

Supplementary Materials

In these larger models that include L1 as third variable, we explain only the significant effects of and interactions with L1.

Table SM1 presents the results of the GCA with the best fit conducted on the difference between participants' proportions of target and competitor fixations in the across-AP condition. This analysis includes all three groups of participants.

Table SM1. Growth curve analysis on all participants' differential proportions of fixations in the across-AP condition

Variable	Estimate	<i>t</i>	
(intercept)	0.07	2.16	*
Time			
Linear	2.27	6.50	***
Quadratic	1.87	5.92	***
Cubic	-0.61	-2.62	*
L1 (English)	-0.18	-4.14	***
L1 (Dutch)	-0.15	-3.61	***
F0	0.02	2.70	**
Time × L1 (English)			
Linear	-2.87	-5.94	***
Quadratic	-2.19	-5.00	***
Cubic	0.61	1.87	
Time × L1 (Dutch)			
Linear	-2.33	-4.81	***
Quadratic	-1.27	-2.89	**
Cubic	0.88	2.72	**
Time × F0			
Linear	-1.26	-16.04	***
Quadratic	-0.20	-2.62	**
Cubic	0.50	6.39	***
F0 × L1 (English)	0.03	4.20	***
F0 × L1 (Dutch)	0.03	4.21	***
Time × F0 × L1 (English)			
Linear	1.99	18.29	***
Quadratic	0.84	7.71	***
Cubic	-0.70	-6.42	***
Time × F0 × L1 (Dutch)			
Linear	0.61	5.66	***
Quadratic	-0.44	-4.09	***
Cubic	-0.07	-0.69	

Note. $\alpha = .05$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$; $n = 79$; 29,416 observations; baseline: French listeners' differential proportions of fixations in the condition without an F0 rise

The baseline in this analysis was the difference between French listeners' differential proportions of fixations in the condition without an F0 rise. The negative estimates for L1 (English

and Dutch) indicate that both groups of L2 learners had lower differential proportions of fixations than French listeners in the condition without an F0 rise. The negative estimates for the interaction between L1 (English and Dutch) and the linear and quadratic time polynomials indicate that both groups of L2 learners had fixation lines that were less ascending and less convex (i.e., \cup) than that of French listeners in the condition without an F0 rise. The positive estimate for the interaction between L1 (Dutch) and the cubic time polynomial means that Dutch listeners had a fixation line that had less of a canonical 's' (i.e., \smile) shape than that of French listeners in the condition without an F0 rise. The positive estimates for the interactions between L1 (English and Dutch) and F0 indicate that both groups of L2 learners showed a larger effect of F0 as compared to French listeners. These two-way interactions, however, are likely due to the two fixation lines of the native French listeners reversing towards the end of the trial rather than to a true difference in the size of the early effect of F0 rise between native listeners and L2 learners. Importantly, the three-way interactions between L1 (English), F0, and the linear, quadratic, and cubic time polynomials mean that French and English listeners show different interactions between F0 and these time polynomials, indicating that the effect of F0 over time differs for the two groups. Similarly, the three-way interactions between L1 (Dutch), F0, and the linear and quadratic time polynomials mean that French and Dutch listeners show different interactions between F0 and these time polynomials, indicating that the effect of F0 over time differs for the two groups.

Table SM2 presents the results of the GCA with the best fit conducted on the difference between L2 learners' proportions of target and competitor fixations in the across-AP condition. This analysis includes only the English and Dutch participants.

Table SM2. Growth curve analysis on the L2 learners' differential proportions of fixations the across-AP condition

Variable	Estimate	<i>t</i>	
(intercept)	-0.11	-3.83	***
Time			
Linear	-0.60	-1.91	
Quadratic	-0.32	-1.30	
Cubic	-0.01	< 1	
L1	0.02	< 1	
F0	0.05	9.17	***
Time × L1			
Linear	0.54	1.22	
Quadratic	0.93	2.65	*
Cubic	0.27	1.01	
Time × F0			
Linear	0.73	10.04	***
Quadratic	0.63	8.67	***
Cubic	-0.20	-2.71	**
F0 × L1	0.00	< 1	
Time × F0 × L1			
Linear	-1.38	-13.44	***
Quadratic	-1.28	-12.46	***
Cubic	0.62	6.09	***

Note. $\alpha = .05$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$; $n=54$; 20,180 observations; baseline: English listeners' differential proportions of fixations in the condition without an F0 rise

The baseline in this analysis was English listeners' differential proportions of fixations in the condition without an F0 rise. The positive estimate for the interaction between L1 and the quadratic time polynomial indicates that Dutch listeners had a differential fixation line that was more convex (i.e., \cup) than that of the English listeners in the condition without an F0 rise. Crucially, the three-way interactions between L1, F0, and the linear, quadratic, and cubic time polynomials mean that English and Dutch listeners show different interactions between F0 and these time polynomials, indicating that the effect of F0 over time differs for the two groups.

