

STIMULI

Summary: There are 3 materials provided in this file. Appendices S1-S3 provide the auditory sentence stimuli for Experiments 1 and 2 and the sets of visual world stimuli for Experiment 2.

Appendix S1. Experiment 1 auditory stimuli. Chinese target words are in Pinyin, with English translations enclosed in parentheses. For catch trials, the pictured object is shown in brackets.

Target trials:

1. We got a qì qiú (balloon) for her birthday.
2. She saw a wáng guān (crown) in the museum.
3. They could see the líng dāng (bell) from the window.
4. He found his pí dài (belt) in the drawer.
5. I took the yùn dǒu (iron) from the shelf.
6. She picked up the xiàng liàn (necklace) from the dresser.
7. He put his xuē zi (boots) by the door.
8. I used the sào zhou (broom) to sweep the floor.
9. They looked for a shuā zi (brush) in the room.
10. We saw the māo tóu yīng (owl) in the tree.
11. We heard the dà pào (cannon) from far away.
12. He picked up the máo mao chóng (caterpillar) from the leaf.
13. We needed a nán guā (pumpkin) for the pie.
14. She observed the wō niú (snail) on the wall.
15. I found a cāng ying (fly) in my house.
16. He searched for his kù zi (pants) in the pile.
17. They watched the movie about the xiǎo chǒu (clown).
18. I moved the papers on his zhuō zi (desk).
19. He took the letter out of the xìn fēng (envelope).
20. I wanted the dessert with the caǒ méi (strawberry).
21. She practiced the piece on her dízi (flute).
22. He saw a child with a sōng shǔ (squirrel).
23. They watched the game of gǎn lǎn qiú (football).
24. We read the story about the qīng wā (frog).
25. She wanted the guide to talk about the cháng jǐng lù (giraffe).
26. We picked up the cage of the zhà měng (grasshopper).
27. I reached for the dress on the yī jià (hanger).
28. He heard the music of the shù qín (harp).
29. They found the wreck of the zhí shēng jī (helicopter).
30. She broke the string on her xiǎo tí qín (violin).
31. We watched the documentary on the qíe (penguin).
32. I handed the waiter the jiǔ bēi (wine glass).
33. I passed her house on the way home.
34. He used the kettle on the counter.

35. We stared at the moon in the sky.
36. She bought a bike from her neighbor.
37. They looked for the needle in the haystack.
38. We listened to the bird in the tree.
39. I used the pepper in my stirfry.
40. She put the orange in the bowl.
41. They wanted the cake from the bakery.
42. He found a peanut in his pocket.
43. She took the pencil from the case.
44. I played the piano in the hall.
45. She found her purse in the closet.
46. I needed a chain for my bike.
47. We saw the church on the hill.
48. They heard the clock in the hall.
49. She took the box with the ring.
50. I wore the sweater with the skirt.
51. They found the web of a spider.
52. We saw the plane above a cloud.
53. He saw the wings of a swan.
54. They looked for the clues by the fence.
55. He broke the bones in his finger.
56. We wanted the sauce on the fish.
57. She heard the cry of the rooster.
58. I broke the nail of my toe.
59. They chased the thief onto the train.
60. I moved the furniture with the truck.
61. He saw the outline of the foot.
62. They found the body in the well.
63. I took the cans that were near the wheel.
64. We watched the scene from the window.

Catch trials:

65. She chose the gown for the party. [lemon]
66. He took the bù dài (pouch) from the man. [banana]
67. They led the girl away from the van. [barn]
68. We got a dìng shū jī (stapler) for class. [nail]
69. I saw a raccoon behind the plant. [zebra]
70. They asked for the sofa on the right. [barrel]
71. I wanted the guàn tóu (tin) for my collection. [anchor]
72. He brought the package in from the porch. [accordion]
73. She gave a rock to the xiǎo hái (child). [sweater]
74. They bought a sofa but not a coffee table. [bed]
75. I noticed the wagon by the nóng mǐn (farmer). [donkey]
76. We asked for a drink after having the meal. [cigarette]
77. He saw a gē zi (pigeon) next to the shed. [skunk]

78. They found a bug on the pán zi (plate). [asparagus]
 79. She considered the size of the huǒ jiàn (rocket). [cow]
 80. We spotted the location of the treasure. [lobster]

Appendix S2. Experiment 2 visual stimuli.

