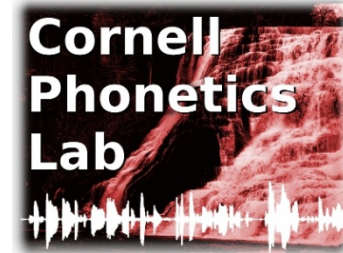


# Articulatory gestures are individually selected in production

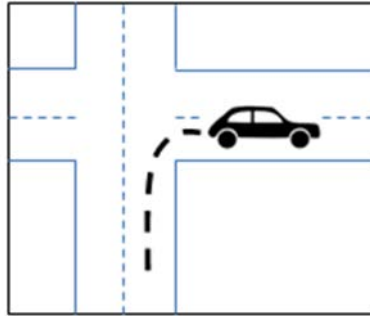
**Sam Tilsen**  
Cornell University



**Louis Goldstein**  
University of  
Southern California



# sequential selection of motor plans



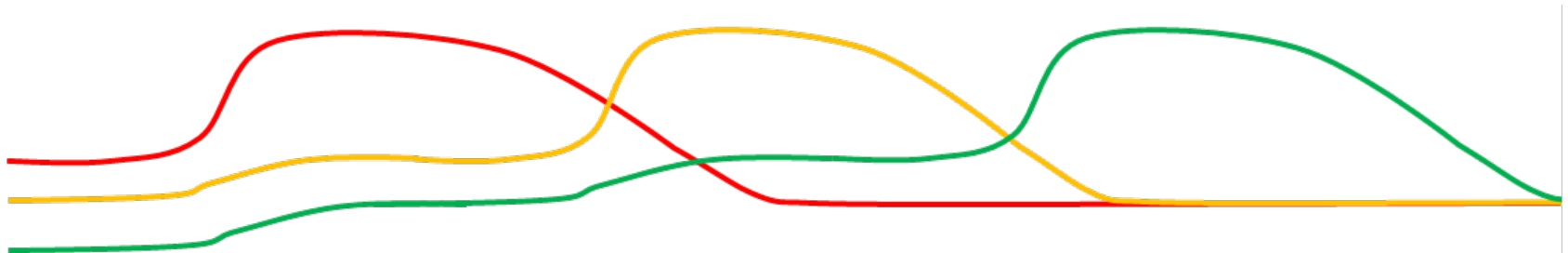
**slow down**



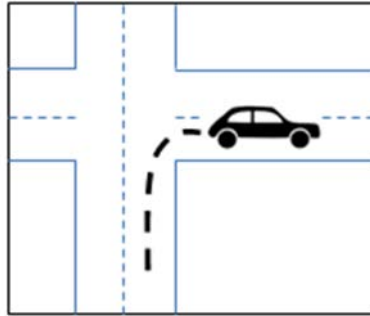
