Quantifier Variance Dissolved

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Abstract
Quantifier variance faces a number of difficulties. In this paper we first formulate the view as holding that the meanings of the quantifiers may vary, and that languages using different quantifiers may be charitably translated into each other. We then object to the view on the basis of four claims: (i) quantifiers cannot vary their meaning extensionally by changing the domain of quantification; (ii) quantifiers cannot vary their meaning intensionally without collapsing into logical pluralism; (iii) quantifier variance is not an ontological doctrine; (iv) quantifier variance is not compatible with charitable translation and as such is internally inconsistent. In light of these troubles, we recommend the dissolution of quantifier variance and suggest that the view be laid to rest.

1. Formulating Quantifier Variance

In contemporary metaontological discussions, quantifier variance is the view according to which there is no unique best language to describe the world.[1] Two equivalent descriptions of the world may differ for a variety of pragmatic purposes, but none is privileged as providing the correct account of reality. The view, crucially, involves the recognition that there is variability in the use of the quantificational apparatus of a language, and it is this variation in the quantificational apparatus that provides the multitude of equally correct languages to describe the world. Furthermore, these languages can be charitably translated into one another so that speakers of each may understand those of the other and see how their statements are true in virtue of this translation. The purpose of this view is to deflate ontological disputes into merely verbal ones, where, upon charitable translation, the proponents of each side of an ontological dispute can be seen to have some common ground of agreement. Such ontological debates thus become deflated upon recognition that each disputant speaks truthfully in their own language, using

[1] E. Hirsch, *Quantifier Variance and Realism: Essays on Metaontology* (Oxford: Oxford University Press, 2011).

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their own quantificational apparatus, and that none are truer than another.

The main advocate of the quantifier variance position is Eli Hirsch, who gives the following outline of the view:

> The quantificational apparatus in our language and thought – such expressions as 'thing', 'object', 'something', '(there) exists' – has a certain variability or plasticity. There is no necessity to use these expressions in one way rather than various other ways, for the world can be correctly described using a variety of concepts of 'the existence of something'.[2]

Hirsch is here clearly influenced by the view of conceptual relativity, advanced by Hilary Putnam, who similarly claims that:

> The logical primitives themselves, and in particular the notion of object and existence, have a multitude of different uses rather than one absolute 'meaning'.[3]

As we can see from these quotes and their discussion of existence, the quantifier-variance theorist is most interested in providing a variance in the meaning of the existential quantifier ∃ (which we prefer to call the particular quantifier, for reasons that will become clear by the end of this paper). Ordinarily, ∃ is taken to mean 'some things in the domain', which is contrasted with the universal quantifier ∀ that is taken to mean 'all things in the domain'. ∃ has this meaning by ranging over the domain of quantification and when it is applied to an open formula, the resulting sentence is true as long as the open formula is satisfied by something in the domain. We argue that ∃ always has this role, as it invariably has the function of ranging over the domain and signaling that some, rather than none, of its members satisfy the relevant formula. Yet the quantifier-variance theorist requires ∃ to have multiple meanings. But to have a variation in the meaning of ∃ forces the quantifier not only to mean 'some', but to have other candidate meanings. This raises the issue of how the meaning of a quantifier can differ, and what the other meanings could be. And it is this issue that we tackle, arguing that one cannot make sense of variation in quantificational apparatus in the way that the quantifier-variance theorist demands.

[2] Eli Hirsch, 'Quantifier Variance and Realism', *Philosophical Issues* 12 (2002), 51.

[3] Hilary Putnam, 'Truth and Convention: On Davidson's Refutation of Conceptual Relativism', *Dialectica* 41 (1987), 71.

2. Domain Variation

The first attempt to understand quantifier variance is by taking the meaning of quantifiers to be identified by their domains, in other words, by extension. If this were the case, then a difference in members of the domain would result in a difference in the meaning of the quantifier ranging over that domain. This would thus establish quantifier variance via domain variance. A difference in the domain can arise in many ways, including being the result of shifts in the domain's members (call this 'domain shifting'), or emerging from restrictions in the domain (call this 'domain restriction'). We argue that neither approach is sufficient to change the meaning of the quantifiers and how they operate.

2.1. Domain Shifting

A domain can vary its members by shifting the sort of thing that is being quantified over. For example, we could quantify specifically only over *P*s or only over *Q*s, such that the domain had only *P*s as members or only *Q*s as members. The question is, however, whether this domain shifting, between *P*s and *Q*s, is sufficient for quantifier variance: would we have a different meaning of the quantifier for each of these domains, namely, those constrained by $\exists_P$ and $\exists_Q$? It seems not, since regardless of what the quantifier ranges over, whether its domain includes objects of kind *P* or *Q*, the way the quantifier operates is constant and means the same for each domain.

