

RESPONSE TO WESTERSTÅHL

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In a paper published in an earlier issue of this journal (Ben-Yami 2009b) I argued that the approach which construes natural language quantifiers that are one-place determiners as binary generalized quantifiers has failed to explain why they are, according to it, restricted. I have also concisely developed there an alternative, Aristotelian-Geachian approach, which, I tried to show, explains both this feature of natural language quantifiers and the mentioned failure of the generalized quantifiers approach. I maintained that the ability of competing theories to supply an explanation of this phenomenon should be a criterion for deciding between them.

Professor Westerståhl replies to my paper (2012), arguing that my alternative approach is problematic and that it fails to improve on the generalized quantifiers one in explaining restriction. I shall try in this response to clarify the relevant aspects of my approach and why it does supply, as I claimed earlier, an improved explanation.

Let me first note, however, that an important part of my paper was devoted to criticising attempts by developers of the generalized quantifiers analysis of natural language quantifiers to explain why the latter are restricted. I presented and rejected (pp. 316–18) explanations suggested by Keenan and Stavi (1986, §2.7), Keenan (1996, p. 56) and Keenan and Westerståhl (1997, p. 852). In his reply, Westerståhl does not try to answer my criticisms, most of which he doesn't even mention. I take it as an indication that he found my criticisms conclusive. And indeed, later in his reply (§6.3) he explicitly adopts 'a more empirical view': restriction, he writes, 'may point to features of the language faculty in the human brain. Maybe a language with unrestricted quantification could never evolve with beings like us.' Westerståhl's view, that we might need to abandon any attempt to explain restriction on semantic principles, is surely a significant result of my paper.

Yet Westerståhl is not consistent in this view: near the end of his paper he writes that his 'guess is that with the semantic tools we have so far been using, no further explanation of quantifier restriction should be expected. To go deeper, we would need a richer framework.' He gestures towards a paper by Fernando (2001), 'which is quite technical [and] leads up to an intricate explanation of conservativity', but he does not pursue this suggestion any

further in his reply. I hope my simple explanation below will obviate the need for technical intricacies or recourse to brain sciences.

A central concept I use in developing my alternative approach is that of *plural reference*. But although Westerståhl has some difficulties with this concept (§2), I shall not defend it here. It goes back to Russell's 'the class as many' (1903); it reappears in Strawson's 'On Referring' and Geach's *Reference and Generality*; and then again in Black (1971), Armstrong (1978), Boolos (1984), Lewis (1991) and others. This is probably as much authority as one could wish for in analytic philosophy.¹ The basic idea is, however, simple: if we can use an expression to refer to a *single* individual, we can surely also use expressions to refer to *more than a single* individual. While 'my daughter', when I use it, refers to that one person, namely my daughter, 'my children' similarly refers to two persons, namely my daughter and my son. 'He', as demonstrative, is used to refer to a single individual, while 'they' is so used to refer to more than a single individual. It is hard to see what could be unclear in this idea.

The clarity of the idea and the apparent existence of plural referring phrases in natural language made philosophers attempt, in recent decades, to incorporate plural reference into logic and semantics. The need for such incorporation became clearer once Boolos (1984) and others noted various valid inferences in natural language that employ plural referring expressions and cannot be captured by standard versions of the predicate calculus. My approach can be seen as part of this attempt.²

A fresh look at model-theoretic semantics reveals something peculiar at its foundations: the universe or model, the domain over which we quantify, remains unspecified by what we say. The truth conditions of a quantified sentence are a function of its domain, but — assuming model-theoretic semantics gives the correct semantics of natural language — speakers never say what this domain is. This seems inadvisable, for misinterpretations might easily arise. On the other hand, it seems we are not familiar from our daily discourse with such misunderstandings. Something must have gone wrong in our analysis of natural language, but what?

¹ For recent developments, clarification and defence of the idea of plural reference see (Ben-Yami 2004, Part I), (Yi 2005–6, Part I), (McKay 2006, Chaps. 1, 2).

