Emergence and Features of Deep Hierarchies
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The *Evo-Lexis* model captures the co-evolutionary process of incrementally designing optimized hierarchies for an evolving set of targets. Hierarchies are modeled as DAGs that compose longer strings from shorter strings and/or individual characters.

We focus on key properties of the resulting hierarchies (e.g. cost, depth, reuse of intermediate components) and on how these properties depend on the evolutionary mechanisms that generate new targets. By focusing on well-known evolutionary mechanisms (mutations, recombination and selection), we analyze how each of them affects the features and evolution of the resulting hierarchies.

Some representative results:

a) Low-cost and deep hierarchies emerge when the population of target sequences evolves through tinkering and mutation.

b) Strong selection on the cost of new candidate targets results in reuse of more complex (longer) nodes in an optimized hierarchy.

c) The bias towards reuse of complex nodes results in an "hourglass architecture" (i.e., few intermediate nodes that cover almost all source-target paths).

d) With such bias, the core nodes are conserved for relatively long time periods although still being vulnerable to major transitions and punctuated equilibria.

Figure legend: Blue, green and red nodes show source, intermediate and target nodes, respectively. Colored dots represent specific characters and show the extent of diversity among targets.