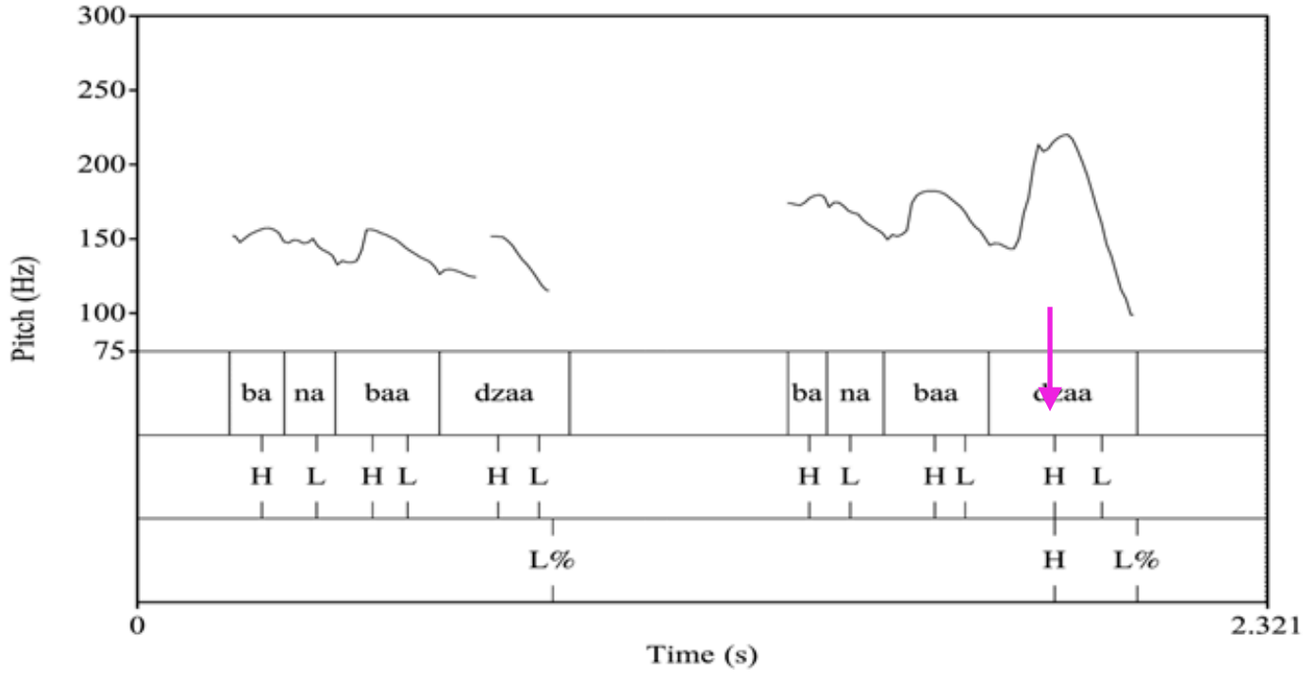
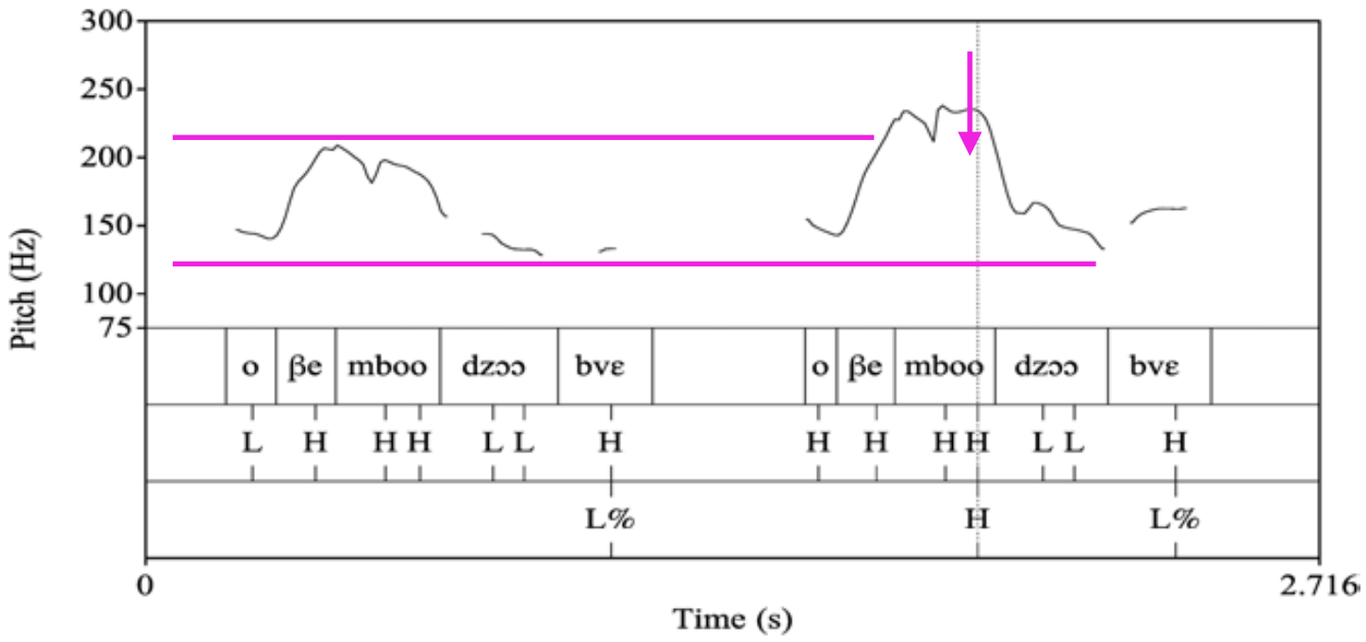
Embosi Modeling:
Take Two

