

Supplementary Materials

Note that for all of the following analyses, con1 is structure (active vs. passive), con2 is plausibility (plausible vs. implausible), and dys is group (dyslexic vs. control).

Section A: R output for the analysis of length and Frequency on length adjusted reading times. Results showed a main effect of length, despite the length correction for the additional words in passive sentences. The inclusion of word frequency (summed frequency of the three content words) did not produce a main effect.

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: rtlen ~ con1 * con2 * dys + len + (1 + con1 | sub) + (1 | item)
Data: paul
```

AIC	BIC	logLik	deviance	df.resid
34415.2	34493.6	-17193.6	34387.2	1986

Scaled residuals:

Min	1Q	Median	3Q	Max
-2.6061	-0.5901	-0.1421	0.3940	8.1369

Random effects:

Groups	Name	Variance	Std.Dev.	Corr
sub	(Intercept)	834115	913.3	
	conlc2	166408	407.9	-0.33
item	(Intercept)	6305	79.4	
	Residual	1483300	1217.9	

Number of obs: 2000, groups: sub, 100; item, 20

Fixed effects:

	Estimate	Std. Error	df	t value	Pr(> t)
(Intercept)	2708.665	196.834	74.609	13.761	< 2e-16 ***
conlc2	-920.808	130.140	140.189	-7.076	6.51e-11 ***
con2c2	-381.612	108.933	1780.543	-3.503	0.000471 ***
dysd2	-609.696	212.676	132.308	-2.867	0.004826 **
len	47.514	7.073	19.149	6.717	1.94e-06 ***
conlc2:con2c2	222.548	154.055	1780.543	1.445	0.148745
conlc2:dysd2	-74.004	174.325	263.026	-0.425	0.671535
con2c2:dysd2	-78.748	154.055	1780.543	-0.511	0.609296
conlc2:con2c2:dysd2	193.024	217.866	1780.543	0.886	0.375750

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intr)	conlc2	con2c2	dysd2	len	cnl2:22	cnl2:2	cn22:2
conlc2		-0.246						
con2c2		-0.277	0.419					
dysd2		-0.540	0.303	0.256				
len		-0.632	-0.168	0.000	0.000			
cnl2:cn2c2		0.196	-0.592	-0.707	-0.181	0.000		
cnl2:dysd2		0.245	-0.670	-0.312	-0.453	0.000	0.442	
cn2c2:dysd2		0.196	-0.296	-0.707	-0.362	0.000	0.500	0.442
cnl2:c22:2		-0.138	0.419	0.500	0.256	0.000	-0.707	-0.625

Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
 Formula: rtlen ~ con1 * con2 * dys + fre + (1 + con1 | sub) + (1 | item)
 Data: paul

AIC	BIC	logLik	deviance	df.resid
34436.8	34515.2	-17204.4	34408.8	1986

Scaled residuals:

Min	1Q	Median	3Q	Max
-2.5589	-0.5859	-0.1361	0.3832	8.1276

Random effects:

Groups	Name	Variance	Std.Dev.	Corr
sub	(Intercept)	836220	914.5	
	con1c2	168716	410.8	-0.33
item	(Intercept)	49762	223.1	
	Residual	1483033	1217.8	

Number of obs: 2000, groups: sub, 100; item, 20

Fixed effects:

	Estimate	Std. Error	df	t value	Pr(> t)
(Intercept)	3582.0973	168.5962	122.1969	21.247	< 2e-16 ***
con1c2	-692.8933	170.0353	55.2812	-4.075	0.000148 ***
con2c2	-381.6120	108.9232	1781.4222	-3.503	0.000471 ***
dysd2	-609.6960	212.8687	132.1545	-2.864	0.004865 **
fre	-0.4454	0.3370	19.4960	-1.322	0.201571
con1c2:con2c2	222.5480	154.0407	1781.4222	1.445	0.148708
con1c2:dysd2	-74.0040	174.5771	260.9358	-0.424	0.671985
con2c2:dysd2	-78.7480	154.0407	1781.4222	-0.511	0.609263
con1c2:con2c2:dysd2	193.0240	217.8464	1781.4222	0.886	0.375707

 Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intr)	con1c2	con2c2	dysd2	fre	cn12:22	cn12:2	cn22:2
con1c2	-0.407							
con2c2	-0.323	0.320						
dysd2	-0.631	0.232	0.256					
fre	-0.167	-0.359	0.000	0.000				
cn1c2:cn2c2	0.228	-0.453	-0.707	-0.181	0.000			
cn1c2:dysd2	0.286	-0.513	-0.312	-0.453	0.000	0.441		
cn2c2:dysd2	0.228	-0.226	-0.707	-0.362	0.000	0.500	0.441	
cn1c2:c22:2	-0.162	0.320	0.500	0.256	0.000	-0.707	-0.624	-0.707

Section B: R output for the analysis of comprehension accuracy. First output is the three-way interaction. Second and third are the results for dyslexics and controls separately. The final output is the Tukey contrasts.

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's
Formula: acc ~ con1 * con2 * dys + (1 + con1 | sub) + (1 | item)
Data: paul

      AIC      BIC   logLik deviance df.resid
1359.6   1432.4   -666.8   1333.6     1987

Scaled residuals:
      Min       1Q   Median       3Q      Max
-3.09493  0.01579  0.26466  0.50720  1.92154

Random effects:
Groups   Name              Variance Std.Dev. Corr
sub      (Intercept)    0.015571 0.12478
         conlc2         0.007469 0.08642  -0.10
item     (Intercept)    0.002106 0.04589
Residual                    0.103542 0.32178
Number of obs: 2000, groups:  sub, 100; item, 20

Fixed effects:
              Estimate Std. Error      df t value Pr(>|t|)
(Intercept)    0.83600    0.03060  112.97594   27.323 < 2e-16 ***
conlc2         -0.11200    0.03740   83.81125   -2.995  0.00361 **
con2c2          0.03200    0.02878  1780.96958    1.112  0.26635
dysd2           0.03600    0.03809  193.73696    0.945  0.34583
conlc2:con2c2   0.10000    0.04070  1780.96958    2.457  0.01411 *
conlc2:dysd2    0.06400    0.04422  291.14032    1.447  0.14889
con2c2:dysd2    0.04000    0.04070  1780.96958    0.983  0.32586
conlc2:con2c2:dysd2 -0.11600    0.05756  1780.96958   -2.015  0.04403 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
              (Intr) conlc2 con2c2 dysd2  cnl2:22 cnl2:2 cn22:2
conlc2        -0.565
con2c2        -0.470  0.385
dysd2         -0.623  0.306  0.378
cnlc2:cn2c2   0.333 -0.544 -0.707 -0.267
cnlc2:dysd2   0.322 -0.591 -0.325 -0.518  0.460
cn2c2:dysd2   0.333 -0.272 -0.707 -0.534  0.500  0.460
cnlc2:c22:2  -0.235  0.385  0.500  0.378 -0.707 -0.651 -0.707
```