In each domain, our quantifier still operates in the same way: by indicating that something in that domain satisfies the relevant formula. As such, $\exists$ will still mean 'some thing in the domain', regardless of what sorts of thing it quantifies over. This should be unsurprising, since similarly to other logical operators and connectives, no variation in meaning occurs with changes in what is in the domain. The meaning of the conjunction symbol does not differ relative to what is being conjoined nor does the meaning of the disjunction differ depending on what is being disjointed. Likewise with quantifiers, their meaning does not differ relative to what they quantify over. The only difference that emerges in quantifiers as a result of domain shifts is in their range or scope.

However, having domains with different members is not enough to secure quantifier variance, since the type of quantification over these various domains is still the same. Those quantifiers play the same roles as they do with different domains, and abide by the same

rules as they would with different domains. Regardless of what the quantifier ranges over, the way the quantifier functions remains constant. Therefore, domain shifting is insufficient for quantifier variance, given that it only marks a difference in quantificational scope, whilst in each domain the quantifiers still operate in the same way: the universal quantifier ranges over all objects of the domain, the particular over some.

2.2. Domain Restriction

Alternatively, instead of varying the domain by shifting the type of thing quantified over, such as P or Q, the variation can be achieved by restricting the domain of quantification. A restricted domain provides a way of getting a variation in the domain's members, and thus alters the scope or range of quantification by taking a subset of a larger domain. For example, a broad (perhaps maximal) domain of Z things can be restricted to a certain type of thing P, and then these things can be restricted again to the Z things that are both P and R (assuming that the extensions of P and R, although overlapping, are not the same). This process yields progressively more constrained domains with each restriction, in light of the increased number of such restrictions, and assuming that at each stage the extensions of the overlapping domains are not the same. For each restricted case, a different quantifier is used: for the broad (perhaps maximal) domain of Z things, one would use the quantifier $\exists_Z$; for the restricted domain of Z things that are also P, one would use the quantifier $\exists_{ZP}$, and for the even further restricted domain of Z things that are both P and R, one would use the quantifier $\exists_{ZPR}$. But despite $\exists_Z$, $\exists_{ZP}$, and $\exists_{ZPR}$ ranging over different domains, do they have different meanings as the result of emerging from different restrictions?

We argue not, since this strategy for establishing quantifier variance also does not secure a variation in the meaning of the quantifiers, for similar reasons to why domain shifting failed to do so. After all, the quantifiers in question (as well as other logical apparatus) behave in the same way irrespective of the domain they range over, and thus, the way they operate and their meanings will remain constant even when their domains do not. In the end, a domain restriction does not change the way quantifiers operate. In any restricted domain, the meaning of quantifiers is preserved, as it does not matter what is in the domain, nor what is not included in it. The only variation that results from domain restriction involves the scope or range of the quantifier $\exists$, rather than its meaning, which is

held fixed throughout, and the quantifier continues to play the same function it played in the broad (perhaps maximal) domain, by being particular to some things in the domain of quantification, whatever members that domain may include and however it may be restricted.

2.3. Maximal Quantifier

It is worth noting that even if we concede that difference in domain entails difference in quantifier meaning, the quantifier-variance theorist is still not in a secure position. This is because in discussing restricted domains appeal is often made to the notion of what the maximal domain (obtained by unrestricted quantification) would be like. After all, it is in contrast with the latter that each of the former is formulated: restricted domains, as opposed to the maximal one, are constrained. But then the maximal domain would require a privileged quantifier, since it has the largest scope over which a quantifier needs to be able to act unrestrictedly in order to range over the whole domain. Likewise, in the case of domain shifting, given the variety of domains, in order to quantify over all of them, they all need to be brought together, perhaps by forming the set, or some special collection, of all these domains. This is also a maximal domain, which again would be quantified over with a privileged quantifier, since it encompasses all domains. And so, both ways of specifying the difference in domains (with the aim of resulting in a difference in quantifiers) will bottom out in requiring a maximal, privileged, wide-ranging quantifier with one meaning.

However, such a privileged quantifier is incompatible with quantifier variance since the view does not allow for a quantifier of this sort. The resistance to acknowledging a privileged or maximal quantifier is due to the quantifier-variance position aiming to deflate ontological debates without there being a 'winner' of such debates, and if there were a privileged or maximal quantifier then in some sense we will have such a winner. For the quantifier-variance theorist, no quantifier delivers the 'true' results about ontology, as Hirsch states:

> The basic idea of quantifier variance can be nicely formulated by saying that the same (unstructured) facts can be expressed using different concepts of 'the existence of a thing', that statements involving different kinds of quantifiers can be equally true by virtue of the same (unstructured) facts in the world.[4]

[4] Hirsch, 'Quantifier Variance and Realism', 59.

