Beyond Abstract Versus Episodic

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Why use an abstraction?

- Highly modular system using (minimal) discrete underlying representations
- Opacity - no direct, transparent correlate to acoustics or articulation
    - Removes correlations between ‘parameters’
- “The workhorse of phonological learning is the automatic and unconscious acquisition of implicit knowledge.”

Episodic memory has capacity to represent gradient information

- Phonetic realization patterns require a mechanism for phonetic details to representations in memory
- Can also represent as updating of parameters

What do abstractions do for us?

Using **coding elements** (to define the parts of a word) we can define **equivalence classes** to explain productivity and adaptability.

Training set	Test set			
	Good		Bad	
VC	VC	CV	VV	CC
CVC	CVC	VCV	CCV	VVC
CVCV	CVCV	VCVC	VVCV	CCVC
VCVCV	VCVCV	CVCVC	CCVCV	VVCVC

Precision vs. Recall

Table 2 Test performance of the pure memorization model[a]

	Memory list model		
	Accept	**Reject**	**Recall**
Possible	VC CVC CVCV VCVCV	CV VCV VCVC CVCVC	$4/(4+4) = 0.5$
Impossible		VV CC CCV VVC VVCV CCVC CCVCV VVCVC	
Precision	$4/(4+0) = 1.0$		

👆Perfect precision

👇Perfect recall

Table 3 Test performance of the overgeneralizing unigram model[a]

	Unigram model		
	Accept	**Reject**	**Recall**
Possible	VC CV CVC VCV CVCV VCVC VCVCV CVCVC		$8/(8+0) = 1.0$
Impossible	VV CC CCV VVC VVCV CCVC CCVCV VVCVC		
Precision	$8/(8+8) = 0.5$		

Balancing precision & recall

Table 4 Test performance of the Goldilocks digram model[a]

	Digram model				
	Accept		Reject		Recall
Possible	VC CVC CVCV VCVCV	CV VCV VCVC CVCVC			8/(8 + 0) = 1.0
Impossible			VV CCV VVCV CCVCV	CC VVC CCVC VVCVC	
Precision	8/(8 + 0) = 1.0				

Parameters to take into account

- Dimensions of similarity
- Markedness
- Type vs. token frequency

- Adapting categories instead of building new ones

1. Phrasal Context
2. Frequency/Predictability
3. Different Voices and Dialects
4. Indexical Information

Prosody

- Contextual information will tell us if a word is prominent or reduced
- Affects F0 and timing
- More prominent words will also be more carefully articulated

“I’m ***giving*** this to Sarah” vs. “I’m giving this ***to*** Sarah” vs. “I’m giving this to ***Sarah***”

Frequency & Predictability

- More frequent words produced with less “effort”
- If a word is highly predictable, reduced in the sentence

“I’m giving this ***to*** Sarah” vs. *“It’s next ***to*** the microwave”

Group speaker variation

- “Phonological learning means internalizing ambient patterns **well enough**.”
- Balance between conformity and variation
- Distinguishing between effects of **language** and effects of **attitude**
    - Are they receiving the same exposure but imitating different people, or receiving different input entirely?

What information have I internalized about myself?

Indexical information

“Referential information is what speaker is talking about, whereas indexical information is information about the speaker, the social context, or the physical context.”

- Self-referential: differences among speakers of different gender identities and sexualities, age groups (with some plasticity for older speakers)
- Using language cues to mark social group
- Differences persist even among groups in contact

- Indexical information interacts with other phonological info for variation - conveyed concurrently with referential information

What information am I sharing?

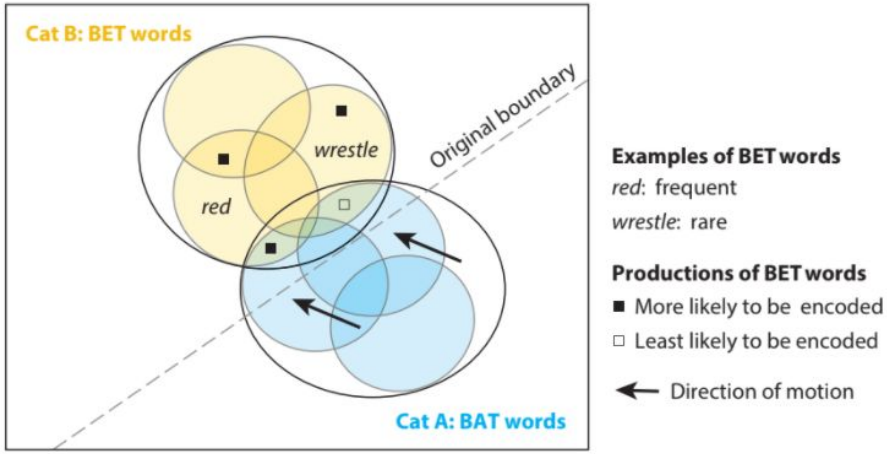
Storage in memory

Phonology characterizes information from many contexts, over long timescale

- Word frequency - weaker phonetic representation, or more salient?
- Highly predictable words are reduced
- Predictable word sequences less prosodically variable
- Longer reaction times for less standard forms (rhotic forms for nonrhotic dialects, etc)
- Phonological adaptation also affected by prestige of donor language (for the semantic domain)

New Zealand English

- Short front vowel rotation
  - <bat> ➔ [bɛt] (not [bæt])
  - <bet> ➔ [bet] (not [bɛt])
  - <bit> ➔ [bət] (not [bɪt] or [bet])
- Using birth year as proxy for time, low-frequency word lead the change
  - Need larger sample to detect change
  - ‘Push chain’ creates ambiguity, which puts low freq words at disadvantage



Episodic effects

- Phonetic memory constantly updated
  - Recognition better when same voice used; even ambient noise associated with memory
- New Zealand English
  - “New Zealand listeners shifted their vowel classification patterns depending on whether stuffed kangaroos and koalas (associated with Australia) or stuffed kiwis (associated with New Zealand) were present in the room.”
  - Recent positive/negative news about Australia also affected vowel space
- Glaswegian English
  - Adjusting probability of allophone of same phoneme (flapped to aspirated) -- ✔✔
  - Remapping a known allophone to a different phoneme -- ✔
  - Creating new phonological category -- ✖✖

Episodic effects in morphophonology

- Some alternations can be generalizaed - others are specific to morphemes, must be learned paradigmatically
- People use different words with different frequencies
- So, the morphological system also varies between social groups
    - Morphology both **episodic** (indexical) and **abstract** (affect productivity of alternations)

Conclusions

- Lexical and indexical information ***not fully separable***
  - Modules are ‘leaky’
- Mental representations are ***very detailed - cannot be captured*** in abstractionist models
  - Representations must be ***highly redundant***
- Word-specific effects ***small***, and preferred to ***adapt a category***