Controls

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: acc ~ con1 * con2 + (1 | sub) + (1 | item)
Data: paul
```

AIC	BIC	logLik	deviance	df.resid
562.3	596.7	-274.2	548.3	993

Scaled residuals:

Min	1Q	Median	3Q	Max
-3.1208	0.1216	0.3090	0.4584	1.2618

Random effects:

Groups	Name	Variance	Std.Dev.
sub	(Intercept)	0.0067083	0.08190
item	(Intercept)	0.0006736	0.02595
Residual		0.0964285	0.31053

Number of obs: 1000, groups: sub, 50; item, 20

Fixed effects:

	Estimate	Std. Error	df	t value	Pr(> t)
(Intercept)	0.87200	0.02423	75.69144	35.984	< 2e-16 ***
con1c2	-0.04800	0.03010	59.16608	-1.595	0.11614
con2c2	0.07200	0.02777	930.13631	2.592	0.00968 **
con1c2:con2c2	-0.01600	0.03928	930.13631	-0.407	0.68385

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intr)	con1c2	con2c2
con1c2		-0.621	
con2c2	-0.573	0.461	
cn1c2:cn2c2	0.405	-0.652	-0.707

> |

Dyslexia

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: acc ~ con1 * con2 + (1 + con1 | sub) + (1 | item)
Data: paul
```

AIC	BIC	logLik	deviance	df.resid
787.6	831.8	-384.8	769.6	991

Scaled residuals:

