

## Supplementary Materials

**Table S.1** Descriptive statistics of subject information of GECO (Cop et al., 2017) and GECO-CN (Sui et al., 2022, cited from Sui et al., 2022)

		GECO-CN (Sui et al., 2022)		GECO (Cop et al., 2017)		t Value	
		L1	L2	L1	L2	L1-L1	L2-L2
<b>Proficiency</b>	<b>HSK</b>	95.47 [3.01]					
	<b>LexTALE</b>		75.75 [12.07]	92.43 [6.34]	75.63 [12.87]		0.03 [36.59]
	<b>Lexical Decision</b>		41.73 [16.84]		56.84 [11.12]		-3.74[45.49] ***
	<b>WRAT4</b>		60.24 [12]		69.92 [8.74]		-3.26[45.97] **
<b>Comprehension</b>	<b>Scores</b>	74.67 [11.74]	65.83 [13.27]	79.63[10.96]	78.95[12.54]	-1.50 [40.43]	-3.49 [40.08]**
	<b>t Value (L1-L2)</b>		3.79[29]***		0.40 [18]		
<b>Data</b>	<b>Number of words</b>	30581	24528	23875	21563		
	<b>Word frequency</b>	5.5 [1.20]	5.24 [1.23]	5.22 [1.29]	5.22 [1.24]		
	<b>Word length</b>	1.52 [0.58]	5.32 [2.33]	5.72 [2.64]	5.21 [2.26]		

\*p < .05, \*\*p < .01, \*\*\*p < .001

\* Data presents information of the data analyzed in this study, i.e., content words that excluded cognates, first and last words of a line as well as names (e.g., Mary).

**Table S.2** Comparative Analyses of Fixation Duration Measures and Skipping Probabilities between First and Second Language Reading in Chinese-English Bilinguals

	Predictors	Estimate	Std. Error	<i>t</i> value	<i>Pr(&gt; t )</i>	VIF
<b>First Fixation Duration</b>	(Intercept)	5.459	0.01921	284.149	<.00025 ***	
	LanguageEN	0.1182	0.002103	56.216	<.00025 ***	3.78
	Frequency	-0.003281	0.000979	-3.353	.00080 **	4.83
	Word Length	-0.02007	0.01153	-1.741	.08177	5.37
	Proficiency	-0.001055	0.000083	-12.651	<.00025 ***	3.36
	Repetition	0.000022	0.000011	1.98	.04773	2.48
	LanguageEN:Frequency	-0.02064	0.001341	-15.392	<.00025 ***	5.34
	LanguageEN:Word Length	0.2699	0.01495	18.055	<.00025 ***	6.19
	Frequency:Word Length	-0.01642	0.006914	-2.375	.01757	4.58
	LanguageEN:Repetition	0.000028	0.000019	1.499	.1339	2.43
	LanguageEN:Frequency:Word Length	0.0802	0.00858	9.348	<.00025 ***	5.75
<b>Gaze Duration</b>	Predictors	Estimate	Std. Error	<i>t</i> value	<i>Pr(&gt; t )</i>	VIF
	(Intercept)	3.198	0.006873	465.367	<.00025 ***	
	LanguageEN	0.08608	0.000757	113.779	<.00025 ***	3.49
	Frequency	-0.002697	0.00038	-7.098	<.00025 ***	4.85
	Word Length	0.04198	0.004338	9.678	<.00025 ***	4.98
	Proficiency	-0.000561	0.00003	-18.96	<.00025 ***	3.13
	Repetition	0.000013	0.000003	3.825	<.00025 ***	1.63
	LanguageEN:Frequency	-0.01618	0.000557	-29.06	<.00025 ***	5.88
	LanguageEN:Word Length	0.2353	0.005656	41.61	<.00025 ***	5.61
	Frequency:Word Length	-0.008898	0.002589	-3.436	.00059 **	4.01
	Frequency:Proficiency	0.000095	0.000015	6.394	<.00025 ***	1.77
LanguageEN:Frequency:Word Length	0.01996	0.003113	6.41	<.00025 ***	4.65	
<b>Total Reading Time</b>	Predictors	Estimate	Std. Error	<i>t</i> value	<i>Pr(&gt; t )</i>	VIF
	(Intercept)	2.954	0.006083	485.58	<.00025 ***	
	LanguageEN	0.08007	0.000699	114.535	<.00025 ***	3.38
	Frequency	-0.002853	0.000357	-7.982	<.00025 ***	4.73
	Word Length	0.08099	0.004093	19.79	<.00025 ***	4.87
	Proficiency	-0.00049	0.000027	-18.182	<.00025 ***	3.00
	Repetition	0.000018	0.000003	5.64	<.00025 ***	1.63
	LanguageEN:Frequency	-0.01431	0.000524	-27.309	<.00025 ***	5.65
	LanguageEN:Word Length	0.1283	0.005379	23.86	<.00025 ***	5.52
	Frequency:Word Length	0.001353	0.002458	0.55	.582	3.96
	Frequency:Proficiency	0.000111	0.000013	8.22	<.00025 ***	1.70
LanguageEN:Frequency:Word Length	0.01207	0.002965	4.071	<.00025 ***	4.62	
<b>Skipping probability</b>	Predictors	Estimate	Std. Error	<i>z</i> value	<i>Pr(&gt; z )</i>	VIF
	(Intercept)	0.1275	0.07298	1.746	.0807	
	LanguageEN	-2.37	0.01438	-164.84	<.00025 ***	3.66
	Frequency	0.03883	0.0062	6.264	<.00025 ***	3.83
	Word Length	-5.517	0.06248	-88.295	<.00025 ***	2.42
	Proficiency	0.01455	0.000564	25.801	<.00025 ***	3.05
	Repetition	-0.000384	0.00005	-7.702	<.00025 ***	1.60
	LanguageEN:Frequency	0.08123	0.0123	6.604	<.00025 ***	4.44
	LanguageEN:Word Length	-3.439	0.1254	-27.416	<.00025 ***	3.49
	Frequency:Word Length	-0.07741	0.0422	-1.834	.0666	1.82
	Frequency:Proficiency	-0.002312	0.000395	-5.857	<.00025 ***	2.39
LanguageEN:Frequency:Word Length	-1.696	0.06638	-25.545	<.00025 ***	2.2	