**turn**



**drive forward**



# sequential selection of motor plans



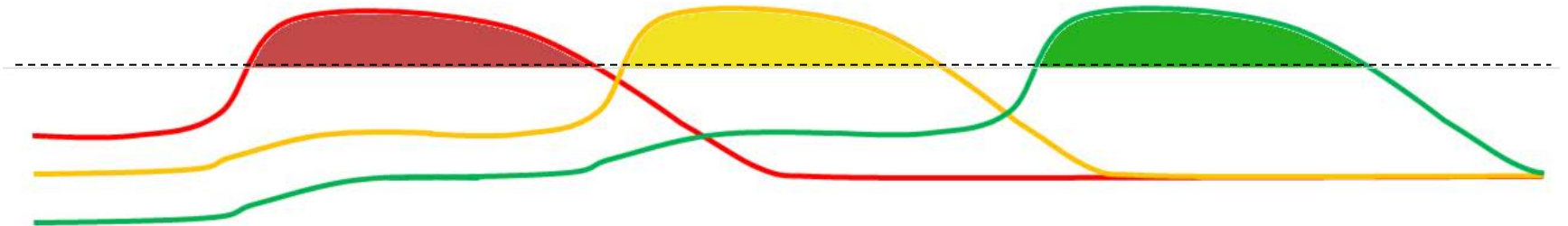
**slow down**



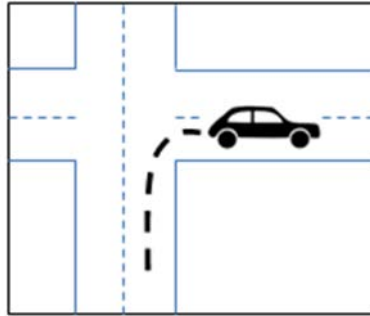
**turn**



**drive forward**



# sequential selection of motor plans



**slow down**

press  
brake



**turn**

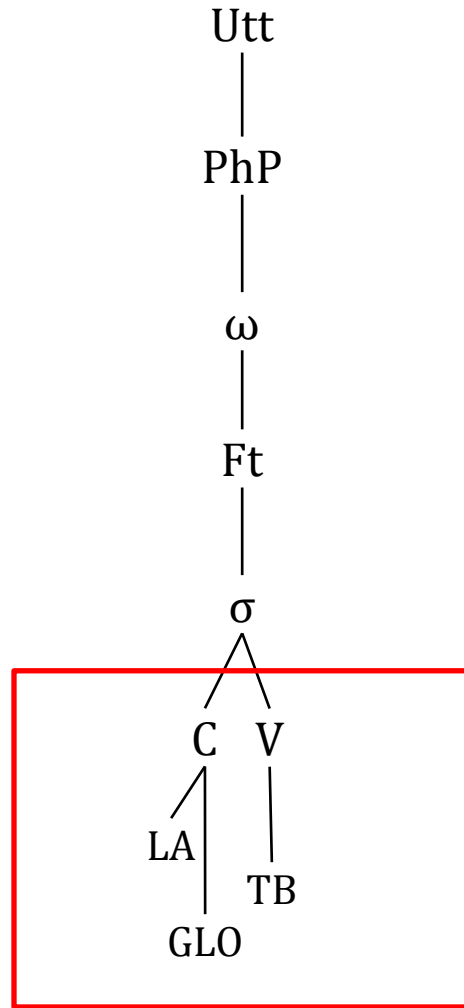
rotate  
wheel      release  
brake



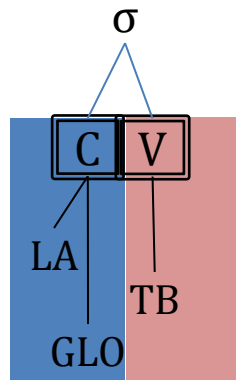
**drive forward**

straighten  
