

Ruzsa on Quine's Argument Against Modal Logic

Abstract. Through the 1970s and 1980s—the days when ELTE philosophy was named Marxism–Leninism—Imre Ruzsa prepared logic books and articles with sharp, comprehensive, up-to-date surveys of the most recent international developments in logic and the philosophy of language. For decades to come, the chapters of his *Classical, Modal and Intensional Logic* would be just about the only Hungarian-language sources available on W. V. O. Quine's famous argument against modal logic, on Saul Kripke's modal semantics that seemed to bypass the Quinean objections, and on Kripke's arguments about the semantics of natural language: that proper names are rigid designators. Based primarily on John Burgess's subsequent work, we can complete the picture of modal logic that Ruzsa painted in his survey by shedding light on additional important connections: crucial links not so much between Quine's argument and Kripke's formal work (as Ruzsa and others had thought), but instead between the Quinean argument and Kripke's thesis about proper names being rigid designators.

Various stripes of modality—senses of 'must' and 'can', necessity and possibility—are traditionally distinguished by logicians, linguists, and philosophers. Let us list a couple of them:

- Deontic modality—what is necessary/possible given laws or norms; that is, what the laws/norms require/permit. For example, "It is necessary (given public transportation regulations) that I buy a ticket to ride the tram"; more colloquially put: "I must buy a ticket to ride the tram".
- Epistemic modality—what is necessary/possible given what is known. For example, "It is necessary (given what I know) that the Opera building is in the next block"; more colloquially put: "The Opera building must be in the next block".

There is also the category of alethic modality, concerning *truth*—what is necessarily and possibly true. Within this, we can draw further distinctions; let us focus on necessity, leaving possibility aside (as is traditionally done):

- Necessary truth as logical truth (sometimes called ‘strict modality’)—truth given some system of logic, in other words, truth given the meanings of the logical vocabulary of a selected system. “I either buy a ticket or I don’t buy a ticket” is an example of a logical truth, for it is true in virtue of what ‘or’ and ‘not’ mean.
- Necessary truth as analytic truth—truth given the meanings of the words contained in the sentence. “All single people are unmarried” is an example of an analytic truth.
- Necessary truth as physical or natural necessity—truth given the laws of physics/laws of nature. “Trams travel slower than the speed of light” is an example of a truth of physics.
- Indeed, in his state-of-the-art 1984 survey volume *Classical, Modal and Intensional Logic* (written in Hungarian), Imre Ruzsa distinguished each of these stripes of modality (Ruzsa 1984, 119–121., 156–160.). What is conspicuously missing from Ruzsa’s (and his contemporaries’) list is yet another sense of necessity within the alethic category: the notion of counterfactual or metaphysical necessity, brought into the limelight by Saul Kripke’s 1970 lecture series “Naming and Necessity” (subsequently published as Kripke 1980):
- Necessary truth as counterfactual (or metaphysical) necessity—truth across all counterfactual circumstances. “Aristotle is (was) human” is a plausible example of a metaphysically necessary truth. Although it is epistemically as well as logically and analytically possible for Aristotle to be a cat, it is not *counterfactually or metaphysically* possible that he is a cat.

Ruzsa’s *Classical, Modal and Intensional Logic* stood alone in various ways, providing just about the only Hungarian-language coverage of numerous landmarks in philosophy of language and logic for almost two decades:

- (I) W. V. O. Quine’s arguments against modal logic (1943–1962)
- (II) Kripke’s formal results: semantics for modal logic (1959–1963)
- (III) Kripke on the semantics of natural language, specifically, his theory that proper names are so-called rigid designators. (1970)

As for (I), it was not until 2002 that a collection of Quine’s essays was published in Hungarian, including his definitive formulation of his attack on modal logic “Reference and Modality” (Quine 1953, discussed in detail below). Until then, there were just three articles by Quine available in Hungarian: “Two Dogmas of Empiricism” (Quine 1951/1973) as well as two smaller chapters from Quine’s attacks on modal logic (Quine 1963, 1947 both in Copi–Gould 1964/1985). Ruz-

sa's 30-page section entitled "Modality and Quantification: Logic 'Conceived in Sin'" was thus, for quite some time, *the* Hungarian source to consult on Quine's attacks on modal logic (Ruzsa 1984, 164–193).

As for (II), to this day, none of Kripke's formal work has been translated into Hungarian, and Ruzsa's 20-page section entitled "Kripke's Modal Semantics" remains the definitive secondary source to turn to in Hungarian (Ruzsa 1984, 227–248, see also Ruzsa 1988, XX). In addition, Ruzsa went on to develop his own Quine-proof system of modal logic (Ruzsa 1984, 290–345).