Target	Cross-language Competitor	Within-language Competitor	Distractor
<i>English target</i>	<i>Mandarin cohort</i>	<i>English cohort</i>	<i>Distractor</i>
bee	bǐ (pen)	beans	candle
beetle	bí zi (nose)	beer	camel
mountain	māo (cat)	mouth	bear
lamp	lán zi (basket)	ladder	airplane
goat	gǒu (dog)	gorilla	kangaroo
monkey	mén (door)	mushroom	fox
artichoke	ěr duo (ear)	arm	peach
diamond	dài zǐ (ribbon)	dice	glasses
leaf	lí zi (pear)	leek	key
shark	xiàng (elephant)	shovel	refrigerator
tulip	tǔ dòu (potato)	tuba	ruler
bus	běn zi (notebook)	butterfly	turtle
coat	koù zi (button)	comb	vase
pipe	paí (playing cards)	pineapple	hammer
cherry	qié zi (eggplant)	chair	suitcase
bomb	bāo (bag)	box	lock
phone	fēng chē (windmill)	fork	stove
tiger	taì yáng (sun)	tie	horse
<i>Mandarin target</i>	<i>English cohort</i>	<i>Mandarin cohort</i>	<i>Distractor</i>
píng zi (bottle)	pig	píng guǒ (apple)	alligator
xī hóng shì (tomato)	sheep	xī guā (watermelon)	eagle
mào zi (hat)	mouse	mào jīn (towel)	flower
lán qiú (basketball)	lantern	la' n bǎo shí (sapphire)	pot
shaó zi (spoon)	saw	shào zi (whistle)	toaster
bēi zi (cup)	baby carriage	bèi zi (quilt)	umbrella
bào zi (leopard)	ball	bào zhǐ (newspaper)	rabbit
miàn bāo (bread)	meat	miàn tiáo (noodles)	carrot
qì chē (car)	cheese	qí zi (flag)	onion
dì tú (map)	deer	diàn shì (television)	lion
xīn (heart)	ship	xīng (star)	scissors
lí zi (plum)	leash	lǐ wù (gift)	corn
shū (book)	shoe	shù (tree)	knife
tāng (soup)	taco	táng (candy)	grapes
wá wa (doll)	watch	wà zi (sock)	toothbrush
shǒu tào (glove)	soda	shǒu jī (cellphone)	kite
kǒng què (peacock)	coal	kǒng lóng (dinosaur)	drum
dēng pào (lightbulb)	duck	dèng zi (stool)	ant

Appendix S3. Experiment 2 auditory stimuli.

1. I saw the bee near the table.
2. He noticed the tulip on the floor.
3. They talked about the mountain while in the car.
4. She was curious about the lamp on the table.
5. We remarked on the monkey outside the house.
6. I was confused about the artichoke on the counter.
7. They bought the diamond from the store.
8. He took the leaf from the tree.
9. We watched the goat from a distance.
10. They were interested in the story about the shark.
11. I heard the boy talk about the beetle.
12. We used the camera to photograph the bus.
13. She was upset that the woman didn't have the coat.
14. I questioned whether the man had the pipe.
15. He glanced at the picture of the cherry.
16. They saw the man put down the bomb.
17. We needed the man to find us a phone.
18. She saw a picture of the tiger.
19. I saw the píng zi (bottle) in the backyard.
20. We found the xī hóng shì (tomato) in the truck.
21. We saw the mào zi (hat) in the tree.
22. He brought the lán qiú (basketball) to the team.
23. I moved the shaó zi (spoon) to the side.
24. She bought the bēi zi (cup) for her sister.
25. They noticed the bào zi (leopard) in the enclosure.
26. We prepared the miàn bāo (bread) for dinner.
27. I took the qì chē (car) to the garage.
28. I knew that the story was not about a dì tú (map).
29. They looked for the lady with a xīn (heart).
30. He explained that the container was not for the lǐ zi (plum).
31. He placed the wallet near the shū (book).
32. They wanted the meal without the tāng (soup).
33. I bought the other item as well as the wá wa (doll).
34. She needed the neighbor to show her the shǒu tàò (glove).
35. We knew that the movie did not feature any kǒng què (peacock).
36. He found the room that had the dēng pào (lightbulb).

TABLES

Summary: This file contains 4 materials. Tables S1-S4 provide the linear mixed effects regression for Experiment 1 and growth curve analyses for Experiment 2.

Table S1. Linear mixed effects regression of log-transformed reaction times from Experiment 1.

Random effects				
Groups	Name	Variance	Std. Dev.	Corr.
Item	(Intercept)	0.012630	0.11238	
	Splice – Yes	0.008644	0.09298	-0.28
Subject	(Intercept)	0.182096	0.42673	
	Switch – Yes	0.008807	0.09385	-0.40
Residual		0.095446	0.30894	

Fixed effects					
	Estimate	Std. Error	<i>df</i>	<i>t</i> value	Pr(> <i>t</i>)
(Intercept)	6.56940	0.07348	59.09000	89.400	<2e-16 ***
Switch-Yes	0.09113	0.04766	79.03000	1.912	0.0595 .
Splice-Yes	0.04653	0.03367	58.68000	1.382	0.1722
Position-Medial	0.21737	0.04620	63.27000	4.705	1.42e-05 ***
SwitchY:SpliceY	-0.05988	0.05089	61.79000	-1.177	0.2438
SwitchY:PosMed	0.01130	0.06449	66.30000	0.175	0.8614
SpliceY:PosMed	-0.01835	0.04742	58.17000	-0.387	0.7002
SwitchY:SpliceY:PosMed	0.04015	0.07000	59.63000	0.574	0.5684

Table S2. Growth curve analysis of Experiment 2 eye-tracking data: Looks to the target, as a function of Position, Switch, and Splice.

