

New neighbours make bad fences: Form-based semantic shifts in word learning

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Words sometimes shift in meaning towards other words that are similar in form. For example, *expunge* is etymologically related to *puncture* but now tends to refer to wiping away, and according to the *Oxford English Dictionary*, this shift “is probably influenced by phonetic association with *sponge*”. The OED has identified over 70 likely cases of such form-based semantic shifts while overlooking or leaving unacknowledged many more, and the *Oxford Guide to Etymology* recognizes similarity of form as a motivation for semantic change (Durkin, 2009), although these changes have also been dismissed as irregular (e.g., Traugott & Dasher, 2001). In recent years, corpus studies have found that words sound similar to words that are similar in form at above-chance levels in 100 languages (Dautriche et al., 2017), and in English this cannot be attributed to etymological relationships and is true throughout the lexicon, not only in pockets of sound symbolism (Monaghan et al., 2014). This subtle correspondence between form and meaning might shape the lexicon to facilitate learning (Kirby et al., 2015), and iterated learning experiments have indeed demonstrated that word forms can converge due to similarity of meaning (Silvey, Kirby & Smith, 2015). However, there is as of yet no experimental evidence for the inverse: that word meanings can converge due to similarity of form.

We therefore conducted two novel word learning experiments, implemented on Qualtrics.com, with 30 items and 60 participants each (native English speakers recruited from Prolific.co), manipulated within subject and within item. Each novel word is either similar in form to an existing “attractor” word or not and is initially presented in a sentence context that implies a meaning that conflicts with the attractor word’s meaning. For example, participants inferred the meaning of either *tormest* or *plonch* from the sentence *The firefighters tormested / plonched the child from the burning building*. The sentence implies the meaning of *rescue*, as confirmed by a cloze test pretest, and the novel target *tormest* is an orthographic neighbour of the attractor word *torment*, whereas the novel control *plonch* has no orthographic neighbours and was generated by the ARC Nonword Database (Rastle, Harrington & Coltheart, 2002). Participants then read an ambiguous (low-cloze) sentence containing the same novel word (e.g., *Chen was tormested / plonched*) and answered a comprehension question by giving a rating on a 7-point scale (e.g., *How thankful was Chen? 1 - Not at all; 7 - Very*). The implied word (*rescue*) elicited low ratings, and the attractor word (*torment*) elicited high ratings (or vice versa in half the items, inverted for analysis). Participants gave low ratings for both novel words, like for the implied word, but as predicted, the novel target (*tormest*) elicited slightly higher ratings than the novel control (*plonch*), indicating that the inferred meaning of the novel target shifted towards the meaning of the attractor word. Experiment 2 required participants to recall and spell the novel word, demonstrating that they had not confused it for the attractor word. Linear mixed effects modelling shows that this difference is significant in both experiments.

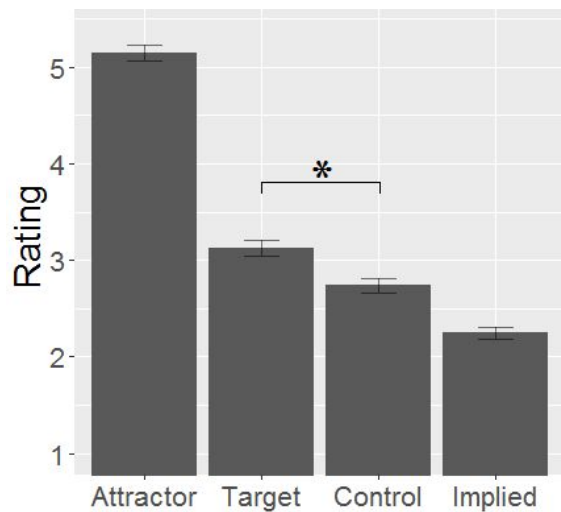
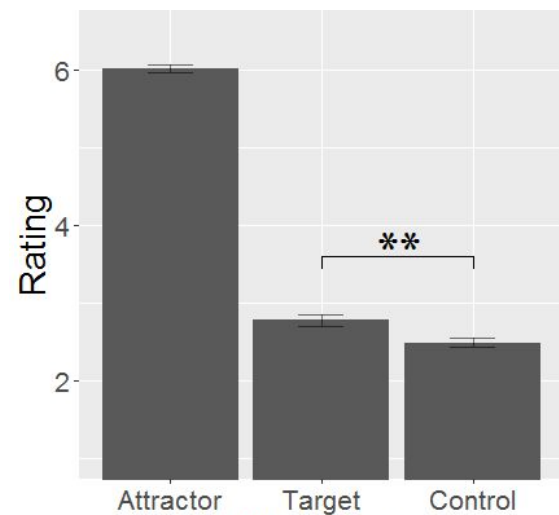
These experiments support the corpus finding that words sometimes shift in meaning towards words that are similar in form, providing evidence that this type of semantic change is regular. The results also suggest that the clustering of form and meaning in the lexicon arises partially as a consequence of how words are learned, which is consistent with the theory that language evolves via learning to constrain arbitrariness and thereby facilitate transmission (e.g., Kirby et al., 2015). Form-based semantic shifts are explicable in terms of the complementary learning systems account of word learning, in which novel words continue to phonologically prime existing words until overnight consolidation, when lexical competition emerges (Davis & Gaskell, 2009). The meanings of newly learned words could in this way be influenced by similar-sounding words following initial exposure, prior to sleep. However, form exerts only a small influence on meaning in these experiments (and across the lexicon), which is to be expected, given that words must be learned primarily according to context (lest communication break down) and that language also evolves to preserve arbitrariness (Kirby et al., 2015).

Table 1. Comparison among word types in Experiment 1

Comparison	β	SE	z	p
Attractor - Implied	2.92	0.24	12.01	< .001
Attractor - Target	-2.01	0.23	-8.67	< .001
Attractor - Control	2.39	0.22	10.74	< .001
Implied - Target	0.91	0.18	5.03	< .001
Implied - Control	-0.53	0.17	-4.93	< .001
Target - Control	0.38	0.15	2.51	.012

Table 2. Comparison among word types in Experiment 2

Comparison	β	SE	z	p
Attractor - Target	-3.25	0.22	-14.79	< .001
Attractor - Control	3.52	0.21	16.43	< .001
Target - Control	0.26	0.09	3.05	.002

**Fig. 1:** Ratings by word type in Experiment 1**Fig. 2:** Ratings by word type in Experiment 2

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