

(A Little) Quantified Modal Logic for Normativists

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Abstract. Burgess (1997), building on Quine (1953), convincingly argued that claims in quantified modal logic cannot be understood as synonymous with or logically equivalent to claims about the analyticity of certain sentences. According to modal normativism, metaphysically necessary claims instead *express* or *convey* our actual semantic rules. In this paper, I show how the normativist can use Sidelle's (1992a, 1995) neglected work on rigidity to account for two important phenomena in quantified modal logic: the necessity of identity and the substitutivity of identicals into modal contexts.

Keywords: modal logic, necessity, normativism, conventionalism, analyticity

1. Introduction¹

Burgess (1997), building on Quine (1953), convincingly argued that claims in quantified modal logic cannot be understood as synonymous with or logically equivalent to claims about the analyticity of certain sentences, as certain versions of conventionalism held. According to modal normativism, metaphysically necessary claims aren't synonymous with or logically equivalent to claims about the analyticity of certain sentences; rather, they *express* or *convey* our actual semantic rules. In this paper, I will be concerned with giving a normativist account of two important phenomena in quantified modal logic: the necessity of identity and the substitutivity of identicals into modal contexts (henceforth, "the phenomena").

¹ I thank Zeynep Soysal and two referees for their meticulous and insightful comments, especially their probing objections.

In this Section, I explain the phenomena and their relations to each other, or, at least, what I take their relations to be for the purposes of this paper. In Section 2, I briefly explain Burgess's objection to understanding metaphysical necessity, specifically *de re* necessity, in terms of analyticity. In Section 3, I discuss what I think is the key to a normativist account of the phenomena: a normativist understanding of rigidity, inspired by Sidelle (1992a, 1995). For, rigidity lies at the heart of the phenomena. Not having a normativist account of rigidity is what has led newer attempts at a normativist account of the phenomena astray (Donaldson and Wang 2022, Thomasson 2020). In Sections 4 and 5, I use the Sidellean account of rigidity of Section 3 to show how the normativist can account for the necessity of identity and the substitutivity of identicals into modal contexts, respectively. Section 5 is where I discuss *de re* necessity, since it is into specifically *de re* necessary contexts that necessary identicals are substitutable. In Section 6, I discuss problems with recent attempts at a normativist account of these phenomena. I claim that the Sidellean account avoids these problems.

Let me now more adequately introduce the phenomena and lay out certain features of them that I will assume for the purposes of this paper. First, an expression is rigid if and only if it refers to the same individual in (or at or with respect to) every possible world where that individual exists (Kripke 1980)². In this paper, I will assume that names are rigid. The name "Nixon" is rigid because in all of our counterfactual reasoning, "Nixon" picks out the *same man*, *Nixon*. When we ponder what Nixon would have thought of the Republican Party today, we

² And in worlds where that individual doesn't exist, it doesn't refer to anything else. There are different ways of further explicating this (e.g., the expression may just fail to refer, or it may still refer to the individual that there doesn't exist), but this won't be relevant for my purposes.

ponder what *that very same man* would have thought of the Republican Party today. Non-rigid expressions refer to or pick out different individuals in (or at or with respect to) different possible worlds. Many definite descriptions are non-rigid. “The 37th President of the United States” is non-rigid. It actually picks out Nixon, but others might have been the 37th President of the United States, and it picks out those individuals in (or at or with respect to) those possible worlds where they are the 37th President of the United States. In other words, “the 37th President of the United States” picks out in (or at or with respect to) a possible world the individual who is there the 37th President of the United States. That individual needn’t be identical to the actual 37th President of the United States, Nixon. In contrast, “Nixon” picks out in (or at or with respect to) a possible world the individual who is there identical to the actual Nixon.

Rigidity lies at the heart of the phenomena. For the rigidity of names suffices for the necessity of identities involving them. This is why opponents of the necessity of identity deny the rigidity of names (e.g., Gibbard 1975). And the identicals that can properly substitute into modal contexts are *necessary* identicals. Let me expand on these points.

