SFU Pronunciation Mini-Conference 2016

Perceptual Illusions and Communication Strategies: L2 Syllable Codas and Redeployment

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- Thanks to Marziyeh Yousefi for proposing this project and for getting me thinking about these questions.

- The views expressed in this talk do not necessarily reflect the scholarly stance of Marziyeh herself (as it may manifest itself in her upcoming candidacy paper) nor those of the employees of the Disney corporation.

L1:L2 Mappings

- Equivalence classification (segment mapping)
  - How do we map L2 sounds which do not occur in our L1 environment onto our L1 representational categories?
    - E.g. what does an English speaker do with an [ü]?; what does a French speaker do with a [θ]?
  - Models:
    - Speech Learning Model (Flege)
    - PAM-L2 (Tyler & Best)
    - Bayesian probability (MaxEnt; Wilson & Davidson)

- Repair strategies (string mapping)
  - How do we handle strings which our L1 phonological structures cannot parse?
  - If our L1 only allows single consonant onsets, what do we do with a word like *straw*?
  - If our L1 doesn't allow clusters like [ŋk] how do we handle a name like *Nkomo*?
  - If our L1 borrows a word from another language is it 'altered' in some way?

Repair Strategies

- Deletion
  - gra<u>ndm</u>other -➔ gra<u>nm</u>other
  - mi<u>st</u> ➔miss
- Epenthesis
  - Spanish ➔ espanish
  - blond ➔ bəlondə

Production/Perception?

- These data are often cited in production tasks
- What about perception?

Input/Intake

- Clearly L1 phonology affects L2 perception
- *Intake* is often viewed as a subset of *input* (Corder; VanPatten, Noticing, etc.)
  - Environmental English Input: [l] and [r]
  - Intake to Japanese Learner Processor: [ɾ]
- But sometimes *intake* exceeds *input*
  - Not Plato's, nor Orwell's but *Escher's* Problem
    - Augmented Reality

Perceptual Illusions

- Studies from a number of L1s (Japanese (Dupoux; Matthews & Brown), Korean (Kabak & Idsardi)
- Japanese: does not allow obstruent consonantal sequences word medially:
  - *ac.tor
  - *chap.ter
- In production, they insert an epenthetic vowel between the obstruents
  - baseball ➔ basubaru

- But this happens in perception too
- When exposed to a string like [ebzo], the Japanese subjects hear [ebuzo] whether or not there is a vowel present (Dupoux, et al.)
  - How can you tell? Behavioural tasks, discrimination tasks, ERP recording, etc.
- But Thai L1 subjects (since Thai allows medial obstruent strings) do NOT hear the illusory vowel (Matthews & Brown)

- Kabak & Idsardi (2007) show that this is mediated by phonological structure (specifically *Coda*) not just by linear adjacency

sC Onset Perception

- There is a cottage industry looking at sC clusters in SLA
- Brazilian Portuguese (Cardoso):
  - Does not allow sC clusters
  - Allows Obsruent + Liquid clusters (e.g. [br])
  - Allows maximally single C codas
- Both production and perception studies showed definite differential accuracy effects (and no ceiling effects):
  - Production: sl > sn > st
  - Perception: st > sn > sl

- The BP L1 subjects had difficulty discriminating accurately between forms which began with:
  - sC and isC

- (where [i] is the BP epenthetic vowel)

- The same is true in Thai (Imsri):
  - No sC onsets
  - No branching codas
- In production, they epenthesize to break up the sC:
  - spa ➔ səpa
- In perception the advanced learners made 60% errors on discriminating sC strings from SVC strings
  - Even when correct, there were significantly longer RTs
  - And remember, they did fine on [ebzo]

- So, these perception errors are real in that they affect representation and processing

- but recent pilot data from Yousefi (2016) suggest that Persian speakers (who also lack sC onset clusters) do *not* exhibit such perceptual illusions

