MICROSCOPY AND DIACHRONY OF BOOLEAN ATOMS:
MORPHOSYNTACTIC CHANGE OF LOGICAL CONSTANTS

This paper investigates diachronically the nature of syntactic-semantic atoms of propositional logic, used to express logical constructions like quantification, coordination and interrogation. With a two dimensional focus on synchronic typology and diachronic developments, the paper explores the ways in which Indo-European (IE) and Japonic specifically and Natural Language more generally incarnates logical terms.

Languages consistently contain a single set of two superparticles—the 'conjunctive' particle μ and the 'disjunctive' particle κ—which handles universal/existential as well as conjunctive/disjunctive constructions respectively, as investigated by Kratzer and Shimoyama (2002), Szabolcsi (2013), and Mitrović and Sauerland (2014), among others. Aside from the latter coordinate/quantification semantics, μ may also serve as an additive and κ as an interrogative element. This paper unifies not only the semantic but also the syntactic distribution of the contextual incarnations of the two kinds of particles by investigating the diachronic facts and processes underlying these linguistic phenomena.

Empirically, the paper focuses on a morphologically rich collection of ancient (and modern) Indo-European (IE) and Japonic languages, which—through their morphology—reveal otherwise silent syntactic material that we fail to find in other languages (such as Japanese). The silent syntax we uncover by examining such languages points, among other things, to a syntactically—and semantically—*neutral* concept of *junction*, which is structurally and interpretationally the foundation underlying the systems of *con*junction and *dis*junction. By breaking down coordination into separate synatctic layers, the paper captures the syntactic and semantic differences, lying in the amount of layered syntactic projections, as well as the core components of the kinds of meanings the pair of particles dictates.

Through a review of a rich collection of data featuring a surprisingly uniform class of superparticles, I examine the relation between grammar and logic, that is, the way in which syntax encodes logical primitives. Partee (1992, 124f) has meditated on such encoding writing that "[n]atural language expression which seem to call for an analysis in higher types . . . tend to belong to small closed syntactic categories whose members seem very close to being universal." The paper explores, at least a fraction, of the diachronic nature of two such primitive categories, which I label μ and κ.

The general thrust of the work examines the natural linguistic status of Boolean algebraic structures. A Boolean algebra, or at least a Boolean subalgebra for conjunction and disjunction, in simplest formal terms, is a tuple containing a lexicon (L) and two boolean operators, defined over L (1). Driven by morphosyntactic evidence, the paper proposes a novel composition of exclusive disjunction, based on the resulting embedded exhaustification of the disjuncts. It will be shown that natural linguistic words like 'and' and 'or' are not direct incarnations of '$\wedge$' and '$\vee$' (in some languages, at least). Rather, 'and' and 'or' are subsets of two broader classes, μ and κ respectively. I will also present a unification of the two classes by appealing to (potentially iterative) exhaustification ($\mathfrak{X}$), following Chierchia (2013), as a semantic signature of μ, and the inquisitive operator (**?**) as a semantic signature of κ, following the formal system of Ciardelli and Groenendijk (2012) and Ciardelli et al. (2013), inter. al., and its implementation in Lin (2014). I also motivate a syntax and semantic for the J(unction) operator (head), with a pair-forming meaning in form of a (bullet) $\bullet$-operator, as originally proposed in Winter (1998, 1996). J thus pairs up two μ- or κ-headed constituents are delivers conjunction and/or disjunction, respectively. Rather than (1), a natural language (super-) Boolean algebra of natural languages ends up looking more like (2).

(1) $\langle L, \wedge, \vee \rangle$

(2) $\langle L, \mu, \kappa, J \rangle = \langle L, \mathfrak{X}, \mathbf{?}, \bullet \rangle$

The analysis explains this multi-functionality of conjunction and disjunction words by fine-graining their syntactic representations and attributing the differences in meaning to the amount of syntactic projection. The range of meanings that the pair of μ- and κ-particles yields—including quantification, scalar/polar expressions, coordination, focus, interrogativity—is thus a compositional consequence of the powerfully meaningful grammatical formatives sketched in (2).

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