

Supplementary Materials: Cognitive Control Facilitates Attentional Disengagement during Second Language Comprehension

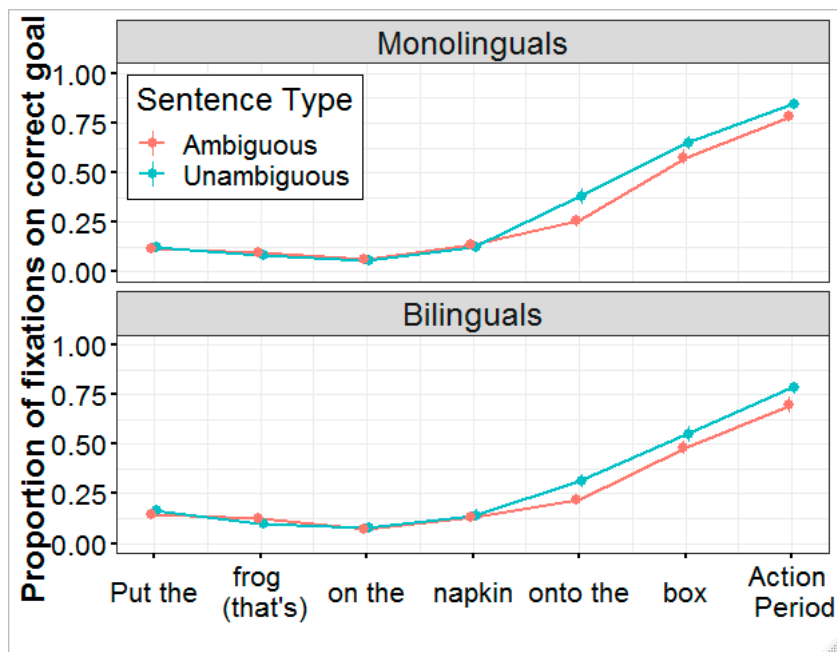


Figure S1. Mean proportion of fixations on the correct goal over time as a function of ambiguity for monolinguals (top) and bilinguals (bottom). Higher values on the y-axis indicate more looks to the correct goal. Colored error bars indicate 95% confidence intervals.