Min	1Q	Median	3Q	Max
-2.88255	-0.03895	0.24272	0.56420	1.84661

Random effects:

Groups	Name	Variance	Std.Dev.	Corr
sub	(Intercept)	0.024722	0.15723	
	con1c2	0.007891	0.08883	-0.05
item	(Intercept)	0.004006	0.06329	
Residual		0.112048	0.33474	

Number of obs: 1000, groups: sub, 50; item, 20

Fixed effects:

	Estimate	Std. Error	df	t value	Pr(> t)
(Intercept)	0.83600	0.03665	59.05789	22.810	<2e-16 ***
con1c2	-0.11200	0.04307	39.26942	-2.600	0.0131 *
con2c2	0.03200	0.02994	880.96805	1.069	0.2854
con1c2:con2c2	0.10000	0.04234	880.96805	2.362	0.0184 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intr)	con1c2	con2c2
con1c2		-0.547	
con2c2	-0.408	0.348	
cn1c2:cn2c2	0.289	-0.491	-0.707

Tukey Contrasts: first variable is structure type (C1=active, C2=passive), second is plausibility (C1=implausible, C2=plausible, and third is group (D1=dyslexic, D2=Control).

```

Simultaneous Tests for General Linear Hypotheses

Multiple Comparisons of Means: Tukey Contrasts

Fit: lmer(formula = acc ~ tw + (1 + con1 | sub) + (1 | item), data = paul,
REML = FALSE)

Linear Hypotheses:
              Estimate Std. Error z value Pr(>|z|)
c2.c1.d1 - c1.c1.d1 == 0 -0.11200    0.03740  -2.995  0.05038 .
c1.c2.d1 - c1.c1.d1 == 0  0.03200    0.02878   1.112  0.94700
c2.c2.d1 - c1.c1.d1 == 0  0.02000    0.03740   0.535  0.99935
c1.c1.d2 - c1.c1.d1 == 0  0.03600    0.03809   0.945  0.97810
c2.c1.d2 - c1.c1.d1 == 0 -0.01200    0.04448  -0.270  0.99999
c1.c2.d2 - c1.c1.d1 == 0  0.10800    0.03809   2.835  0.07883 .
c2.c2.d2 - c1.c1.d1 == 0  0.04400    0.04448   0.989  0.97170
c1.c2.d1 - c2.c1.d1 == 0  0.14400    0.03740   3.850  0.00269 **
c2.c2.d1 - c2.c1.d1 == 0  0.13200    0.02878   4.586 < 0.001 ***
c1.c1.d2 - c2.c1.d1 == 0  0.14800    0.04448   3.328  0.01810 *
c2.c1.d2 - c2.c1.d1 == 0  0.10000    0.04078   2.452  0.19878
c1.c2.d2 - c2.c1.d1 == 0  0.22000    0.04448   4.946 < 0.001 ***
c2.c2.d2 - c2.c1.d1 == 0  0.15600    0.04078   3.826  0.00299 **
c2.c2.d1 - c1.c2.d1 == 0 -0.01200    0.03740  -0.321  0.99998
c1.c1.d2 - c1.c2.d1 == 0  0.00400    0.03809   0.105  1.00000
c2.c1.d2 - c1.c2.d1 == 0 -0.04400    0.04448  -0.989  0.97170
c1.c2.d2 - c1.c2.d1 == 0  0.07600    0.03809   1.995  0.45691
c2.c2.d2 - c1.c2.d1 == 0  0.01200    0.04448   0.270  0.99999
c1.c1.d2 - c2.c2.d1 == 0  0.01600    0.04448   0.360  0.99995
c2.c1.d2 - c2.c2.d1 == 0 -0.03200    0.04078  -0.785  0.99265
c1.c2.d2 - c2.c2.d1 == 0  0.08800    0.04448   1.979  0.46817
c2.c2.d2 - c2.c2.d1 == 0  0.02400    0.04078   0.589  0.99879
c2.c1.d2 - c1.c1.d2 == 0 -0.04800    0.03740  -1.283  0.89191
c1.c2.d2 - c1.c1.d2 == 0  0.07200    0.02878   2.502  0.17860
c2.c2.d2 - c1.c1.d2 == 0  0.00800    0.03740   0.214  1.00000
c1.c2.d2 - c2.c1.d2 == 0  0.12000    0.03740   3.208  0.02640 *
c2.c2.d2 - c2.c1.d2 == 0  0.05600    0.02878   1.946  0.49005
c2.c2.d2 - c1.c2.d2 == 0 -0.06400    0.03740  -1.711  0.65319
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
(Adjusted p values reported -- single-step method)

