Class 17: Sideways interfaces II, phonology-processing interface

To do
☐ Work on your project!
☐ Presentations Monday: 15 minutes + 5 for questions/discussion
☐ Papers due next Friday (Mar. 23)

1 Big questions that I think lurk behind understanding phonology and processing (especially speech planning)
   • Is there a separate phonological grammar (that feeds into the processing system)?
   • Or is the grammar just a different level of description of the processing system?
   • If the grammar is a separate module, what kinds of information does it exchange with speech planning?

   In our proseminar last quarter, we didn’t try to answer (!) these questions, but we did read a lot of literature that gets us closer to being able to tackle them. Here are some highlights.

2 The Production Planning Hypothesis (what you read about)

   • The problem of domains
     ▪ English tapping rule: \( \{ t,d \} \rightarrow r / V(\text{a}) \rightarrow \# V \)
       ▪ PROBABLY APPLIES: get over it
       ▪ COULD APPLY: a bat, a ball and a glove
       ▪ PROBABLY DOESN’T APPLY: Lakewood, Ohio’s fifteenth-largest city, is part of the Cleveland metro area

   • Usual story: we need to say more about the relationship between the two words
     ▪ same phonological word/phrase/utterance?
     ▪ some more-syntactic relationship?

   • Production Planning Hypothesis: no—apparent prosodic/syntactic effects are the extra-grammatical effect of processing
     ▪ You can’t plan a tap until you know that the following word starts with a vowel
       ▪ you probably even need to know which vowel, to get the gestures just right
     ▪ So whenever the next word isn’t ready in time, you won’t tap

   ❓ Let’s draw contrasting tableaux, as in your reading question

   • This makes all kinds of predictions about where you’ll see processes applying more and less
     ▪ factors that should make the next word harder to access (low frequency, low predictability) should suppress the process
       ▪ eat apples vs. eat aardvarks
“planning proxies” we can measure—signs that planning is taking a while—should correlate with suppression of the process
- longer duration for eating → following word (a vs. the) matters less in determining eating vs. eatin’
- all these effects should probably go away when the environment is X#__Y rather than X__#Y
- este amor → estamor sensitive to amor’s frequency, etc.
  - e → Ø / __ # a : you need to know that the next word starts with /a/
- nuestra escuela → nuestrascuela not sensitive
  - e → Ø / a # __ : you already know that the preceding word ended with /a/
  (Lamontagne & Torreira 2017)
- except maybe for sounds that have to be coordinated with the preceding sound
  - see ya [ɾ]omorrow: you have to plan the articulation of ya’s vowel to include the upcoming tap

3 Some open questions for the Production Planning Hypotheses
- Can we really do without domains?
  - Kilbourn-Ceron 2017b looked at French liaison in two environments: frequency/predictability matters in both
    - Adj+Noun (ancie[n] ami ‘old friend’): supposed to be obligatory but actually there are exceptions
    - Nounplural+Adjplural (personne[z] importantes ‘important people’): supposed to be variable
  - But there are differences in application that seem grammatically governed
    - quan[t] il arrive ‘when he arrives’ vs. quan[*t] arrive-t-il ‘when does he arrive?’
    - il[z] arrivent ‘they arrive’ vs. sont-il[*z] arrivés ‘have they arrived?’
  
  Ideas on how we can rule out liaison in the forbidden environments?

- Is there a phenomenological difference between making a speech error and failing to apply an optional rule because of a planning failure?
  - [a] apple ← this is a speech error for me
  - ea[t] apples ← this is not a speech error for me, just a rarer option
  - If so, should this be reflected in the grammar?
  - See Hall 2008 in the perceptual realm for arguments that we can tell these apart
    - English long-distance /r/-dissimilation is driven by misperception
      - su(r)prise, gove(r)nor, San Berna(r)dino
      - listeners hear a long period low F3, but don’t realize it’s coming from two separate [a]s

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1 I don’t know if liaison is truly forbidden in these two examples (prescriptively, I think it is) but at any rate it must be much less common

Ling 201A, Phonological Theory II, Kie Zuraw, Winter 2018
we can also make the reverse mistake: *fa(r)miliar, perse(r)vere

- English short-distance /t/-dissimilation is a variety of means deployed to avoid violating a markedness constraint \(^*_{\text{\textipa{\textipa{}}}r}\)
- deletion: inf\(r\)ared, Ghi\(r\)adelli
- more deletion: mir\(r\)or, terr\(r\)
- promote [ə] to a full vowel: [ɛɹəɹ], [d\(\tilde{\text{z}}\)ɹəɹ]
- periphrasis: barer, sourer, clearer, etc. are less common than expected (less bare, less sour, less clear)
- number disagreement: Where’re the lions/Where’s the lions? but How’re the lions/??How’s the lions
- paradigm gap: *beerery (cf. winery), *jeerery (cf. mockery), *azarery (cf. popery)
- …and more (see the paper)

\(?\)? This should remind us of the too-many-solutions problem (I can refresh your memory)—discuss!

