singular terms are not required to generate the semantic problem of non-analytically equivalent linguistic specifications of intensions. Such specifications may be predicative and will lead to non-analytically equivalent predications of $x$. This is certainly correct. But can it be all that Quine meant? Suppose that the Evening-Star-Intension as a matter of fact satisfies the predicate “is Frege’s favorite intension”. Why should this cast any doubt on the possibility that this same intension analytically satisfies the predicate “is identical to the Evening-Star-Intension”?

$^{34}$ Quine [28], p. 153 of the 1961 revised version.
My conjecture is that Quine really took the problem to be *ontological*. According to this strong interpretation, the problem lies not in the possibility of non-analytically equivalent semantic specifications of one and the same intension, but rather in the availability of non-analytically equivalent, so to speak, ontological specifications. It is the recognition that intensions bear *only some* properties necessarily, and some other properties contingently, that induces Quine to question the availability of the analytic interpretation of the modal operators.

My conjecture is that in Quine’s eyes the fact that intensions bear some properties necessarily and some contingently disqualifies them from being merely definitional entities. The consequence is that the notion of analytic predication does not make sense even for them. Like the ordinary objects of the Russellians, intensions do not bear properties analytically.

Against this strong reading of Quine’s 1961 claims, it may be pointed out that the fact that intensions bear contingent properties does not rule out the possibility that the properties they bear of necessity be borne by definition. For the strong interpretation to be correct, Quine must think that if an entity bears properties by analytic necessity (by definition), then it bears only those properties. Indeed, I take Quine to be assuming as much. This assumption may well be false, nonetheless there is textual evidence to attribute it to Quine.

When Quine characterizes essentialism, which he takes to be the alternative (nature-oriented rather than language-oriented) interpretation of necessity, he claims that if an object bears properties essentially (to be contrasted with analytically) then it may bear more than just its essential properties. In other words, Quine’s characterization of
essentialism is extensional. Essentialism is the theory that some properties of an object are borne only contingently, while others of necessity:

More formally, what Aristotelian essentialism says is that you can have open sentences—which I shall represent here as ‘Fx’ and ‘Gx’—such that

(54) \((\exists x)(\text{nec } Fx \& Gx \& \sim \text{nec } Gx)\).^{35}

Also,

But in the connection with the modalities [quantifying in] yields something baffling—more so even than the modalities themselves; viz. talk of a difference between necessary and contingent attributes of an object. …

Curiously, a philosophical tradition does exist for just such a distinction between necessary and contingent attributes. It lives on in the terms ‘essence’ and ‘accident’, ‘internal relation’ and ‘external relation’. It is the distinction that one attributes to Aristotle …^{36}

Once again the fact that Quine may be wrong about this, that is that essentialism may instead be compatible with the possibility that all properties be borne essentially, is irrelevant to our intepretational project. Right or wrong, this is the way in which Quine distinguishes analytic from essentialist interpretations of modal logic.

^{35} [29], p. 156
^{36} [30], p. 199.
In fact, Quine claims that “if we narrow the universe of objects available as values of variables of quantification so as to exclude such stubborn objects, there ceases to be any such objection to quantifying into modal position.” Quine calls “robust” those entities that bear some properties necessarily and others contingently. The idea then is that restricting the ontology to non-stubborn objects, i.e. allegedly intensions, solves the problems of modal logic. However, Quine points out that if the entities are non-robust, then they can be specified only in necessarily equivalent ways. This leads to the annihilation of modal distinctions. What is important here is the ordering of reasoning: From the non-robust nature of the entities to the lack of non-necessarily equivalent specifications.

In my view, Quine’s famous extensional characterization of essentialism has ontological underpinnings. I conjecture that, according to Quine, it is the ontological robustness of an entity, the fact that it (allegedly) bears necessary properties from its own nature, that guarantees that not all of its properties be so borne. Real entities engage in factual matters. On the contrary, intensions are meant to be ontologically feeble entities, shadows of definitions and stipulations. As such they bear only the properties that define them.

In 1960 and 1961, Quine definitely rejects these feeble entities, and not just in the sense in which he always disliked them as “creatures of darkness”. The fact that intensions cannot escape contingent specifications is the result of their inevitable intercourse with the real factual world. The inevitability of such an interaction definitely disproves the intensional hypothesis of a separate realm of shadowy, merely definitional

37 [30], p. 197.
38 See [30], pp. 197-8
entities. Quine therefore concludes that the appeal to intensions does not provide a feasible way out of the problem of interpreting quantified modal logic, because it does not provide a reconciliation of the objectual reading of the quantifiers and the analytic interpretation of necessity.

