# Studying the evolution of word meanings in the lab

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Natural languages persist through the cycle of learning and use, where learners learn from linguistic data which represents the communicative behaviour of other individuals who learnt their language in the same way. Languages are therefore the product of a potentially complex interplay between the biases of human language learners, the communicative functions which language serves, and the ways in which languages are transmitted in populations. Language learning and language use are inherently creative processes: when learning we extend and sharpen incipient patterns in the linguistic data we encounter, and in use we push constantly at the expressive envelope provided by our language, finding ways to express the concepts and distinctions we care about conveying. These creative processes drive language change, including change in word meanings, that we can observe in the historical record, and are ultimately responsible for the structure of the lexicons we see in the languages of the world. Invaluable insights into the factors shaping word meaning can therefore be obtained by studying historical cases of change (e.g. Ramiro et al., 2018), or by identifying regularities across languages seen in cross-linguistic corpora (e.g. Kemp et al., 2018).

However, studying natural languages in the wild does not provide the experimental control necessary to identify and differentiate the mechanisms responsible for those patterns. In this talk I will review experimental methods, based around artificial language learning, dyadic interaction and iterated learning paradigms, which shed light on these questions. In these experiments participants learn and use artificial lexicons or other novel communication systems; by manipulating the constraints on learning and the communicative tasks participants must employ those artificial lexicons to solve, we can test hypotheses about the factors shaping the structure of word meanings.

I will cover three related topics, presenting experimental work covering underspecification, colexification, and semantic extension. In part 1 I will review foundational experiments showing how trade-offs between pressures in learning and use shape the extent to which lexicons underspecify meaning, and which dimensions of meaning tend to be underspecified (Kirby et al., 2008; Silvey et al., 2015). In part 2 I will discuss experimental work showing how colexification (use of the same label to express distinct concepts) depends both on semantic similarity (as shown by Xu et al., 2020) and communicative need, with similar concepts more likely to be colexified unless there is a need to distinguish those concepts in communication (Karjus et al., 2021). Finally, in part 3 I will present experimental data showing how shared perceptual experience and world knowledge facilitate semantic extension (Bowerman & Smith, 2022). Together, these methods provide a general experimental framework for testing hypotheses about how word meanings evolve, and why words in natural languages have the sorts of meanings they do.

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