None of the philosophical literature on plural quantification is mentioned in Peters and Westerståhl's 528-page book of 2006, a book which discusses, as its title declares, *Quantifiers in Language and Logic*, and whose aim 'is to give a comprehensive picture of the whole area of quantification' (p. viii). The idea of plural reference is mentioned on pages 1–3 of the book, first to say that the book will not cover this topic and then to cast doubt on its importance to the semantics of quantification.

² For a comparison of my approach to other approaches in plural logic, those which follow Boolos, see (Ben-Yami 2009a).

The answer is, the lack of plural referring expressions from the calculus. Let us consider a quantified subject–predicate sentence, ‘ $q S$ are P ’, where q is a quantifier. From his *Begriffsschrift* on, Frege has interpreted the grammatical subject term S in such sentences as logically predicative (see, for instance (1892: 197–8)). All general terms are, according to him, logically predicative; only singular terms can be logical subject terms.³ This made it impossible for Frege to specify a plurality by means of any expression in language. The plurality over which we quantify remains unspecified in Fregean logic.

For Frege himself this was not a drawback, as in his semantics the domain is always the universal domain. But with the emergence of model-theoretic semantics with its variable domains, the difficulty came into being: a semantics which essentially involves an unmentioned — or even ineffable? — domain. If the domain is that important, why not specify it?

The answer is that natural language of course does specify its ‘domain’. By contrast to the predicate calculus, natural language has plural referring expressions, which it uses to specify the plurality over which we quantify. In a sentence of the form ‘ $q S$ are P ’ the grammatical subject term S is used as a plural referring expression, determining the plurality over which we quantify. For instance, if I say, when discussing an exam I gave, ‘Most students arrived on time’, I use ‘students’ to refer to the students that took my exam; and I use the quantifier ‘most’ to specify to how many of them the predicate, ‘arrived on time’, applies.

Since quantification necessarily involves a plurality over which we quantify, it is most natural that we should have expressions to specify that plurality, as indeed natural language has. Only the lack of plural referring expressions from the predicate calculus made logicians blind to the mentioned function of the grammatical subject term, and brought them to misinterpret it as logically predicative.

Westerståhl practically agrees (§2) that once we interpret the subject term S as a plural referring expression, natural language quantifiers turn out to be necessarily ‘restricted’. And I hope I have clearly explained above why this interpretation is not built in by ‘a mere stipulation’ but ‘for independent principled reasons’ (§6.3). This is therefore a significant advantage over the generalized quantifiers approach of the approach that interprets the grammatical subject term S in ‘ $q S$ are P ’ as a plural referring expression. The inverted commas around ‘restricted’ above are due to the fact that the interpretation of natural language quantifiers as restricted, in the sense this term

³For a presentation and criticisms of Frege’s arguments for his position, see (Ben-Yami 2006).

has within the logic of generalized quantifiers, is applicable only if we construe the former as binary generalized quantifiers, a construal I of course reject. A different explanation of restriction, independent of this construal, is given below, quoted from Westerståhl. I shall briefly present there my explanation of restriction; but first a few more words on domains of discourse.

As I explicitly noted in my earlier paper (p. 321) and as could be seen above, according to my approach natural language has no domain of discourse in the technical sense of predicate logic semantics, namely, an unspecified but presupposed plurality over which we quantify. Against this Westerståhl gives the following example:

Suppose I describe a tram ride to my friend, and how at some point the tram stopped due to a power failure, and all passengers had to get out. I might end my discourse with:

(10) Everyone left.