As for (III), not until the late 1990s was there any Hungarian coverage or translation of Kripke's *Naming and Necessity* available in Hungarian, apart from Ruzsa's 13-page section on Kripke's rigidity thesis (Ruzsa 1984, 302–315). Kripke argues that proper names like 'Aristotle' exhibit distinctive behavior within a certain rather straightforward kind of modal context: they are rigid designators, that is, they refer to the same individual with respect to every counterfactual situation. The rigidity thesis yields a powerful argument against Frege's descriptivist theory of proper names, which associates proper names with definite descriptions—such as 'the teacher of Alexander the Great'—that are non-rigid: after all, in a counterfactual situation in which someone else taught Alexander the Great, this definite description picks out someone other than Aristotle. The turn of the 20th-21st centuries brought the Hungarian translation of Kripke's "Identity and Necessity" paper, which also discusses the rigidity thesis (Kripke 1971/2004; see also the brief excerpts collection Kripke 1980/1997). Around the same time, important, albeit brief coverage of the rigidity thesis appeared in (Sainsbury 1997, 85–89) and (Farkas–Kelemen 2002, 135–145). The Hungarian translation of *Naming and Necessity*, along with an 87-page companion article was published fairly recently (Kripke 1980/2007, Zvolenszky 2007). Again, for almost two decades, Ruzsa's 1984 book provided one of very few sources on Kripke's work on the semantics of natural language.

My goal in this short paper is to highlight, beyond (I)–(III), two more aspects of the debate between Quine and Kripke, neither of which have been properly recognized by Ruzsa or his contemporaries:

Supplementing (I): (a) Quine's lasting argument against modal logic, and his challenge to locate an alternative notion of necessity unaffected by his arguments (especially in Quine 1953, 1960, 1963).

Supplementing (III): (b) The role of Kripke's explication of the notion of metaphysical necessity (1970).

These complete the picture painted by Ruzsa's pioneering survey in *Classical, Modal and Intensional Logic*.

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with the Isonzo is not a trait of the river, but depends on the manner of referring to the river. (adapted from Quine 1953, 148)

(3) is an instance of quantifying in, that is, binding the variable x within the scope of the modal operator \Box by the quantifier $\exists x$, which is outside the scope of \Box . This is the sort of construction that spells interpretive trouble when it comes to linguistic necessity, according to Quine. He did not think he has given a general argument against quantifying into any modal context whatsoever (as many interpreters at the time thought)—he says this much in the following passage (see also Quine 1963):

What has been said of modality in these pages relates only to strict [that is, linguistic] modality. For other sorts, for example, physical necessity and possibility, *the first problem would be to formulate the notions clearly and exactly*. Afterwards we could investigate whether such modalities, like the strict ones, cannot be quantified into without precipitating an ontological crisis. The question concerns intimately the practical uses of language. ... In discussions of physics, naturally, we need quantifications containing the clause 'x is soluble in water', or the equivalent in words; but ... we should then have to admit within quantifications the expression ... 'necessarily if x is in water then x dissolves'. Yet we do not know whether there is a suitable sense of 'necessarily' into which we can so quantify. (Quine 1953, 158-159.; emphasis added)

Here, Quine poses a challenge: quantifying in spells interpretive trouble for linguistic notions of necessity; when considering how interpretation would go with alternative notions of necessity (physical necessity, for example), first, those notions should be clarified, then the question of interpreting quantifying in can be raised. Accordingly, we can expand (a):

(a) Quine's lasting argument: When considering the (then-)established notion of necessity, that of linguistic necessity, certain modal logic formulas (those involving quantifying in) lack sense, they cannot be interpreted.

Quine's associated challenge: Clarify an alternative notion of necessity, and if the need for interpreting quantifying in arises with respect to that notion, then check that there is no interpretive trouble there.

In what follows we will unpack Quine's lasting argument (following primarily Burgess 1997), and see how Kripke responds to Quine's associated challenge by bringing in the notion of metaphysical necessity. But before that, let us introduce a preliminary distinction between *de dicto* and *de re* statements:

a *de dicto* ("about the sentence") statement:

(4) Necessarily, all single people are unmarried.

"The following is necessary: all singles are unmarried."

a *de re* (“about the thing”) statement:

(5) All single people are necessarily unmarried.

“All singles bear the modal attribute of being necessarily unmarried.”

Consider, for a moment, the counterfactual sense of necessity. According to it, (4) is true, for in all counterfactual circumstances, everyone who is single is unmarried. Meanwhile, (5) is false: for those who are in fact single might, in an alternative scenario, have gotten married instead—they are not single in all counterfactual situations.

Now we can spell out step by step Quine's request for interpreting quantifying in, this time with linguistic necessity at hand:

Step 1. First we need to make sense of the open formula ‘ $\Box (x = \text{Isonzo})$ ’.

Step 2. This requires making sense of *de re* modal claims.