Kripke famously, and, for the purposes of this paper, correctly, argued that identity statements are metaphysically necessary when the expressions flanking the identity sign are rigid. A well-known example is “Hesperus = Phosphorus”. Since both “Hesperus” and “Phosphorus” rigidly refer to Venus, and Venus = Venus in every possible world, “Hesperus = Phosphorus” is true in every possible world (where Venus exists). This alone was an important philosophical discovery, but Kripke also claimed that some necessary identities – e.g., the previous one – were only knowable a posteriori. For it was an empirical discovery that Hesperus was Phosphorus.

Modal contexts are those such as “Hesperus is necessarily (originally) made of rock”. (Let’s suppose this is true.) This is an example of a *de re* necessity claim, where what is necessarily true is a claim that a certain object possess a certain property. We could make the *de re* nature of the claim explicit by saying “it is necessary, *of* Hesperus, that *it* is made of rock”. Recall that “Hesperus = Phosphorus” is also true. Can we substitute “Phosphorus” for “Hesperus” in the above modal context? Yes, since they are both rigid. We can thus validly infer that “Phosphorus is necessarily (originally) made of rock” is true. A designator such as “the second planet from the sun” would only be validly substitutable if we stipulate that it rigidly refer to Venus. This would, of course, also make “Hesperus = the second planet from the sun” necessarily true. Rigidity is thus of critical importance in both phenomena.

So far, I have been trying to stay in the formal mode in my presentation of the phenomena, in order to emphasize the importance of rigidity. One might object that my characterization of the phenomena is incorrect or at least incomplete, since I have ignored the necessity of the facts themselves. It is a common complaint against normativists that they can only account for the necessity of statements and not of facts.³ Kripke’s (1980) argument for the necessity of identity itself, rather than of identity *statements*, does not explicitly appeal to rigidity but only to the premise that an object is necessarily identical to itself and Leibniz’s Law, which is also used in the substitution of identical into modal contexts. Thus, one might think that Leibniz’s Law and not rigidity is at the heart of the phenomena. However, arguments concerning the phenomena in quantified modal logic work because variables are rigid designators (relative

³ But see Sidelle (1989) and Thomasson (2020) for detailed arguments that the normativist view is the only one that makes sense.

to assignments) (Stanley 2017), and Leibniz's Law pulls its weight in those arguments thanks to that rigidity. Furthermore, the normativist will take Kripke's premise and Leibniz's Law to express semantic rules governing the concept of identity.

Much of what I've said is relatively uncontroversial. Even those who deny the phenomena usually accept that they would follow if there were such things as rigid expressions (e.g., Gibbard 1975). I will assume that everything I've said so far is correct, for, it is the normativist view of the matter, and the purpose of this paper is to show that the normativist can account for the phenomena, relying only on claims that are already inherent in her position. Next, I discuss problems for earlier attempts to understand the phenomena in terms of semantic rules.

2. Problems for Earlier Attempts

Burgess (1997), building on Quine (1953), criticizes earlier attempts to understand the phenomena in terms of semantic rules for stating that necessary claims are synonymous with or logically equivalent to claims about the analyticity of certain sentences. For example, to say that bachelors are necessarily unmarried is to say that "bachelors are unmarried" is analytic. Here, there is already a problem, for these two claims seem to have different modal properties. It is necessary that bachelors are necessarily unmarried, but it is not necessary that "bachelors are unmarried" is analytic, at least if that sentence is non-semantically individuated. If analyticity is predicated of a *string*, then that string could have meant something else, and so it is not necessarily analytic. The workaround is to say that analyticity is predicated of *meaningful* strings, what Thomasson (2020) and Ludwig (in progress) call *statements* or *claims*. For the purposes of this paper, sentences (and mutatis mutandis for terms) in quotation marks should be thought of as naming claims, not strings, and not restricted to English.

The bigger problem is this. Take, e.g., the open sentence “It is necessary that x is F ”, expressing a *de re* necessity. This cannot mean or be logically equivalent to “It is analytic that x is F ” because this would make analyticity itself *de re*, and we don’t know what it means to say of *an object* that it is analytic that *it* is F . As we said above, analyticity is a property of *statements*, not non-linguistic objects. One might try to explicate *de re* analyticity along something like the following lines: let the open sentence “It is necessary that x is F ” be true of or satisfied by an object just in case it possesses the property of having its F -ness described by an analytic statement.⁴ For example, the open sentence “It is necessary that x is even” is satisfied by the number 2, since the number 2 possesses the property of having its evenness described by an analytic statement, viz., “2 is even”.