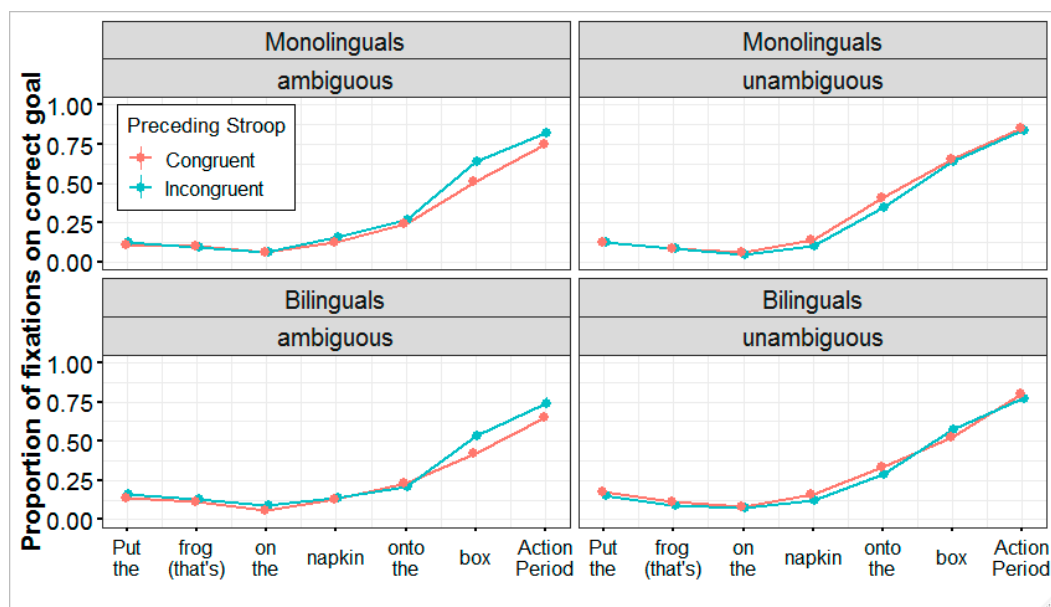


Figure S2. Mean proportion of fixations on the correct goal over time as a function of ambiguity and preceding Stroop trial type for monolinguals (top row) and bilinguals (bottom row). Colored error bars indicate 95% confidence intervals.

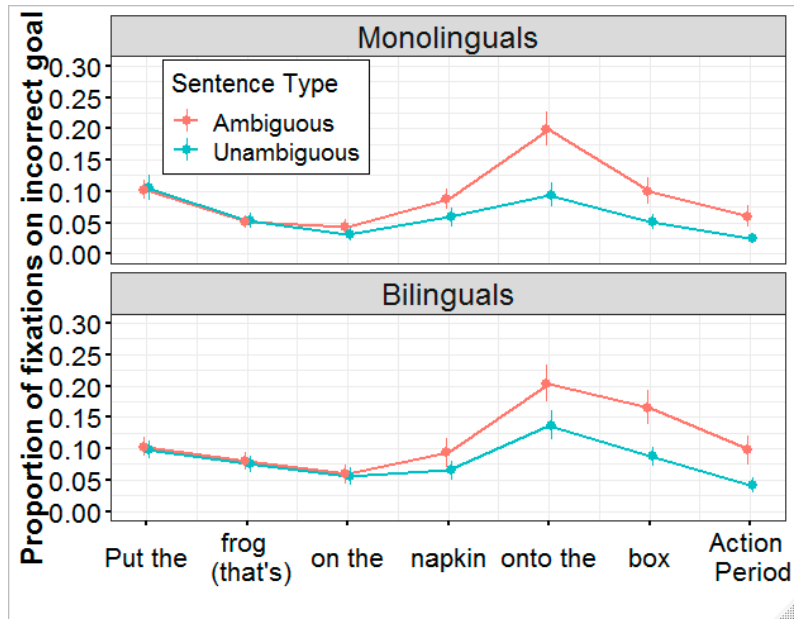


Figure S3. Mean proportion of fixations on the incorrect goal over time as a function of ambiguity. Higher values on the y-axis indicate more looks to the incorrect goal. Colored error bars indicate 95% confidence intervals.