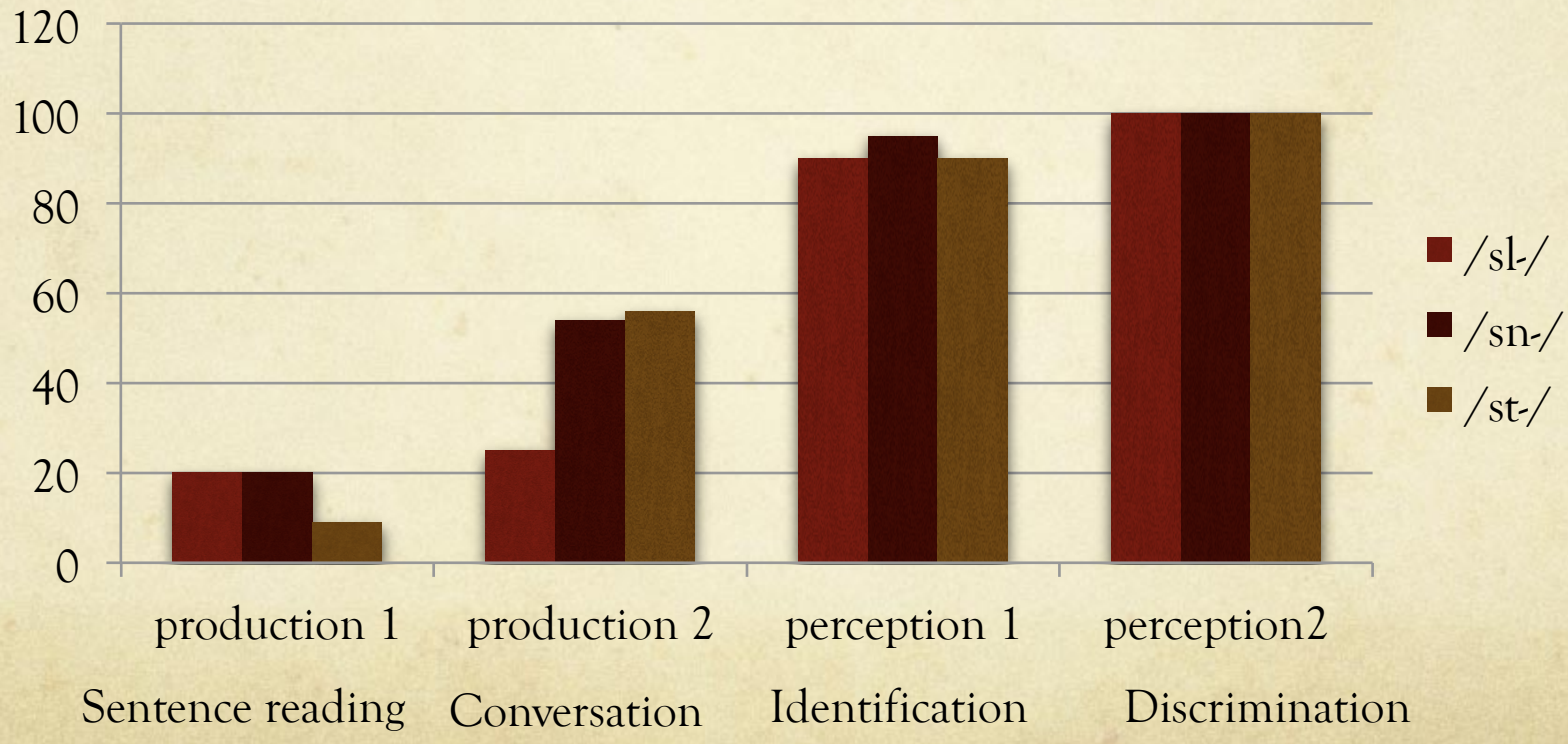
Perception task 1 (identification):

From 60 pseudoword stimuli (from Boudaoud & Cardoso) played (10 /st/, 10 /est-/, 10 /sl-/, 10 /esl-/, 10 /sn-/, 10 /esn-/) the participant chose 55 correctly (92%), and 5 option "c" which is a "not sure" option (8%).

Perception task 2 (ABX discrimination):

- From 30 stimuli played (containing 10 of /st/, 10 /sn/ and 10 /sl/): all were chosen correctly (100%)

Discussion
summary of results



Why the Cross-Linguistic Difference?

- sC clusters tend to exceptional cross-linguistically
- Remember /st, sk, sp / onset clusters violate Sonority Sequencing
- Persian allows coda clusters which violate the SSP
  - E.g. *setr*; *zebr* have *rising* coda sonority
- Japanese, Thai, Korean, and BP do not
- None of them allow sC onsets

Why the Difference?

