"Flippin' 'eck": Social meaning in the stem

Scholars interested in the cognitive aspects of social meaning are interested in how social meanings are stored alongside linguistic knowledge (Foulkes & Doherty, 2006), as well as how these two types of information interact to influence cognition. For example, in exemplar theory approaches, it has been posited that social information relating to the identity of the speaker is encoded in listeners' stored knowledge of linguistics tokens (Pierrehumbert, 2001). Many sociolinguists have sought to provide support for this hypothesis by demonstrating that social information can influence speech perception; this has been demonstrated at the phonetic (Hay et al, 2006; D'Onofrio 2018) and sentential (Casasanto, 2008; L. M. Squires, 2011) levels. The current study tests whether social information contained within a word stem can influence perception of other morphemes within the same word.

Spoken word processing is incremental (Allopenna et al, 1998), with information delivered sequentially to the listener in each phoneme. Each new piece of information provides more evidence as to the identity of the word in question; the available perceptual evidence is combined with prior memories of similar words and their probabilities (Norris & McQueen, 2008). Experimental evidence suggests an influence of stem frequency (Taft & Forster, 1976) and semantic transparency (Marslen-Wilson et al, 1994) on morphology processing, among other effects. Given that the processing of whole words is susceptible to influence from social information (Walker & Hay, 2011; Cai et al., 2017), it stands to reason that parts-of-words may show similar effects.

To test this hypothesis, a set of word-stems with inherent social meaning were selected, namely swearwords. Swearwords – which are emotionally arousing and societally taboo – are both cognitively and socially interesting. Firstly, swearwords take up more attentional resources than neutral words, evidenced by the slow-down caused by taboo language in modified Stroop (Guillet & Arndt, 2009) and picture-word inference tasks (Dhooge & Hartsuiker, 2011). Secondly, swearwords contain social meaning; they are more common among working-class speakers (McEnery, 2005) and in casual conversation, typically indexing informality (Stapleton, 2010). As such, swearwords are salient to listeners and have associations with particular social groups and speech styles.

A set of 8 swearwords were selected from previous studies on British Swearing (McEnery, 2005; Love, 2017), namely *fuck*, *shit*, *crap*, *cunt*, *twat*, *dick*, *piss* and *bitch*, all of which were rated highly for tabooness in a norming study (Janschewitz, 2008). To test for the influence of social information, these words were combined with potentially ambiguous tokens of a derivational morpheme with similar social meaning, namely variable (ING). While the standard velar [ɪŋ] variant (e.g. *fucking*) indexes *poshness*, the non-standard alveolar [ɪn] variant indexes working-class (Schleef et al, 2017); the [ɪn] variant is also more common in casual speech and among working-class speakers (Schleef et al, 2011). To create ambiguous tokens, test items were taken from a 7-step nasal continuum artificially synthesised using the TANDEM-STRAIGHT program (Kawahara et al, 2008), from the velar pronunciation to the alveolar pronunciation, resulting in versions of each item with a potentially ambiguous (ING) ending. The same process was completed for a phonetically-matching neutral word (e.g. *ducking*) and non-word (e.g. *nucking*) for each swearword.

The experiment employed a variant categorization task constructed on Gorilla (Anwyl-Irvine et al, 2018). 385 British English speakers were recruited via Prolific Academic (2019). On each trial, participants heard a test item and were asked to select, via button press, whether the word had an '-ing' or '-in' ending. The hypothesis was that swearwords would bias participants to hear the alveolar [ɪn] on ambiguous tokens of (ING); this was motivated by the shared social meanings of alveolar [ɪn] and swearwords. A 3x7 research design was employed. The 3-level factor was Item Type (*swear* vs *neutral* vs *non-word*). The 7-level factor was continuum step, from 1 (maximally [ɪŋ]) to 7 (maximally [ɪn]).

Logistic mixed effect regression models were run in R using the *lme4* package (Bates et al, 2015), with Response included as the dependent variable ('ing' = 1). Continuum Step and Item Type and their interaction were included as categorical predictors. Preceding Continuum Step, Duration, Stem Arousal and Valency (Janschewitz, 2008), Stem Frequency and Dominant Part-of-Speech (Van Heuven et al, 2014), as well as participant demographics, were included as predictors in the full model. Participant and Word were included as random intercepts. Figure 1 reports the full model; this excludes variables that did not significantly improve model fit based on chi-square comparisons of the sums of the squares of the residuals. Results suggest a bias for `-ing' for swearwords compared to their neutral counterparts at steps 3 & 4, contrary to the experimental hypothesis. Figure 2 plots means for each item type across the continuum.