As Burgess points out, this immediately runs into difficulties. It makes necessary all claims that can be got from an analyticity by substitution of coreferential expressions. For example, “2” and “the number of my feet” are coreferential. Thus, it is necessary that the number of my feet is even, since the number of my feet (which, recall, is 2) possesses the property of having its evenness described by an analytic sentence (viz., “2 is even”).

Normativism escapes Burgess’s objection by claiming that necessary claims, including *de re* necessary claims, convey our actual semantic rules or their consequences.⁵ To be clear,

⁴ This is not exactly one of the proposals that Burgess discusses, but it has the same metalinguistic flavor and is subject to the same objections for the same reasons.

⁵ Including consequences that only follow with the inclusion of empirical information, to accommodate a posteriori necessities (Chalmers 2004, Sidelle 1989, Thomasson 2020).

normativism does not eschew analyticity. For the normativist, to say that a statement is analytic is to say that it conveys a semantic rule.

3. The Key: The Rules of Rigidity

As we saw in Section 1, the phenomena rest on rigidity. Let me just state the rigidity rule I recommend, inspired by Sidelle (1992a, 1995), and then comment on it.

Rigidity Rule (RR): if expression “*e*” actually applies to individual *i*, then “*e*” must be applied in any possible world *w* to the individual in *w* who satisfies the analytic transworld identity criteria associated with “*e*”.

Instances of the antecedent are not themselves rules or prescriptions of any kind; they are empirical claims. The consequent is not intended to mean that avoiding conceptual impropriety requires constantly applying “*e*” to *i* or anything like that, as if whenever one encountered Nixon one was required to call him “Nixon”. It means that, to avoid conceptual impropriety, if you apply “*e*” to anything in any scenario, real or imagined (actual or counterfactual), it had better be to *i* (Sidelle 1989). The consequent could just as well read “‘*e*’ may not be applied to anything other than *i* in any scenario, real or imagined” (cf. Donaldson and Wang 2022, 300). The appeal to “possible worlds” in the consequent shouldn’t be taken to imply anything metaphysically significant. Sidelle often talks instead of “counterfactual scenarios”.

For the normativist, that an individual satisfies the analytic transworld identity criteria associated with “*e*” is what makes that individual identical to *i* in another world.⁶ So, e.g., when I reason counterfactually about what Nixon would have thought of the Republican party today, the

⁶ Transworld identity criteria also help to determine a term’s *actual* referent, for, application criteria alone will not distinguish between objects that differ only modally (Sidelle 1992a).

person in my counterfactual reasoning counts as the very same Nixon in virtue of satisfying the analytic transworld identity criteria associated with “Nixon”, namely – since “Nixon” is a person-name – being a person who shares Nixon’s biological origin (or whatever the transworld identity criteria for persons are). None of this need be conscious, but it can be brought out of people by asking them counterfactual questions (Sidelle 1992a). Motivating and addressing objections to the very idea of analytic transworld identity criteria would take me too far afield (see Sidelle 1989, 1992a, 1995).

Next, I show how the normativist can use RR to explain the necessity of identity.

4. The Necessity of Identity

Identity statements are necessary when the expressions flanking the identity sign are rigid. Suppose that “*a*” and “*b*” are both rigid. Suppose also that they refer to the same individual, which we might only come to know a posteriori. Then, it is (a posteriori) necessary that $a = b$. For the normativist, what’s happening is this. Since “*a*” is a rigid name that actually applies to some individual, *a*, by RR, “*a*” must be applied to *a*, i.e., to whatever satisfies the transworld identity criteria associated with “*a*” in any scenario. But we have learned a posteriori that rigid name “*b*” also actually applies to *a*. Thus, by RR, “*b*” must be applied to *a*, i.e., to whatever satisfies the transworld identity criteria associated with “*a*” (e.g., to whatever shares *a*’s origin). This is not to deny that “*b*” has its own transworld identity criteria, only that they are different than “*a*”’s. Since their transworld identity criteria are the same, and since “*a*” and “*b*” must be applied to that individual that satisfies those criteria in all scenarios, “*a*” and “*b*” must be applied to the same individual in all scenarios, and this is precisely the rule that is conveyed by the claim that $a = b$.