wheel      press gas  
pedal

# what types of units are selected?

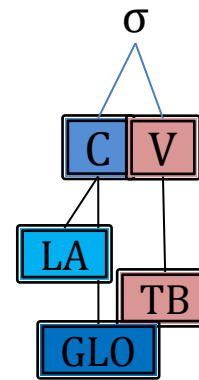


# what types of units are selected?



*segments only*

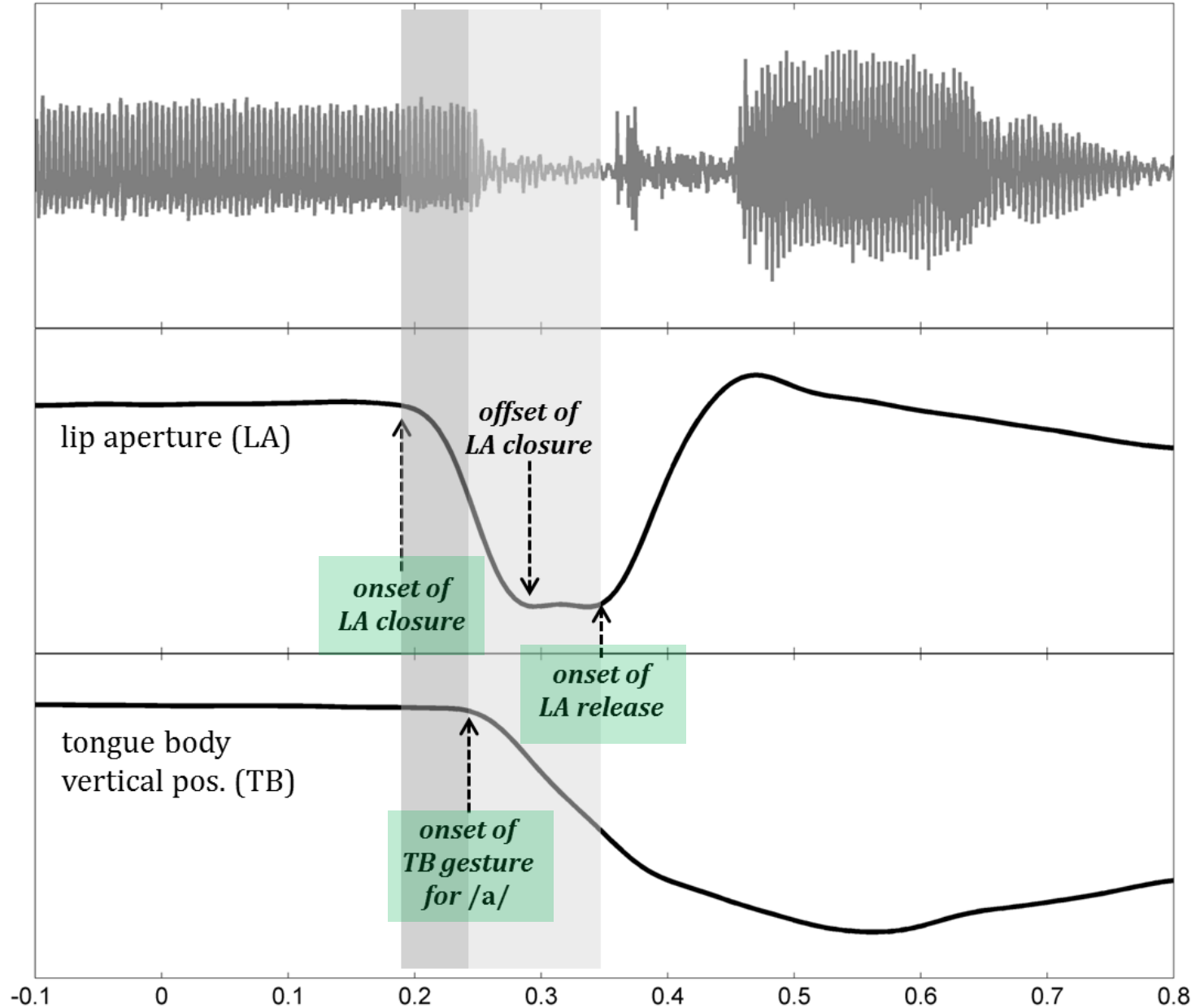
**SEGMENTALLY  
COHERENT  
SELECTION**



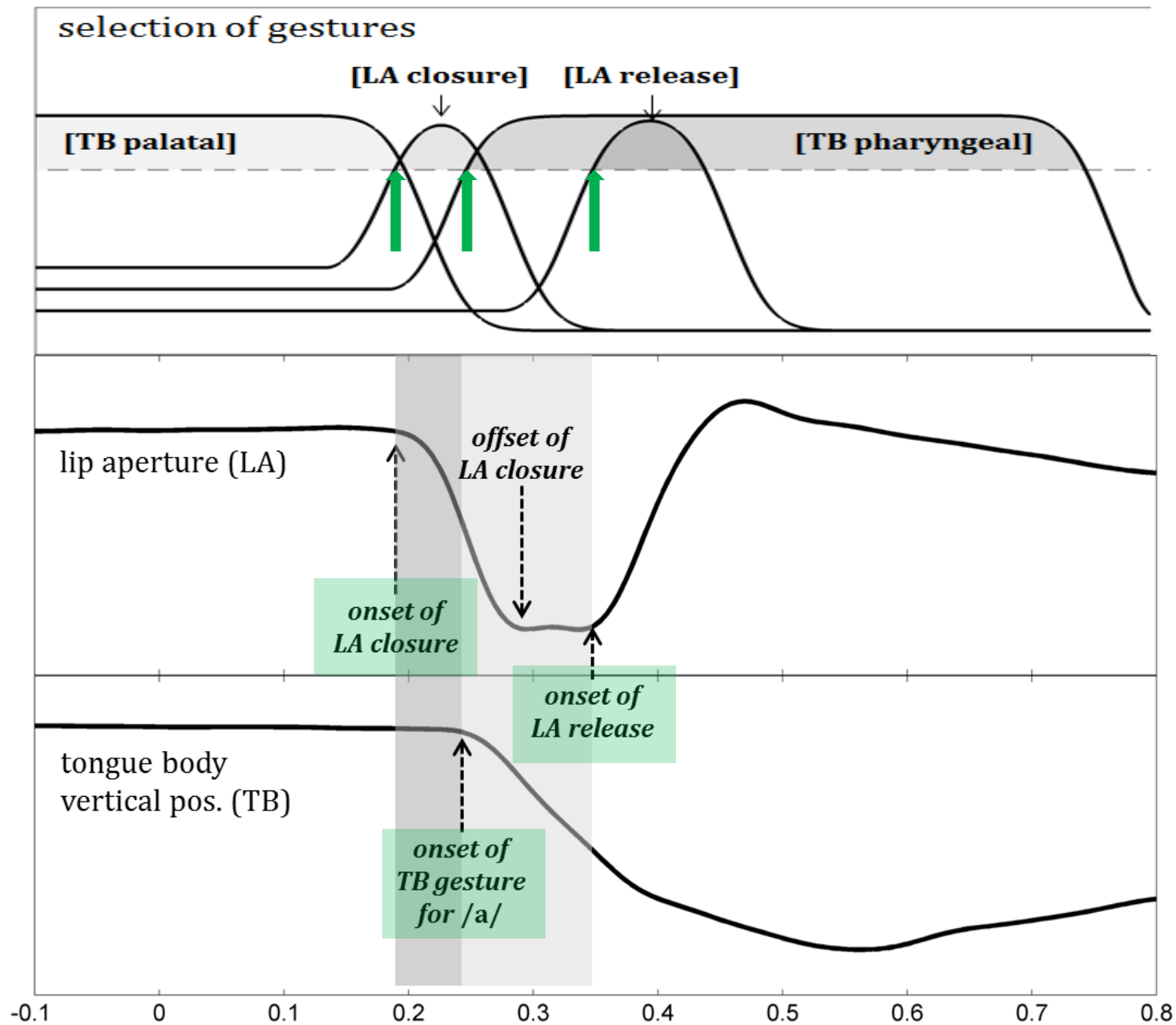
*gestures  
(and segments)*

**INDEPENDENT  
GESTURAL  
SELECTION**

# articulatory gestures in /pa/

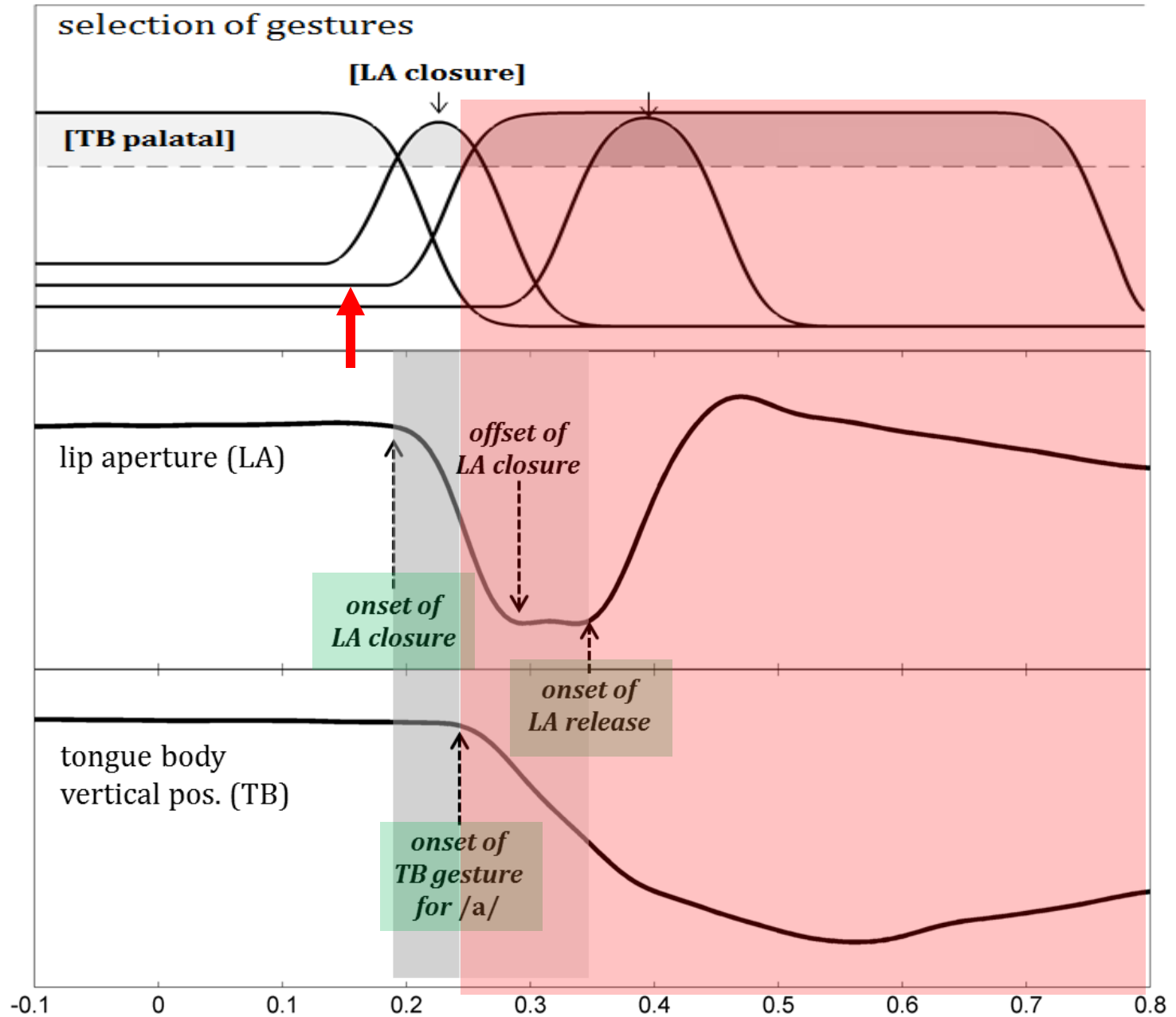