As such, there may be facts about the world, but there is no privileged 'joint-carving' quantifier that latches onto such facts, as all the usages of different quantifiers express equally true claims. With the rejection of a privileged quantifier comes the rejection of a maximal domain, since if domains were to determine meanings, then the meaning of the quantifier ranging over the maximal domain would be a privileged one. After all, this would be the all-encompassing domain, the one from which all other domains are part. Therefore, neither domain shifting nor domain restriction ultimately leads to quantifier variance, because quantifier meaning is not dictated by members of the domain (as such meaning is not defined extensionally), and because domain specifications end up requiring a privileged quantifier (which would encompass all of the specifications), but this is something the position of quantifier variance does not allow for.[5]

Note that, with these considerations, we are committed to the existence of neither unrestricted quantification nor the maximal domain. It is unclear that there is a coherent way of formulating any such quantification and the resulting maximal domain. If the maximal domain is a set, then unrestricted quantification would require quantifying over everything, and there would have to be a set of everything, including, in particular, a set of all sets, among other inconsistent totalities, since all of these things are in the scope of an unrestricted quantifier: *everything* is in its scope, after all! But that is clearly inconsistent.

In response, it may be argued that the totality in question is of everything *that exists*, and that inconsistent objects do not exist, and thus, inconsistent totalities that include such objects are clearly excluded. However, given that such totalities do not exist, it is not the case that something is missing from the scope of the unrestricted quantifier. Nothing really is outside its scope. As long as it is properly understood what it takes to be in the scope of an unrestricted quantifier, there should be no problem to formulate the maximal domain.

[5] A similar point was made by Rossberg, in Marcus Rossberg, 'The Logic of Quantifier Variance', accessed online (08/2017) at http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.405.5953. Rossberg notes that domain variation (both in terms of restriction and shifting) leads to 'maximalism', which is not in the spirit of the quantifier variant view that aims for a sparser ontology than maximalism. Rossberg further states that Hirsch insists on varying the meanings rather than ranges of the quantifiers. For more on maximalism, see Matti Eklund, 'Neo-Fregean Ontology', *Philosophical Perspectives* 20 (2006), 95–121.

There are, however, a number of difficulties with this response. First, it clearly begs the question against dialetheists, who argue that certain inconsistent objects, including inconsistent totalities, do exist.[6] And if inconsistent objects exist, unrestricted quantification needs to range over them. Second, even if the maximalist is inclined to rule out dialetheism by fiat, it is still unclear what the maximal domain ultimately is. After all, there is widespread disagreement about what exists. Just within philosophical theorizing, it is contentious as to whether any of the following items exist or not: mathematical entities,[7] universals,[8] possible worlds,[9] subatomic particles,[10] and even tables.[11] For each of these items, arguments have been devised for their existence as well as for their nonexistence. Thus, to the extent that there is disagreement about what exists, the maximalist response ends up begging the question against all of those who deny the existence of any contentious entity that the unrestricted-quantification theorist intends to include in the maximalist ontology.

If the maximal domain is not a set, but some sort of (non-set-theoretic) collection of existent objects, the same concern will emerge in light of the controversial nature of what exists. In fact, it is unclear how exactly the maximal domain is supposed to be specified. In order to determine which objects are in such a domain, one needs to specify what exists. But it is unclear how to determine what exists, given that the specification of an ontology ultimately depends on the background theory that provides the identity and

[6] G. Priest, *In Contradiction*, 2nd Edition, (Oxford: Clarendon Press, 2006).

[7] Compare B. Hale, *Abstract Objects*, (Oxford: Blackwell, 1987), with H. Field, *Science without Numbers*, (Princeton, NJ: Princeton University Press, 1980).

[8] Compare D. M. Armstrong, *Universals and Scientific Realism*, volumes I and II (Cambridge: Cambridge University Press, 1978), with G. Rodriguez-Pereyra, *Resemblance Nominalism: A Solution to the Problem of Universals* (Oxford: Clarendon Press, 2002).

[9] Compare D. Lewis, *On the Plurality of Worlds* (Oxford: Blackwell, 1986), with Gideon Rosen, 'Modal Fictionalism', *Mind* 99 (1990), 327–354.

[10] Compare M. Redhead, *Incompleteness, Non-Locality, and Realism: A Prolegomenon to the Philosophy of Quantum Mechanics* (Oxford: Oxford University Press, 1987), with B. C. van Fraassen, *Quantum Mechanics: An Empiricist View* (Oxford: Clarendon Press, 1991).

