

Eademne Sunt?

Hans-Martin Gärtner¹

[1] *Hungarian Research Network. Research Centre for Linguistics, Budapest, Hungary.*

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Corresponding Author: Hans-Martin Gärtner, Research Centre for Linguistics, Budapest, Benczúr u. 33, 1068 Budapest VI, Hungary. E-mail: gaertner@nytud.hun-ren.hu

Abstract

This paper is a reaction to Watumull and Roberts (2023, <https://doi.org/10.5964/bioling.12393>).

Keywords

Leibniz, addition, merge, associativity, idempotence

In a recent squib (Gärtner, 2023), I pointed out that standard axiomatizations of the Leibnizian "real addition" operator \oplus include associativity, (1), as one of its properties (cf. Lenzen, 2000, Section 4; Rescher, 1954, p. 11; Swoyer, 1994, p. 15):

(1) Associativity: $(A \oplus B) \oplus C = A \oplus (B \oplus C)$

It was further maintained that associativity does not hold for Chomskyan Merge and that therefore the suggestion by Roberts and Watumull (2015, p. 213) to "identi[fy]" the two operators, the former renamed "Lerge," was problematic.

In their reply, Watumull and Roberts (2023) dismiss the associativity challenge on the basis of the idea that from a global perspective, for any (syntactic objects) X , Y , and Z , Merge generates all possible combinations, $\{\{X, Y\}, Z\}$ and $\{X, \{Y, Z\}\}$ among them. And, importantly, it is assumed that "[t]he order of operations only matters when we seek to understand what parts of our knowledge we can *use*, factoring in third factors, etc." (p. 2). Effects of the structural differences are taken to be "external to the internal properties of Merge and the structures it generates" (p. 2f.).

To see what is at stake here, it has to be noted that (1) states an identity, postulating equivalence of the two sides. This usually gets interpreted as substitutability *salva veritate* in the case of \oplus , which for Merge could be changed to (at least) *salva grammata*



ticalitate. Thus, concentrating on the latter, for any structural context κ , $\kappa[\{\{X,Y\},Z\}]$ and $\kappa[\{X,\{Y,Z\}\}]$ would both be "well-formed" by associativity. Of course, on such premises, interface effects of thematic interpretation or grammatical function assignment (mentioned in both the squib and the reply) won't constitute any obstacles. But what about the structural make up of the syntactic objects involved: featural differences, specifier vs. complement, asymmetric c-command etc.? Indeed, [Watumull and Roberts \(2023\)](#) are ready to flout the "grammaticality" constraint in taking it that (internal and external) "Merge generates all possible structures, only some of which converge (where convergence is dependent upon satisfying factors extrinsic to Merge)" (p. 3).

Let's turn to the axiom of idempotence, (2) (cf. [Lenzen, 2000](#), Section 4; [Rescher, 1954](#), p. 11; [Swoyer, 1994](#), p. 15), which wasn't elaborated upon in the squib.

(2) Idempotence: $A \oplus A = A$

[Watumull and Roberts \(2023, p. 1\)](#) consider it "unproblematic for the Merge = Lerge conjecture," assuming that it "is simply the case of Internal Merge applied to a single lexical item, yielding the successor function." In line with the exposition by [Chomsky \(2020, p. 24\)](#), (the initializing step of) this can be formulated as in (3a), with IM short for "Internal Merge." (3b) provides a notation with M short for generalized binary "Merge" to make the relation to (2) more transparent.

(3) a. $IM(0) = \{0,0\} = \{0\}$
 b. $M(0,0) = \{0,0\} = \{0\}$

Now, clearly, the notion of a successor function demands that input and output are different, $n \neq \text{successor}(n)$, and indeed $0 \neq \{0\}$ ("zero" is unequal "one"). This, however, is in contrast to what idempotence says, where A added to itself is equivalent to (just) A. Discussing the reasons why Leibniz adopts idempotence for "real addition"—but not for its counterpart from arithmetics ([Lenzen, 2004](#), p. 21)—would lead back to several of the points already made in the squib.¹

1) [Watumull and Roberts \(2023, p. 3\)](#) add an appeal to "scholarly scrupulous[ness]," a substantial part of which could have been avoided if they had consulted the published version of the squib rather than an earlier draft. Their conjecture that "perhaps Leibniz knew what he was doing" in omitting associativity, i.e., that he was striving for a non-associative calculus, would seem to require additional exegetic backup. It is quite compatible with the available evidence—considering both the diversity, vastness, and complexity of projects pursued by Leibniz and contemporary mathematical practice (cf. [Hailperin, 2004](#), p. 327)—that Leibniz knew what he was doing while at the same time "overlooking" (cf. [Lenzen, 2004](#), p. 19) some (tedious) details.

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