It can be quite natural to assume that my discourse has built a temporary universe consisting of people in the tram (even if I used no expression denoting that set), and so (10) automatically means what I intended it to mean, i.e. that *everyone in the tram* left. (§4)

Westerståhl then struggles with the question, whether 'one' in 'everyone' might not be doing the plural referential work. To save himself this issue, he could have used the example I brought in my paper, 'the second contribution to the following exchange: "Have all students arrived?" — "No. Some are missing."' (p. 324). So despite the impression Westerståhl may unintentionally have created, I was well aware of this possible objection. I there classified it as a special 'elliptic' case, but given Westerståhl's objection, I shall say a few more words about it here.

First, notice that this is a special specific case; even if it were a case of an unspecified yet presupposed domain of quantification, it would not follow that in, say, 'Most students have arrived' the domain is not explicitly specified by the general noun 'students', and it would not therefore prove that my analysis is mistaken. But secondly, both in Westerståhl's example and in mine, a plural referring expression which explicitly specifies the domain *was* used, albeit in an earlier sentence: Westerståhl's story contains the earlier sentence, 'all *passengers* had to get out', and my exchange contains 'Have all *students* arrived?'. Accordingly, a Gricean conversational maxim, Avoid Unnecessary Prolixity (Grice 1967: 27), would dictate that the speaker should not repeat what need not be repeated. And *we* should remember that these Gricean principles were intended to show which cases

should *not* bring us to modify our semantics. The fact that no explicit plural referring expression is used in these 'elliptic' sentences is predictable *on* my analysis, given Gricean principles and the fact that the appropriate plural referring expression has just been used. So we can still maintain that the alleged implicit domains of quantification, discourse universes or 'temporary universes', which are 'theoretical tools used by the semanticist' (§4), are redundant. Moreover, both in Westerståhl's example and in mine, the plurality necessary for quantification has been specified earlier in the discourse (passengers, students), and the common noun that usually follows the quantifier is absent. This supports the claim that the role of this common noun, when it *is* used, is to specify the plurality over which we quantify. For this reason, when this plurality has just been specified, the common noun is redundant and can be omitted. These 'elliptic' cases thus *support* my analysis.

Westerståhl proceeds to note that some sentences in natural language require what he calls *context sets*, for instance:

- (1) Wherever John shows up, most people tend to leave.

Here, he claims, we quantify over (locations and) sets or pluralities of people in the vicinity of John at each place. No constituent of (1), and no token or use of 'people', refers to these context sets or pluralities, he claims, yet still these context sets are needed.

Again, even if Westerståhl were right and such examples did show that some sentences require a presupposed and unspecified domain of quantification (here, a plurality of sets or pluralities), this would not show that in 'Some students were late' the noun 'students' is not a plural referring expression explicitly specifying the domain of quantification; thus it would not prove my analysis wrong or the generalized quantifiers one right. But, secondly, I think it does not show what Westerståhl claims it does. Consider the sentences

- (2) Jotham loves his mother.
 (3) Every child loves his mother.

While 'his mother' is a referring expression in (2), designating Jotham's mother, it refers to nothing in (3). So do we need a special analysis of 'his mother' in (3), something like context sets of mother singletons? — of course we do not: for any *substitution* of a child's name for 'every child' in (3), 'his mother' then refers to the mother of the designated child; this is how the meaning or truth conditions of (3) are determined. Since in (3), 'his mother' is anaphoric on a *quantified* noun phrase, it acquires reference

only when an appropriate referring expression is *substituted* for the quantified noun. To claim that a special kind of quantification, reference or what have you is necessitated by 'his mother' in (3), would be similar to the following line of argumentation. Compare the formulas

- (4) $p \rightarrow q$
 (5) $(x)(Px \rightarrow Qx)$

In (4), \rightarrow stands for the material implication, namely, the truth-function TFFT. But, one might argue, since neither its antecedent nor its consequent has a truth value in (5), it cannot be a truth function there, and a special interpretation of \rightarrow is needed in this case. We of course reject this argument, since for any *substitution* of a constant for the variable in the parentheses, \rightarrow is interpreted as the truth function TFFT. More generally, parts of speech that appear within the scope of a quantifier may contribute to the determination of the meaning of the quantified sentence through their contribution to the meaning of substitution instances of that sentence. This is also the case with multiply quantified sentences, such as (1) or the following one:

- (6) Every child likes most of his classmates.