\* $p < .0125$ . \*\* $p < .0025$ . \*\*\* $p < .00025$  (*t* corrected significant level according to Von der Malsburg & Angele, 2017)

\* Estimate = Estimates; Std. Error = standard errors; *t* value = *t*-values;  $Pr(>|t|)$  = *p*-values (calculated using lmerTest package); VIF = variance inflation factor.

**Table S.3** Additional Comparative Analyses of Fixation Duration Measures and Skipping Probabilities in Second Language Reading between Chinese- and Dutch-English Bilinguals in Various Language Proficiency Measures

<b>Second Language (WRAT4)</b>					
	<b>Predictors</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>t value</b>	<b>Pr(&gt; t )</b>
<b>First Fixation Duration</b>	(Intercept)	6.262000	0.026210	238.926	< .00025 ***
	GroupDutch	-0.067610	0.046650	-1.449	.154180
	Frequency	-0.029300	0.001164	-25.165	< .00025 ***
	GroupDutch:Frequency	0.008963	0.001918	4.672	< .00025 ***
<b>Gaze Duration</b>	<b>Predictors</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>t value</b>	<b>Pr(&gt; t )</b>
	(Intercept)	3.800000	0.010890	348.801	< .00025 ***
	GroupDutch	-0.074340	0.019390	-3.835	.000388 **
	Frequency	-0.027130	0.000522	-51.983	< .00025 ***
	GroupDutch:Frequency	0.013020	0.000829	15.7	< .00025 ***
<b>Total Reading Time</b>	<b>Predictors</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>t value</b>	<b>Pr(&gt; t )</b>
	(Intercept)	3.671000	0.010770	340.879	< .00025 ***
	GroupDutch	-0.058490	0.019160	-3.053	.003800 *
	Frequency	-0.028180	0.000561	-50.247	< .00025 ***
	GroupDutch:Frequency	0.011880	0.000878	13.533	< .00025 ***

