Lexical Retrieval and Effects of Homophones

Chelsea Sanker chelsea_sanker@brown.edu
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Background

- In most lexical access models, perceptual searches end when narrowed down to a single lexical item (e.g. TRACE (McClelland & Elman 1986), Shortlist (McQueen et al. 1994), NAM/PARSYN (Vitevitch & Luce 1999))
- If homophones have separate representations, a search among them could not be narrowed down to a single item without context
- Prior work has demonstrated that homophones can influence each other (e.g. Jescheniak & Levelt 1994), but other work suggests that they have separate representations (e.g. Caramazza et al. 2001, Gahl 2008)
- Homophones can exhibit phonetic differences in production (e.g. Guion 1995, Gahl 2008); I look at how such patterns influence perception

Methodology

- Same-different task for pairs of English words (20 listeners, native English speakers):

(a) homophone-homophone (e.g. *pale-pail*)
(b) same, word with homophone (e.g. *pale-pale*)
(c) same, word w/o homophone (e.g. *fail-fail*)
(d) different, including a type (b) (e.g. *pale-fail*)
(e) different, only type (c) words (e.g. *fail-feel*)

- The items in all pairs differed by speaker (3 speakers, female, native English speakers)
- Within a block, differences were always in the same position (onset, nucleus, or coda)
- Half of listeners encountered no hph-hph pairs; the other half heard all five pair types

Block Type: Effects of Context

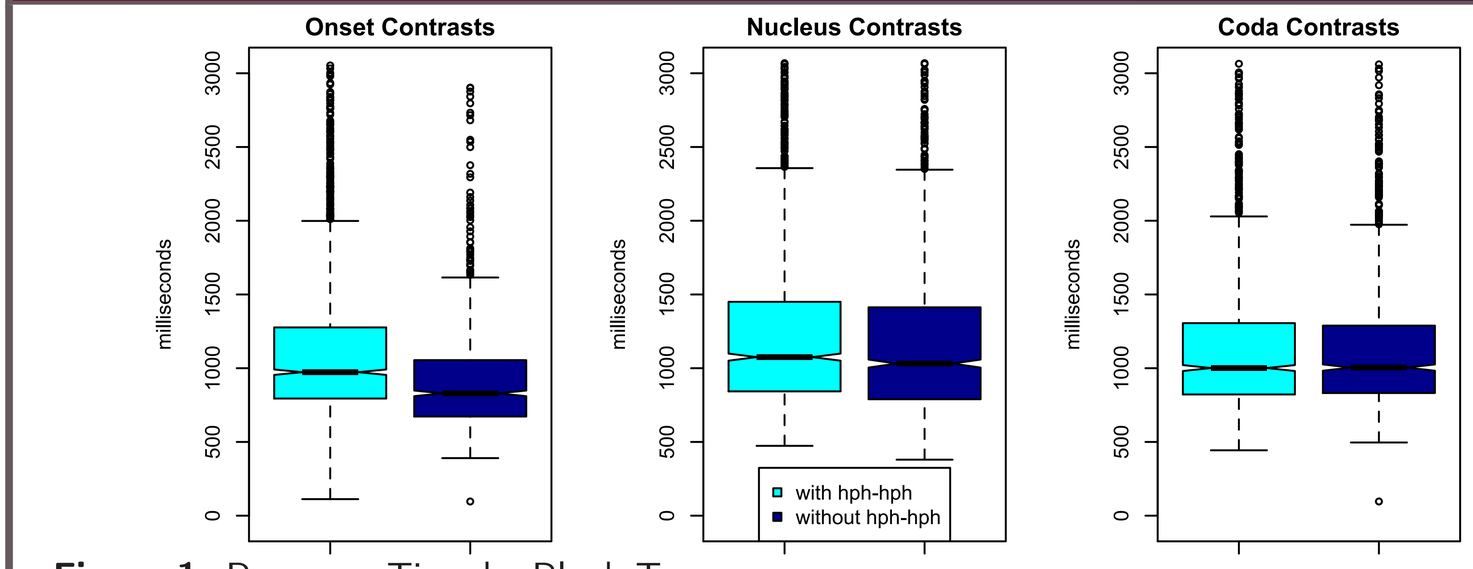

Figure 1: Response Time by Block Type

Fastest responses for onset decisions (1041 ms), then coda decisions (1144 ms, $p < 0.0001$), then nucleus decisions (1202 ms, $p < 0.0001$); slowness of nucleus decisions suggests greater uncertainty about these contrasts, perhaps due to greater category overlap

A larger number of apparent 'same' pairs in blocks with hph-hph pairs seemed to result in slower responses, perhaps because it drew listeners' attention to sub-phonemic details

