ABSTRACTS

A2.21 Philosophical Logic

The Quantified Argument Calculus and Natural Language

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I present the Quantified Argument Calculus (Quarc) and show how it sheds light on various aspects of NL. Quarc is a recently developed logic system in which quantifiers join one-place predicates to form arguments, as in NL syntax. In NL, both ‘John’ and ‘All students’ occur in the argument place of the sentences, ‘John is clever’ and ‘All students are clever’. Correspondingly (writing the argument to the left of the predicate), these two sentences are formalised in Quarc as (j)P and (S)P.

The formal system is introduced, and distinction between it and the Predicate Calculus are noted. For instance, like NL, Quarc has both sentential negation and predication negation. NL sentences ‘It’s not the case that John is clever’ and ‘John isn’t clever’ are formalised, ¬(jP) and (j)¬P. This is essential when quantified sentences are considered, for predication negation is necessary for capturing the difference between ‘It’s not that some students are clever’ and ‘Some students aren’t clever’: ¬(S)P and S¬P. This explains the semantic reason why all natural languages contain both modes of negation, a thing redundant and absent from the PC. We see that Quarc, being closer to the syntax of NL, can explain this feature of NL.

I continue to introduce a few more features of Quarc. For instance, while Quarc makes no use of variables (again sharing this feature with NL, unlike the PC), it has to make use of anaphora. Similarly, expressive completeness forces Quarc, like NL and unlike PC, to have some way of reordering the arguments in the sentence, in this manner explaining the presence of some such device in any language.

Some additional results are also presented, e.g. the extension to modality, where again we have closer proximity to NL. The formal properties of Quarc are also mentioned: soundness, completeness, etc.

Games and the pragmatics of quantifier scope disambiguation

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One standard assumption in logic and in the semantics of natural languages is that a sentence whose surface syntax displays two or more different quantifier phrases is
ambiguous. Scope ambiguities arise when the distributions of quantifiers at the level of the sentence's logical form generate different interpretations of the sentence. When the first quantifier syntactically profiled in the sentence outscopes the second quantifier, the former has a wide scope while the latter, being in the nuclear scope of the former, has a narrow scope. The inverse scoping is when the above mentioned linear order of the quantifiers is reversed: the second quantifier scopes over the first and consequently takes a wide scope. In this paper, I will isolate, according to my own methodological principles, a class of doubly-quantified sentences having a reading which is pragmatically blocked. Sentences in which the occurrence of the determiner corresponding to the existential quantifier syntactically precedes the occurrence of the determiner corresponding to the universal quantifier, will have an object narrow scope reading which is pragmatically blocked and formally not entailed by the object's wide scope reading. Similarly, sentences in which the occurrence of the determiner corresponding to the universal quantifier is syntactically introduced before the occurrence of the determiner corresponding to the existential quantifier, will have an object narrow scope reading which is pragmatically preferred to a wide scope interpretation of the object which, in this case, will be contextually blocked. In order to explain the quantifier scope disambiguation and the contextually dispreferred reading of these doubly-quantified sentences, I will use a game-theoretical analysis. I will offer arguments showing that the preferred reading is a Pareto-efficient Nash equilibrium of the game which models these sentences' interpretation and that this unique solution is best captured within the Parikh's framework of games of partial information.

An explication of the concept EXPLICATION in the framework of hyperintensional logic

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Carnap's work on explication (1947, 1950) has been recently intensively studied (see e.g. Klein and Awodey 2004, Carus 2007, Wagner 2012). That the very concept EXPLICATION is not generally well understood is evident from the common view (e.g. Belnap 1993) that explication is something like a definition. A little reflection reveals that such view is certainly wrong: Carnap's explication replaces an intuitive, imprecise concept (the explicandum) by a rigorous correlative concept (the explicatum). In his "An Explication of 'Explication'" (1968) Hanna identified explication with the function which maps predicates such as P to predicates such as Q, whereas the extensions of P and Q are similar. There are several reasons why Hanna's otherwise valuable attempt should be dismissed. For example, his proposal makes explication language dependent: his explication of the ('international', language independent) concept EFFECTIVELY CALCULABLE FUNCTION turns to be an explication of the English expression "effectively calculable function" only. I suggest a rivalling explication whose pivotal idea is that we explicate concepts, not object; only concepts, not objects, can encompass contradictory properties, which corresponds to conflicting intuitions as regards a particular notion. The logical framework here employed is rather general; it is Tichý's (1988) ramified version of simple type theory. The framework enables us to implement (not only) Church's (1950, 1984) idea that any expression expresses a concept - a structured, hyperintensional procedure - which determines an object, which is the denotatum of that expression. (For
such explication of the concept CONCEPT see e.g. Materna 2004, or Duží, Jespersen, Materna 2010 and my 2011, 2014.)

I explain that the concept EXPLICATION (which belongs to meta-explication framework) determines a partial identity function from concepts to concepts (this can be widened to classes of concepts). I demonstrate that the proposal fits Carnap’s four conditions characterizing explication and other desiderata.