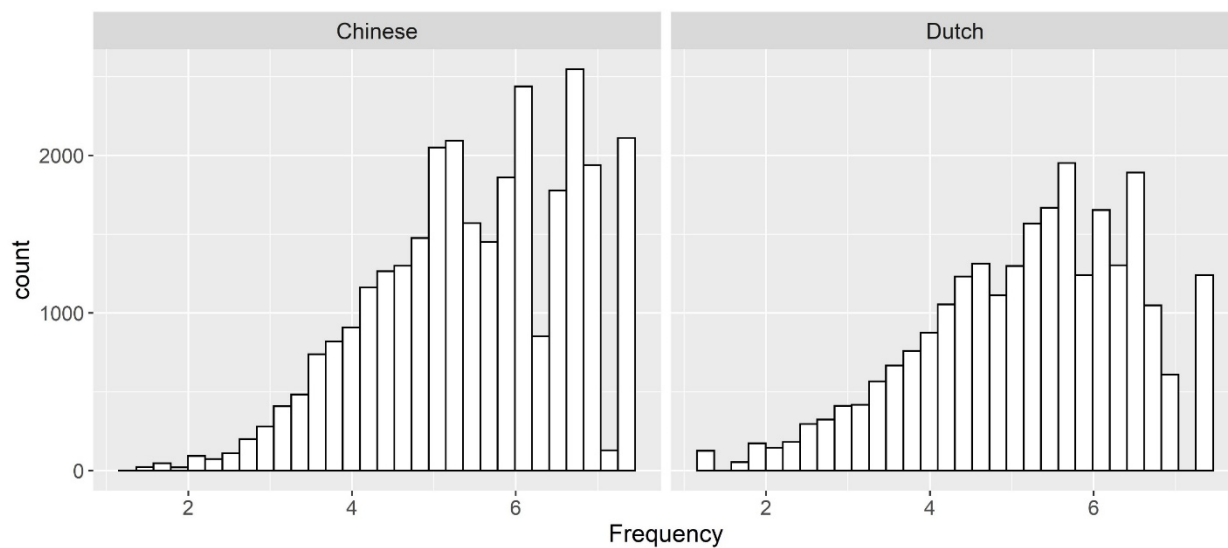
  

<b>Second Language (Lexical Decision Task)</b>					
	<b>Predictors</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>t value</b>	<b>Pr(&gt; t )</b>
<b>First Fixation Duration</b>	(Intercept)	6.636000	0.029610	224.13	< .00025 ***
	GroupDutch	-0.064490	0.057360	-1.124	.266960
	Frequency	-0.032940	0.001308	-25.181	< .00025 ***
	GroupDutch:Frequency	0.013540	0.002242	6.039	< .00025 ***
<b>Gaze Duration</b>	<b>Predictors</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>t value</b>	<b>Pr(&gt; t )</b>
	(Intercept)	3.801000	0.011250	337.894	< .00025 ***
	GroupDutch	-0.072280	0.021790	-3.317	.001830 **
	Frequency	-0.027360	0.000527	-51.959	< .00025 ***
	GroupDutch:Frequency	0.014480	0.000865	16.741	< .00025 ***
<b>Total Reading Time</b>	<b>Predictors</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>t value</b>	<b>Pr(&gt; t )</b>
	(Intercept)	3.674000	0.011120	330.317	< .00025 ***
	GroupDutch	-0.054220	0.021540	-2.517	.015540 .
	Frequency	-0.028510	0.000564	-50.585	< .00025 ***
	GroupDutch:Frequency	0.012410	0.000910	13.639	< .00025 ***

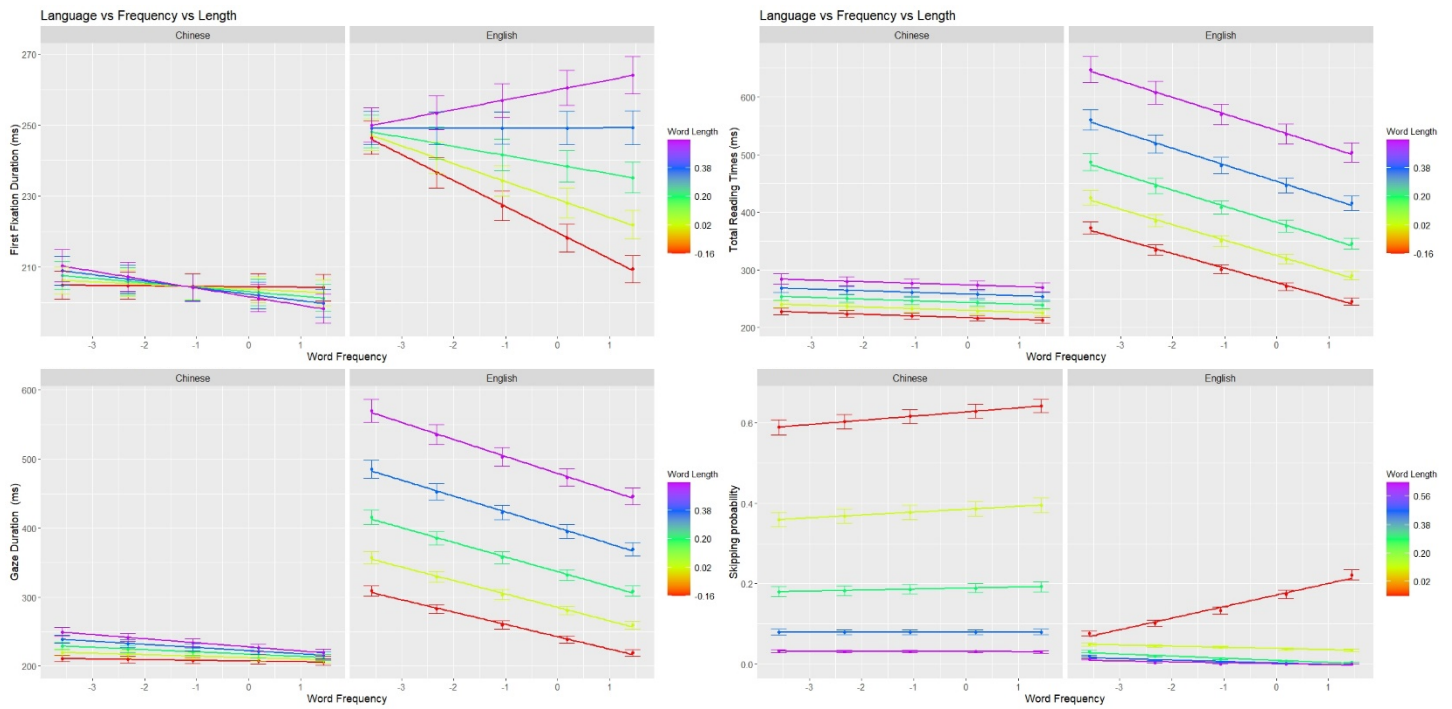
\*  $p < .0125$ . \*\* $p < .0025$ . \*\*\* $p < .00025$  (the significant level was corrected according to Von der Malsburg & Angele, 2017)