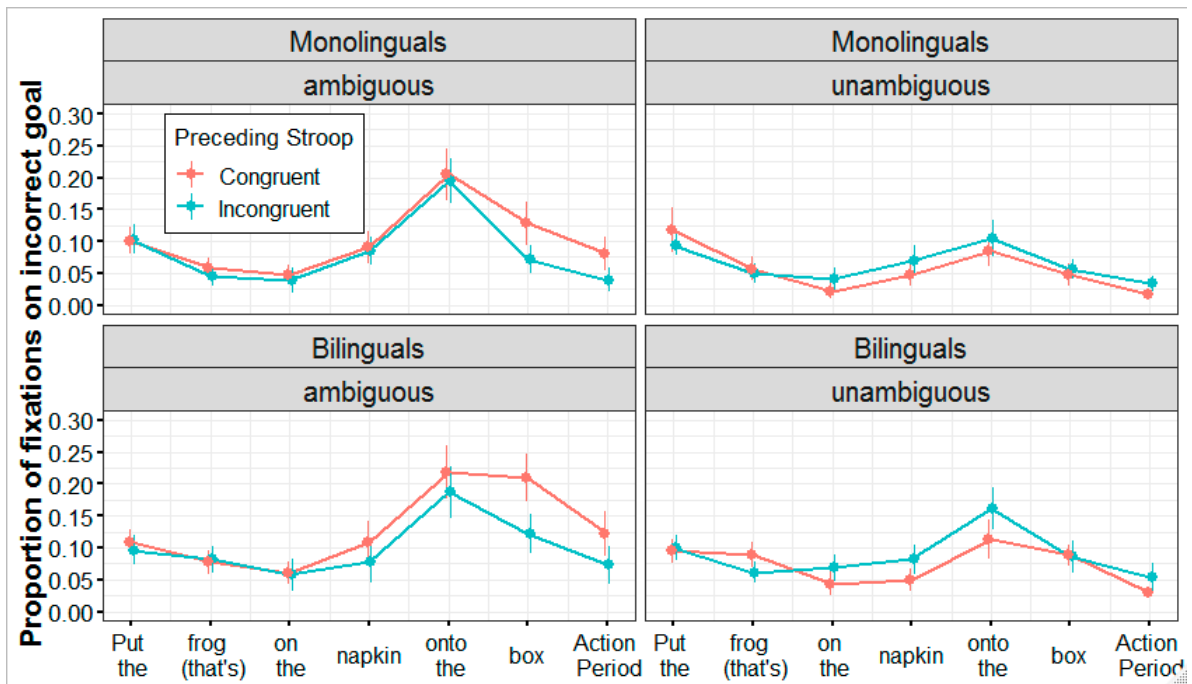


Figure S4. Mean proportion of fixations on the incorrect goal over time as a function of ambiguity and preceding Stroop trial type. Colored error bars indicate 95% confidence intervals.

Table S1. Summary of mixed model analysis for correct goal fixations.

Formula: $\text{Elog}(\text{PropLooks}) \sim \text{Stroop} \times \text{Ambiguity} \times \text{Group} + (\text{Stroop} \times \text{Ambiguity} \mid \text{participant}) + (\text{Stroop} \times \text{Ambiguity} \mid \text{item})$				
Fixed effects	Estimate	SE	t-values	p
(Intercept)	-0.11	0.02	-6.29	<0.001
Stroop	0.03	0.02	1.52	0.137
Ambiguity	0.09	0.01	6.05	<0.001
Group	0.09	0.03	3.43	0.001
Stroop:Ambiguity	-0.10	0.03	-3.02	0.004
Stroop:Group	0.01	0.02	0.32	0.747
Ambiguity:Group	-0.01	0.02	-0.62	0.539
Stroop:Ambiguity:Group	-0.05	0.04	-1.26	0.212
Random effects	Variance	SD		
Intercept participant	0.0070	0.08		
Stroop participant	0.0004	0.02		
Ambiguity participant	0.0011	0.03		
Stroop:Ambiguity participant	0.0017	0.04		
Intercept item	0.0064	0.08		
Stroop item	0.0083	0.09		
Ambiguity item	0.0013	0.04		
Stroop:Ambiguity item	0.0084	0.09		
Residual	0.0592	0.24		

Note: SE = standard error of coefficient estimate. Contrast coding was used for all factors, making the coefficient interpretations as follows: intercept = estimated overall mean fixations on the correct goal (in logits); Stroop = mean difference between trials that were preceded by congruent or by incongruent Stroop sequences; Ambiguity = mean difference between ambiguous and unambiguous sentences; Group = mean difference between bilinguals and monolinguals.

Table S2. Summary of mixed model analysis for incorrect goal fixations.