Yes/No Q: H L%



L% is found at end of the utterance

H occurs on the last H tone if the final tone is a L tone.



Otherwise, the H of the HL% is pushed forward towards the preceding H tone, extending the contour on a larger domain.

<u>Alternative description:</u>
H is attracted to the H of the last HL sequence!

Modeling: Ideas

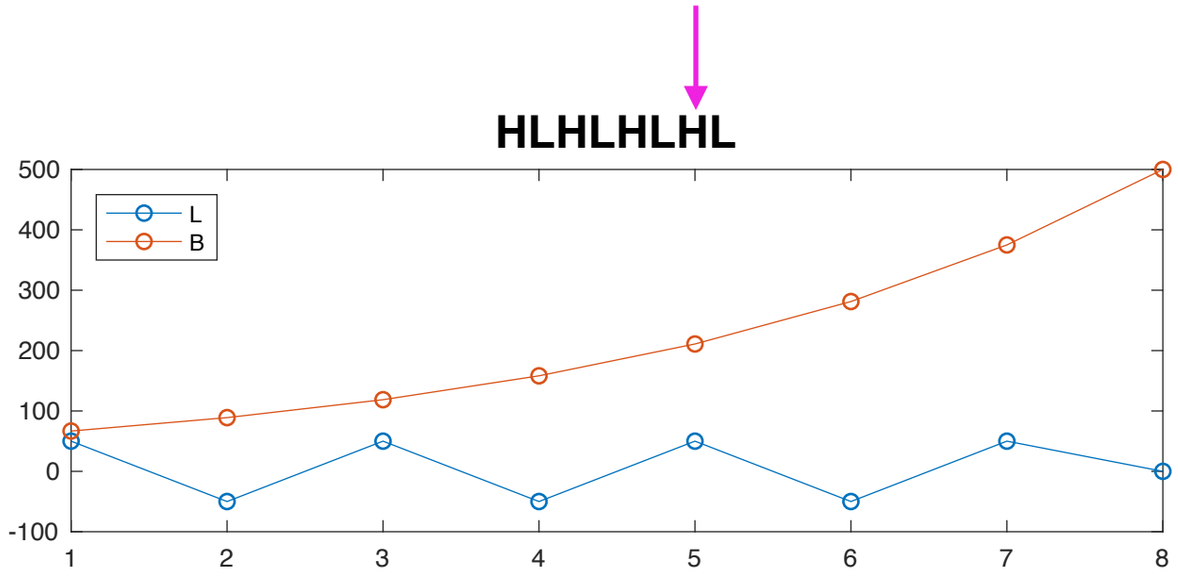
Alternative description:
H is attracted to the H of the last HL sequence!