# selection of articulatory gestures in /pa/

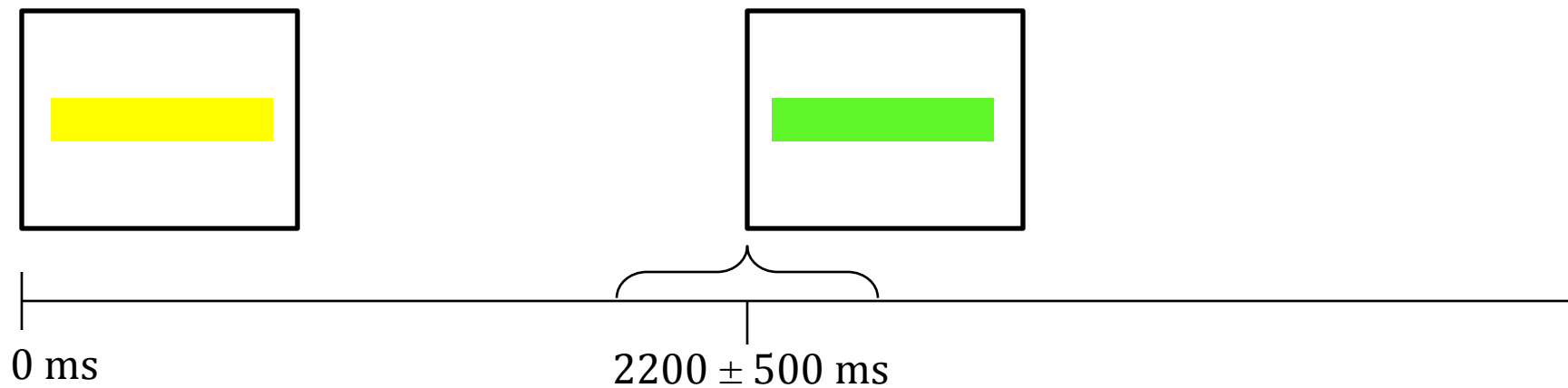




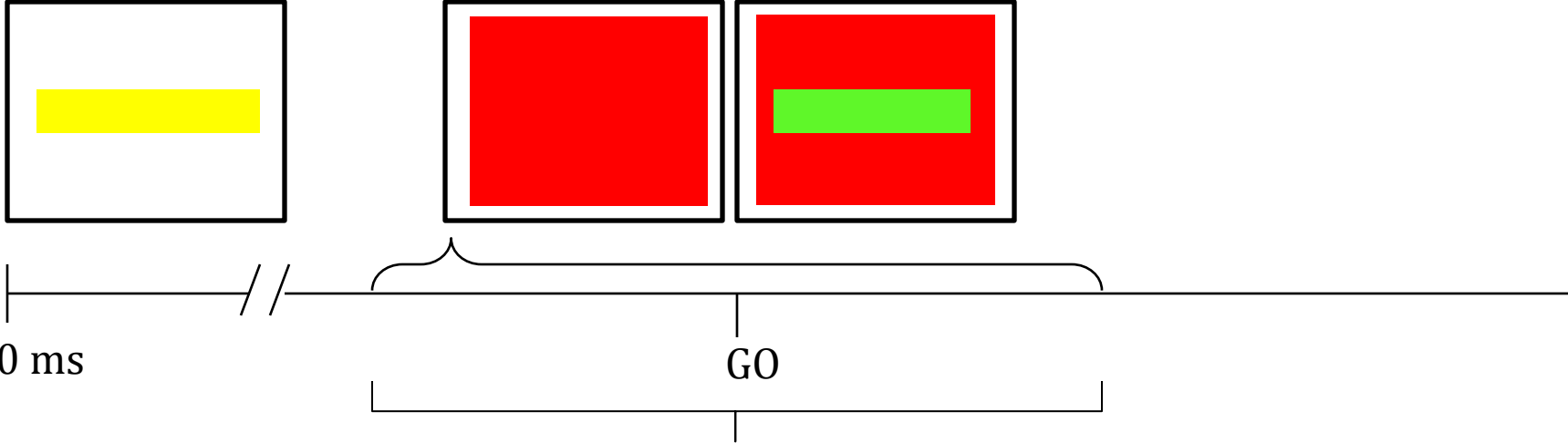
# withheld selection of articulatory gestures in /pa/



# pre-response [i] and randomly timed go-signal

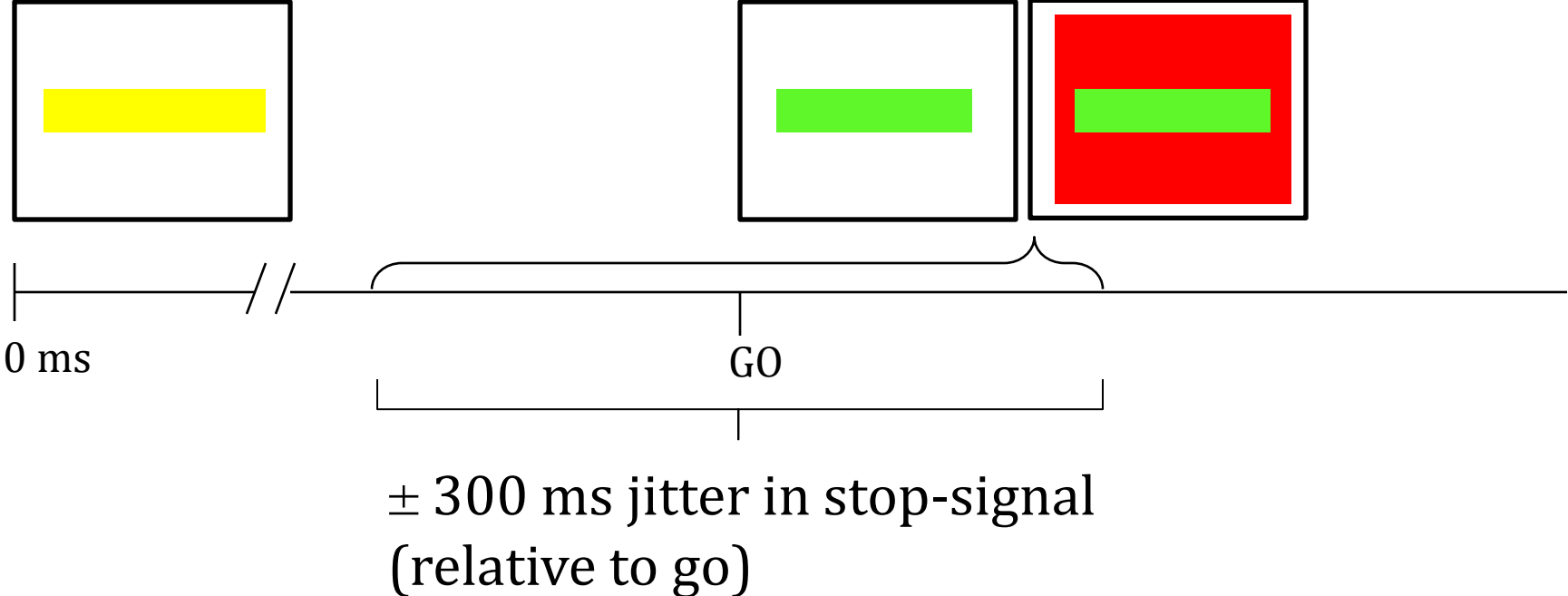


# don't respond, or stop speaking, when given a stop-signal



$\pm 300$  ms jitter in stop-signal  
(relative to go)