Formula: $\text{Elog}(\text{PropLooks}) \sim \text{Stroop} \times \text{Ambiguity} \times \text{Group} + (\text{Stroop} + \text{Ambiguity} \mid \text{participant}) + (\text{Stroop} \times \text{Ambiguity} + \text{Group} \mid \text{item})$				
Fixed effects	Estimate	SE	t-values	p
(Intercept)	-0.84	0.02	-38.20	< 0.001
Stroop	-0.03	0.02	-1.35	0.184
Ambiguity	-0.13	0.02	-5.61	<0.001
Group	-0.07	0.02	-2.95	0.005
Stroop:Ambiguity	0.09	0.04	2.07	0.046
Stroop:Group	0.02	0.02	0.72	0.471
Ambiguity:Group	0.00	0.03	0.12	0.907
Stroop:Ambiguity:Group	-0.08	0.04	-1.92	0.055
Random effects	Variance	SD		
Intercept participant	0.0056	0.07		
Stroop participant	0.0000	0.01		
Ambiguity participant	0.0052	0.07		

Intercept item	0.0153	0.12
Stroop item	0.0068	0.08
Ambiguity item	0.0108	0.10
Stroop:Ambiguity item	0.0003	0.02
Group item	0.0136	0.12
Residual	0.0631	0.25

Note: Contrast coding was used for all factors, making the coefficient interpretations as follows: intercept = estimated overall mean fixations on the incorrect goal (in logits); Stroop = mean difference between trials that were preceded by congruent or by incongruent Stroop sequences; Ambiguity = mean difference between ambiguous and unambiguous sentences; Group = mean difference between bilinguals and monolinguals.

Table S3. Summary of mixed model analysis for correct goal fixations by experimental half.

Formula: Elog(PropLooks) ~ Stroop × Ambiguity × Group × Experimental Half + (1 participant:Stroop:Ambiguity) + (1 item:Stroop:Ambiguity:Group)				
Fixed effects	Estimate	SE	t-values	p
(Intercept)	-0.16	0.01	-12.42	<0.001
Stroop	0.04	0.03	1.69	0.092
Ambiguity	0.14	0.03	5.28	0.000
Group	0.08	0.03	3.18	0.002
EH2	0.11	0.02	6.65	0.000
Stroop:Ambiguity	-0.18	0.05	-3.38	0.001
Stroop:Group	0.04	0.05	0.74	0.458
Ambiguity:Group	0.00	0.05	-0.08	0.939
Stroop:EH2	-0.08	0.03	-2.35	0.020
Ambiguity:EH2	-0.09	0.03	-2.68	0.008
Group:EH2	0.01	0.03	0.40	0.690
Stroop:Ambiguity:Group	0.04	0.10	0.34	0.731
Stroop:Ambiguity:EH2	0.17	0.06	2.66	0.009
Stroop:Group:EH2	-0.07	0.06	-1.09	0.278
Ambiguity:Group:EH2	-0.02	0.06	-0.28	0.783
Stroop:Ambiguity:Group:EH2	-0.16	0.13	-1.21	0.228
Random effects	Variance	SD		
Intercept participant:Stroop:Ambiguity	0.0075	0.09		
Intercept item:Stroop:Ambiguity:Group	0.0071	0.08		
Residual	0.0583	0.24		

Note: EH2 = second experimental half. First experimental half was set as the reference level, yielding the following interpretation for the intercept = estimated overall mean fixations on the correct goal (in logits) during the first experimental half.

Table S4. Summary of mixed model analysis for incorrect goal fixations by experimental half.

Formula: Elog(PropLooks) ~ Stroop × Ambiguity × Group × Experimental Half + (Stroop + Ambiguity participant) + (Stroop × Ambiguity + Group item)				
Fixed effects	Estimate	SE	t-values	p
(Intercept)	-0.84	0.01	-66.25	<0.001
Stroop	0.01	0.03	0.37	0.712
Ambiguity	-0.11	0.03	-4.50	<0.001
Group	-0.07	0.03	-2.77	0.006
EH	0.08	0.02	3.74	<0.001
Stroop:Ambiguity	0.09	0.05	1.81	0.072
Stroop:Group	0.03	0.05	0.50	0.615
Ambiguity:Group	0.00	0.05	0.08	0.934
Stroop:EH	-0.03	0.05	-0.69	0.494
Ambiguity:EH	-0.10	0.05	-2.27	0.024
Group:EH	0.00	0.05	-0.01	0.989
Stroop:Ambiguity:Group	-0.09	0.05	-2.07	0.038
Stroop:Ambiguity:EH	0.23	0.09	2.59	0.010
Stroop:Group:EH	-0.02	0.09	-0.18	0.857
Ambiguity:Group:EH	-0.07	0.09	-0.79	0.430
Stroop:Ambiguity:Group:EH	-0.04	0.18	-0.21	0.831
Random effects	Variance	SD		
Intercept participant:Stroop:Ambiguity	0.0067	0.08		
Intercept item:Stroop:Ambiguity:Group	0.0179	0.13		
Residual	0.0641	0.25		