The results suggest that, rather than biasing listeners to the variant with similar social meanings, the swearwords inhibited listener performance. Due to the increased attentional resources taken up by swearwords, listeners were less able to identify the following (ING) sound; as a result, they defaulted to the underlying form, namely the velar [ɪŋ] variant, as the most likely option. This follows a canonical form bias found in other perceptual work on variable (ING) (Vaughn & Kendall, 2018). The result provides further evidence for the strain that swearwords put on attentional resources – this time on a linguistic rather than non-linguistic task. Furthermore, managing complex, rapidly occurring sociolinguistic information is a "cognitive challenge" (Campbell-Kibler, 2020). As such, models of sociolinguistic cognition need to consider the variable strain that different word types can have on listener's cognitive capabilities.

	Response			
Predictors	*Odds Ratios*	*std. Beta*	*Statistic*	*p*
(Intercept)	7.09	2.03	8.51	**<0.001**
Step 2	0.79	-0.24	-1.15	0.250
Step 3	0.62	-0.48	-2.47	**0.014**
Step 4	0.25	-1.37	-7.51	**<0.001**
Step 5	0.09	-2.42	-13.08	**<0.001**
Step 6	0.04	-3.22	-17.33	**<0.001**
Step 7	0.04	-3.19	-16.94	**<0.001**
Type: Non-word	0.47	-0.76	-2.47	**0.014**
Type: Neutral Word	0.84	-0.18	-0.57	0.568
Pre-Step	1.02	0.04	1.65	0.100
Participant Gender: Male	1.02	0.02	0.33	0.744
Pariticipant Gender: Other	2.71	1.00	3.06	**0.002**
Step 2 * Non-word	0.88	-0.13	-0.52	0.606
Step 3 * Non-word	0.87	-0.14	-0.55	0.579
Step 4 * Non-word	1.16	0.15	0.64	0.522
Step 5 * Non-word	1.23	0.20	0.86	0.392
Step 6 * Non-word	1.90	0.64	2.65	**0.008**
Step 7 * Non-word	1.25	0.22	0.90	0.366
Step 2 * Neutral Word	0.83	-0.18	-0.67	0.500
Step 3 * Neutral Word	0.51	-0.67	-2.66	**0.008**
Step 4 * Neutral Word	0.59	-0.54	-2.20	**0.028**
Step 5 * Neutral Word	0.62	-0.48	-1.93	0.053
Step 6 * Neutral Word	1.00	-0.00	-0.02	0.985
Step 7 * Neutral Word	0.76	-0.27	-1.04	0.300
Random Effects				
σ^2	3.29			
$\tau_{00\ ParticipantID}$	0.19			
$\tau_{00\ word}$	0.27			
Observations	10284			
Marginal R^2 / Conditional R^2	0.294 / 0.380			

Figure 1

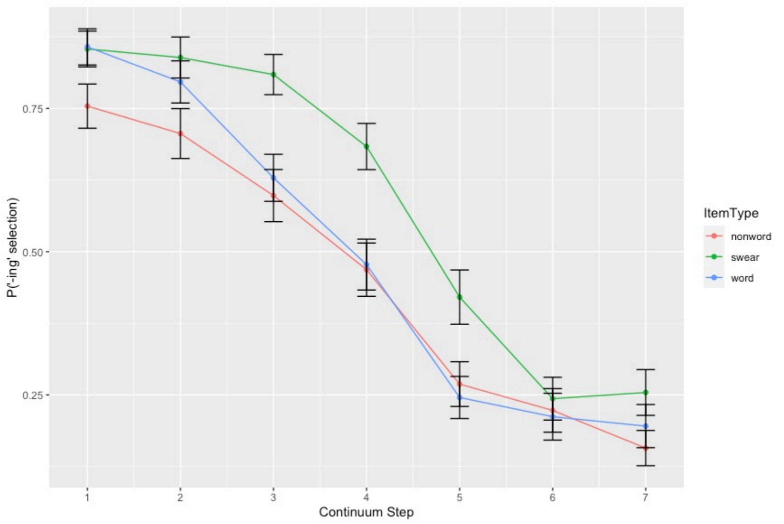

Figure 2

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