[11] Compare A. Thomasson, *Ordinary Objects* (New York: Oxford University Press, 2007), with T. Merricks, *Objects and Persons* (Oxford: Clarendon Press, 2001).

persistence conditions for the relevant objects. And typically, a difference in background theory leads to a difference in the specification of the ontology. Consider, as an illustration, examples involving abstract objects: If the background theory includes a paraconsistent logic, the set of all sets that are not members of themselves (that is, the Russell set) will be part of the ontology; otherwise, it will not.[12] If the background theory includes a modal second-order logic, then natural and real numbers will not be part of the ontology;[13] otherwise, assuming that there are no other nominalization resources in the background theory, the ontology will include such numbers. Even the properties of certain objects depend on the background theory under consideration. For instance, if the axiom of choice is part of the background theory, then all sets are well-ordered; otherwise, they are not. Thus, depending on the background theory, the specification of the ontology as well as the properties of the relevant objects seem to change. However, there is no uncontroversial way to decide on the adequacy of a background theory. As a result, it is similarly unclear how to determine the maximal domain, the domain of everything.

Suppose, however, that no assumption is made about the existence of the objects in the maximal domain nor is it assumed that the maximal domain itself exists. The idea is just to consider the maximal domain independently of supposing its existence, similarly to the attitude one may take toward a fictional object. That is, however the maximal domain is specified, whether it is consistent or not, and whatever the properties of the objects in it turn out to be, the existence of the maximal domain is not assumed nor is the existence of the objects in it. Would this allow one to formulate a stable notion of a maximal domain?

We do not think so. First, note that any such conception of the maximal domain, due to the fact that it makes no commitment to the existence of the objects in question nor to the existence of the entire domain *per se*, provides no solace for realism. The proposal is simply neutral on this issue. If the goal is to offer a realist account of the maximal domain and of unrestricted quantification, this proposal does not get off the ground.

[12] Newton C.A. da Costa, Décio Krause, and Otávio Bueno, 'Paraconsistent Logics and Paraconsistency', in D. Jacquette (ed.), *Philosophy of Logic* (Amsterdam: North-Holland, 2007), 791–911.

[13] G. Hellman, *Mathematics without Numbers: Towards a Modal-Structural Interpretation* (Oxford: Clarendon Press, 1989).

Moreover, even on such a non-committal construal, a maximal domain has not been properly specified. After all, the extension of a maximal domain ultimately depends on the underlying logic that is adopted. Since quantification would range unrestrictedly over everything, whether what is quantified over exists or not, then it would range, in particular, over inconsistent objects, such as the Russell set. As a result, given that the maximal domain includes inconsistent objects, it is itself inconsistent. Now suppose that the underlying logic is classical. As is well known, in this logic, everything follows from a contradiction, since explosion holds.[14] Hence, an inconsistent maximal domain would then be trivial. The result is that such a maximal domain will include everything, but it would also include nothing, or only 17 objects. Since everything follows from the inconsistent domain, triviality emerges, and the maximal domain ends up being surprisingly unspecified. (It is also maximally specified, given that it is trivial, and thus satisfies every possible specification!) Logical anarchy ensues.

If, however, the underlying logic is paraconsistent, the presence of an inconsistent maximal domain need not lead to triviality, given that, in paraconsistent logics, from a contradiction not everything follows. However, this does not entail that the maximal domain has been properly specified. For there are infinitely many different paraconsistent logics, with progressively weaker consequence relations, comprising a hierarchy of paraconsistent logics, called C logics.[15] Since each of these logics provides different inferential resources, they lead to different specifications of the maximal domain. After all, for each paraconsistent logic C_i, $1 \leq i \leq \omega$, a particular contradiction trivializes it, and thus, under different paraconsistent logics, different objects would be quantified over in the maximal domain. So, given the dependence of the domain on the underlying logic, it is still unclear what the maximal domain ultimately is.

In the end, the fact that quantifier variance seems to invite such quantificational maximalism provides an additional source of concern about the proposal. In light of these difficulties, we recommend moving on from this strategy of securing a difference in quantifier meaning by differing the domain of quantification, and will now explore how else quantifiers may vary their meaning.

[14] See Priest, *In Contradiction,* and da Costa, Krause and Bueno, 'Paraconsistent Logics and Paraconsistency'.

[15] See da Costa, Krause, and Bueno, 'Paraconsistent Logics and Paraconsistency', for a discussion of this.

3. Logical Pluralism

Instead of domain specification, what is needed for a difference in the meaning of quantification is for there to be *at least* different introduction and elimination rules for the quantifiers.[16] For two logical constants to differ they need minimally to have distinct introduction and elimination rules. So, a mere difference in the domain of quantification is not enough to deliver a difference in the meaning of the quantifiers, rather a difference in the rules that govern the quantifiers would be required. An operational difference, a difference in the behaviour of quantification, via distinct introduction and elimination rules, is what is necessary for variance in quantification as the quantifier-variance theorist requires.