```

Section C: R output for the analysis of comprehension accuracy with the inclusion of individual differences variables. Working Memory followed by Verbal Intelligence.

```

Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: acc ~ con1 * con2 * dys * wm + (1 + con1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
1363.5   1481.1   -660.7   1321.5     1979

Scaled residuals:
    Min       1Q   Median       3Q      Max
-3.12416  0.02797  0.26641  0.49235  1.93968

Random effects:
Groups   Name              Variance Std.Dev. Corr
sub      (Intercept)  0.014443  0.12018
          con1c2      0.007458  0.08636   -0.08
item     (Intercept)  0.002093  0.04575
Residual              0.103128  0.32114
Number of obs: 2000, groups:  sub, 100; item, 20

Fixed effects:
              Estimate Std. Error      df t value Pr(>|t|)
(Intercept)   7.518e-01  6.399e-02  2.067e+02  11.749 < 2e-16 ***
con1c2        -1.807e-01  7.628e-02  2.818e+02  -2.370  0.01848 *
con2c2         2.415e-02  6.770e-02  1.787e+03   0.357  0.72128
dysd2          7.346e-02  9.422e-02  1.984e+02   0.780  0.43652
wm             4.968e-03  3.331e-03  1.989e+02   1.491  0.13743
con1c2:con2c2  2.630e-01  9.574e-02  1.787e+03   2.747  0.00607 **
con1c2:dysd2   1.191e-01  1.110e-01  2.910e+02   1.073  0.28432
con2c2:dysd2   1.807e-02  1.022e-01  1.781e+03   0.177  0.85967
con1c2:wm      4.058e-03  3.927e-03  2.921e+02   1.033  0.30226
con2c2:wm      4.631e-04  3.619e-03  1.789e+03   0.128  0.89819
dysd2:wm      -2.333e-03  4.976e-03  1.984e+02  -0.469  0.63973
con1c2:con2c2:dysd2 -1.912e-01  1.445e-01  1.781e+03  -1.323  0.18608
con1c2:con2c2:wm -9.624e-03  5.118e-03  1.789e+03  -1.881  0.06019 .
con1c2:dysd2:wm -3.289e-03  5.864e-03  2.910e+02  -0.561  0.57538
con2c2:dysd2:wm  1.217e-03  5.397e-03  1.781e+03   0.226  0.82157
con1c2:con2c2:dysd2:wm 4.665e-03  7.632e-03  1.781e+03   0.611  0.54109
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation matrix not shown by default, as p = 16 > 12.
Use print(x, correlation=TRUE) or
      vcov(x)          if you need it

```

Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
 Formula: acc ~ con1 * con2 * dys * viq + (1 + con1 | sub) + (1 | item)
 Data: paul

AIC	BIC	logLik	deviance	df.resid
1364.9	1482.5	-661.4	1322.9	1979

Scaled residuals:

Min	1Q	Median	3Q	Max
-3.16181	0.02104	0.26288	0.50751	1.95221

Random effects:

Groups	Name	Variance	Std.Dev.	Corr
sub	(Intercept)	0.013918	0.11798	
	con1c2	0.007469	0.08643	-0.09
item	(Intercept)	0.002092	0.04574	
	Residual	0.103349	0.32148	

Number of obs: 2000, groups: sub, 100; item, 20

Fixed effects:

