

Using false memories to characterize lexical representations: A test case from Spanish
Anne Pycha, University of Wisconsin, Milwaukee

Free variation is typically restricted to certain phonemes, and to certain positions. In many dialects of Spanish, for example, the phoneme /s/ is realized as [s] initially (*sopa* ‘soup’), but exhibits free variation among [s], [h], and [∅] non-initially before C (*busto* ‘chest’) (Lipski 1984). Meanwhile, words without /s/ (*nabo* ‘turnip’) are realized with relative consistency. These asymmetries suggest that the lexical representation for /s/ in *sopa* differs from that in *busto*, and that the representation of /s/ differs from that of other phonemes which do not vary freely.

Researchers disagree as to the nature of such differences (Lahiri & Marslen-Wilson 1991, Goldinger 1997), but they have nevertheless employed similar experimental techniques that focus on activation: the logic is that faster reaction times to a stimulus indicate greater activation of the associated representation (e.g., Sumner & Samuel 2005). We use an alternative technique that focuses on distinctiveness. Here, the logic is that representations are memories: stored elements of spoken words. Previous work shows that people actively construct memories at each retrieval, drawing on events they perceived as well as those they did not (Schacter 1996). While people accurately remember distinctive events – e.g., words that are taboo (*hell*), mis-spelled (*dream*), infrequent (*creed*), or concrete (*ice*) – they falsely remember less distinctive events (Gallo 2010). As a way of investigating how free variation affects representations, we ask: do Spanish listeners create false memories at different rates for words like *sopa*, *busto*, and *nabo*?

We used a list paradigm that reliably gives rise to false memories. For example, after hearing a list such as *thread, pin, sewing...*, people falsely remember hearing the semantic lure *needle* (Roediger & McDermott 1985). And, after hearing a list such as *bag, rack, book...*, people falsely remember hearing the phonological lure *back* (Sommers & Lewis 1999). We selected Spanish phonological lures, matched for frequency and density, across three conditions: s-initial (*sopa*), s-medial (*busto*), and controls without /s/ (*nabo* ‘turnip’). For each lure such as *sopa*, we constructed a list of nine neighbors, differing in initial C (*ropa* ‘clothing’), medial V (*sepa* ‘that I know’), and medial C (*soda* ‘soda’). A speaker from Puerto Rico recorded each word. She produced [s] for all positions, so that we could compare representations across conditions while holding the acoustic signal constant. Native Spanish-speaking participants (n=28) listened to each list and did a recall task (which taps explicit recollection), typing as many words as they could remember. At the end, they did a recognition task (which taps implicit familiarity), making yes/no judgments as to whether they heard the word previously.

The key result, shaded, is that listeners are more likely to falsely remember any word that contains /s/, compared to a control word that does not. This effect holds for recognition, but disappears in recall, where no differences are significant.

	Recall task			Recognition task		
	Mean rates of word recall (SD)			Mean rates of ‘yes’ responses (SD)		
	Heard	Not heard	Lure	Heard	Not heard	Lure*
Initial /s/	0.43 (0.12)	0.15 (0.11)	0.33 (0.27)	0.71 (0.18)	0.29 (0.24)	0.78 (0.24)
Medial /s/	0.38 (0.11)	0.18 (0.13)	0.24 (0.27)	0.71 (0.19)	0.35 (0.23)	0.73 (0.28)
Control	0.41 (0.11)	0.19 (0.10)	0.29 (0.22)	0.76 (0.17)	0.29 (0.24)	0.59 (0.25)

*Mixed-effects model, initial /s/: $\beta=0.19$, $t=3.00$, $p < 0.05$; medial /s/: $\beta=0.14$, $t=2.22$, $p < 0.05$

Thus, Spanish words such as *sopa* and *busto* are particularly effective lures – giving listeners a false sense of implicit familiarity – compared to words like *nabo*. This suggests that the acoustic signal associated with /s/ creates relatively indistinctive representations wherever it occurs. More broadly, it suggests that free variation impacts the manner in which listeners remember words, in ways that go beyond mere activation.

References

- Gallo, D. A. (2010). False memories and fantastic beliefs: 15 years of the DRM illusion. *Memory & Cognition* 38(7): 833-848.
- Goldinger, S.D. (1997). Speech perception and production in an episodic lexicon. In Johnson, K. & Mullennix, J.W. (eds.), *Talker Variability in Speech Processing*. New York: Academic Press. pp. 33-66.
- Lahiri, A., & Marslen-Wilson, W. (1991). The mental representation of lexical form: A phonological approach to the recognition lexicon. *Cognition*, 38(3), 245-294.
- Lipski, J. M. (1984). On the weakening of /s/ in Latin American Spanish. *Zeitschrift für Dialektologie und Linguistik*, 31-43.
- Roediger, H. L., & McDermott, K. B. (1995). Creating false memories: Remembering words not presented in lists. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 21(4), 803.
- Schacter, D. L. (1996). *Searching for Memory: The Brain, the Mind, and the Past*. New York: Basic Books.
- Sommers, M. S. & Lewis, B.P. (1999). Who really lives next door? Creating false memories with phonological neighbors. *Journal of Memory and Language* 40, 83-108.
- Sumner, M., & Samuel, A. G. (2005). Perception and representation of regular variation: The case of final /t/. *Journal of Memory and Language*, 52(3), 322-338.