One might worry that this explanation only works because I have assumed something necessary: the truth of “the referent of ‘*a*’ = the referent of ‘*b*’”. However, these descriptions should be read as non-rigid, so the identity statement is not necessary (cf. Sidelle 1989, 44).

We thus have a normativist explanation of the necessity of identity, including its sometimes a posteriori status.

5. The Substitutivity of Identicals into Modal Contexts

We saw that since “*a*” and “*b*” are rigid, if “ $a = b$ ” is true, then it is a (perhaps a posteriori) necessary truth expressing the rule that “*a*” and “*b*” must be applied to the same individual in all scenarios (i.e., to that individual that satisfies the transworld identity criteria associated with “*a*”/“*b*”). Now suppose the *de re* claim that *a* is necessarily *F*. This conveys the rule that “*a*” must be applied to an *F* (Donaldson and Wang 2022, Thomasson 2020). For the normativist, names must come associated with a disambiguating sortal (Thomasson 2007). If name “*a*” is introduced as an *F*-name, then “*a*” must be applied to an *F*, and this is conveyed by the claim that necessarily, *a* is *F*. “Nixon” is a person-name, so “Nixon” must apply to a person. This rule is conveyed by the claim that Nixon is necessarily a person. Now, from the rules that “*a*” must be applied to an *F* and that “*a*” and “*b*” must be applied to the same individual, it follows that “*b*” must be applied to an *F*. This rule is conveyed by the claim that *b* is necessarily *F*. Thus, the substitutivity of identicals into modal contexts is accommodated.

6. Newer Attempts

Thomasson (2020) gives an account of *de re* necessity and the necessity of identity. Donaldson and Wang (2022) argue that her account runs into problems with substitutivity, so they offer their own account. These accounts of the phenomena have struggled because they did not have an account of rigidity.

Donaldson and Wang (2022) give this example. An ornithologist sees a grouse and introduces the name “Annie” to refer to that grouse. It is thus a rule that “Annie” must be applied to a grouse.⁷ (Recall that, for the normativist, names must be associated with sortals.) This rule is conveyed by the claim that Annie is necessarily a grouse. Later the ornithologist sees a bird in the distance and introduces the name “Bennie” to refer to that bird. Unbeknownst to the ornithologist, Annie = Bennie. Recall that Annie is necessarily a grouse. How are we to secure the substitutivity of identicals into modal contexts and the inference to the claim that *Bennie* is necessarily a grouse?

Donaldson and Wang (2022, 301) suggest that Thomasson’s response would be⁸ to appeal to the schematic rule she appeals to in her discussion of the necessity of identity. That rule states: where $a = b$, any name “*a*” that properly applies to *a* may be applied to *b* (Thomasson 2020, 110). In our example, the relevant instance of this rule is: where Annie = Bennie, any name that may be applied to Annie may be applied to Bennie. Donaldson and Wang then argue that from this rule and the rule according to which “Annie” must be applied to a grouse, it follows that “Bennie” must be applied to a grouse. Donaldson and Wang think this is correct but criticize the rule they attribute to Thomasson. They write that, “Recall that ‘Annie’ is associated with the sortal ‘grouse’ while ‘Bennie’ is associated with the sortal ‘bird’. Assuming modal normativism, one would think it would be desirable to be able to express this difference between the two names by saying ‘Annie *must be* a grouse, but Bennie *could be* a bird of another species’.

⁷ I assume throughout that all namings are successful as intended, e.g., that the thing baptized as “Annie” is in fact a grouse.

⁸ Thomasson doesn’t actually make this response because she doesn’t consider any case like this.

Thomasson's [rule] precludes this" (303). They then go through a detailed discussion of the individuation of rules, suggesting that "We suspect that to make progress on this issue, we will have to get a better handle on the fundamental question of how rules are individuated" (Ibid.).