	Estimate	Std. Error	df	t value	Pr(> t)
(Intercept)	0.82469	0.03028	112.45275	27.232	< 2e-16 ***
con1c2	-0.10904	0.03765	86.27113	-2.896	0.00478 **
con2c2	0.03793	0.02909	1781.10014	1.304	0.19240
dysd2	0.04992	0.03764	200.99773	1.326	0.18626
viq	0.07442	0.02648	201.50776	2.810	0.00543 **
con1c2:con2c2	0.09622	0.04114	1781.10014	2.339	0.01945 *
con1c2:dysd2	0.06325	0.04471	291.10789	1.415	0.15827
con2c2:dysd2	0.03475	0.04115	1781.56448	0.844	0.39863
con1c2:viq	-0.01947	0.03146	292.13080	-0.619	0.53654
con2c2:viq	-0.03905	0.02900	1788.62780	-1.347	0.17826
dysd2:viq	-0.05723	0.03784	201.05239	-1.512	0.13202
con1c2:con2c2:dysd2	-0.11813	0.05820	1781.56448	-2.030	0.04253 *
con1c2:con2c2:viq	0.02486	0.04101	1788.62780	0.606	0.54436
con1c2:dysd2:viq	0.03400	0.04495	291.21768	0.756	0.45006
con2c2:dysd2:viq	0.04352	0.04138	1782.39564	1.052	0.29313
con1c2:con2c2:dysd2:viq	-0.06377	0.05852	1782.39564	-1.090	0.27601

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation matrix not shown by default, as p = 16 > 12.
 Use print(x, correlation=TRUE) or
 vcov(x) if you need it

Section D: R output for the analysis of un-adjusted reading times.

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: rt ~ con1 * con2 * dys + (1 + con1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid 
33035.8  33108.2 -16504.9  33009.8    1934 

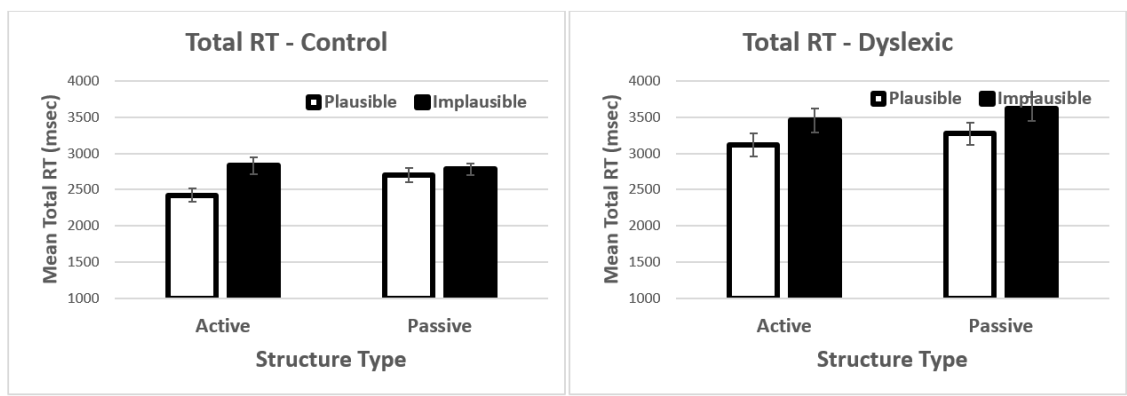
Scaled residuals:
    Min       1Q   Median       3Q      Max 
-2.4757 -0.6430 -0.1588  0.4786  4.2753 

Random effects:
Groups   Name              Variance Std.Dev. Corr
sub      (Intercept)      640960    800.6 
        con1c2           66708     258.3  0.14 
item     (Intercept)      36477     191.0 
        Residual         1156577  1075.4 
Number of obs: 1947, groups: sub, 100; item, 20 

