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Revisiting the quantitative phylogeny of the Uralic languages

Phylogenetic tools have gained a foothold in recent historical linguistics over the last years, with applications that already reach further than creating quantitative topologies for languages. In addition, effort is put into fine-tuning existing methods and data, and re-evaluating the existing phylogenies. Here we present approaches with which we optimize and re-evaluate the quantitative Uralic phylogeny by using cognate coded basic and less basic vocabulary data. First, we take into account the heterogeneous stability of meanings in lexical data. We experiment this with both manual partitioning strategies, where the characters are divided into clusters with different rate of change using a priori knowledge (e.g. semantic category), and algorithmic partitioning strategies, where the characters are divided using heuristic techniques that assign stability ranks for each character. The second approach is to improve the divergence time estimates by analyzing the partitioned data and using improved evolutionary models designed for languages. Finally, we also examine the divergence structure of the Uralic family using a new tool, which allows for assessing whether the divergence event resembles polytomous or binary branching. When comparing different ways to partition the data, we found that algorithmic techniques were more successful than manually created partitioning approaches. The timed tree based on algorithmic partitioning and language-specific evolutionary models improved our earlier timing analyses. According to these analyses, Proto-Uralic started disintegrating ca. 5000 years ago (with error variation 6600–3700 YBP in the preliminary analyses), with a binary split separating Samoyedic from Finno-Ugrian. The Finno-Ugrian divergence, in turn, occurred either rapidly or polytomously some 4200 years ago (5400–3100), including the divergence of the Finno-Saami entity. Saami languages diverged from Finnic languages some 2800 (3800–2000) years ago.