# don't respond, or stop speaking, when given a stop-signal

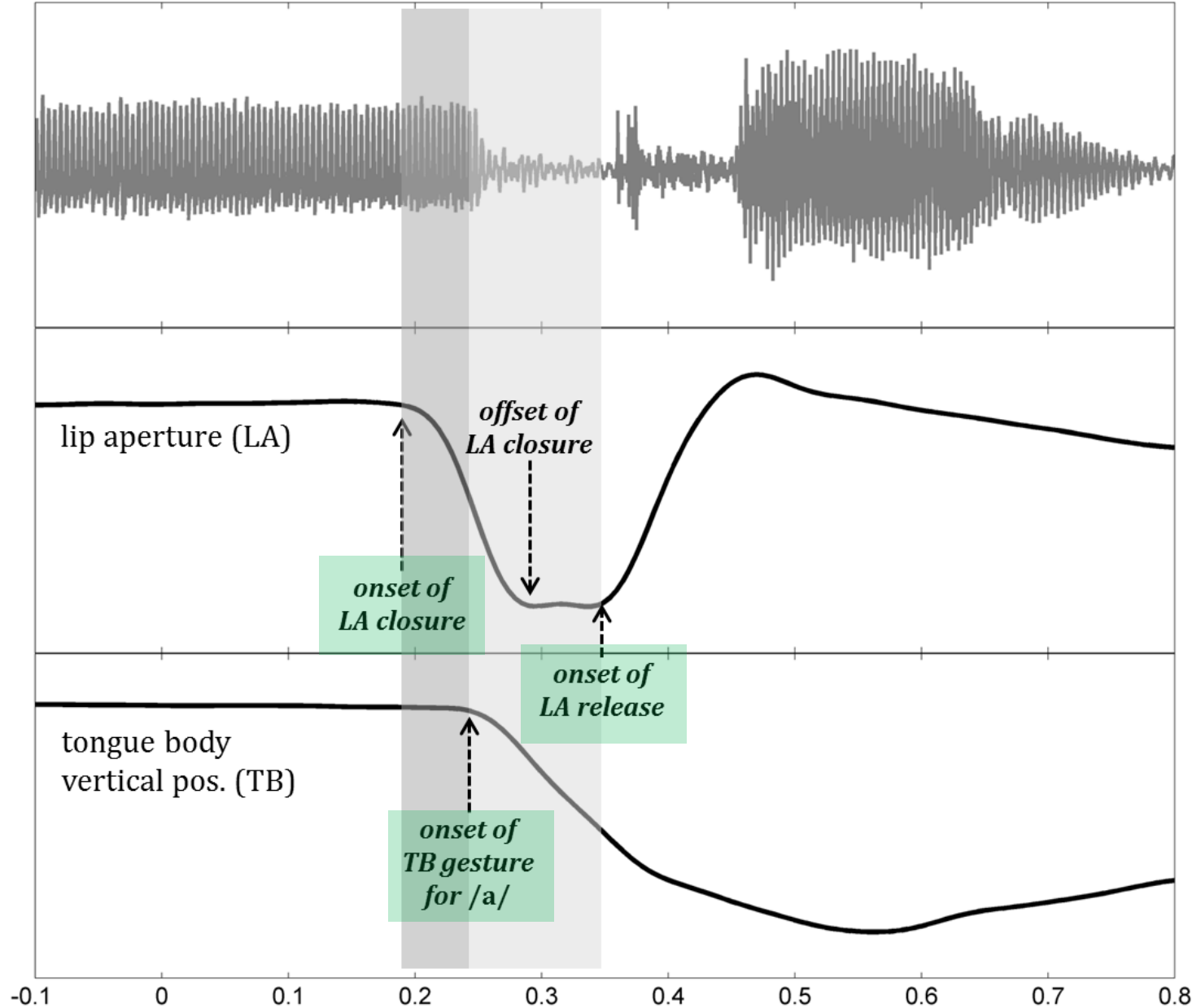


non-word responses:

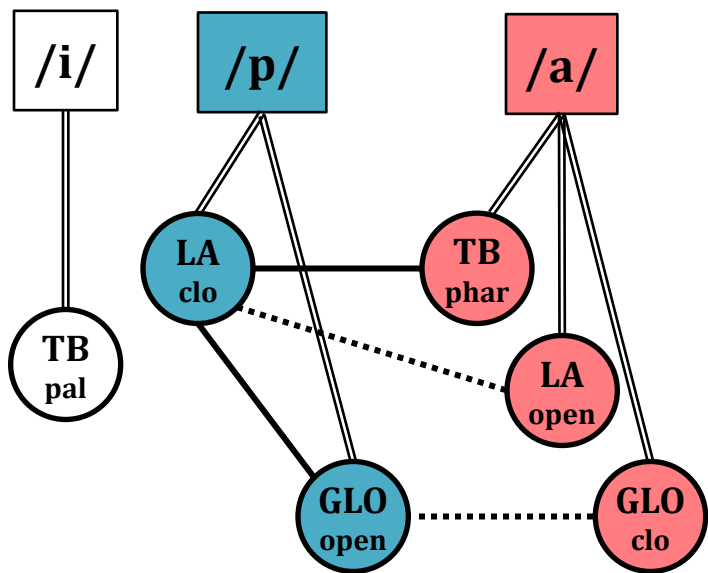
## three metrical stress conditions

	<b>[p]-initial</b> (5 subjs)	<b>[k]-initial</b> (5 subjs)
<b>monosyllabic</b>	PA	KA
<b>stress-initial</b> (sw)	<b>PA</b> .ka	<b>KA</b> .pa
<b>stress-final</b> (ws)	pa. <b>KA</b>	ka. <b>PA</b>

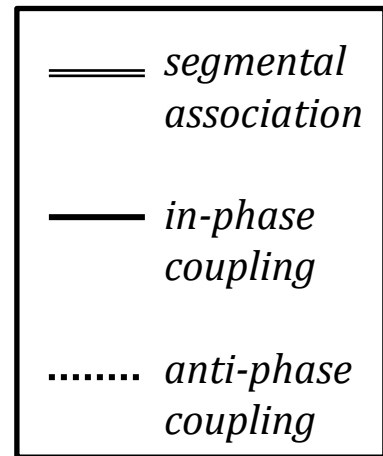
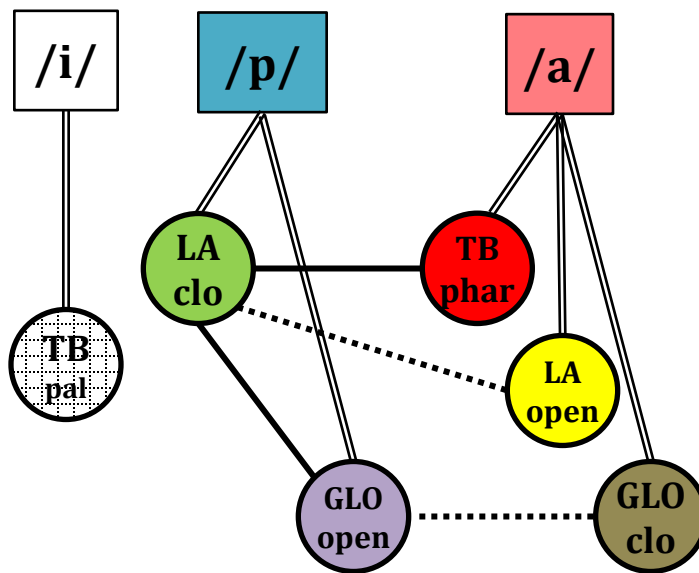
# articulatory gestures in /pa/