- Planning or Grammar: Find the syllable with the maximal activation of the Boundary Tone (BT) and trigger at that syllable.
- Two contributions to BT activation:
  - Lexical Tones
    HL sequences activate BT
  - Boundary location
    BT are activated the closer to the boundary we are.
- Interaction
  - The activation sources interact (in the statistical sense)
    Triggering depends both activations

Modeling: More specifics

- Lexical Tone contribution (L)
  - Model by calculating the difference in Target f0 between the current syllable and the next syllable.
  - A high value for difference means the beginning of a HL sequence, which attracts/activates BT
- Boundary Tone contribution (B)
  - Model BT activation with first-order exponential decay from the boundary to the initial syllable.
- Interaction
  - $BTact = B*T$ (Product is an interaction)
- Inhibition
  - Triggering BT at position i can be inhibited by the total amount of $BTact$ from $i+1$ to $nsyll$ (end).

Results


HLHLHLHL
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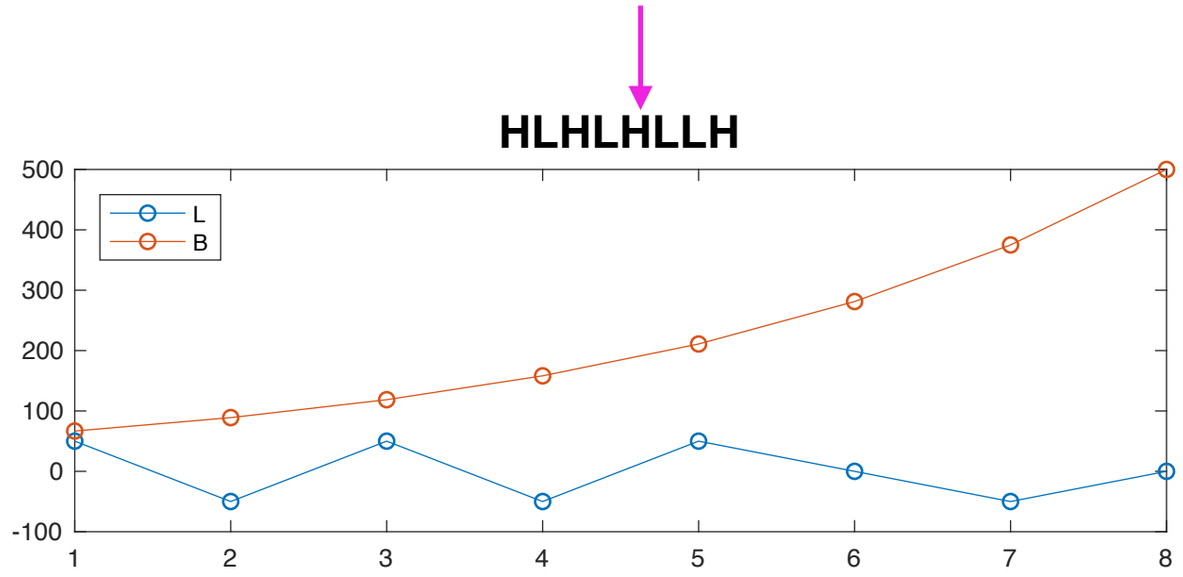
400
300
200
100
0
-100
L
B
1
2
3
4
5
6
7
8