Fixed effects:
              Estimate Std. Error      df t value Pr(>|t|)
(Intercept)    3453.98     145.65  126.30  23.714 < 2e-16 ***
con1c2          128.40     135.36   64.54   0.949  0.346386
con2c2         -341.06     97.21  1724.64 -3.509  0.000462 ***
dysd2          -622.21    187.33   131.68 -3.322  0.001159 **
con1c2:con2c2    28.93     138.73  1729.91  0.209  0.834840
con1c2:dysd2   -177.18    147.57   294.63 -1.201  0.230831
con2c2:dysd2    -61.15     137.26  1724.61 -0.446  0.656000
con1c2:con2c2:dysd2 280.59    195.18  1727.96  1.438  0.150727
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
              (Intr) con1c2 con2c2 dysd2  cn12:22 cn12:2 cn22:2
con1c2        -0.397
con2c2        -0.335  0.360
dysd2         -0.644  0.165  0.261
cn1c2:cn2c2    0.235 -0.516 -0.700 -0.182
cn1c2:dysd2    0.194 -0.552 -0.331 -0.301  0.473
cn2c2:dysd2    0.237 -0.255 -0.708 -0.368  0.496  0.466
cn1c2:cn22:2  -0.167  0.367  0.498  0.258 -0.711 -0.663 -0.703
```

Means of unadjusted total reading times.



Working Memory

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: rt ~ con1 * con2 * dys * wm + (1 + con1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
33039.8  33156.8 -16498.9  32997.8     1926

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.4380 -0.6486 -0.1595  0.4688  4.3073

Random effects:
Groups   Name              Variance Std.Dev. Corr
sub      (Intercept)      572257    756.5
con1c2   con1c2           57724     240.3    0.26
item     (Intercept)      36382     190.7
Residual                    1156212  1075.3
Number of obs: 1947, groups:  sub, 100; item, 20

Fixed effects:
              Estimate Std. Error      df t value Pr(>|t|)
(Intercept)    4161.492    306.472   145.997   13.579   <2e-16 ***
con1c2         -18.971    263.883   287.312   -0.072   0.9427
con2c2        -202.188    231.381  1729.316   -0.874   0.3823
dysd2        -1067.763    454.135   137.607   -2.351   0.0201 *
wm            -41.770     16.025   136.933   -2.607   0.0102 *
con1c2:con2c2   -36.278    332.571  1741.900   -0.109   0.9131
con1c2:dysd2   -325.171    371.838   309.365   -0.874   0.3825
con2c2:dysd2   -311.327    348.576  1725.869   -0.893   0.3719
con1c2:wm         8.637     13.229   314.868    0.653   0.5143
con2c2:wm        -8.107     12.300  1729.613   -0.659   0.5099
dysd2:wm        27.056     23.940   136.654    1.130   0.2604
con1c2:con2c2:dysd2  461.178    495.812  1732.091    0.930   0.3524
con1c2:con2c2:wm     3.840     17.675  1738.894    0.217   0.8280
con1c2:dysd2:wm     7.970     19.540   304.710    0.408   0.6836
con2c2:dysd2:wm    14.329     18.323  1724.981    0.782   0.4343
con1c2:con2c2:dysd2:wm -10.324     26.082  1729.576   -0.396   0.6923
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation matrix not shown by default, as p = 16 > 12.
Use print(x, correlation=TRUE) or
vcov(x) if you need it
```

Verbal Intelligence

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: rt ~ con1 * con2 * dys * viq + (1 + con1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
33033.0  33150.1 -16495.5  32991.0     1926

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.4791 -0.6566 -0.1663  0.4881  4.2589

Random effects:
Groups   Name              Variance Std.Dev. Corr
sub      (Intercept)      619718    787.2
conlc2   conlc2           29902     172.9    0.38
item     (Intercept)      35185     187.6
Residual                    1154096  1074.3
Number of obs: 1947, groups:  sub, 100; item, 20

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)    3479.30     145.11  127.51  23.976 < 2e-16 ***
conlc2          77.11      132.45   63.01   0.582 0.562533
con2c2        -344.51      98.24  1726.19  -3.507 0.000465 ***
dysd2         -678.23     187.24   132.71  -3.622 0.000414 ***
viq          -164.76      131.69   132.93  -1.251 0.213090
conlc2:con2c2    47.01     140.09  1731.22   0.336 0.737243
conlc2:dysd2   -106.76     144.04   329.96  -0.741 0.459108
con2c2:dysd2   -38.85      138.76  1726.71  -0.280 0.779549
conlc2:viq     337.89      101.91   336.57   3.316 0.001014 **
con2c2:viq      19.11       97.65  1731.68   0.196 0.844889
dysd2:viq     -33.80      188.37   133.10  -0.179 0.857885
conlc2:con2c2:dysd2 227.58     197.22  1729.88   1.154 0.248688
conlc2:con2c2:viq -111.95     139.35  1734.41  -0.803 0.421895
conlc2:dysd2:viq -212.71     145.07   332.54  -1.466 0.143511
con2c2:dysd2:viq  104.82      139.84  1727.22   0.750 0.453599
conlc2:con2c2:dysd2:viq -117.12     198.49  1729.65  -0.590 0.555208
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation matrix not shown by default, as p = 16 > 12.
Use print(x, correlation=TRUE) or
vcov(x) if you need it
```

Section E: R output for the analysis of length adjusted reading times.