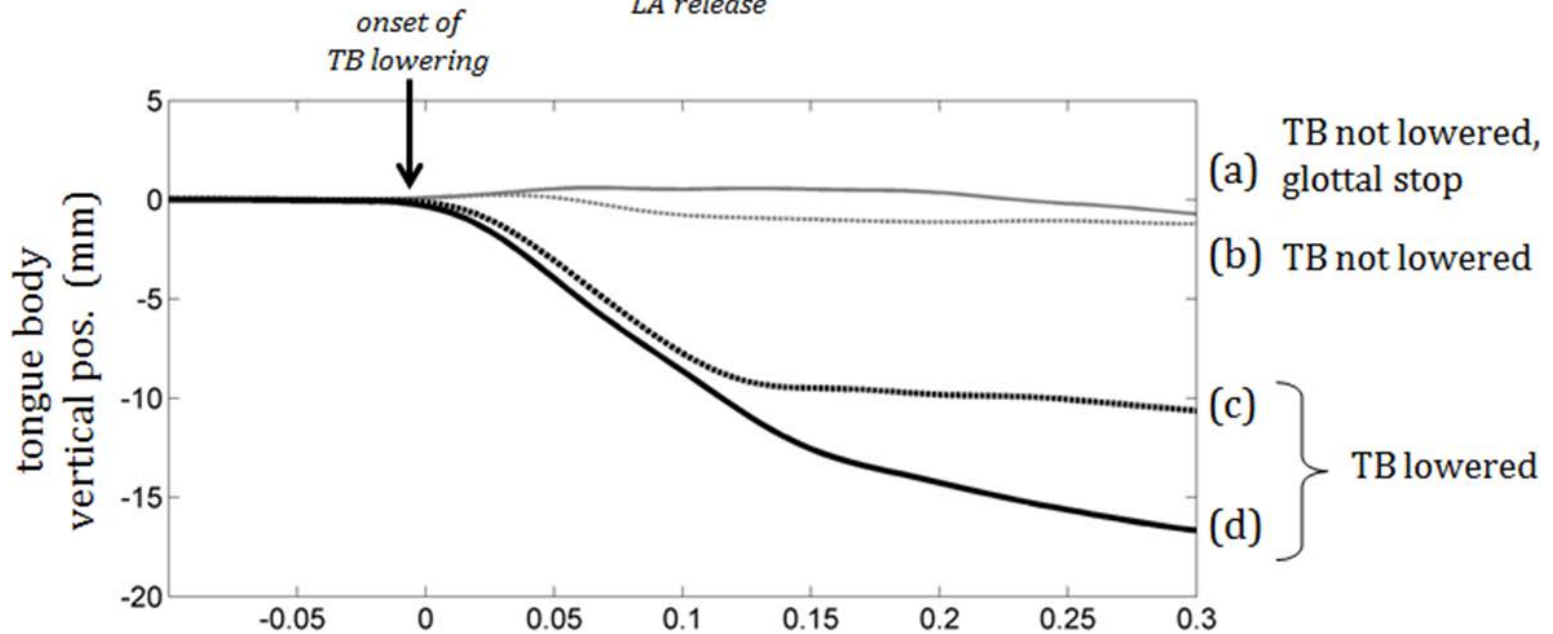
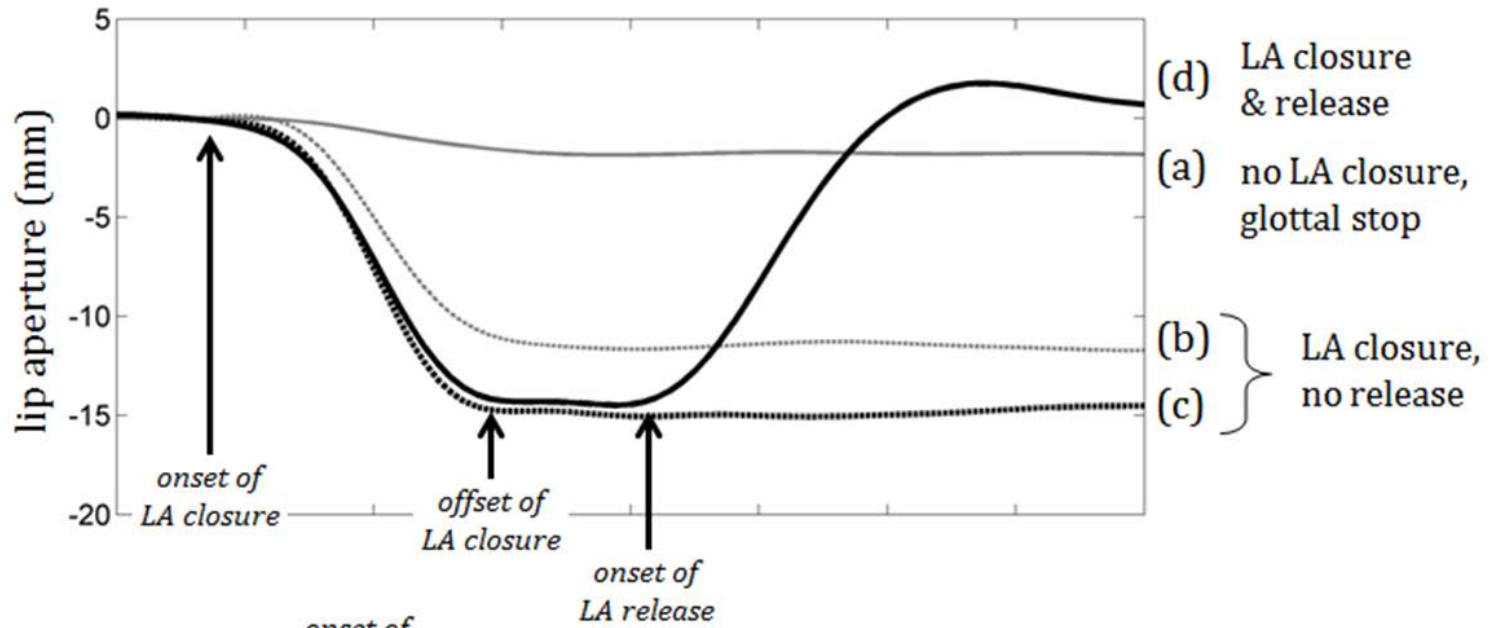
(a) segmentally coherent selection