If quantifier variance is understood as emerging from multiple quantifiers differing in the way they operate via distinctive introduction and elimination rules, then this will amount to (or collapse into) a form of logical pluralism. There are several characterizations of this family of views. First, logical pluralism can be stated as the conception according to which there is a plurality of correct logical systems, each of which has different valid rules of inference.[17] The pluralism results from the variety of correct logical systems. But in contrast with the two alternative formulations discussed next, it is

[16] The 'at least' here is italicized in an attempt to distance ourselves from committing to one side of the debate over whether the meanings of logical constants are *fully* determined by logical rules of inference. Those who think the meanings are completely specified in this way can be called 'inferentialists' (see, for instance, Ian Rumfitt, 'The Categoricity Problem and Truth-Value Gaps', *Analysis* 57 (1997), 223–36). Such a proposal can be objected to on the basis of Carnapian considerations, for example, in Panu Raatikainen, 'On Rules of Inference and the Meanings of Logical Constants', *Analysis* 68 (2008), 282–87. For a critical discussion of this line of objection, see Julien Murzi and Ole Hjortland, 'Inferentialism and the Categoricity Problem: Reply to Raatikainen', *Analysis* 69/3 (2009), 480–488. We take it that a difference in the introduction and elimination rules is *necessary* (rather than sufficient) for a difference in a logical constant. After all, two logical constants are interchangeable if they have the same operational rules (this is the so-called 'collapse' argument, examined in John H. Harris, 'What's So Logical About the Logical Axioms?', *Studia Logica* 41 (1982), 159–171; for how this relates to the quantifier variance view, see Jared Warren, 'Quantifier Variance and the Collapse Argument', *The Philosophical Quarterly* 65.259 (2015), 241–253).

[17] This is related to Eklund's multitude view in Matti Eklund, 'The Multitude View of Logic', in G. Restall, and G. Russell (eds), *New Waves in Philosophical Logic* (Basingstoke: Palgrave Macmillan, 2012), 217–240.

less clear how the various correct logical systems in fact emerge on this view.

Second, logical pluralism can be spelt out as stating that, although there is a single notion of validity, there are different relations of logical consequence, depending on the particular cases under consideration.[18] On this formulation:

> (Val) An argument is valid as long as in every *case* in which the premises are true the conclusion must be true as well.

Cases are particular situations in terms of which the truth of premises and conclusions are assessed. If the relevant cases involve complete and consistent situations, applying the concept of validity (Val) to them yields classical logic. If the cases concern incomplete and consistent situations, an instance of (Val) generates a constructive logic. If the cases are about complete and inconsistent situations, (Val) returns a paraconsistent logic. Finally, if the appropriate cases encompass incomplete and inconsistent situations, a non-alethic logic emerges from (Val).[19]

Finally, logical pluralism can be formulated in terms of the existence of different logics that emerge depending on the possibilities under consideration.[20] On this view, logical consequence is a modal notion and relies on a primitive notion of possibility:

> (Val_{M}) An argument is valid as long as the conjunction of its premises and the negation of its conclusion is impossible.

Different logics emerge in accordance with the relevant possibilities in the context of (Val_{M}). In particular, classical logic is associated with consistent and complete possibilities; constructive logics with consistent and incomplete possibilities; paraconsistent logics with inconsistent and complete possibilities; and non-alethic logics with inconsistent and incomplete possibilities. In the end, different possibilities yield different logics. Note that, on this view, there may be different logics appropriate to the same context: classical and paraconsistent logics coincide if the context is consistent (that is, they validate the same inferences), for in this scenario, every classically valid

[18] This is the way that Beall and Restall articulate the view, in Jc. Beall, and G. Restall, *Logical Pluralism* (Oxford: Oxford University Press, 2006).

[19] For a survey of some of these logics, see Seiki Akama and Newton C.A. da Costa, 'Why Paraconsistent Logics?' in S. Akama (ed.), *Towards Paraconsistent Engineering* (Dordrecht: Springer, 2016), 7–24.

[20] This is the version favoured in Otávio Bueno and Scott Shalkowski, 'Modalism and Logical Pluralism', *Mind* 118 (2009), 295–321.

inference is also paraconsistently valid, and vice-versa. (If inconsistencies are involved, however, some classically valid inferences, such as explosion, are not valid according to paraconsistent logic.)