Note: EH = experimental half. All factors were contrast coded, yielding the following interpretation for the intercept = estimated overall mean fixations on the incorrect goal (in logits).

Table S5. Summary of mixed model analysis examining the effect of working memory on incorrect goal fixations.

Formula: Elog(PropLooks) ~ Stroop × Ambiguity × Group × Experimental Half × Working Memory + (1 participant:Stroop:Ambiguity) + (1 item:Stroop:Ambiguity:Group)				
Fixed effects	Estimate	SE	t-values	p
(Intercept)	-0.82	0.01	-56.87	<0.001
Stroop	0.02	0.03	0.73	0.465
Ambiguity	-0.13	0.03	-4.65	<0.001
Group	-0.05	0.03	-1.76	0.080
EH	0.12	0.02	4.82	<0.001
WM	-0.02	0.01	-1.55	0.124
Stroop:Ambiguity	0.10	0.06	1.68	0.094
Stroop:Group	0.03	0.06	0.59	0.554
Ambiguity:Group	-0.00	0.06	-0.05	0.957
Stroop:EH	-0.07	0.05	-1.35	0.179
Ambiguity:EH	-0.15	0.05	-2.96	0.003
Group:EH	0.02	0.05	0.42	0.672

Stroop:WM	-0.01	0.02	-0.33	0.744
Ambiguity:WM	0.01	0.02	0.31	0.756
Group:WM	-0.09	0.02	-3.60	<0.001
EH:WM	-0.02	0.02	-1.21	0.225
Stroop:Ambiguity:Group	-0.05	0.11	-0.47	0.638
Stroop:Ambiguity:EH	0.30	0.10	2.97	0.003
Stroop:Group:EH	-0.08	0.10	-0.83	0.405
Ambiguity:Group:EH	-0.09	0.10	-0.91	0.361
Stroop:Ambiguity:WM	-0.02	0.05	-0.49	0.627
Stroop:Group:WM	-0.04	0.05	-0.83	0.409
Ambiguity:Group:WM	0.06	0.05	1.35	0.180
Stroop:Block:WM	0.06	0.03	1.70	0.089
Ambiguity:Block:WM	0.02	0.03	0.56	0.573
Group:Block:WM	-0.12	0.03	-3.49	<0.001
Stroop:Ambiguity:Group:EH	0.04	0.20	0.18	0.859
Stroop:Ambiguity:Group:WM	-0.02	0.09	-0.18	0.858
Stroop:Ambiguity:EH:WM	-0.07	0.07	-0.97	0.330
Stroop:Group:Block:WM	0.12	0.07	1.82	0.069
Ambiguity:Group:EH:WM	0.15	0.07	2.19	0.029
Stroop:Ambiguity:Group:EH:WM	-0.21	0.14	-1.51	0.130
Random effects	Variance	SD		
Intercept participant:Stroop:Ambiguity	0.0055	0.07		
Intercept item:Stroop:Ambiguity:Group	0.0183	0.14		
Residual	0.0634	0.25		

Note: EH = experimental half; WM = O-span recall score. WM was centered using a z-score transformation. All other factors were contrast coded, yielding the following interpretation for the intercept = estimated overall mean fixations on the incorrect goal (in logits) for individuals with average working memory.