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James R. Hurford, Language and number. The emergence of a cognitive system. Oxford: Basil Blackwell, 1987, 322 pp. $49.95.

Reviewed by Michel FAYOL*

The numerical systems of language are intrinsically interesting for at least three reasons. First, from a linguistic point of view they are structured by a finite lexicon and a simple morphology. Thus, from a Saussurian and purely synchronic standpoint, they are easy to analyze and compare to each other. Second, they are also social objects, which among other things must be acquired and function during social interaction. It follows that modifications of varying degrees will occur during the course of history. Third, they are created, acquired, and manipulated by human beings whose limited cognitive abilities both enlarge and restrict their potential for processing.

Up until now, these three perspectives have remained more or less isolated from each other. It was up to James Hurford to attempt and succeed in formulating a synthesis that so masterfully links all three.

In the first part of the book, the author points out that 'natural Language numeral systems' (p. 14) present a '*universal series of irregularities*' p. 49: the use of 1 (= 1 deletion); *base suppletion*, ... Such irregularities are perceived in relation to what would be an ideal of regularity (cf. *Modern Welsh*, p. 84,

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which, as a complete, invented system, has no irregularities). And one must try to explain why they appeared and still remain. According to Hurford, irregularities are the trails of the successive phases of organization throughout history.

Indeed, numeral languages are social objects. Hence in explaining their acquisition, development, and functioning, we are led to abandon a purely Saussurian approach. To understand how *numeral languages* have evolved, we must resort to 'a *social diachronic explanation*' (p. 261). In order to prove the validity of this conception, the author examines three hypotheses pertaining to the origin of numbers (chapter 3): *referential/pragmatic*, *conceptual/verbal*, *ritual*. He shows that each of them has its strong and weak points. This leads him to propose '*a pluralist account*' (p. 110) whereby the different cognitive modalities of number construction – *perceptually based*, then *language based*, etc. – have left traces in the linguistic systems of *numeral* formulation (for example, in some languages, numeral terms are inflected up to 2 or 3).

Thus, according to Hurford, numerals are '*collection denoting expressions*' (p. 206) that have been elaborated in the course of history, then modified to suit the needs of expression. When new numerosities had to be expressed, various '*inventors*' devised formulations in accordance with their prior knowledge: isolated lexical items, then syntactic combinations, and so on. Different solutions were thus found for the same formulation problem. A '*standardization*' phase followed the creation phase. This second, very long phase resulted in the gradual elimination of certain expressions to the benefit of others. The processes behind this natural selection, as it were, are very simple. In chapter 6, the author shows quite well just how the increasing dominance of the decimal system can be explained solely by the multiplicity of social interactions, without relying on any other mechanism. His simulation on a computer confirms the plausibility of this explanation. Although the author does not mention it, this reminds us of the procedure used by the advocates of connectionist theory to 'generate' prototypical representations.

The *social diachronic* perspective taken by the author thus enables him both to explain the persistence of universal irregularities in *numeral languages*, and to infer the existence in human beings of cognitive abilities underlying the construction and use of numbers. For example, according to the author, if *numerals* are first used as adjectives or in predicates, it is essentially because of the low salience of numerosity in comparison to other dimensions (such as color, shape). This has two consequences. First, the greater the quantities to which one is referring, the more often *numerals* are used as nouns (virtually as proper nouns): salience in fact depends on the numerosity itself. Second, as cognition progresses, the transition from the use of *numerals* as 'satellites of the nouns' to their use as nouns involves a 'radical conceptual shift' (p. 206). The difficulties encountered by children are a witness to the significance of this shift.

In the *social diachronic* perspective, it is possible to join the synchronic point of view, i.e. the current state of a numeral system, and the historic point of view, i.e. how and why this system changed as it did. This perspective is based on the assumption that subjects – individuals whose interactions result in *standardization* – are endowed with certain basic abilities. In chapter 7, the author shows that numerical abilities essentially rely on language as a tool. According to Hurford, only the *cardinality principle* cannot be derived from linguistics.

Hurford's analysis is impressively relevant and clear. By avoiding the question of the essence of numbers, and looking instead at the problem of the origin, development, and functioning of *numerals* within linguistic systems, he shows that to explain the entire set of observed phenomena, it suffices to postulate:

- the existence of language as a set of subsystems evolving over time;
- the pragmatic factors that induce selection and gradual *standardization*;
- a highly economic model of the psychological subject, endowed with a few basic aptitudes for acquiring language, the ability to conceive of objects and collections, ..., the principle of cardinality (cf. p. 305), but also – although only mentioned in passing by the author – equipped with limited information processing capacity.

By incorporating all of the above into one remarkably concise conception, the author certainly has met his challenge: to demonstrate that a linguistic approach to verbal numeration can contribute to understanding not only what numbers are, and how they are organized and evolve, but also the way in which human subjects acquire and process them. At a time when research in this field is becoming more and more common, this book makes an original and rich contribution.

Joachim Jacobs, Syntax und Semantik der Negation im Deutschen. München: Wilhelm Fink Verlag, 1982. 455 pp.

Reviewed by Eva KOKTOVÁ*

In the book under review, negation in German is described within the framework of Montague Grammar in terms of three types of relations ('Bezugsarten') of negation: syntactic range ('syntaktischer Bereich'), semantic range ('semantischer Bereich'), and focus ('Fokus'). This is done with respect to two basic types of negation: contrastive ('kontrastierende Negation', KN) and noncontrastive ('nicht-kontrastierende Negation', NKN). These two types

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