If this is the case, one of the two features must be abandoned. We may either read the quantifiers substitutionally, bringing them in line with the analytic, meta-linguistic interpretation of the modal operators, or interpret the modal operators in an essentialist way, bringing them in line with the intended objectual interpretation of the quantifiers. In the first case, we lose the intended interpretation of the quantifiers; in the second, we lose the analytic interpretation of the modal operators, and end up embracing Aristotelian essentialism. On this point, Quine’s reply to Marcus is especially relevant:

I grant further that essentialism does not come in if we interpret quantification in your new way. By quantification I mean, quantification in the ordinary sense … If on the other hand we do not have quantification in the ordinary sense then I have nothing to suggest at this point about the ontological implications or difficulties of modal logic. The question of ontology wouldn’t arise if there were no quantification of the ordinary sort. Furthermore, essentialism certainly wouldn’t be to the point, for the essentialism I am talking about is essentialism in the sense that talks about objects; that an object has certain of these attributes essentially, certain others only accidentally. And no such question of essentialism arises if we
are only talking of the terms and not of the objects that they allegedly refer to.\footnote{39}{39 [32], pp. 134-5. Quine’s reference is to [6] where Marcus proposes a substitutional interpretation of the quantifiers.}

According to my interpretation, it is not just the sheer realization that some predications of intensions are accidental that forces a rejection of the intensional solution. Despite Quine’s suggestion to the contrary, it seems indeed possible for definitional entities to bear some properties accidentally, i.e., those that are true of them, but not by definition. The crucial Quinean insight is rather that the properties that intensions bear necessarily are not merely definitional, rather they are essential to them, i.e. true in virtue of their own nature, not their definition.

Struck by the stubbornness of intentions, Quine came to regard necessary predications not as analytic but as essential. Hence, he concluded, quantified-in modal talk is committed to essentialism, even when quantification is restricted to intensional entities. The only result such a restriction achieves is a limitation of the class of entities to which essentialism applies:

Evidently this reversion to Aristotelian essentialism … is required if quantification into modal contexts is to be insisted on. An object, of itself and by whatever name or none, must be seen as having some of its traits necessarily and other contingently, despite the fact that the latter traits follow just as analytically from some ways of specifying the object as the former traits do from other ways of specifying it. …
Essentialism is abruptly at variance with the idea, favored by Carnap, Lewis, and others, of explaining necessity by analyticity … For the appeal to analyticity can pretend to distinguish essential and accidental traits of an object only relative to how the object is specified, not absolutely. Yet the champion of quantified modal logic must settle for essentialism.⁴⁰

12. Conclusion

In conclusion we may want to ask the question whether Quine was right or wrong about modal logic. Obviously, the purpose of this paper is not to argue that Quine was simply right. First, the many successes of modal logic show that there is no technical problem in combining modality and quantification, and completeness results provide adequate formal interpretations of quantified modal discourse.

But Quine’s concerns were not technical. Quine was looking for a coherent interpretation of quantified-in English modal sentences. Starting in 1960, he claimed that these sentences can be coherently interpreted only as essentialist predications. Yet, even this thesis seems dubious. A non-essentialist interpretation of the modal idioms seems compatible with their being predicated of objects. De re modality, the fact that an object may bear a necessary property directly (or that it necessarily satisfies a property) does not in and of itself exclude the possibility that the necessity in question be analytic.

However, if we follow Quine in his quest for non-reductive interpretations, we discover soon enough that the necessary predication to an object of a property does not

amount to the necessary truth of a sentence. If so, we cannot make sense of a necessary predication by reduction to a necessary truth, and nor can we make sense of it in terms of satisfaction of a necessary property. What we need is a clear notion of necessary satisfaction. Thus, if the necessity in question is to be analytic, we must make sense of the notion of analytic satisfaction per se. Quine’s claim seems to be that only analytic entities satisfy properties analytically, that is in virtue of their own definition. Perhaps surprisingly, the real problem of interpreting modal logic turns out to be ontological and not semantical after all. Once definitional entities are rejected, no room is left for the notion of analytic satisfaction. I have argued that Quine’s core idea in 1960 is that even concepts, abstract as they may be, are stubborn entities, and not merely definitional after all. Quine may have reached this conclusion for the wrong reasons: he thought that to be merely definitional an entity must bear no property accidentally. But whatever its ground, the conclusion seems true enough.

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References

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