Towards a path dependent account of category fluency

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Abstract

Category fluency is a widely studied cognitive task. Two major competing accounts have been proposed as the underlying retrieval mechanism: an optimal foraging process deliberately searching through memory (Hills et al., 2012) and a random walk sampling from a semantic network (Abbott et al., 2015). Evidence for both accounts has centered around predicting human patch switches, where both existing models of category fluency produce paradoxically identical results. We begin by peeling back the assumptions made by existing models, namely that each named exemplar only depends on the previous exemplar, by (i) adding an additional bias to model the category transition probability directly and (ii) relying on a large language model to predict based on the full prior exemplar sequence. Then, we present evidence towards resolving the disagreement between different models of foraging by reformulating them as sequence generators. For evaluation, we compare generated category fluency runs to a bank of humanwritten sequences by utilizing a metric based on n-gram overlap. We find that category switch predictors do not necessarily produce human-like sequences; rather, the additional biases used by the Hills et al. (2012) model are required to improve generation quality, which is further improved by our category modification. Even generating exclusively with an LLM requires an additional global cue to trigger the patch switching behavior during production. Further tests on only the search process on top of the semantic network highlight the importance of deterministic search in replicating human behavior.

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