	β	Std. Error	t value	Pr(> t)
(Intercept)	0.6278	0.0163	38.4257	0.000e+00
Linear polynomial	0.5988	0.0513	11.6724	0.000e+00
Quadratic polynomial	-0.1980	0.0417	-4.7446	2.089e-06
Cubic polynomial	-0.1519	0.04	-3.7988	1.4541e-04
Position - Medial	-0.1849	0.0172	-10.7419	0.000e+00
Switch - Yes	-0.0769	0.0201	-3.8325	1.269e-04
Spliced - Yes	-0.0833	0.0159	-5.234	1.656e-07
Lin:PosMed	0.0278	0.0595	0.4665	6.408e-01
Quad:PosMed	0.1706	0.0593	2.8791	3.987e-03
Cub:PosMed	0.0653	0.059	1.1071	2.683e-01
Lin:SwitchY	0.0235	0.0691	0.3395	7.342e-01
Quad:SwitchY	-0.0257	0.0681	-0.378	7.055e-01
Cub:SwitchY	-0.0150	0.0672	-0.2236	8.230e-01
PosMed:SwitchY	0.1023	0.0298	3.4382	5.857e-04
Lin:SpliceY	-0.1066	0.0552	-1.9309	5.35e-02
Quad:SpliceY	0.0933	0.0552	1.69	9.106e-02
Cub:SpliceY	0.0613	0.0552	1.1202	2.626e-01
PosMed:SpliceY	0.1395	0.0253	5.5178	3.432e-08
SwitchY:SpliceY	0.0489	0.0296	1.6512	9.87e-02
Lin:PosMed:SwitchY	0.1047	0.1022	1.0243	3.057e-01
Quad:PosMed:SwitchY	0.186	0.1	1.859	6.305e-02
Cub:PosMed:SwitchY	-0.1029	0.098	-1.0494	2.94e-01
Lin:PosMed:SpliceY	0.1156	430.0873	1.325	1.852e-01
Quad:PosMed:SpliceY	-0.0675	0.0864	-0.781	4.348e-01
Cub:PosMed:SpliceY	-0.155	0.0856	-1.8118	7e-02
Lin:SwitchY:SpliceY	0.1868	0.1015	1.839	6.582e-02
Quad:SwitchY:SpliceY	0.053	0.0986	0.5377	5.908e-01
Cub:SwitchY:SpliceY	-0.0594	0.0959	-0.62	5.354e-01
PosMed:SwitchY:SpliceY	-0.1328	0.0438	-3.0324	2.426e-03
Lin:PosMed:SwitchY:SpliceY	-0.1751	0.1498	-1.1688	2.424e-01
Quad:PosMed:SwitchY:SpliceY	-0.1215	0.1449	-0.8387	4.016e-01
Cub:PosMed:SwitchY:SpliceY	0.0854	0.1402	0.609	5.42e-01

Groups	Name	Variance	Std.Dev.	Corr.
Subject	(Intercept)	0.005741	0.07577	
	ot1	0.045437	0.21316	0.60
	ot2	0.008961	0.09466	-0.14 0.15
	ot3	0.003069	0.05540	-0.77 - -
Residual		0.062447	0.24989	0.97 0.12

Table S3. Growth curve analysis of Experiment 2 eye-tracking data: Looks to the Mandarin competitor, as a function of Switch and Splice.

	β	Std. Error	<i>t</i> value	Pr(> <i>t</i>)
(Intercept)	0.1174	0.0114	10.2814	0.000e+00
Linear polynomial	-0.0999	0.0335	-2.9813	2.87e-03
Quadratic polynomial	0.0572	0.024	2.3734	1.763e-02
Cubic polynomial	0.064	0.0208	3.0807	2.065e-03
Switch - Yes	0.0641	0.0118	5.4377	5.397e-08
Splice - Yes	0.0153	0.0134	1.1466	2.516e-01
Lin:SwitchY	-0.1035	0.0375	-2.7623	5.739e-03
Quad:SwitchY	-0.1114	0.032	-3.4758	5.094e-04
Cub:SwitchY	-0.0011	0.03	-0.03778	9.699e-01
Lin:SpliceY	-0.0443	0.0407	-1.087	2.772e-01
Quad:SpliceY	0.0447	0.031	1.4412	1.495e-01
Cub:SpliceY	-0.0697	0.0279	-2.4986	1.247e-02
SwitchY:SpliceY	-0.0232	0.0117	-1.9787	4.784e-02
Lin:SwitchY:SpliceY	0.0498	0.0406	1.2253	2.205e-01
Quad:SwitchY:SpliceY	-0.0455	0.0404	-1.1247	2.607e-01
Cub:SwitchY:SpliceY	0.0706	0.0403	1.7507	8e-02