(b) individual gestural selection

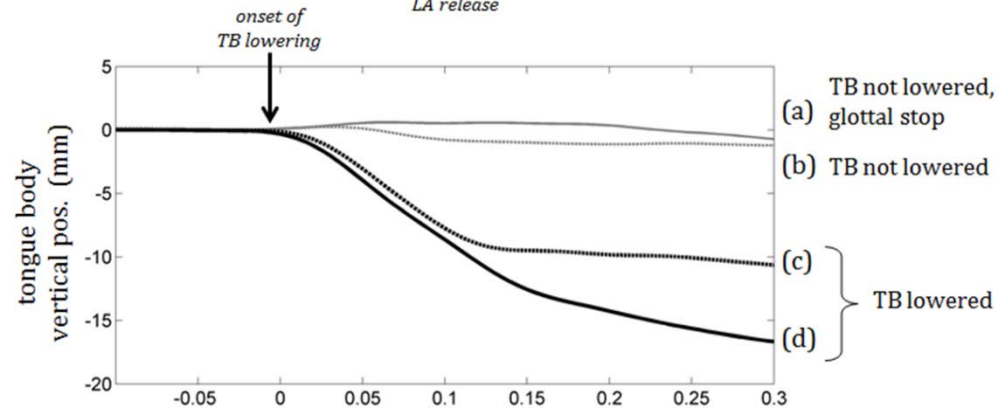
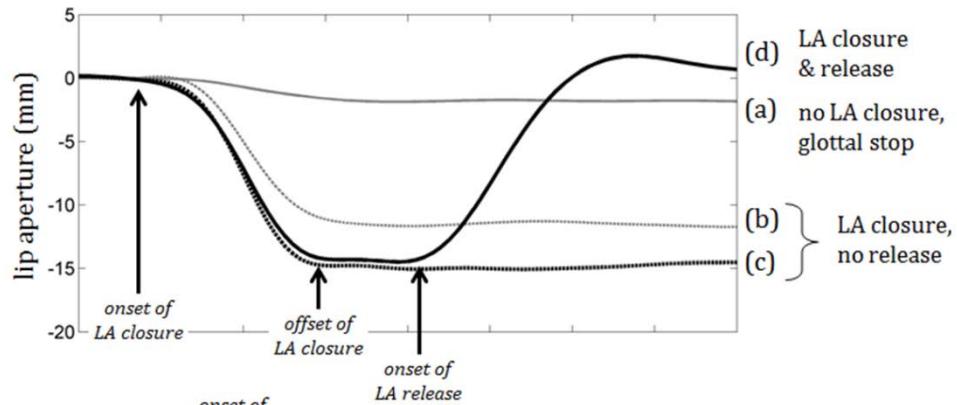


# gestural occurrence patterns





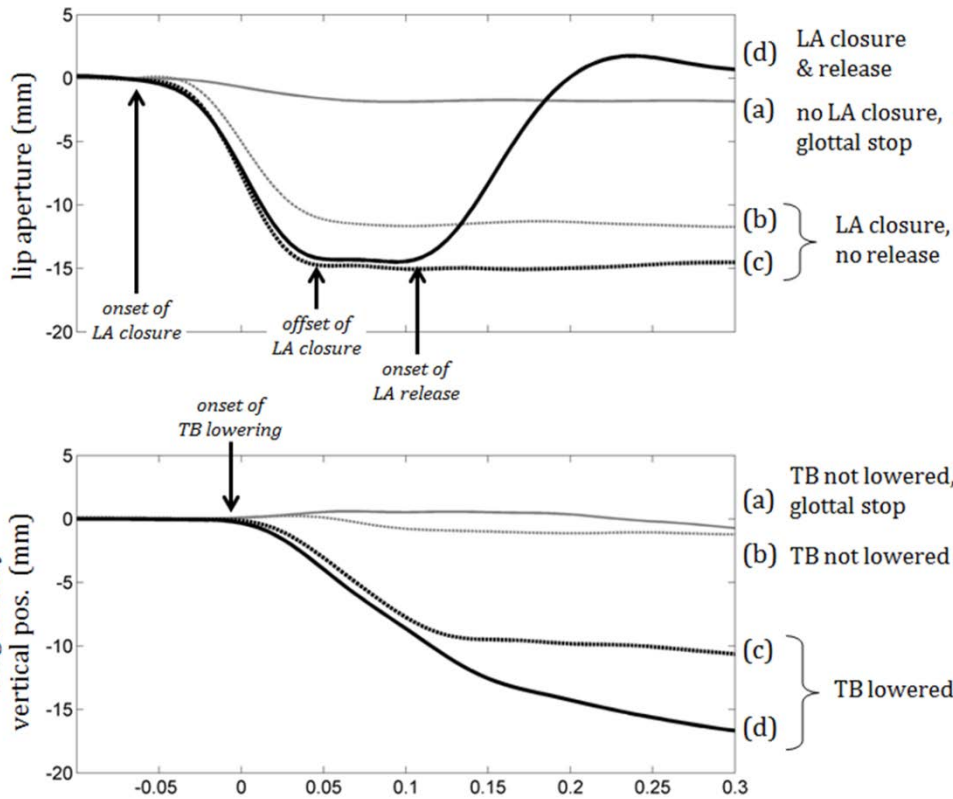
# independent occurrence of gestures



## Proportions of occurrence patterns

	(a)	(b)	(c)	(d)
				[+LA rel]
			[+TB low]	
		[+ LA clo]		
<i>s01</i>	.00	.15	.18	.67
<i>s02</i>	.11	.17	.38	.34
<i>s03</i>	.00	.44	.12	.45
<i>s04</i>	.02	.34	.34	.30
<i>s05</i>	.19	.34	.07	.40
	<b>.06</b>	<b>.29</b>	<b>.22</b>	<b>.43</b>