Summary of Results: ANOVA of Response Times

	Df	Sum Sq	Mean Sq	F val.	P value
ContType (onset; nucl.; coda)	2	37.0	18.5	94.3	< 0.0001 ***
StimSet (with/without hph-hph pairs)	1	13.9	13.9	70.8	< 0.0001 ***
PairType (same, diff., etc)	4	8.3	2.1	10.6	< 0.0001 ***
HomType (homographs, non-hgs)	1	0.0	0.0002	0.0011	0.97
Participant	19	313	16.5	83.9	< 0.0001 ***
ContType*StimSet	2	1.8	0.88	4.5	0.011 *
StimSet*PairType	3	3.4	1.1	5.7	0.00067 ***
ContType*PairType	8	2.3	0.28	1.4	0.17
PairType*HomType	2	0.75	0.38	1.9	0.15
ConType*HomType	2	0.23	0.12	0.59	0.55
StimSet*HomType	1	0.06	0.059	0.30	0.58
Residuals	8175	1604	0.20		

Pair Type

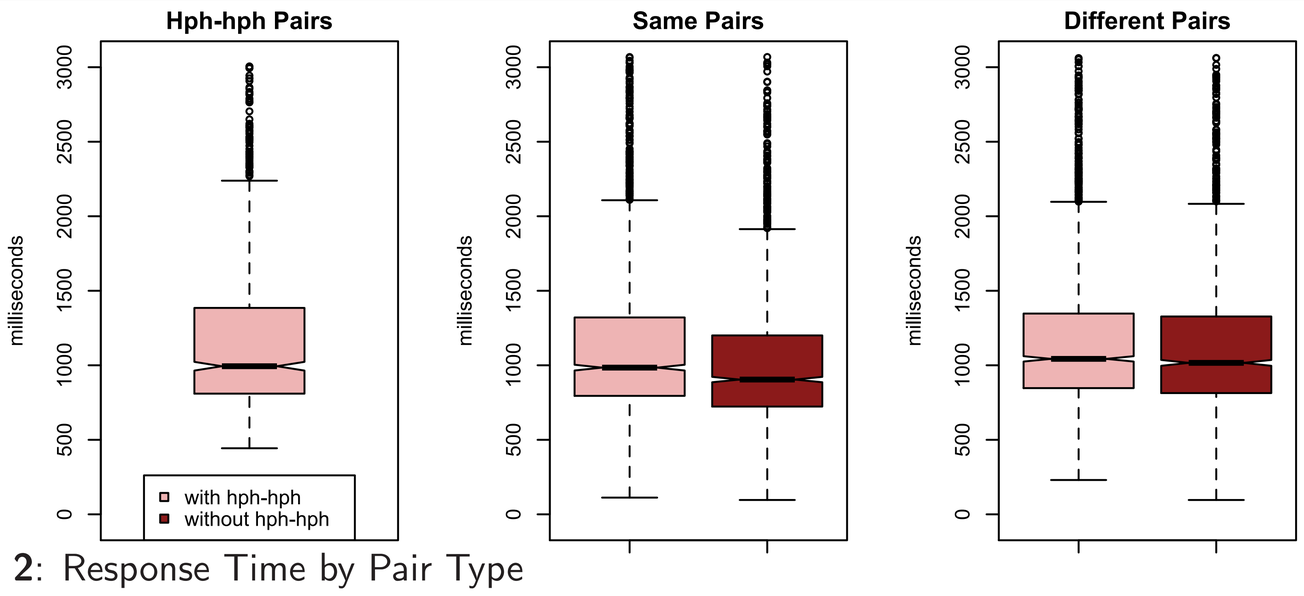

Figure 2: Response Time by Pair Type

Slower responses to hph-hph pairs than same pairs suggest an effect of differences in phonetic details

Responses to same pairs were slightly slower for words with homophones than those without: 1111 ms vs. 1073 ms ($p = 0.025$), cf. results for high neighborhood density (e.g. Luce & Pisoni 1998)

No significant effect of spelling of homophones (homographs vs. non-homographs)

Conclusions

- Effects of whether a particular word has a homophone and whether it is paired with itself or with that homophone indicate the importance of including homophones in processing models
- Homophones must be stored as separate lexical items: slower decisions for words with homophones can result from being unable to narrow down a search to a single item
- Slower decisions in blocks with hph-hph pairs may reflect a sublexical search strategy motivated by the proportion of apparent 'same' pairs, reinforced by phonetic differences
- Differences between block types demonstrate the effect of expectations on processing, and moreover indicate that contrasts do not all behave similarly

Selected References

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