4 OCP (repetition avoidance) and anti-OCP as a speech-planning effect?

- There are many parallels between speech errors and normal phonology, when it comes to similarity and its avoidance
  - Similarity
    - already-similar segments tend to interact in speech errors (shubjects show)...
    - …and in consonant harmony (/kun+il+a/ → [kunina])
    - and similar segments nearby are penalized by OCP (Arabic /ktb/ is a good verb root, */dtb/ would be bad)
  - Exemption for identity
    - OCP sometimes makes exception for perfect identity
      - Peruvian Aymara *[t’ank’a], but [k’ink’u] ‘clay’
      - Arabic /s\(\text{m}\)mm/ is fine
    - speech-production idea: what’s hard about motor planning in, e.g., subjects show, is that the two sounds are similar but not identical
  - Prosodic position
    - consonant swaps in errors tend to be in same prosodic position (onset-onset, coda-coda, etc)
    - consonant harmony is sometimes restricted to consonants in same prosodic position

- How do these parallels arise?
  - Maybe errors somehow become normalized and become grammatically required
    - maybe this is plausible for a language without strong normative pressures or a widely-used phonological writing system (which would keep exposing speakers to conservative forms)
  - Maybe the relevant constraints make it into the universally available constraint inventory because of their strong functional grounding
    - *ʃ…s is a good constraint because we’re likely to make errors saying such sequences
    - Variant: learners can construct all kinds of constraints, but are more likely to pick up on those that have strong functional grounding
• Berg 1998: maybe speech errors are just a window into what the system favors
  • one of the many factors affecting whether a diachronic change happens is whether the innovative form gets an inherent boost
  • see Martin 2007 for lexical competition (couch vs. sofa), implemented as resting activation that depends in part on a word’s phonological goodness
  • see Yang 2000 and Niyogi 2009 for syntactic change with the possibility that some grammars are just better
  • It’s not that speech errors get grammaticalized, but rather that the same factors promoting errors promote language change

5 Opacity and directionality

• Self-counterfeeding/self-counterbleeding; right-to-left, left-to-right, and simultaneous application
• Tone sandhi is a great testing ground because
  • it applies across word boundaries
    • Chinese: if two dipping tones in a row, first one becomes rising
      • xiao\textsuperscript{213} ma\textsuperscript{213} \xrightarrow{} xiao\textsuperscript{35} ma\textsuperscript{213} ‘small horse’
    • and the words/morphemes in question are often monosyllabic, so that when one syllable changes, it changes the environment of neighboring syllables

The above-cited authors offer many tantalizing ideas…
• Following-environment counterbleeding as a planning failure (or a phonologization of a planning challenge?)
  • ma\textsuperscript{213} hen\textsuperscript{213} xiao\textsuperscript{213} \xrightarrow{} ma\textsuperscript{213} hen\textsuperscript{35} xiao\textsuperscript{213} is a transparent (bleeding) way to satisfy *213 213
  • but it requires you to know, while planning ma’s tone, that xiao has dipping tone
  • counterbleeding ma\textsuperscript{35} hen\textsuperscript{35} xiao\textsuperscript{213} only requires you to look one syllable ahead
  • Still, how can we implement this in the grammar, to allow counterbleeding in OT?

• Reasonable planning explanation for why spreading sandhi tends to go left-to-right
  • Shanghai /σ\textsuperscript{MH} σ σ σ/ \rightarrow [σ\textsuperscript{M} σ\textsuperscript{H} σ\textsuperscript{L}] is easier: to plan each syllable, you only need to know how many there are, and the underlying tone of the first one (which you’ve already accessed)
  • Danyang /σ σ σ σ\textsuperscript{33}/ \rightarrow [σ\textsuperscript{33} σ\textsuperscript{33} σ\textsuperscript{33} σ\textsuperscript{33}] is harder: to plan the first syllable, you need to know the tone of the last one

• The productivity of many of these patterns is unknown
  • Just as what happens in two-syllable sequences must be memorized (because it’s usually pretty arbitrary), a lot of three-syllable sequences might be memorized too
  • Much more work to be done in seeing what speakers do in novel collocations!!
Phonetic and phonological paradigm uniformity

• Basic question: do related words affect a word’s pronunciation at the sub-phonological level (e.g., duration?)
  - Bermúdez-Otero 2010: no! Refutes previous purported cases
  - Seyfarth et al. 2017: yes! When we say *frees, free* is also activated, including its final lengthening (pi-gesture), which makes *frees* longer than *freeze*
    - Maybe I should draw this…