Despite the variety of formulations of logical pluralism, quantifier variance should be sharply distinguished from all of these logical pluralist proposals. First, logical pluralism is a conception of logical consequence and its plurality; as opposed to quantifier variance, it is not an ontological doctrine about the lack of a privileged ontological language to describe the world. Nothing in logical pluralism states anything about a privileged ontological language. In this regard, logical pluralism and quantifier variance are independent doctrines.

But it may be argued that the variety of quantificational apparatuses in logical pluralism actually support the doctrine of quantifier variance. After all, the multitude of logics that are allowed for in logical pluralism provide grist for the mill of the quantifier-variance theorist. In fact, the many quantifiers that are embraced in logical pluralism provide the quantificational apparatuses that yield the plurality of equally correct ontological languages.

This is not right, however. Logical pluralism provides a variety of different quantifiers, but, as the formulations of the view above made clear, the quantifiers all emerge in specific contexts: particular cases (in the Beall-Restall formulation) or particular possibilities (in the Bueno-Shalkowski formulation). And nothing in these contexts provides any support for equally correct ontological languages. The quantifiers in question are *logical* devices; they are part of the logical apparatus of the various logics. Nothing in them, or in the logical pluralist view, entails anything about the adequacy (or lack thereof) of an ontological language to describe the world. In order to reach any such conclusion, an additional ontological interpretation is needed, but that is not something logical pluralism provides.

Moreover, quantifier variance is not meant to entail a multiplicity of logical systems, each with its own quantifiers and conception of validity, but rather it requires that, within a single logic, there should be multiple (existential) quantifiers operating differently. And so, logical pluralism should not be equated with quantifier variance, as having a choice between logical systems is not the same as having a choice of quantifier meaning within a system of logic.

Furthermore, it is far from clear how one can obtain one logical system with a choice of many introduction and elimination rules for the quantifier. After all, if different introduction and elimination rules were introduced, one would end up with different *logical*

quantifiers rather than with different *ontological* claims. And, as noted, quantifier variance concerns the latter, not the former. It is, therefore, not surprising that Hirsch himself rejects this way of formulating the variance in quantifier meaning:

> The purely syntactic and formal logical properties of [the existential quantifier] will not be changed at all (the formal principles of quantificational logic will be unaltered).[21]

Without varying the meaning of the quantifiers extensionally via their domains, or intensionally via interpretations of their inference rules (in the way provided by the different forms of logical pluralism), it is hard to see what candidate methods are left to vary the meaning of the quantifiers, since so far, each attempt has failed or is inconsistent with the aims of the quantifier-variance theorist.

We said that logical pluralism is a position in the philosophy of logic, whereas quantifier variance is put forward as a position in metaontology. In fact, the latter is taken as a way of deflating ontological debates. However, for reasons that will be examined below, quantifier variance also cannot be made sense of as a metaontological position.

4. Ontological Pluralism

Ontological pluralism, on Berto and Plebani's formulation,[22] is the view according to which there are different ways of existing. On Eklund's version,[23] ontological pluralism is the position according to which there is a plurality of equally true ontologies. Either way, ontological pluralism should not be conflated with quantifier variance. Yet, it often is.

Strictly speaking, quantifier variance is a view about variation in quantification and the lack of a privileged ontological language; it is not a view about variation or plurality in ontology. In fact, quantifier variance is *independent* of pluralism in ontology. After all, on the one hand, multiple ontologies do not require multiple quantifiers operating differently. Consider, for instance, the early formulation of non-relativist quantum mechanics that involved quantification over both matrices and waves, which, despite being ontologically very different,

[21] Hirsch, 'Quantifier Variance and Realism', 53.

[22] F. Berto and M. Plebani, *Ontology and Metaontology: A Contemporary Guide* (Bloomsbury Academic, 2015).

[23] Matti Eklund, 'Metaontology', *Philosophy Compass* 1/3 (2006), 317–334.

were described via a single quantification. Second, it is possible to have different quantifiers while keeping a single ontology. Consider, for example, a second-order formulation of real analysis that involves both first- and second-order quantifiers (the latter are required for the proof of the categoricity of the theory), but a single ontology of real numbers is found throughout. In other words, variance in quantifier is neither necessary nor sufficient for variance in ontology.

But let us concede to the quantifier-variance theorist that the word 'existence' may be used in various ways. Let us further concede that it may well be that there are multiple ontologies. Nevertheless, these concessions will not deliver quantifier variance, for unless quantification is inextricably tied to existence, as it is in a Quinean view,[24] such pluralities in language and in ontology will not entail variance in quantification, nor will variance in quantification result in variance in ontology.