Let me make a few remarks. First, according to my account, the individuation of rules is a red herring. The thought that making progress requires an account of the individuation of rules is a consequence of not having the right rules in the first place. Second, I agree that Thomasson's rule is incorrect, and in my own explanation of the necessity of identity, I did not appeal to it. Such a rule is unnecessary once you have the Sidellean account of rigidity. However, third, I don't know why it would be desirable to be able to say that Annie must be a grouse, but Bennie could be a bird of another species, because that's just false. Bennie must be a grouse. Bennie could've turned out to be a different species, for all the ornithologist knew, but that's merely an *epistemic* possibility. (See my response to the objection below if you don't think a normativist is allowed to say this.) Fourth, from the rule that any name that may be applied to Annie may be applied to Bennie and the rule that "Annie" must be applied to a grouse, it does not follow that "Bennie" must be applied to a grouse. Donaldson and Wang appear to have in mind something like the following:

1. Any name that may be applied to Annie may be applied to Bennie
2. "Grouse" must be applied to Annie
- C. "Grouse" must be applied to Bennie

But "grouse" isn't a name, and the conclusion doesn't get us that "Bennie" must be applied to a grouse but that "Grouse" must be applied to Bennie. So, the argument seems doubly confused.

The Sidellean rigidity rule can easily explain this case. "Annie" is introduced as a grouse-name, so it is a rule that "Annie" must be applied to a grouse. This is conveyed by the claim that

Annie is necessarily a grouse. “Bennie” is introduced as a bird-name, so it is a rule that “Bennie” must be applied to a bird. This is conveyed by the claim that Bennie is necessarily a bird.

Unbeknownst to the ornithologist, “Annie” and “Bennie” actually refer to the same individual. By RR, “Annie” and “Bennie” must be applied to the same individual in all scenarios (i.e., the individual that satisfies the analytic transworld identity criteria). This is conveyed by the claim that Annie = Bennie. From the rule that “Annie” and “Bennie” must be applied to the same individual and the rule that “Annie” must be applied to a grouse, it follows that “Bennie” must be applied to a grouse. This is conveyed by the claim that Bennie is necessarily a grouse.

Note that the fact that the two names are associated with different sortals (i.e., “bird” and “grouse”) does not imply that their referents are not identical. When the identity criteria of two names are compatible (i.e., might be the same when fully specified), we know a priori that it is possible that their referents are identical (Sidelle 1992b, Lowe 1989). And the identity criteria for “bird” and “grouse” *are* the same, without fuller specification, since “bird” and “grouse” are sortals belonging to different levels of the same general category, *animal*, and thus they share the identity criteria for animals (Lowe 1989, Dummett 1973, Thomasson 2007), but it may take empirical investigation to determine whether the identity criteria are satisfied in any given case.

Note also that the normativist can say that Bennie could not have been a bird of another species, Bennie must be a grouse, even before these names were introduced, before human beings existed, in worlds with different semantic rules, etc., by appeal to the fact that it is one of our conventions that in counterfactual, intertemporal, etc. reasoning, we use our *actual, current* conventions (Sidelle 2009, Thomasson 2020, Topey 2019, and Wright 1985).

With *de re* necessities accommodated, quantified necessities derived therefrom are also accommodated straightforwardly. For example, from the claim that Annie is necessarily a grouse,

it follows that something is necessarily a grouse. Recall that, according to normativism, necessities convey semantic rules *or their consequences*. It is a consequence of the rule that “Annie” must be applied to a grouse that something must be applied to a grouse. This rule-consequence is conveyed by the claim that something is necessarily a grouse.⁹

7. Conclusion

I’ve argued that normativists haven’t yet adequately explained important phenomena in quantified modal logic because they have neglected rigidity. I showed how normativists can adequately explain the phenomena using a Sidelleian rigidity rule. There are many objections one might have to modal normativism.¹⁰ That it doesn’t have an adequate account of quantified modal logic and the phenomena of the necessity of identity and the substitutivity of identicals into modal contexts isn’t one of them.

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⁹ This, of course, assumes that the normativist has an account of logical consequence. See Thomasson (2020) for discussion of this.

¹⁰ I have not here addressed one of the most influential objections, according to which any account of necessity that appeals to analyticity implies that our conventions have the power to make analytic sentences true (Boghossian 1996). Thomasson (2020) points out that the objection only targets views on which our conventions make analyticities true. However, according to normativism, conventions do not make analyticities true; instead, conventions are *conveyed* by analyticities. For other responses to this argument, see, e.g., Asay (2020), Donaldson (2020), Hale and Wright (2015), Topey (2019), and Warren (2015).

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