\* Estimate = Estimates; Std. Error = standard errors; t value = t-values; Pr(>|t|) = p-values (calculated using lmerTest package); VIF = variance inflation factor.

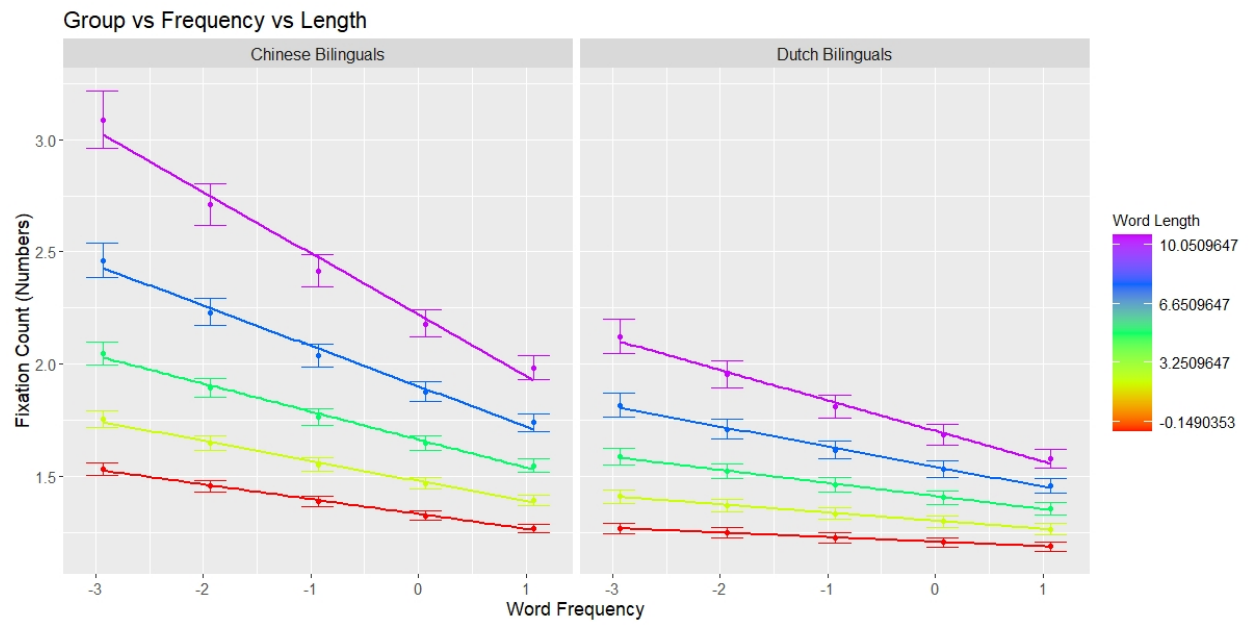
**Figure S.1** Histograms of the word frequency distribution of the Chinese and Dutch data analyzed in this work.



**Figure S.2** Three-way Interaction Plots between the Language (L1 and L2), Word Length, and Frequency in Chinese-English Bilinguals.



**Figure S.3** The effects of Group, Word Length, and Frequency on Fixation Count (Numbers) in Second Language Reading.



**Figure S.4** The effects of First language proficiency and Frequency on Gaze Duration (millisecond) in Second Language Reading.