There is much to say for the distinction between quantification and existence, and to ignore the distinction is to ignore Meinongians like Parsons,[25] neutral quantificationists like Azzouni,[26] and free logicians like Sainsbury,[27] who think there is a difference between ontological commitment and quantificational commitment. To see the difference, one only needs to notice that quantification (in both natural and formal languages) need not be ontologically committing.[28] With regard to natural languages, like English, it is simply incorrect to say 'there exists' is synonymous with 'some'. The difference between 'some' and 'there exists' is that 'some' is an ontologically neutral quantificational term, and 'there exists' is not a quantificational term at all. 'Some' is about the *number* of things (namely only some of them), and so is *quantitative*, whereas 'there exists' describes the *way* things are (namely as existing things), and so is

[24] See Willard V.O. Quine, 'On What There Is', reprinted from the *Review of Metaphysics* 2/5 (1948) in the *Proceedings of the Aristotelian Society* 25 (1951), 217–234.

[25] T. Parsons, *Nonexistent Objects* (New Haven: Yale University Press, 1980).

[26] J. Azzouni, *Deflating Existential Consequence: A Case for Nominalism* (New York: Oxford University Press, 2004).

[27] R.M. Sainsbury, *Reference without Referents* (Oxford: Oxford University Press, 2005).

[28] This is argued in Suki Finn, 'The Role of Existential Quantification in Scientific Realism', *Philosophy* 92/361 (2017), 351–367. See also Azzouni, *Deflating Existential Consequence: A Case for Nominalism,* for a different way of making this point.

qualitative. The word 'some' is fit for numerical quantificational use, and 'there exists' is not. As such, quantified sentences should have nothing to do with existence – they shouldn't require existence for their truth or meaning, and they shouldn't imply ontological commitment. To conflate quantification with existence and derive ontological commitment from quantificational commitment results in all sorts of problems. For instance, suppose that Ernest, a classical mathematician, who is talking about sets that are too big, claims that:

(*) There are sets that do not exist.

Clearly, in uttering (*), Ernest did not intend to say something contradictory. He is simply acknowledging a fact about classical set theory. However, if the quantifier 'there are' in (*) is taken to be ontologically committing, poor Ernest will be uttering something that, from his classical perspective, is clearly false (because contradictory):

(**) There exist sets that do not exist.

However, one may protest that 'some' just by definition means 'at least one existent thing', and so examples like (*) can thus be dealt with by being not strictly speaking true. They could argue that all such examples are a misuse of language that is parasitic on their use of 'some' or 'there are', and are properly interpreted as involving a cancelling prefix to create a more accurate sentence. Those who adopt such a reading will argue that all uses of 'some' or 'there are' are loaded until it is cancelled by such a prefix, otherwise the sentence will just be false if it involves non-existent things. However, such a strategy will not work for examples that involve a true sentence and a neutral use of the word 'some' where no prefix will easily fit. Take Strawson's famous example,[29] where he points to a dictionary of legendary and mythical characters and says, with regard to the characters, 'some of these exist and some of them don't exist'. The seemingly ontologically loaded word here is 'exist', and 'some' must be considered ontologically neutral, to prevent a contradiction arising in the second disjunct – 'there exist some characters that don't exist'. To account for sentences such as this without contradiction, we must be able to use 'some' in an ontologically neutral way, and a prefix strategy will not work. This is because this example quantifies over a domain of objects where some are existent and some are not. As such, only part of the sentence will pertain to non-existents and another part of the same sentence pertains to

[29] Peter Strawson, 'Is Existence Never a Predicate?', *Critica* 1 (1967), 5–15.

existents, and so an overarching cancelling prefix for the whole sentence will not work since only part of the sentence will require the commitment to be cancelled. Therefore, the prefix strategy fails to allow for all quantification to be ontologically committing.

What all of this illustrates, is that in tying quantification to existence, two distinct roles are ultimately conflated:

(a) The *quantificational role* specifies whether all objects in the domain of quantification are being quantified over or whether only some objects are.
(b) The *ontological role* specifies that the objects quantified over exist.

These are fundamentally different roles, which are best kept apart.[30] By distinguishing them and letting quantifiers only implement the quantificational role, one obtains an ontologically neutral quantification. Ontological neutrality applies to both the universal and the particular quantifier (that is, the existential quantifier without any existential, ontological import).

The ontological role is then assigned to an existence predicate E. What conditions such a predicate satisfies are then a matter of ontological debate, not a matter of logic, which, at any rate, is not the locus of ontological debates, at last in principle. Different criteria of existence can be adopted, depending on the particular ontological views one may have. For instance, certain realists may take E to be satisfied by ontological independence;[31] others, of a more Quinean persuasion, will insist that E is satisfied by what is indispensably posited in our best scientific theories; whereas still others, more sympathetic with some forms of empiricism, will claim that E is satisfied by what is observable. These are, of course, just a few possible criteria of existence. In the end, it is a matter of philosophical debate to determine which of these criteria (if any) is ultimately correct.