• Nutshell versions of some of the other papers cited above:
  - Steriade 2000: French *pas d’rôle* ‘no role’, lit. ‘not of role’ is different from both *pas drôle* ‘not funny’ and *jade rose* ‘pink jade’
    - articulatory data from Fougeron & Steriade 1997
    - syllable structure won’t help us here: how can we get a three-way distinction?
    - analysis: constraint requiring same duration in corresponding output consonants
      - the [d] in *pas d’rôle* wants to have the same duration as the [d] in *de rôle*
  - Barnes & Kavitskaya 2002: French “schwa” (really something like [œ]) leaves behind rounding even when it deletes
    - …*plus p’tit que Lannes* [kala] lots of lip rounding in video
    - …*plus p’tit qu’la femelle* [kwâla] medium amount of lip rounding
    - …*tout p’tit clavecin* [kla] least amount of lip rounding
    - interpretation: we don’t need phonetic paradigm uniformity, because this isn’t really deletion!
      - it’s just gestural overlap: instead of occurring during a break between [k] and [l], the schwa is fully overlapped with them
    - ❓ If time, let’s draw a gestural score
  - Riehl 2003: no paradigm uniformity in American English tapping
    - This would be *phonetic* paradigm uniformity (if it existed) in the sense that there is no /t/ phoneme in English
    - Tapping is variable in context [-stress]__[-stress]
    - Steriade 2000: whether you tap in *nègativístic* should depend on whether you tapped in *négative*
    - Riehl had 6 speakers produce target words multiple times
    - It looks like there’s a correlation between number of taps in the base word and number in the suffixed word for each speaker
    - But Riehl argues that it’s not strong enough
    - I think a regression model would help here: beyond each speaker’s tendency to tap, is there still a correlation for that speaker’s tapping behavior in each word pair?
Braver & Kawahara 2015: incomplete lengthening in Japanese
- /ki+particle/ ‘tree’ 60 msec (doesn’t need to be lengthened)
- /ki/ ‘tree’ 125 msec (supposed to be lengthened to meet bimoraic minimum)
- /ki/ ‘key’ 157 msec (underlyingly long)
- analysis: /ki/ wants to be faithful to the duration seen in /ki+particle/  
  i.e., back to Steriade, but with a quantitative implementation: we can’t dismiss the duration difference as resulting from gestural overlap, because nothing is deleted here

7 Theories that try to integrate—or separate!—grammar and speech planning

Again, just a nutshell version of a couple of ideas, to give you an idea

- Zuraw 2009: let prosodic structure reflect how lexical access occurred
  - constraints like ALIGN(AccessedUnit, Left; PWord, Left)
    - if you access dispassionate as a whole unit, rest of grammar says make it one PWord \(\Rightarrow\) no need to aspirate the /p/
    - but if you access is as dis+passionate, this constraint says passionate should be a separate PWord \(\Rightarrow\) its initial /p/ must get aspirated
    - (except it was a Tagalog case study)
  - Allows the grammar to say where a rule must apply and can’t apply
    - only where the constraint ranking allows it can lexical access affect pronunciation

- Smolensky & Goldrick 2016 (and colloquium last quarter)
  - Isn’t about speech planning per se, but builds gradient “activity” into the input to the grammar
  - Activity could just be a static property of an underlying representation
    - French /pəti(0.73*t)/
      - the final consonant sort of wants to show up, but needs encouragement
      - such as a following vowel-initial word
    - …but it could also be affected by all kinds of on-line factors
      - have you recently activated /t/, or is there another one coming up?
      - how strongly activated is the whole word?
      - how sure are you about the word’s phonological representation—have you finished retrieving all of it?
• MacKenzie 2012: some variation is in the grammar, some is in processing, and some is sociostylistic

one way to diagnose: if the variation is sensitive to factors that control categorical processes elsewhere (e.g. part of speech), then it’s probably grammatical—or at least it could be

An intriguing new idea about how to diagnose what kind of variation you’ve got: Tamminga, MacKenzie & Embick 2017

• self-priming/persistence: after you say –in’ once, you remain more likely to choose that variant for a while
• this increased probability decays over time
• maybe different types of variation result in different decay patterns, and different patterns of self-priming and imitation in the first place

Coming up: last class on Wednesday
• Getting phonological evidence
References


Munson, Benjamin. 2007. Lexical access, lexical representation, and vowel production. Laboratory Phonology 9. 201–228.


Tamminga, Meredith. 2015. Modulation of the following segment effect on coronal stop deletion [slides]. N WAV 44. Toronto.


