# Names, Verbs and Quantification

NICHOLAS DENYER

## 1. Do names differ from verbs?

Sentences like 'Socrates runs' and 'Plato admires Aristotle' can easily be split into their constituent words. These words can easily be classified as either names (like 'Socrates', 'Plato' and 'Aristotle') or verbs (like 'runs' and 'admires'). Because there is a learnable knack of making such classifications, and because those who have learnt this knack agree, without prior collusion, on how to classify new cases, it is hard to doubt that there is something to the distinction between names and verbs. What quite does this distinction amount to?

Some philosophers base on this distinction between two sorts of expression some grandiose ontological distinctions between individuals and forms, particulars and universals, objects and concepts, or the like. Richard Gaskin has recently argued that such philosophers are mistaken.[1] Gaskin readily concedes the linguistic distinction between verbs and names. He argues however that this distinction does not mean anything much for ontology. There is, he says, 'no need to make a philosophy out of superficial grammar by refusing to accord verbs the status of names, and their referents therefore the status of objects' (p. 26). Thus, instead of Frege's hierarchy, with names (referring to objects) at the bottom, and verbs (referring to concepts) at the next level up, we could 'calibrate the same facts' (p. 30) by swapping the two around. We must, 'at least for natural language' (p. 31), draw a line between expressions for particulars and expressions for universals. Indeed, given that expressions have 'distinct logical valencies' (p. 30), we must draw the line so that all expressions like 'Socrates' fall on one side, while all those like 'runs' fall on the other. But neither that, nor anything else, is reason for 'Socrates' and its kin to fall on this side rather than that. For 'there is no absolute sense in which Socrates is a particular' rather than a universal (p. 30). Furthermore, whatever expressions we opt to put at whatever level of the hierarchy, 'all items in the hierarchy can be regarded as referring to objects, for they all admit of significant quantification in respect of their referents' (p. 33).

By these claims, Gaskin evidently intends more than the boring point that we could just change terminology. He doesn't want to say

[1] Richard Gaskin, 'The Unity of the Declarative Sentence', *Philosophy* **73** (1998) 21–45.



https://doi.org/10.1017/S0031819198004070 Published online by Cambridge University Press

just that we could start to apply the expression 'name' to words like 'runs' instead of, or as well as, to words like 'Socrates'. Rather, he wants to say something like this: whatever we call them, what we now call names and verbs are, in their own nature, so similar that both verbs and names are in fact as we take names to be, or at any rate so similar that verbs and names could be interchanged without it making any logical or metaphysical difference; thus the distinction between names and verbs goes little deeper than, for example, the conventional distinctions some languages draw between words that are, and words that are not, printed with a capital letter; and a sign of this similarity between names and verbs is the fact that we may quantify with equal ease over the referents of either.

There is however an obvious objection to these claims: if they are true, why should there be such huge differences between first-order quantification and quantification of other kinds?

## 2. First- and second-order quantification

In first-order logic, the quantifiers bind only name-variables, that is, variables occupying places that might be occupied by (what we now call) names. Thus, in first-order logic, we would be allowed to generalize 'Plato admires Socrates' only by such formulae as '(∃x)(x admires Socrates)' (i.e. 'Someone admires Socrates'), '(∀x)(Plato admires x)' (i.e. 'Plato admires everyone') and '(∃x)(∃y)(x admires y)' (i.e. 'Someone admires someone').

Here are three striking features of first-order logic. First, semantic consequence is compact. In other words, if some conclusion follows from some set of premises in the sense that there is no model whereby the conclusion is false and each premise is true, then the conclusion follows, in that sense, from some finite subset of those premises. Second, there is a complete and consistent proof procedure for logical truth. In other words, it is possible to define proof in such a way that there are proofs for all and only those formulae that are true in all models, and in such way moreover that a suitably programmed computer can check, for an arbitrary formula and arbitrary string of symbols, whether or not the string of symbols is a proof, in the sense defined, of the formula. Third, the Löwenheim-Skolem Theorem holds. In other words, if some formulae are true in some model whose domain contains infinitely many things, then for any infinite number, those formulae are true in a model whose domain contains that number of things.[2]

[2] Many textbooks give a more ample definition of these features, and prove that first-order logic has them. See e.g. George S. Boolos and Richard C. Jeffrey, *Computability and Logic* (Cambridge University Press, 1974) 131–56.



https://doi.org/10.1017/S0031819198004070 Published online by Cambridge University Press

In second-order logic, quantifiers can bind, not only name-variables, but verb-variables too. Thus, in second order logic, we would be allowed to generalize 'Plato admires Socrates', not only by such formulae as '(∃x)(x admires Socrates)', but also by such formulae as '(∃ϕ)(Plato ϕ Socrates)' (i.e. 'Plato does something to Socrates') and '(∃ϕ)(∃x)(Plato ϕ x)' (i.e. 'Plato does something to someone').

Second-order logic has none of the three features that we have noted in first-order logic. Second-order semantic consequence is not compact; there is no complete and consistent proof procedure for second-order logical truth; and there are second-order formulae that are true in countably infinite models, but false in models of other infinite sizes.[3]

There are therefore big differences between first- and second-order logic. These differences are accentuated by the following fact: they manifest themselves even if we confine our attention to formulae which contain only one quantifier binding a verb-variable. In view of these differences between first- and second-order logic, it is hard to believe that verbs can be assimilated to names in anything like the way that Gaskin envisages. No doubt we could adopt a terminology which has both verbs and names 'referring to objects'; but then, to do justice to the facts, we would have to say that some 'objects' are logically very different from others.