- I propose that the performance of all the subjects is explained, in part, via properties of their L1 coda structure
- Japanese, Thai, BP transfer their L1 knowledge and do *not* have the building blocks to handle sC onsets and the perceptual illusion of vowel insertion occurs;
- The illusory vowel is actually part of their stored representation

- Persian subjects, on th other hand, *redeploy* their L1 coda knowledge of SSP violating strings to their perception of L2 sC onsets thus overcoming the perceptual illusion
- They learn quickly that the illusory vowels are not part of the stored representation

Redeployment

- Archibald (2005)
- L2ers can build new representations out of the building blocks of their L1 representations
  - E.g. English L1 using place distinction for alveopalatal fricatives [s/ʃ] to acquire Czech palatal stops [c/ɟ] (Atkey)
  - E.g. English L1 using heavy syllables' weight-projecting moras to acquire Japanese geminate consonants (Summerell)

Redeployment

- Persian allows a negative Minimal Sonority Distance in codas (very marked)
- Codas are more marked than onsets
- If a marked structure is allowed in the coda, it should be allowed in the onset
- Therefore, if they accept negative Minimal Sonority Distance in English onsets (hence [st]) then they should also accurately perceive [sn] and [sl]; and they seem to

Epenthesis and Communication

- These same Persian subjects who accurately perceive the English L2 sC sequences are still epenthesizing in their L2 production
- Abrahamsson (2003) shows that epenthesis is used as a communication strategy by Mandarin learners of Swedish in order to make the task of the listener easier by boosting comprehensibility.

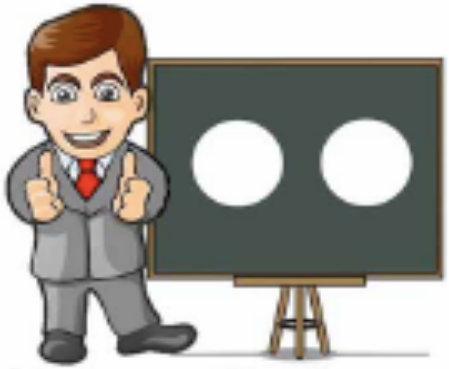
Epenthesis and Communication

- Mandarin learners started with a deletion strategy (hypothetical examples from English not from Swedish):
  - wet → wɛ
  - when → wɛ
  - went → wɛ

- But as their proficiency increased they switched to an epenthesis strategy:
  - wet → wɛtə
  - when → wɛnə
  - went → wɛntə

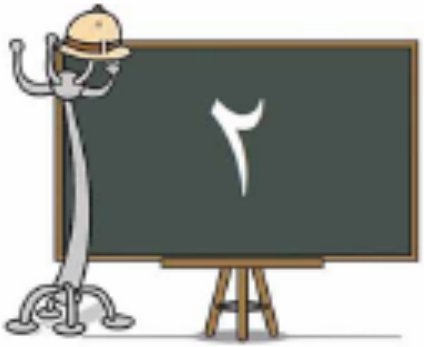
- These production/perception differences are informed by some recent MEG studies (Pylkännen)
- Her focus is on language switching but it is relevant
- in production there is a close relationship between language control and general cognitive control but *not* in comprehension;

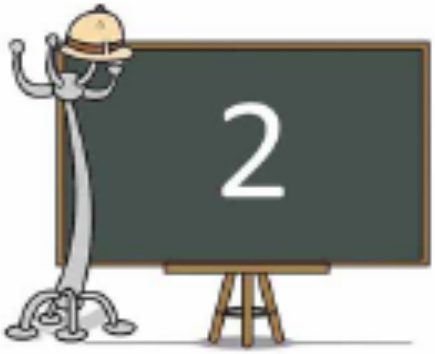
Cutural Condition



Match	"two"	"ethnan"
Mismatch	"ethnan"	"two"