Groups	Name	Variance	Std.Dev.	Corr.		
Subject:Language	(Intercept)	0.001462	0.038233			
	ot1	0.01218	0.110367	-0.31		
	ot2	0.004572	0.067616	0.28	-0.02	
	ot3	0.002159	0.04646	0.32	-0.08	-0.81
Subject:Splice	(Intercept)	0.002585	0.050843			
	ot1	0.02116	0.145457	-0.12		
	ot2	0.00711	0.084324	0.31	-0.37	
	ot3	0.003553	0.059605	0.42	-0.33	-0.54
Subject	(Intercept)	0.0004436	0.021062			
	ot1	0.0004436	0.021062	1.00		
	ot2	0.00009529	0.009762	-1.00	-1.00	
	ot3	0.0001252	0.01119	-1.00	-1.00	1.00
Residual		0.02093	0.144660			

Table S4. Growth curve analysis of Experiment 2 eye-tracking data: Looks to the English competitor, as a function of Switch and Splice.

	β	Std. Error	<i>t</i> value	Pr(> <i>t</i>)
(Intercept)	0.1698	0.0158	10.6795	0.000e+00
Linear	-0.2088	0.0427	-4.8909	1.003e-06
Quadratic	-0.0177	0.0283	-0.6253	5.317e-01
Cubic	0.0388	0.0255	1.5192	1.286e-01
Switch - Yes	0.0009	0.0173	0.0551	9.560e-01
Splice - Yes	0.0354	0.0181	1.9494	5.123e-02
Lin:SwitchY	-0.0565	0.0497	-1.1358	2.56e-01
Quad:SwitchY	0.0717	0.04263	1.6819	9.257e-02
Cub:SwitchY	0.0455	0.0392	1.1601	2.459e-01
Lin:SpliceY	-0.0169	0.0519	-0.3257	7.446e-01
Quad:SpliceY	0.0076	0.0359	0.2119	8.321e-01
Cub:SpliceY	0.0198	0.0354	0.5586	5.763e-01
SwitchY:SpliceY	-0.0227	0.0158	-1.4351	1.512e-01
Lin:SwitchY:SpliceY	0.0005	0.0547	0.0102	9.918e-01
Quad:SwitchY:SpliceY	-0.0433	0.0544	-0.7954	4.263e-01
Cub:SwitchY:SpliceY	0.0026	0.0542	0.0483	9.614e-01

Groups	Name	Variance	Std.Dev.	Corr.			
Subject:Language	(Intercept)	0.003678	0.06064				
	ot1	0.02057	0.1434	-0.42			
	ot2	0.007443	0.08628	-0.28	-0.18		
	ot3	0.001831	0.04279	0.50	-0.79	-0.46	
Subject:Splice	(Intercept)	0.004815	0.06939				
	ot1	0.032	0.1789	0.02			
	ot2	0.003764	0.06135	-0.56	-0.50		
	ot3	0.003491	0.05909	-0.24	-0.95	0.44	
Subject	(Intercept)	0.00000255	0.001597				
	ot1	0.0000009466	0.0009729	1.00			
	ot2	0.000008021	0.002832	1.00	1.00		
	ot3	0.0000000005020	0.00007085	1.00	1.00	1.00	
Residual		0.03809	0.1952				

FIGURES

Summary: This file contains 7 materials. Figure S1 shows the Experiment 2 visual stimuli. Figures S2-S7 show results from Experiments 1-2 plotted by tone and pitch contours from the acoustic analysis.

Figure S1. Examples of visual world display in code-switched and unilingual (no code-switch) trials in Experiment 2.