Westerståhl would have us quantify in (6) over an unspecified yet presupposed set of context sets of classmates. My alternative explanation is as follows: 'his classmates' does not refer to anything in (6); however, for any appropriate substitution of a child's name for 'every child', 'his classmates' then designates that child's classmates, and the sentence is true just in case the child likes most of them. And (6) is true just in case every such substitution yields a true sentence. Again, this interpretation follows directly from the application of general rules for the interpretation of parts of speech within the scope of a quantified noun phrase. So I do not think that even for the more complex case of multiply quantified sentences did Westerståhl succeed in showing that my rejection of implicit quantification domains does not apply.⁴

I explained in section 4 of my earlier paper on a priori grounds why natural language quantifiers that are one-place determiners are necessarily restricted on my approach. But I shall concisely repeat the main idea here. First, let us explain what restriction amounts to. I quote Westerståhl's informal explanation, which opens his reply, and which I find no less clear or precise than any formal one:

⁴I discuss multiply quantified sentences, bound anaphora and related issues in more detail in (Ben-Yami 2004, Chaps. 7, 8).

Natural language quantification is *restricted*, in the sense that the truth or falsity of a sentence like

(1) Most students came to the party

is independent of (a) how many non-students there were at the party, and (b) how many individuals in the universe of discourse are neither students nor party guests. That is, quantification is restricted to the set of students.

On my approach, there is no universe of discourse involved in the truth conditions of 'Most students came to the party', and of course no non-students are mentioned by it; its truth value is therefore *necessarily* independent of these. Quantification is thus necessarily restricted to the plurality of students. I am sure readers would agree that this semantic explanation of restriction is not technically intricate and of course makes any recourse to brain science redundant.

Westerståhl devotes §3 of his paper to proving that any natural language quantifier realizable on my approach can also be interpreted as a restricted binary quantifier, and *vice versa*. This, I think, is redundant, for it was one of the central claims of my paper. My additional claim was that the generalized quantifiers approach cannot explain why *only* these quantifiers are realized in natural language, while my alternative approach can. As we saw, Westerståhl indeed admits that this has not been explained by the former approach. He also wonders whether I could prove on my approach non-trivial facts, for instance, that the binary quantifier *most* is not definable by any unary quantifiers (§5). Now although I supplied a simple proof of that in my paper (pp. 311–312), of course when we come to unary or binary quantifiers, which presuppose a domain of quantification, my approach to quantification will not apply. It was intended to apply to natural language, and not to a formal system which I claim fails to capture the semantics and logic of natural language. A different but related and relevant question, which Westerståhl raises at the end of section 4, is whether it is possible to do natural language semantics on my approach with a formal system as powerful as model-theoretic semantics, but without using discourse universes etc. The reply here is affirmative, and I have mentioned in my earlier paper two works that do just that ((Lanzet and Ben-Yami 2004), (Lanzet 2006)).

I addressed in this response only Westerståhl's main objections and what I take to be misunderstandings. I thus pass over a few minor points in silence. I shall end with the following comment. Westerståhl interprets my remark, that 'the ability of competing theories to supply an explanation [of restriction] should be a criterion for deciding between them', as if I meant

by it that this should be the *sole* criterion. (Ben-Yami 2009: 309; Westerståhl 2010, Introduction and §5) But this is not what I meant: I wrote that it should be *a* criterion, not *the* criterion; other strengths and weaknesses of theories should of course also be considered. Additional advantages of my approach were not the subject of the paper to which Westerståhl replied, but they can be found in (Ben-Yami 2004), where my system is developed in much more detail. I show there how my approach explains away an alleged ambiguity of the copulative structure; how it explains semantic analogies between empty singular terms and empty general terms; how it explains the semantic need for active–passive voice distinction, converse relation-terms or similar reordering devices; and more. Other strengths of my Aristotelian-Geachian approach are discussed in (Ben-Yami 2009a: §3), vis-à-vis plural quantification logic. A deductive system built on its basis, which incorporates Aristotelian logic and is not less powerful than the first order predicate calculus can be found in (Ben-Yami 2004: Part III) and (Lanzet 2006). The decision between the different approaches should of course take all this into consideration.

