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Can logic change over time? On the one hand, the logical concepts, as expressed by function words (*every, some, and, if*), are subject to the evolutionary forces shaping natural language vocabulary. Since natural language undergoes constant and continuous change, so do the logical concepts expressed through it. On the other hand, the logical operators are unchanging: as part of the abstract mathematical realm there can be no more change in logic than there can be in mathematics.

Our goal is to make some headway on a possible reply to this dilemma. We begin by characterizing two senses of the word 'logic', distinguishing, following Harman [2], between a *theory of deduction* and a *theory of reasoning*. This distinction is used to defuse Quine's [6] famous objection to the possibility of change in logic: according to Quine, there can only be wholesale replacement of logical theory but no incremental development ('change of logic, change of subject'). We then present two arguments in favor of the possibility of change in logic, one from a naturalistic perspective on scientific explanation [3] and the other from considerations of open texture [7, 4].

Having argued for change in logic, we owe an account of logical meaning that, on the one hand, shows how logical concepts can change while, on the other, explains their relative robustness when it comes to conceptual change: the logical vocabulary can change, but not as fast as nouns and predicates do. To this end we first discuss a proposal based on Došen's [1] idea that the logical constants mark structural features of deductive reasoning. We then reject the problematic underlying assumption of a stable *core meaning*, to sketch an account that makes room for a more flexible treatment of the identity and individuation of logical concepts, elaborating on an old theme from Putnam [5].

## References.

[1] K. DOŠEN, Logical Constants as Punctuation Marks, Notre Dame Journal of Formal Logic, vol. 30 (1989), pp. 362–381.

[2] G. HARMAN, Logic and Reasoning, Synthese, vol. 60 (1984), pp. 107–127.

[3] P. MADDY, *Second Philosophy: A Naturalistic Method*, Oxford University Press, 2007.

[4] D. Makovec and S. Shapiro, editors. *Friedrich Waismann*, Springer International Publishing, 2019.

[5] H. PUTNAM, Three-Valued Logic, Philosophical Studies, vol. 8 (1957), pp. 73–80.

[6] W.V.O. QUINE, *Philosophy of Logic*, Harvard University Press, 1970.

[7] F. WAISMANN, Verifiability, Aristotelian Society Supplementary Volume, vol. XIX (1947), pp. 119–150.