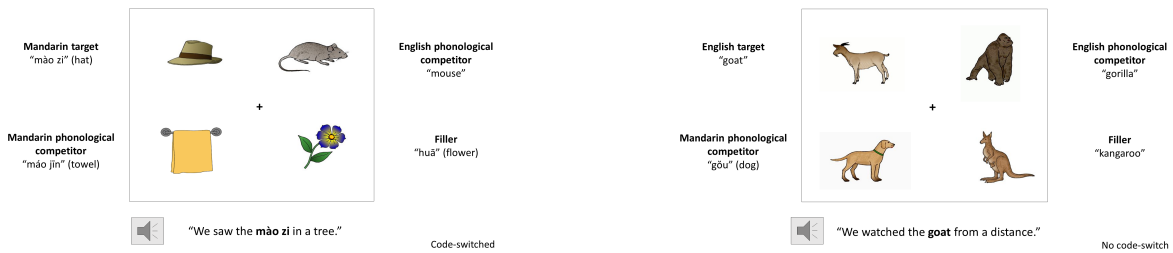


Figure S2. Empirical data (points) and model fit (lines) for looks to the Mandarin competitor, across all participants and trials.

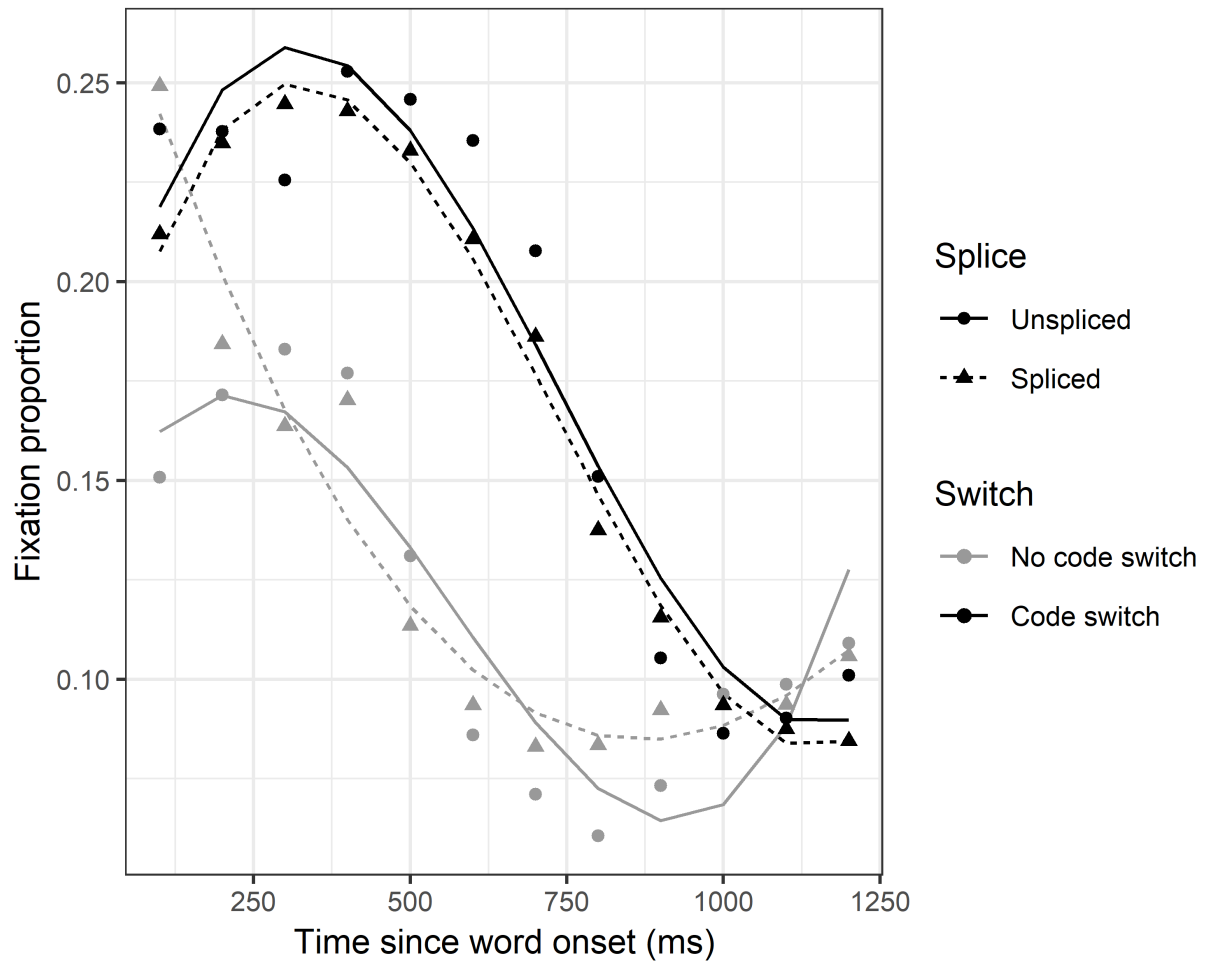


Figure S3. Empirical data (points) and model fit (lines) for looks to the English competitor, across all participants and trials.