Script Condition

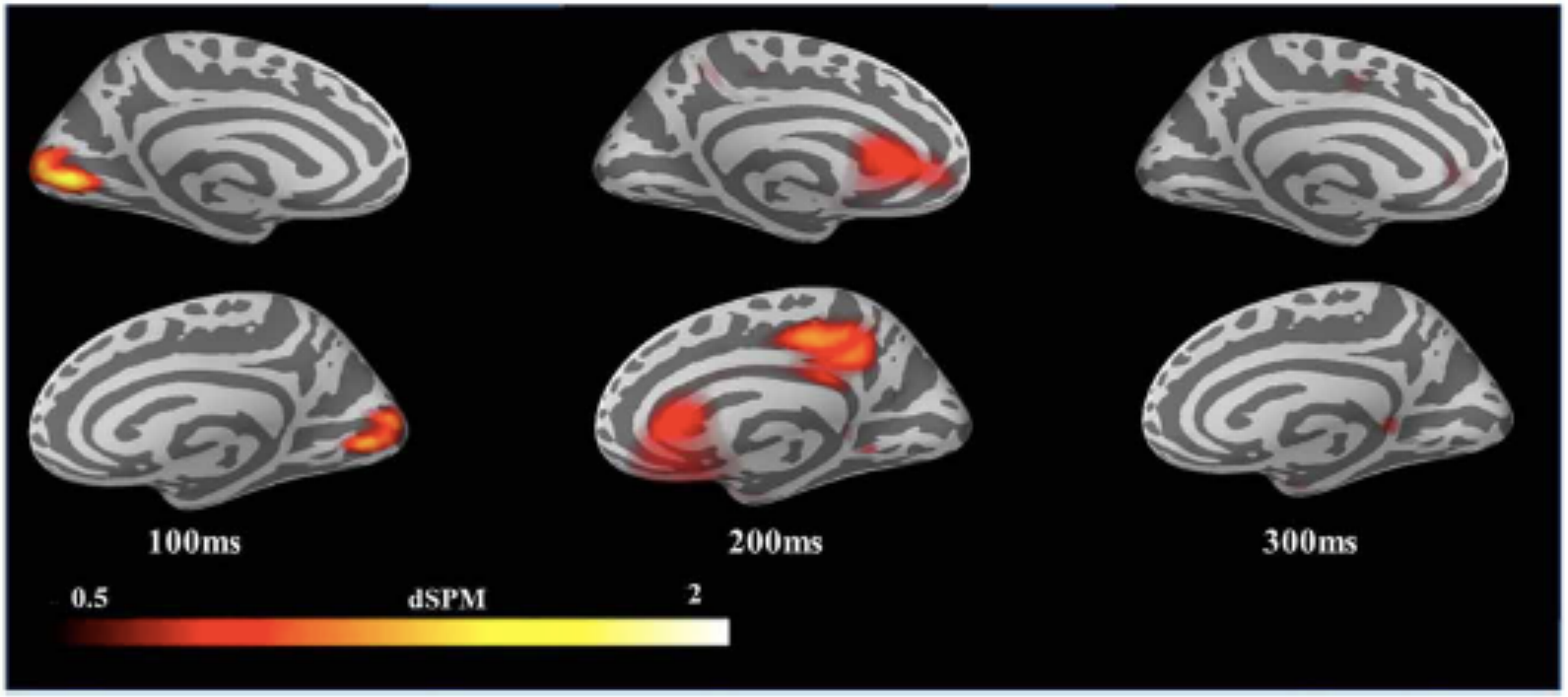


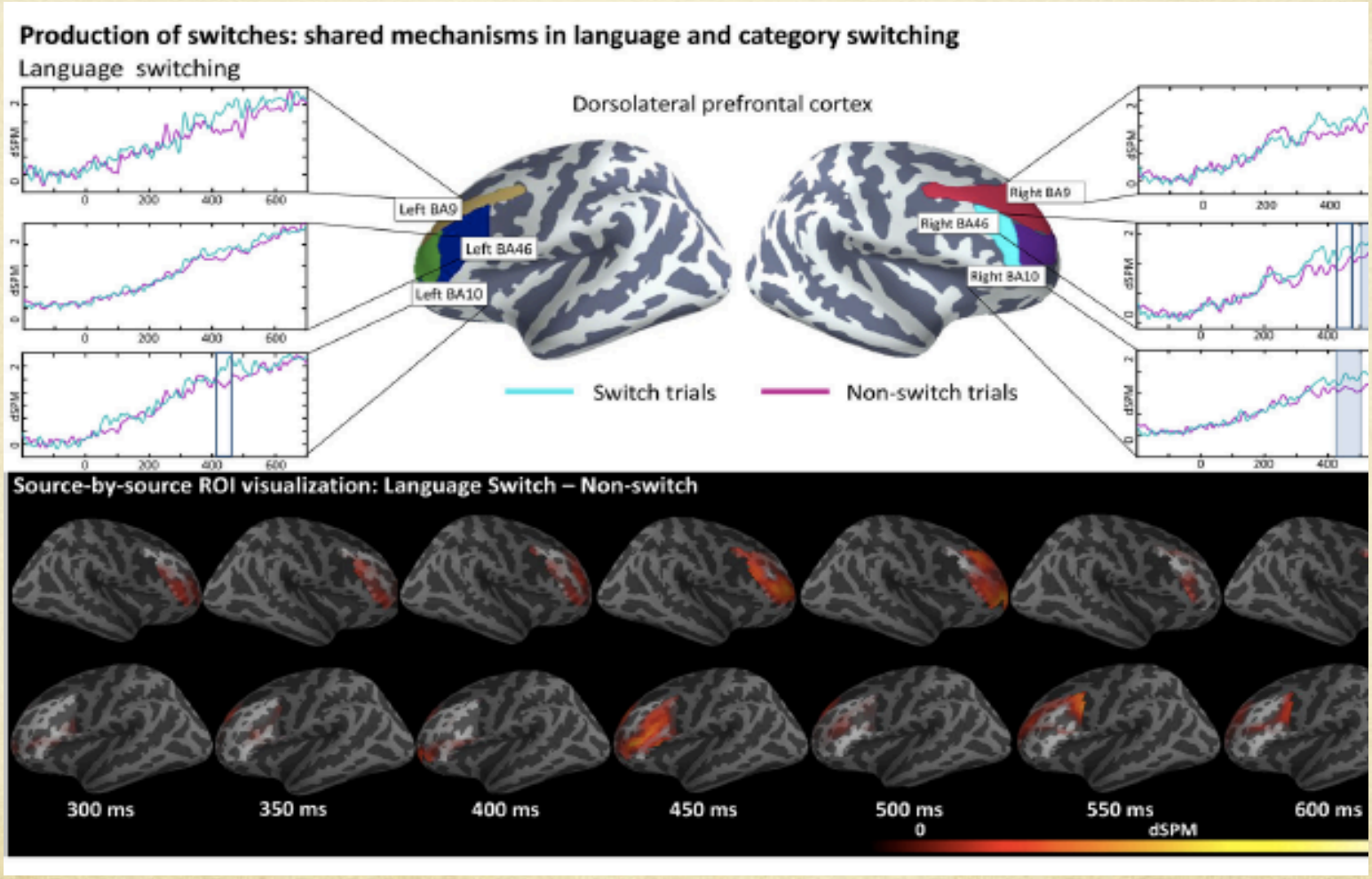


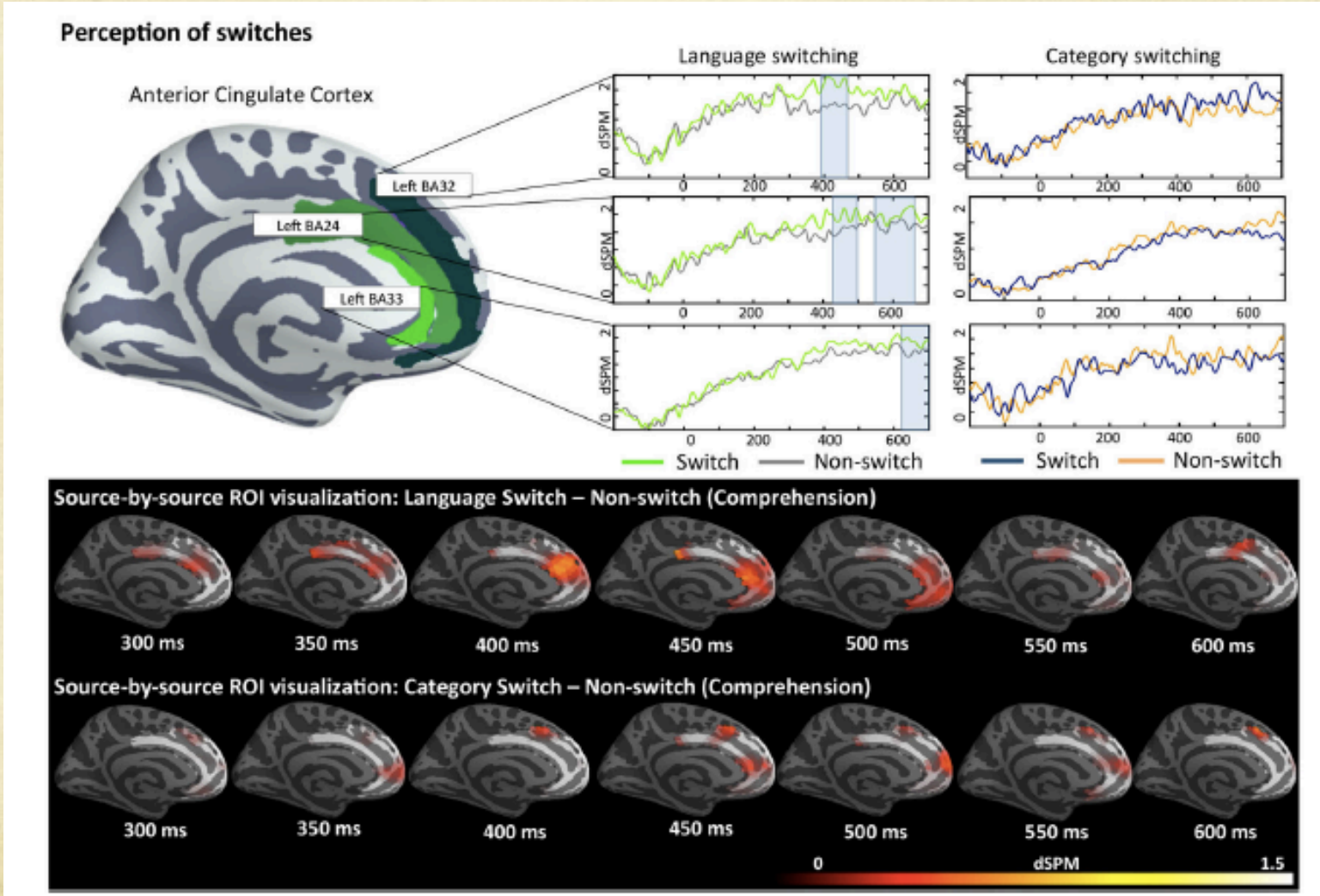
Match	"ethnan"	"two"
Mismatch	"two"	"ethnan"

FIGURE 1 | Graphic depiction of all types of stimuli utilized in the experiment and correct responses for each of the experimental conditions.

Whole brain comparison of mismatch conditions: culture vs script cue




Production of switches: shared mechanisms in language and category switching
Language switching
Dorsolateral prefrontal cortex
Left BA9
Left BA46
Left BA10
Right BA9
Right BA46
Right BA10
dSPM
0
200
400
600
Switch trials
Non-switch trials
Source-by-source ROI visualization: Language Switch – Non-switch
300 ms
350 ms
400 ms
450 ms
500 ms
550 ms
600 ms
0
dSPM


Perception of switches
Anterior Cingulate Cortex
Left BA32
Left BA24
Left BA33
Language switching
Category switching
dSPM
0
200
400
600
Switch
Non-switch
Source-by-source ROI visualization: Language Switch – Non-switch (Comprehension)
300 ms
350 ms
400 ms
450 ms
500 ms
550 ms
600 ms
Source-by-source ROI visualization: Category Switch – Non-switch (Comprehension)
0
dSPM
1.5

- Production. Less need for executive control in script condition (compared to culture condition).
- Language control in production recruits *domain-general* regions (dorsolateral prefrontal regions bilaterally) which are also implicated in non-language switching tasks
- while perception recruits *language-specific* regions (anterior cingulate cortex) which is not implicated in a non-language switching task.

Summary

- The perceptual illusions are part of *grammar*.
- The produced epenthetic vowels, on the other hand, are under cognitive executive control.

Pedagogic Implications

- Instruction can, of course, both:
  - Work on changing perception (e.g. processing instruction) in the learners;
  - Work on conscious communication strategies to improve intelligibility and comprehensibility

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Thank you.

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