HLHLHLLH
500
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L
B
1
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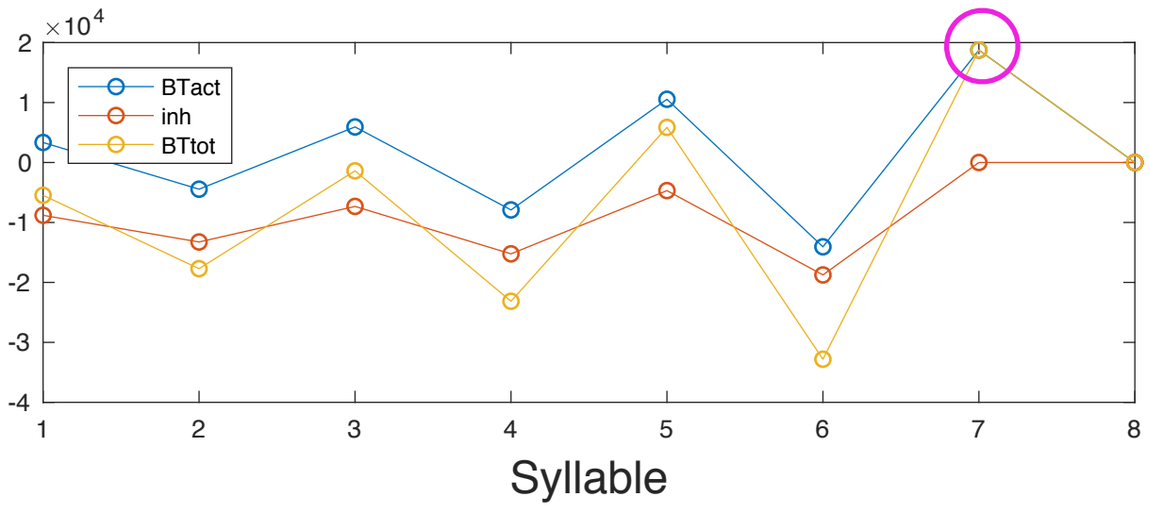
×10^4
2
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0
-1
-2
-3
-4
BTact
inh
BTtot
1
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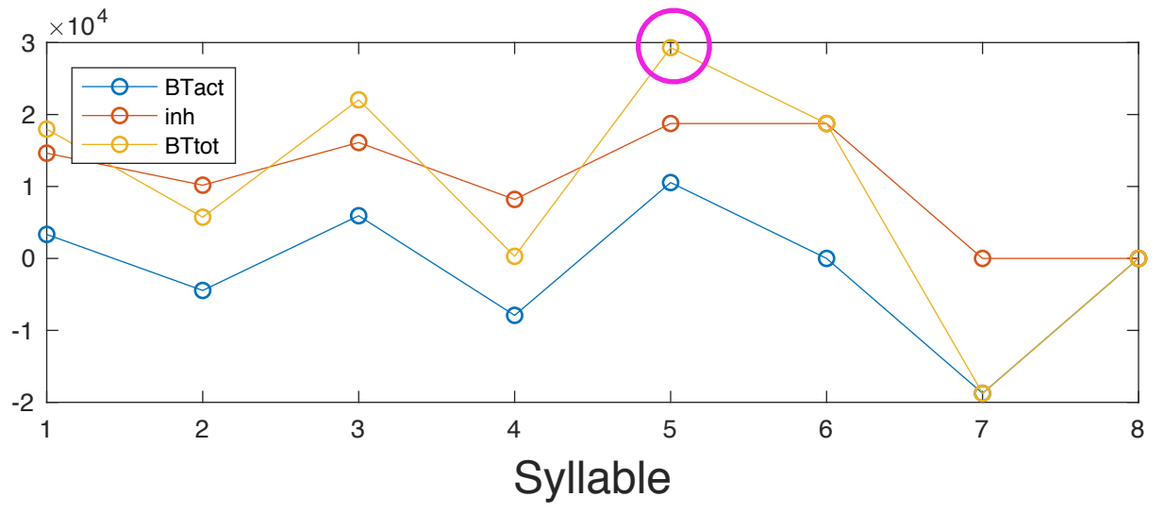
3
4
5
6
7
8
Syllable