Table SM3 presents the results of the GCA with the best fit conducted on the difference between participants' proportions of target and competitor fixations in the within-AP condition. This analysis includes all three groups of participants.

Table SM3. Growth curve analysis on all participants' differential proportions of fixations in the within-AP condition

Variable	Estimate	<i>t</i>	
(intercept)	-0.08	-2.48	*
Time			
Linear	1.23	3.28	**
Quadratic	2.51	8.41	***
Cubic	0.57	2.32	*
L1 (English)	-0.11	-2.57	*
L1 (Dutch)	-0.12	-2.73	**
F0	0.07	13.45	***
Time × L1 (English)			
Linear	-1.83	-3.51	***
Quadratic	-1.72	-4.15	***
Cubic	-0.64	-1.88	
Time × L1 (Dutch)			
Linear	-2.35	-4.52	***
Quadratic	-1.47	-3.55	***
Cubic	-0.38	-1.13	
Time × F0			
Linear	0.41	9.58	***
Quadratic	-0.71	-9.26	***
Cubic	-0.69	-9.03	***
L1 × F0 (English)	-0.03	-4.07	***
L1 × F0 (Dutch)	-0.08	10.94	***
Time × L1 × F0 (English)			
Quadratic	0.78	7.36	***
Cubic	1.05	9.94	***
Time × L1 × F0 (Dutch)			
Quadratic	-0.36	-3.43	***
Cubic	0.48	4.51	***

Note. $\alpha = .05$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$; $n = 79$; 29,442 observations; baseline: French listeners' differential proportions of fixations in the condition without an F0 rise

Again, the baseline in this analysis was French listeners' differential proportions of fixations in the condition without an F0 rise. The negative estimates for L1 (English and Dutch) mean that both groups of L2 learners showed lower differential proportions of fixations than French listeners in the condition without an F0 rise. The negative estimates for the interaction between L1 (English and Dutch) and the linear, quadratic, and cubic time polynomials mean that both groups of L2 learners had fixation lines that were less ascending, less convex (i.e., \cup), and less reverse 's' (i.e., \sim) shaped than that of French listeners in the condition without an F0 rise. The negative estimate for the interaction between L1 (English) and F0 indicates that English listeners showed a smaller effect of F0 than French listeners. The positive estimate for the interaction between L1 (Dutch) and F0 indicates that Dutch listeners showed a larger effect of F0 than French listeners. Importantly, the three-way interactions between L1 (English), F0, and the quadratic and cubic time polynomials mean that French and English listeners show different interactions between F0 and these time polynomials, indicating that the effect of F0 over time differs for the two groups.

Similarly, the three-way interactions between L1 (Dutch), F0, and the quadratic and cubic time polynomials mean that French and Dutch listeners show different interactions between F0 and these time polynomials, indicating that the effect of F0 over time differs for the two groups.

Table SM4 presents the results of the GCA with the best fit conducted on the difference between L2 learners' proportions of target and competitor fixations in the within-AP condition. This analysis includes only the English and Dutch participants.

Table SM4. Growth curve analysis on L2 learners' differential proportions of fixations in the within-AP condition

Variable	Estimate	<i>t</i>	
(intercept)	-0.19	-7.26	***
Time			
Linear	-0.56	-1.65	
Quadratic	0.80	2.85	**
Cubic	-0.07	< 1	
L1	-0.01	< 1	
F0	0.04	8.62	***
Time × L1			
Linear	-0.54	-1.14	
Quadratic	0.25	< 1	
Cubic	0.26	< 1	
Time × F0			
Linear	0.33	4.75	***
Quadratic	0.07	1.02	
Cubic	0.36	5.13	***
L1 × F0	0.12	16.09	***
Time × L1 × F0			
Linear	0.04	< 1	
Quadratic	-1.15	-11.62	***
Cubic	-0.57	-5.83	***

Note. $\alpha = .05$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$; $n = 54$; 20,254 observations; baseline: English listeners' differential proportions of fixations in the condition without an F0 rise

Again, the baseline in this analysis was English listeners' differential proportions of fixations in the condition without an F0 rise. Importantly, the positive estimate for the interaction between L1 and F0 indicates that Dutch listeners showed a larger effect of F0 than English listeners. Furthermore, the three-way interactions between L1, F0, and the time quadratic and cubic time polynomials mean that the Dutch and English listeners showed different interactions between F0 and these time polynomials, indicating that the effect of F0 over time differs for the two groups.