Step 3. The *de dicto* claims at hand are (1) and (2), and their *de re* counterparts are (1r) and (2r):

(1) $\Box \text{Isonzo} = \text{Isonzo}$	true
(1r) It is true of the Isonzo that it is necessarily identical with the Isonzo.	
$\exists x (x = \text{Isonzo} \ \& \ \Box x = \text{Isonzo})$?
(2) $\Box \text{Soča} = \text{Isonzo}$	false
(2r) $\exists x (x = \text{Soča} \ \& \ \Box x = \text{Isonzo})$?

But the notion of linguistic necessity—about truth given the meanings of expressions—provides guidance for interpreting *de dicto* modal claims only; there is no direct guidance for making sense of *de re* modal claims. (For what might that *river* be that is *analytically* or *logically* identical with the Isonzo, given that (1) and (2) differ in truth value?)

Step 4. We have two strategies for interpreting (1r) and (2r), but both turn out unacceptable.

Step 5. The first strategy for interpreting *de re* modal claims is:

the unselective strategy: the *de dicto* statement yields its *de re* counterpart—for any proper name whatsoever.

This yields an unacceptable outcome: we have objects with contradictory properties: the river Isonzo a.k.a. Soča is at once analytically identical with the Isonzo (qua Isonzo) and not analytically identical with it (qua Soča). The cost of avoiding this is high: we have to give up on the idea that the truth of *de dicto* modal claims may in part depend on the words and names used. But linguistic necessity is supposed to be about truth in virtue of the meaning of certain expressions, so this option is unacceptable.

Step 6. The second strategy for interpreting *de re* modal claims is:

the selective strategy: *de dicto* modal claims yield their *de re* counterparts in selected cases only—with respect to standard names.

For example, if 'Isonzo' counts as a standard name while 'Soča' does not, then we cannot get (2r) from (2). But then we would have to make arbitrary decisions about which natural-language proper name to regard as standard: 'Cicero' or 'Tully'? 'Burma' or 'Myanmar'?

Step 7. With linguistic necessity, the standard names featured in the selective strategy lead to an arbitrary form of essentialism:

"Evidently, the 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 others 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." (Quine 1953, 155)

In other words, with standard names chosen arbitrarily, we end up with arbitrary choices for what is and what is not analytically true of an object. So the distinction between essential and accidental properties of objects—this is what essentialism is committed to—will be arbitrarily drawn.

For linguistic necessity, this seven-step argument does conclusively show that interpreting *de re* modal claims spells trouble whichever interpretive strategy we follow, making the first half of (a) a lasting argument indeed. The second half of (a), Quine's challenge is: we have (yet) to locate a notion of necessity which allows us to make sense of *de re* modal statements without running into unacceptable consequences. It is to this challenge that (Kripke 1980/2007) provides a response:

(b) Kripke's response to Quine's challenge: with the notion of counterfactual (metaphysical) necessity spelled out, interpreting *de re* modal claims is no longer problematic.

The following seem like plausible candidates for true *de re* modal claims: Cicero was necessarily human, but was only contingently born outside Rome; there is a counterfactual situation in which he was born in Rome, but there is no counterfactual situation in which *he* fails to be human. With this counterfactual notion of necessity at hand, our interpretation of *de re* modal claims is directly given; there is no need for either the selective or the unselective strategy of piggybacking on *de dicto* modal claims.

Ruzsa, along with contemporary commentators of Quine, thought that Quine's argument against modal logic (a, that is) targeted all stripes of modality. Hence, they thought that providing a framework for accommodating formulas with quantifying in—Kripke's formal work from the 1950s and 1960s (for example, Kripke 1963)—suffices to show that quantified modal logic is viable after all. (Indeed, commentators were in a difficult position because alongside his lasting argument, Quine also gave other, more general arguments against inter-

preting quantified modal logic, without properly distinguishing them from one another; for problems raised for some of the general arguments, see for example Kaplan 1986 and Fine 1989, 1990.) Ruzsa and others also considered Quine's charge that quantified modal logic comes with a high price tag—embroilment in essentialism, that is, commitment to a distinction between essential and accidental properties of objects (in Step 7)—to arise for quantified modal logics of all stripes. Yet again, there is a crucial detail to realize about Quine's argumentative strategy: his claim that essentialism is untenable is doubly embedded within his argument: first, it is featured within one of the interpretive strategies for making sense of *de re* modal claims (the one based on standard names); and second, we get an arbitrary, and hence objectionable form of essentialism specifically in the case of linguistic necessity, precisely because of the need to rely on standard names. In short, the lasting argument of Quine's does not claim that across the board, there is a problem with interpreting *de re* modal formulas; nor does it claim that across the board, essentialism is objectionable. And the response for his challenge calling for an alternative notion of modality where the interpretive problem is resolved, is in fact met not in Kripke's formal work, but in Kripke's observations about the semantics of natural language, when, in propounding his rigidity thesis, he also clarified the notion of counterfactual necessity (b, that is). (a) and (b) are then the missing links that complete the otherwise admirably detailed and illuminating picture of state-of-the-art modal logic and modal semantics that Imre Ruzsa relayed to Hungarian readers back in 1984.

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