×10^4
3
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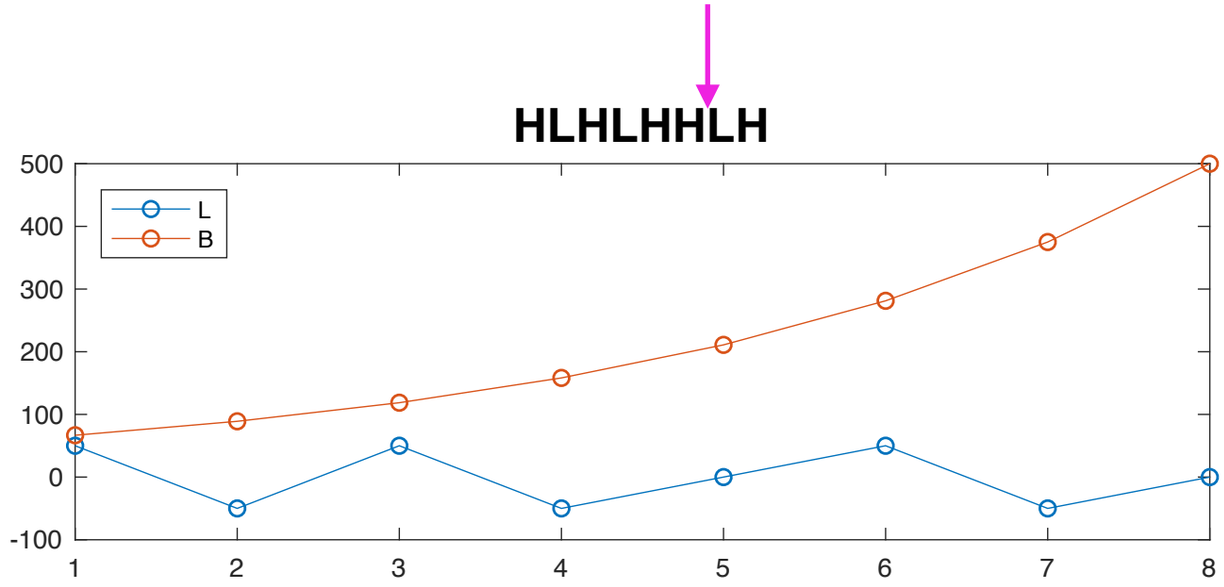
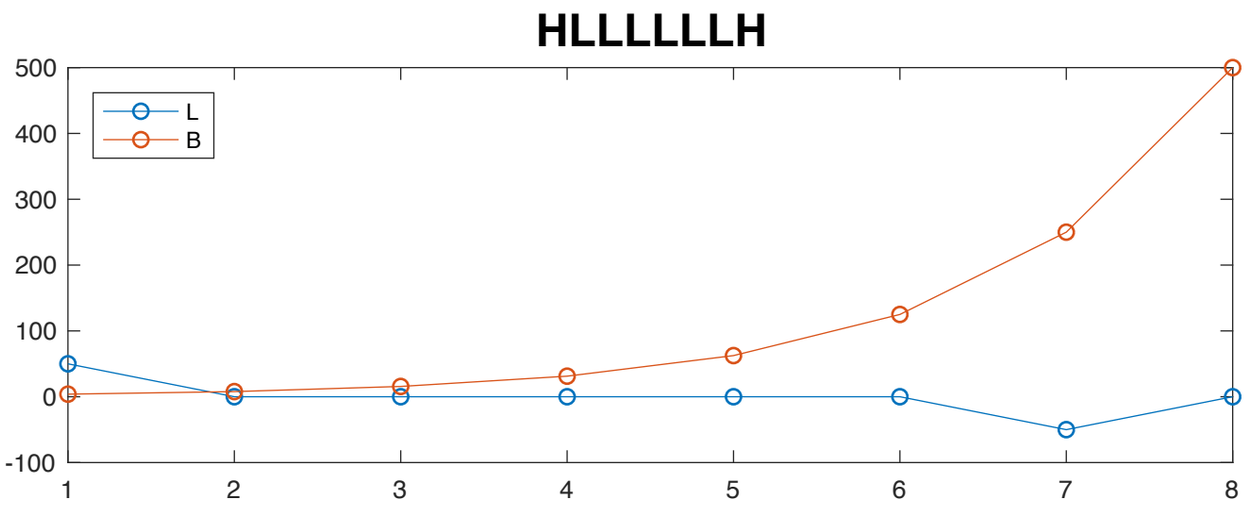
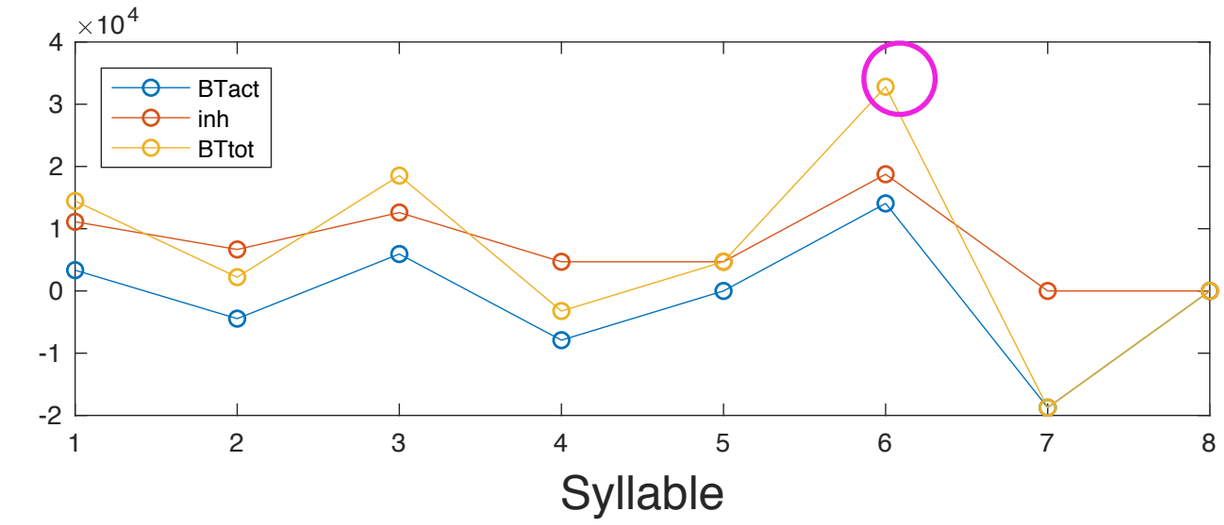
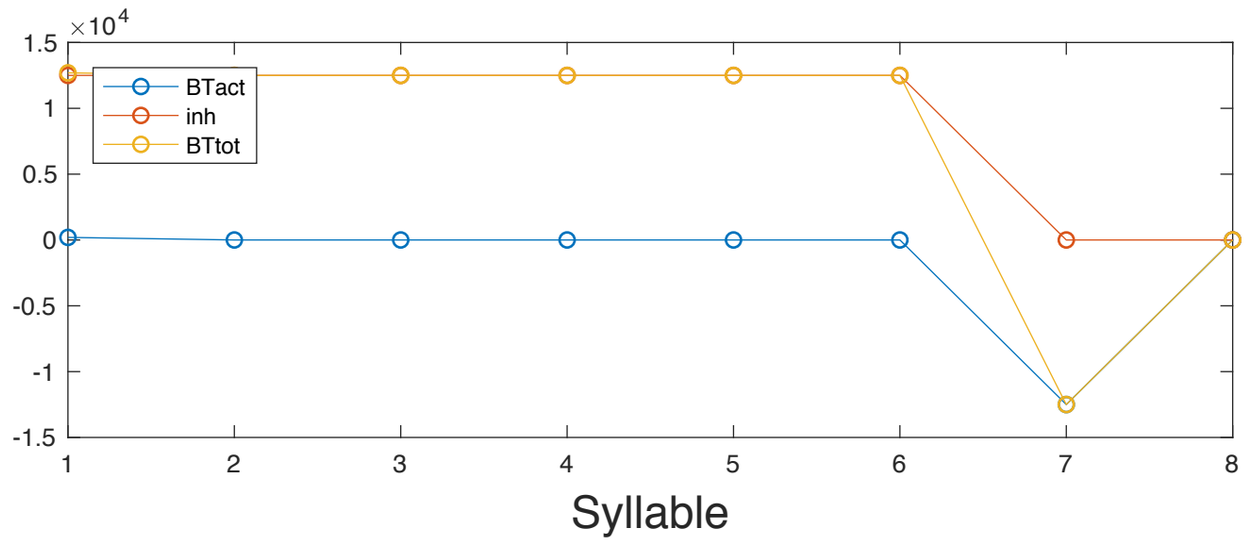
Syllable









Not clear what the right answer in here, and interestingly, the model doesn't give a clear answer.

Going Forward

- Test for robustness as a function of values of:
  - String length
  - F0 of H and L
  - B dynamics
    - $B(nsyll)$
    - k
- More data (of course)
- Utility of Inhibition?
- Dynamical mechanism for actual triggering BT (H and L%), suppressing lexical tones (or possibly blending?)