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**Vowel but not consonant identity and the very informal English lexicon**

While English imposes few phonological restrictions on compounds (Martin 2007), some informal corners of the lexicon impose stricter limits, such as in hypocoristics and fucking-infixation (McCarthy 1982). Here we present results from a ratings study of shitgibbons: compounds with a monosyllabic obscenity followed by a trochaic innocuous noun, showing that vowel identity improves shitgibbon acceptability but consonant identity does not. We offer an analysis in which the grammar favors optimal structures, including vowel identity; onset-to-onset consonant identity is blocked by intervening codas. The analysis is implemented as a MaxEnt grammar, trained on English compounds and augmented with a locality bias that blocks the effect of consonant identity.

**Background:** Speakers have sharpened phonological intuitions about novel words that are coined informally and organically. These intuitions often show that the patterns found in the core phonology of unrelated languages also emerge in the more informal or unregulated margins of English, suggesting a common cognitive source: see e.g. Moreton et al (to appear) on faithfulness to head nouns in the formation of novel English lexical blends, and the prosodic preferences of English expletive infixation (McCarthy and Prince, 1986, and also Elfner and Kimper, 2008). Here, we extend this research into the class of obscene insults known (now) as shitgibbons (for their recent origins, see Jones 2017). Prosodically, shitgibbons are optimal: binary compounds made of two trochees, the first monosyllabic and the second disyllabic, conforming to the general preference for increasing phonological weight at the right edge (see Ryan 2017 for a comprehensive review). In this study we investigate what makes a segmentally-optimal shitgibbon, starting with the intuition that similarity among stressed vowels improves their wellformedness.

**Experiments:** We conducted three anonymous online surveys (using Experigen, Becker & Levine 2014) to test native speaker preferences for vowel identity and consonant identity in shitgibbons. In Experiment 1 (75 participants), each participant judged 30 compounds made of ten obscenities, where each obscenity was paired with three innocuous nouns: matching the stressed vowel only, or the initial consonant only, or neither. Each compound was rated on a scale of 1–5 as to how “funny” it was and again as to how “satisfying” it was as an insult.

<table>
<thead>
<tr>
<th>Experiment 1 sample materials</th>
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<tbody>
<tr>
<td>No identity</td>
</tr>
<tr>
<td>fuck-whistle</td>
</tr>
<tr>
<td>shit-dragon</td>
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<tr>
<td>crap-puffin</td>
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**Results:** Vowel identity increased well-formedness on both scales by ~.34 of a point, a highly significant difference, as confirmed by two fully-crossed correlation-free mixed-effects regressions in `lme4` (satisfying: $\beta = .18, t = 4.05, p < .001$; funny: $\beta = .19, t = 3.92, p < .001$). Consonant identity had no significant effect (both $\beta < .03, t < 1, p > .1$). Two additional experiments with 50 participants each compared no identity to vowel identity only and no identity to consonant identity only, with nearly identical results. Furthermore, the source of increased shitgibbon wellformedness is strict vowel identity rather than harmony among vowel features. Grouping our results according to the vowels in our obscenities [ɪ, æ, ʌ, aɹ], we found no consistent preferences among non-matching vowels, as would be expected under e.g. height or backness harmony.
**Analysis:** Our results demonstrate that even in the emotionally-charged context of an obscenity, phonological preferences influence the acceptability of novel words. While a trochaic maximum and segmental identity are clear candidates for phonological optimization, they are of course freely violable in the English lexicon. In particular: what singles out stressed vowels for an identity requirement in the shitgibbon grammar, and why not the consonants?

Many natural language phonologies impose vowel and consonant harmonies among non-adjacent segments, and this non-locality is frequently analyzed as the result of separate vocalic and consonantal tiers (McCarthy 1979; Heinz, 2010; a.o). Using such tiers, McMullins (2016) most recently argues that natural languages impose consonant harmony within two kinds of domains: strictly local within a tier – e.g. consecutive consonants – or unbounded, applying to all segments on a tier. On this account, the onset consonants of our two stressed syllables should not be able to harmonize without also requiring harmony with the coda consonant that intervenes between them – that is, the medial [k] in *fuck-farmer* or the [p] in *crap-cobbler* should indeed block onset consonant harmony. As for the need for total harmony (i.e. identity), Berent et al (2012) and Gallagher (2013) provide evidence that natural language phonologies require phonotactic constraints that reference segmental identity explicitly, rather than classes of shared features.

**Simulations**

To ask whether segmental shitgibbon preferences can be derived from speakers’ knowledge of English compounds, we created a 7311-word corpus including all of the two-word compounds from the corpora of Martin (2007) and Sepp (2006) (gratefully acknowledged). Main stress vowels matched in 10% of the compounds, while initial consonants matched in 8%. We then ran Monte Carlo simulations, comparing the number of identical vowels and consonants among the 7311 items to the proportions found in 100,000 corpora of randomly-generated compounds. The observed number of vowel and consonant matches in the existing compound lexicon was significantly higher than expected by chance, although the over-representation of vowel matching was stronger (t=4.72, p<.001) than that of the consonants (t=2.23, p<.05). We ran the same comparisons on the subset of 1004 gibbon-like compounds in the corpus (i.e. monosyllables + trochees), with very similar results (vowels: t=3.32, p<.001, consonants: t=2.03, p<.05).

To create a phonotactic grammar of these shitgibbon preferences, we trained a MaxEnt learner on both our total compound corpus and the gibbon-like subset, providing it with constraints that prefer total stressed V harmony (cf. Colavin, Levy and Rose, 2010) and also total onset-to-onset C harmony. The learner acquired preferences for identity along both dimensions, unlike our human participants who only imposed V harmony. To prevent the learner from noticing the goodness of consonant matching, we used a Bayesian prior to keep the weight of Agree(C) close to zero, thus improving the match with our participants’ behavior (see Wilson 2006, White 2016, a.o, for the use of such biases). We interpret this as support for the tier-based analysis above, whereby onset-to-onset consonant harmony may not be learned without targeting intervening codas.

**Conclusions**

This study finds a preference for vowel identity but not consonant identity in the stressed syllables of novel shitgibbon compounds, even though both vowel matching and consonant matching are over-represented in English compounds. We claim that shitgibbon intuitions are derived from existing grammatical pressures and universal locality restrictions, which already loosely constrain English compounds and which can be amplified in certain word-formation processes.

**Selected references**