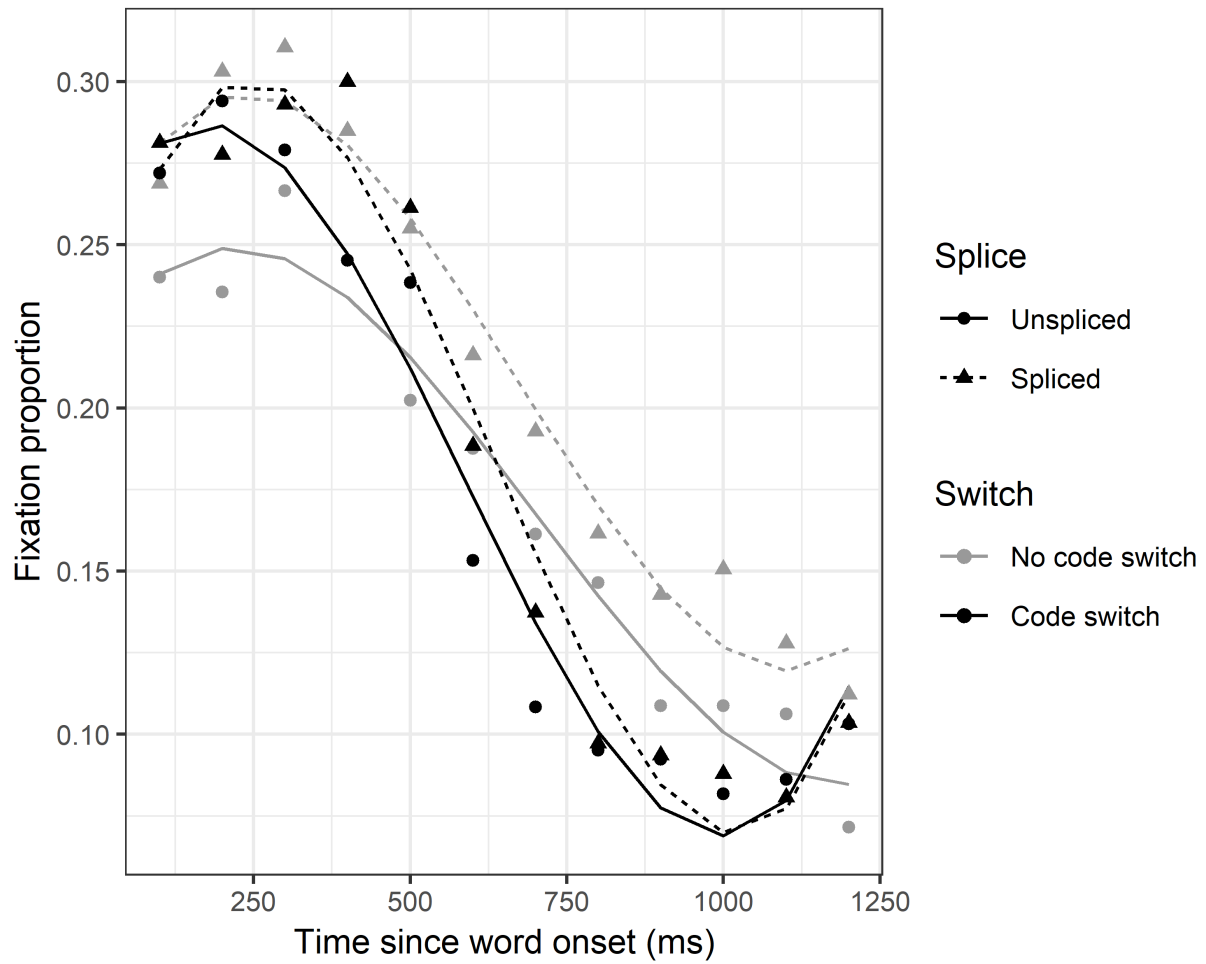


Figure S4. Reaction times to code-switched stimuli in Experiment 1, by tone and by splicing condition.