## 3. First- and pure second-order quantification

In my argument that verbs cannot be *assimilated* to names, so that both are understood as referring to objects, I have left untouched the contention that verbs and names could be *interchanged*; I have left untouched the contention that verbs might be understood as referring to objects, and names as referring instead to properties of those objects, without it making any serious logical or metaphysical difference. To show what is wrong with this contention, I need to compare first-order logic, not with second-order logic generally, but with *pure* second-order logic.

In pure second-order logic, quantifiers bind *only* verb-variables, and not also name-variables, as in second-order logic generally. Thus 'Plato admires Socrates' can be generalized only by such a formula as '(∃ϕ)(Plato ϕ Socrates)'. In pure second-order logic, any formula that is true in a model is true in some model of only finite size. To be exact, it is true in some model whose domain contains no more individuals than there are names in the formula. In consequence, logical truth for pure second-order logic is decidable: a

[3] For proof, see Boolos and Jeffrey, op. cit. note 2, 197–206.



https://doi.org/10.1017/S0031819198004070 Published online by Cambridge University Press

computer could be programmed to count the number of names in a formula, and then check whether or not the formula is false in any of the finitely many, finitely big, models whose domain contains no more individuals than the formula does names.[4]

First-order logic is quite different. Here there are formulae that are true only in infinitely big models. In consequence, logical truth is not decidable by any procedure like that for the logical truth of pure second-order formulae. Indeed, there can be no procedure whatsoever, of the foolproof and mechanical sort that could be executed by a computer, which when applied to an arbitrary formula will decide, in a finite amount of time, whether that formula is true in all models or false in some.[5]

In view of these stark differences between quantifying verb-variables only, and quantifying name-variables only, could there be any interesting truth in the claim that we can regard verbs, instead of names, as referring to objects?

## 4. Second-order quantification with monadic predicates.

There are signs that Gaskin was thinking solely of monadic predication, and that when he spoke of verbs, he had in mind only those verbs that are intransitive. Here is one such sign: Gaskin spoke of 'any syntactic component of a sentence which may occur more than once (as the main predicate by definition may not)' (p. 31, n. 2). On this principle, names cannot be predicates once transitive verbs are allowed; for with a transitive verb, the same name may well occur more than once in a single atomic sentence, as in the words of Shakespeare's Richard III: 'Richard loves Richard; that is, I am I.' On the other hand, if all our verbs are intransitive, then in no atomic sentence can a name occur twice, and so this principle would, as Gaskin plainly intended, allow names as predicates. Here is another sign that Gaskin had only intransitive verbs in mind: he tells us both that 'first-level predicates do not carry a determinate number of argument-places for second-level predicates', and that 'proper names can themselves be classified as second-level predicates' (p. 28). Now in a sentence formed with a transitive verb, such as 'Plato admires Socrates', we can hardly suppose that both these things are true; for the first-level predicate 'admires' needs a name on either end of it to make an atomic sentence, and so does carry a determi-

[4] For proof of the assertions here made about pure second-order logic, see Nicholas Denyer, 'Pure Second-Order Logic', *Notre Dame Journal of Formal Logic* **33** (1992) 220–24.

[5] For proof, see Boolos and Jeffrey, op. cit. note 2, 112–20.



https://doi.org/10.1017/S0031819198004070 Published online by Cambridge University Press

nate number of argument-places for names, and hence for second-level predicates, if that is what names can be classified as. On the other hand, if all our verbs are intransitive, then, as Gaskin plainly intended, names and verbs simply cannot be distinguished by whether or not they carry argument-places, or by the number of argument-places that they carry: the only way to form an atomic sentence will be by combining exactly one name with exactly one verb.

Since Gaskin does not seem to have had polyadic predication in mind, let us therefore now ignore it. In other words, let us now suppose that all our verbs are intransitive. What now becomes of the distinctions I have been drawing between first-order quantification and quantification of other kinds? They vanish. Once we allow only monadic predication, it makes no serious logical difference whether we quantify name-variables, or verb-variables, or both. Whichever we quantify, semantic consequence will be compact, logical truth will be decidable, and there will be no formulae true only in infinitely big models.[6] Thus, if all verbs were intransitive, the logic of quantifiers would provide little difficulty for Gaskin's contention that, because their 'referents equally admit of being quantified over' (p. 33), verbs can be interchanged with names, or even assimilated to them.

Gaskin's contention about verbs and names has therefore this modicum of truth: there is no difference between intransitive verbs and names that, in the logic of monadic predication, shows up in any difference between first-order, second-order and pure second order-quantification. But that is not much more than a modicum.[7]

*Trinity College, Cambridge*

[6] For proof, see W. Ackermann, *Solvable Cases of the Decision Problem* (Amsterdam: North-Holland Publishing Company, 1954) 41–47.

[7] Thanks are due to Richard Gaskin, for helpful correspondence.



https://doi.org/10.1017/S0031819198004070 Published online by Cambridge University Press