Moreover, using ontologically neutral quantifiers, Ernest can express (*) above without any inconsistency, since the quantifier does not have any ontological import. He can even formalize (*), as follows (where '$\exists$' is the particular quantifier, 'S' is the predicate 'is

[30] See Azzouni, *Deflating Existential Consequence: A Case for Nominalism,* and Otávio Bueno, 'Dirac and the Dispensability of Mathematics', *Studies in History and Philosophy of Modern Physics* 36 (2005), 465–490.

[31] See Azzouni, *Deflating Existential Consequence: A Case for Nominalism*.

a set', and 'E' is the existence predicate):

$$(*')\exists x(Sx \wedge \neg Ex)$$

With ontologically neutral quantifiers, ontological pluralism is obtained by E rather than $\exists$. This is as it should be, given that ontological pluralism should not be a matter of logic. Note, however, that the variance in E, the relevant ontological variance once ontologically neutral quantifiers are introduced, results in *predicate* variance, rather than *quantifier* variance. Nevertheless, it is unclear whether this is a plausible type of variance that can do the work that quantifier variance was meant to achieve. For this is a variance in different criteria for existence, whereas quantifier variance was supposed to characterize ontological variance via changes in the quantification apparatus of languages that describe the world. However, once again, no variance in any quantifier is involved.

5. Charitable Translation

According to quantifier variance, those using different quantifiers speak truthfully according to their own language and can be charitably translated into the language of others; the different languages with their own quantifiers all being equally correct. This is how quantifier variance serves to deflate ontological disputes into being merely verbal disputes.

But charitable translation cannot occur on the quantifier variance approach. There is no privileged quantifier according to this doctrine, yet such a privileged quantifier would be required in order for it to range over all the different languages, to charitably translate one into another, and compare them accordingly. Hence, it is unclear how comparison of languages or inter-translation could be implemented in the absence of a maximal language, or a privileged quantifier, within which, or in terms of which, the comparison is carried out. This shows an internal tension and the consequent unviability of the quantifier variance view.

Translations are implemented in terms of a background theory that allows one to compare the vocabulary and various expressions of the home and the target languages. But differences in the quantificational resources of the background theory will lead to differences in the translation. Suppose the target language involves contradictions: a phenomenon all too common among anthropologists and that

Evans-Pritchard faced when studying the Azande in Africa.[32] The very idea of a proper translation would require one to *preserve* the inconsistencies when translating the target language into the home language. Otherwise, rather than translating the target discourse, one would be amending, correcting, and distorting it. Nevertheless, if the background theory is unable to cope with inconsistencies, the translations will become unreliable. In fact, the translations themselves would become trivial. In contrast, if the background theory has the resources to deal with inconsistencies, the translations, at least in principle, can behave properly. But this means that the adequacy of translations ultimately depends on the resources of the background theory.

Quantifier-variance theorists would need to be able to implement such translations across all ontological languages. But, on their view, there is no privileged ontological language. Thus, there is no single background theory in terms of which the translations could be implemented. In particular, there is no privileged quantifier to secure the adequacy of all such translations. But this leaves the quantifier-variance theorists in the unstable situation of requiring translations across ontological languages and denying the resources that are needed to implement them effectively. Something needs to go.

The problem is that it is unclear what can be dropped without undermining quantifier variance altogether. After all, to embrace a privileged ontological language in terms of which the translations could be performed would be to deny the cornerstone of the quantifier variance doctrine. And to deny the need to implement the translations across ontological languages would prevent the quantifier-variance theorist from turning ontological disputes into verbal disagreements. In the end, none of the options are viable.

6. Conclusion

Quantifier variance is ultimately untenable. Variance in quantifier meaning cannot be established via variance in quantificational domains. Rather, a true variance in the meaning of quantification amounts to a form of logical pluralism via different introduction and elimination rules. Yet quantifier variance was not intended as a

[32] E. Evans-Pritchard, *Witchcraft, Oracles, and Magic Among the Azande* (Oxford: Clarendon Press, 1937). For discussion, see Newton C.A. da Costa, Otávio Bueno, and Steven French, 'Is there a Zande Logic?', *History and Philosophy of Logic* 19 (1998), 41–54.

view in the philosophy of logic, but rather as a metaontological view. However, quantifier variance cannot be interpreted as an ontological account since this requires a problematic understanding of quantification being inextricably tied to existence. As a result, quantifier variance fails to establish itself as a deflationary metaphysical doctrine. Finally, quantifier variance is internally inconsistent since it cannot make room for charitable translation alongside the rejection of a privileged quantifier in order to deflate metaphysical disputes. As such, the quantifier variance view just dissolves.[33]

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