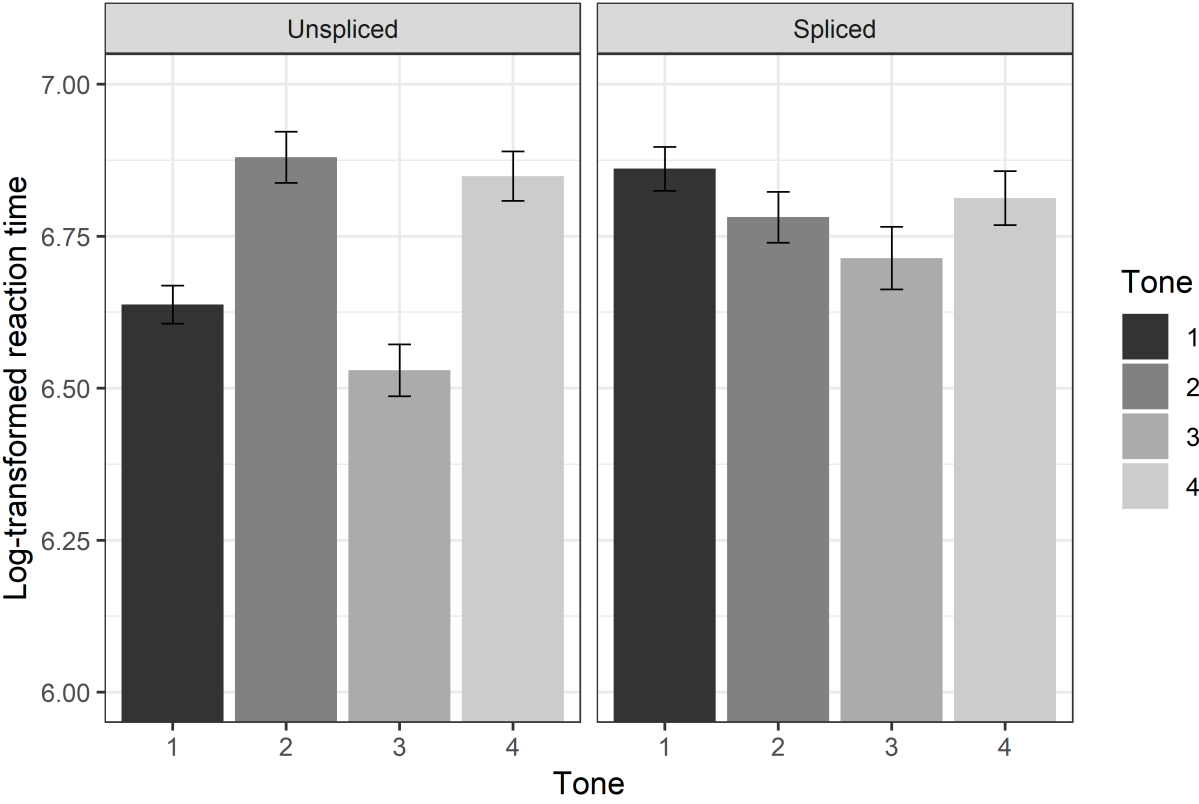


Figure S5. Pitch contours for both medial and final unspliced stimuli in Experiment 1, by tone. Contours for code-switched stimuli are labeled by tone, and unilingual stimuli are labeled as English.

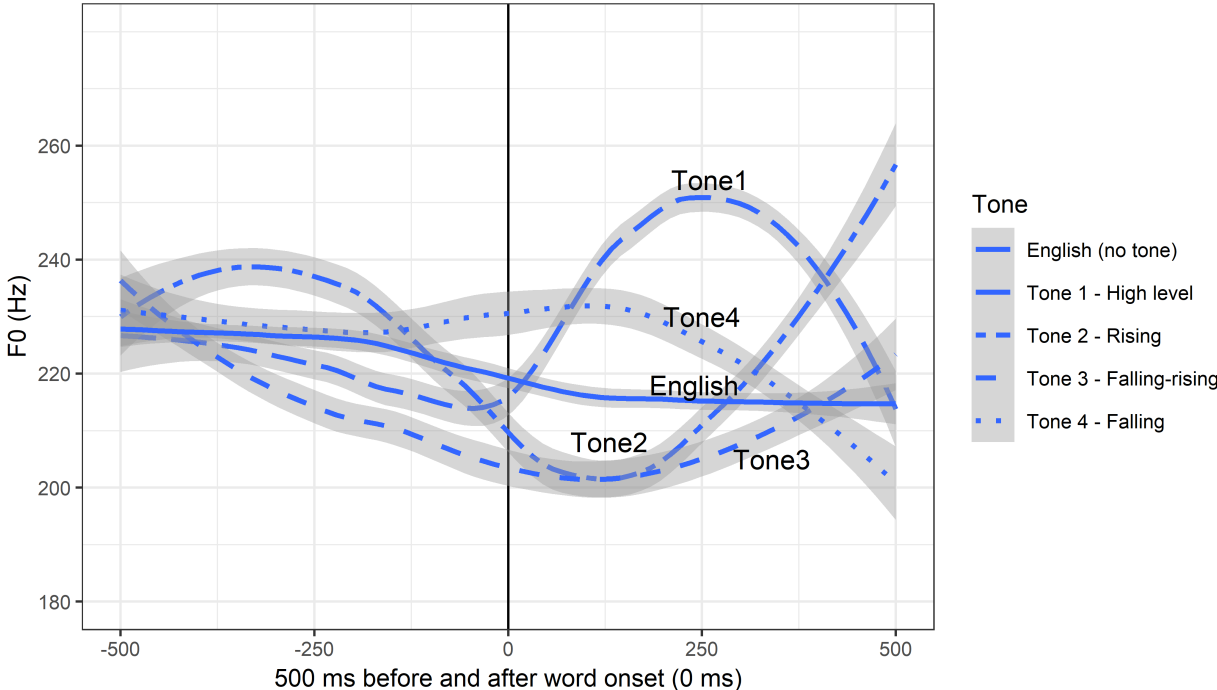


Figure S6. Looks to target, by position and tone, in Experiment 2. There were no sentence-medial target words with tone 3.