# independent occurrence of gestures



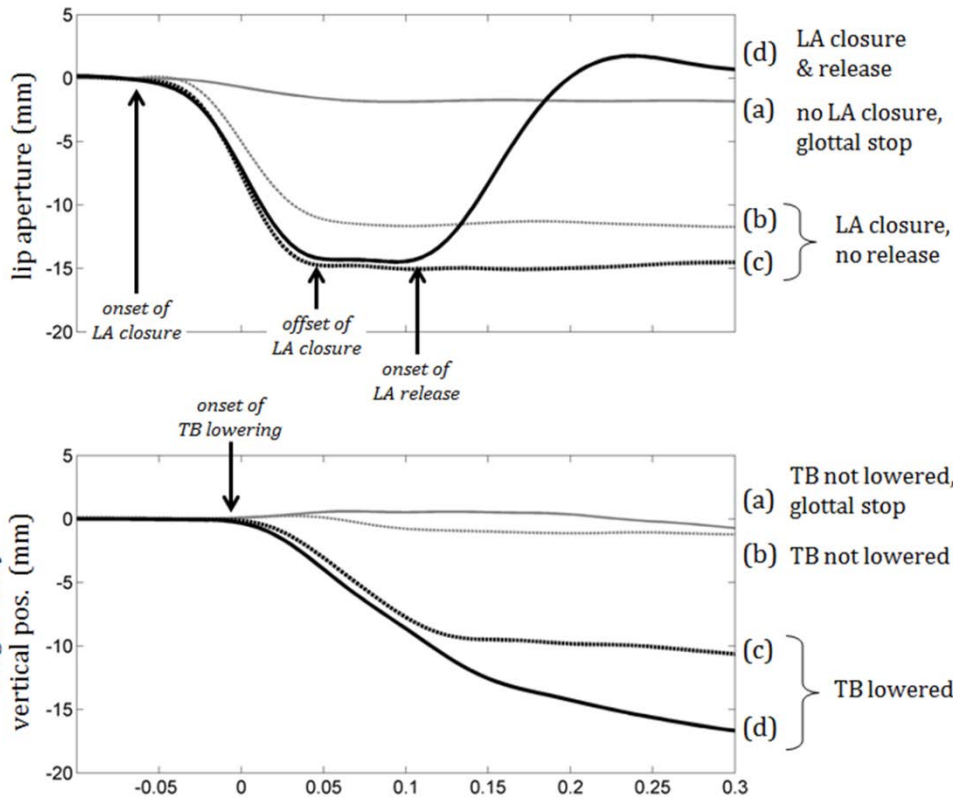
predictions of  
segmentally coherent selection:

LA rel = /a/: \*(c)

## Proportions of occurrence patterns

	(a)	(b)	(c)	(d)
				[+LA rel]
			[+TB low]	
		[+ LA clo]		
<i>s01</i>	.00	.15	.18	.67
<i>s02</i>	.11	.17	.38	.34
<i>s03</i>	.00	.44	.12	.45
<i>s04</i>	.02	.34	.34	.30
<i>s05</i>	.19	.34	.07	.40
	<b>.06</b>	<b>.29</b>	<b>.22</b>	<b>.43</b>

# independent occurrence of gestures



predictions of  
segmentally coherent selection:

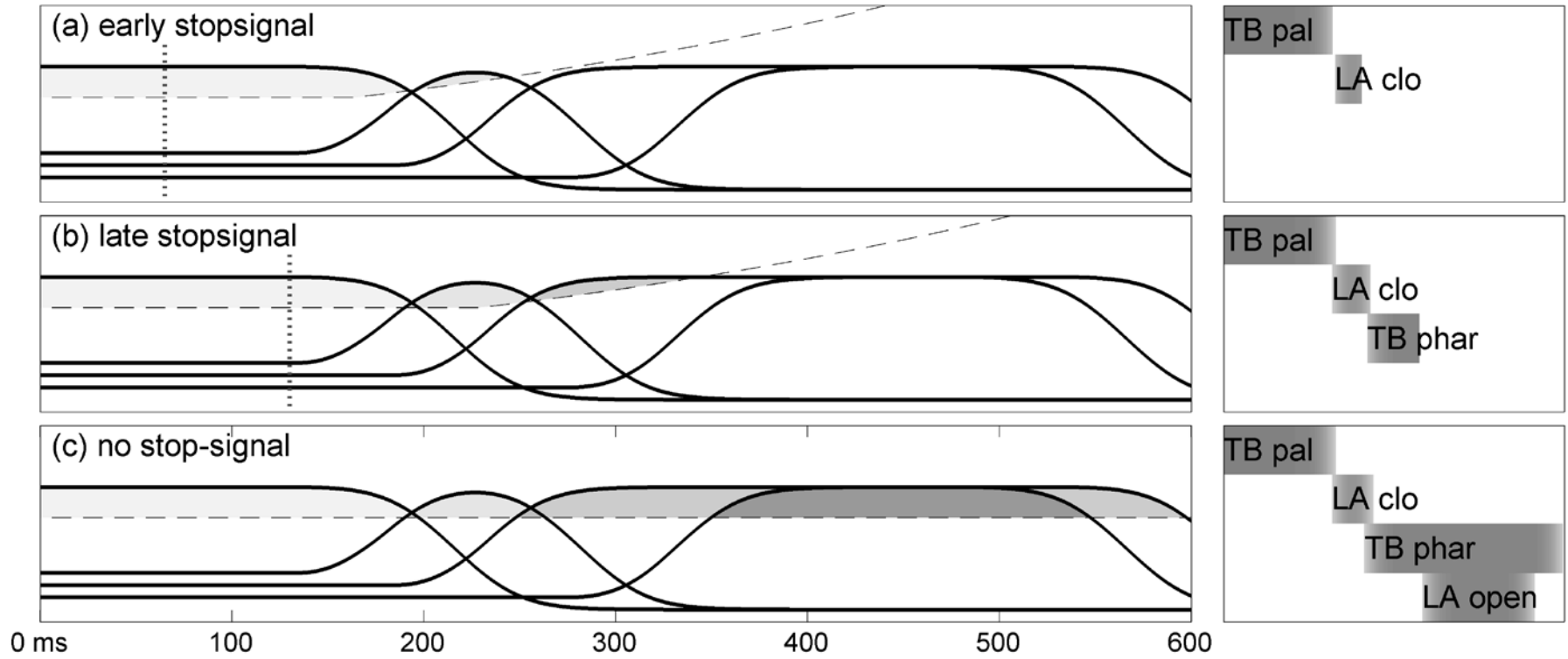
LA rel = /a/: \*(c)

LA rel = /p/: \*(b) & \*(c)

## Proportions of occurrence patterns

	(a)	(b)	(c)	(d)
				[+LA rel]
			[+TB low]	
		[+ LA clo]		
<i>s01</i>	.00	.15	.18	.67
<i>s02</i>	.11	.17	.38	.34
<i>s03</i>	.00	.44	.12	.45
<i>s04</i>	.02	.34	.34	.30
<i>s05</i>	.19	.34	.07	.40
	<b>.06</b>	<b>.29</b>	<b>.22</b>	<b>.43</b>

# selection-based model of gestural activation



- **articulatory gestures are individually selected**
- **stop-signal tasks provide information on the dynamics of planning and production**

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