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REFERENCES

- Armstrong, D.M. 1978: *Nominalism and Realism: Universals and Scientific Realism*. Volume I, Cambridge University Press.
- Ben-Yami, H. 2004: *Logic & Natural Language: On Plural Reference and Its Semantic and Logical Significance*. Ashgate, Aldershot. Revised and updating version at <http://philosophy.ceu.hu/publications/ben-yami/2004/15107>.
- Ben-Yami, H. 2006: A Critique of Frege on Common Nouns. *Ratio* 19: 148–155.
- Ben-Yami, H. 2009a: Plural Quantification Logic: A Critical Appraisal. *Review of Symbolic Logic* 2: 208–232.
- Ben-Yami, H. 2009b: Generalized Quantifiers, and Beyond. *Logique et Analyse* 208: 309–326.
- Black, M. 1971: The Elusiveness of Sets. *The Review of Metaphysics* 24: 614–36.

- Boolos, G. 1984. To Be is to Be a Value of a Variable (or to Be Some Values of Some Variables). Reprinted in his 1998: *Logic, Logic, and Logic*. Harvard University Press: 54–72.
- Fernando, T. 2001: Conservative Generalized Quantifiers and Presupposition. *Semantics and Linguistic Theory* XI: 172–91.
- Frege, G. 1892: Über Begriff und Gegenstand. *Vierteljahrsschrift für wissenschaftliche Philosophie* 16: 192–205.
- Geach, P.T. 1962: *Reference and Generality: An Examination of Some Medieval and Modern Theories*. Emended edition 1968. Cornell University Press.
- Grice, H.P. 1967: Logic and Conversation. Reprinted in his 1989: *Studies in the Way of Words*. Harvard University Press: 1–143.
- Keenan, E. 1996: The Semantics of Determiners. In Lappin, S. (ed.): *The Handbook of Contemporary Semantic Theory*. Blackwell, Oxford: 41–63.
- Keenan, E. and Stavi, J. 1986: A Semantic Characterization of Natural Language Determiners. *Linguistics and Philosophy* 9: 253–326.
- Keenan, E. and Westerståhl, D. 1997: Generalized Quantifiers in Linguistics and Logic. In van Benthem, J. and ter Meulen, A. (eds.): *Handbook of Logic and Language*. Elsevier, Amsterdam: 837–93.
- Lanzet, R. 2006: *An Alternative Logical Calculus: Based on an Analysis of Quantification as Involving Plural Reference*. Thesis submitted at Tel-Aviv University.
- Lanzet, R. and Ben-Yami, H. 2004: Logical Inquiries into a New Formal System with Plural Reference. In Hendricks, V. et al. (eds.): *First-Order Logic Revisited*. Logos, Berlin: 173–223.
- Lewis, D. 1991: *Parts of Classes*. Blackwell, Oxford.
- McKay, T.J. 2006: *Plural Predication*. Clarendon Press, Oxford.
- Russell, B. 1903: *The Principles of Mathematics*. Second edition 1937. George Allen and Unwin, London.
- Strawson, P.F. 1950: On Referring. Reprinted in his 1971: *Logico-Linguistic Papers*. Methuen, London: 1–27.
- Westerståhl, D. 2012: Explaining Quantifier Restriction: Reply to Ben-Yami. *Logique et Analyse* 55: 109–120.
- Yi, B. 2005–6: The Logic and Meaning of Plurals. *Journal of Philosophical Logic* 34: 459–506 & 35: 239–88.