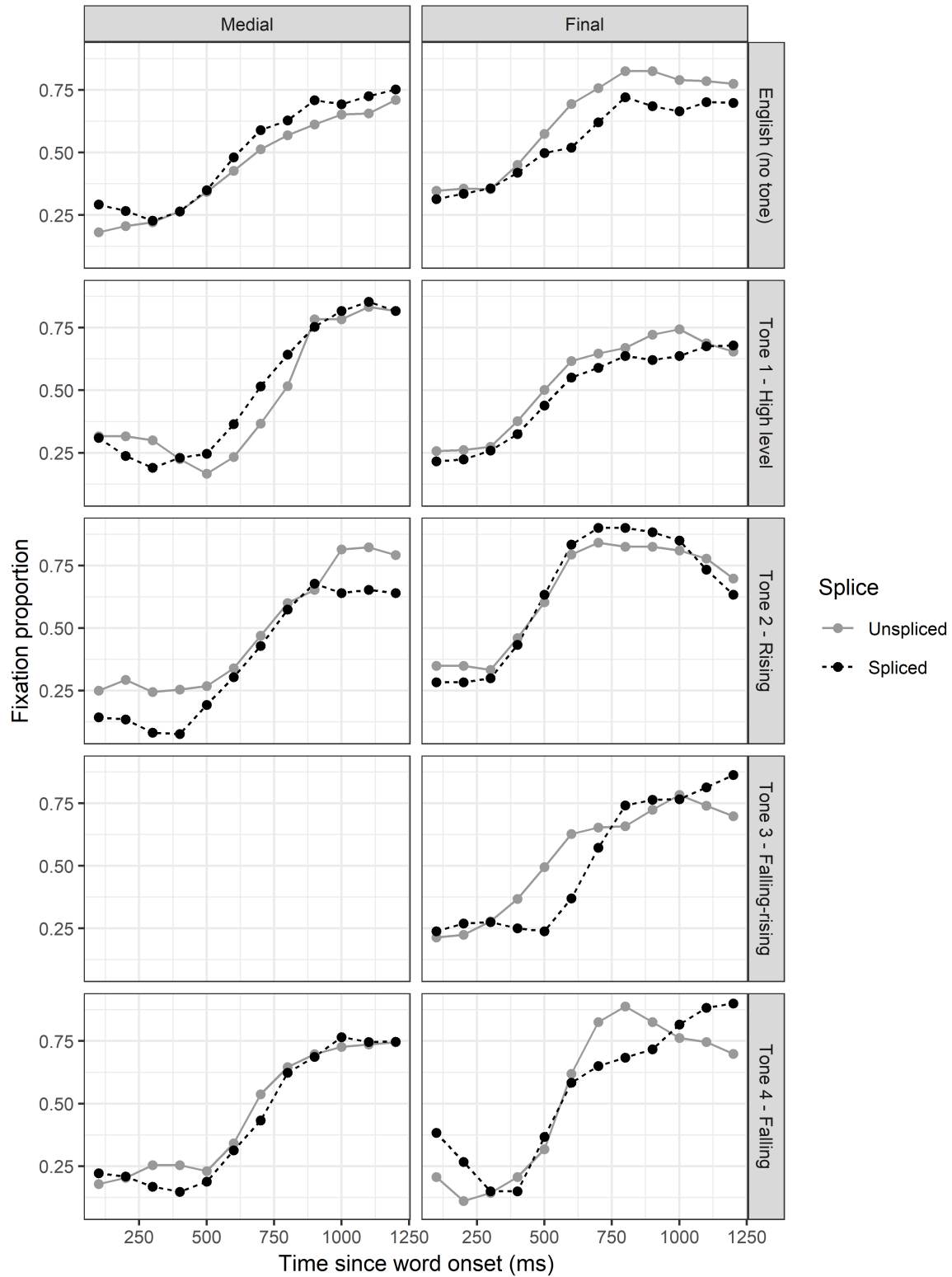


Figure S7. Pitch contours for sentence-final unspliced stimuli in Experiment 2, by tone. Contours for code-switched stimuli are labeled by tone, and unilingual stimuli are labeled as English.