```

Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: rtlen ~ con1 * con2 * dys + (1 + con1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
33151.1  33223.7 -16562.6  33125.1     1948

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.4459 -0.6432 -0.1371  0.4595  4.7761

Random effects:
Groups   Name              Variance Std.Dev. Corr
sub      (Intercept)      653203    808.2
con1c2   con1c2           67966     260.7   -0.36
item     (Intercept)      39507     198.8
Residual                   1089022  1043.6
Number of obs: 1961, groups:  sub, 100; item, 20

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)    3457.40     146.58  124.37  23.587 < 2e-16 ***
con1c2         -744.75     134.84   59.01  -5.523 7.87e-07 ***
con2c2         -342.51     94.33  1742.86  -3.631 0.00029 ***
dysd2          -625.23    187.16  129.46  -3.341 0.00109 **
con1c2:con2c2    150.17    133.41  1742.83   1.126 0.26045
con1c2:dysd2    -92.30    143.19  299.40  -0.645 0.51966
con2c2:dysd2    -58.31    133.19  1742.80  -0.438 0.66161
con1c2:con2c2:dysd2 280.38    188.64  1744.02   1.486 0.13738
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
              (Intr) con1c2 con2c2 dysd2  cn12:22 cn12:2 cn22:2
con1c2       -0.502
con2c2       -0.323  0.351
dysd2        -0.639  0.237  0.253
cn1c2:cn2c2  0.229 -0.496 -0.707 -0.179
cn1c2:dysd2  0.285 -0.532 -0.331 -0.445  0.467
cn2c2:dysd2  0.229 -0.249 -0.708 -0.357  0.501  0.467
cn1c2:c22:2 -0.162  0.351  0.500  0.252 -0.707 -0.658 -0.706

```

Working Memory

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: rtlen ~ con1 * con2 * dys * wm + (1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
33153.6 33259.6 -16557.8 33115.6    1942

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.4581 -0.6535 -0.1428  0.4659  4.6634

Random effects:
Groups   Name              Variance Std.Dev.
sub      (Intercept)      545577    738.6
item     (Intercept)      38927    197.3
Residual                    1103239 1050.4
Number of obs: 1961, groups: sub, 100; item, 20

Fixed effects:
              Estimate Std. Error      df t value Pr(>|t|)
(Intercept)    4174.732    299.975   174.927  13.917 < 2e-16 ***
con1c2         -809.151    241.858   528.253  -3.346  0.00088 ***
con2c2         -207.413    226.024  1846.154  -0.918  0.35892
dysd2         -1082.608    443.461   164.705  -2.441  0.01569 *
wm             -42.375     15.648   163.900  -2.708  0.00749 **
con1c2:con2c2   -253.323    318.407  1846.171  -0.796  0.42637
con1c2:dysd2   -178.084    339.502  1841.503  -0.525  0.59996
con2c2:dysd2   -299.995    340.479  1841.538  -0.881  0.37838
con1c2:wm        3.785     12.000  1844.624   0.315  0.75247
con2c2:wm       -7.809     12.016  1847.010  -0.650  0.51582
dysd2:wm        27.743     23.378   163.565   1.187  0.23706
con1c2:con2c2:dysd2 738.202    479.389  1841.495   1.540  0.12376
con1c2:con2c2:wm   23.687     16.981  1847.035   1.395  0.16323
con1c2:dysd2:wm    4.639     17.882  1841.421   0.259  0.79535
con2c2:dysd2:wm   13.803     17.898  1841.357   0.771  0.44069
con1c2:con2c2:dysd2:wm -26.767     25.276  1841.373  -1.059  0.28975
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation matrix not shown by default, as p = 16 > 12.
Use print(x, correlation=TRUE) or
vcov(x) if you need it
```

Verbal Intelligence

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: rtlen ~ con1 * con2 * dys * viq + (1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
33151.3  33257.3 -16556.6  33113.3     1942

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.5046 -0.6505 -0.1384  0.4615  4.8692

Random effects:
 Groups   Name      Variance Std.Dev.
 sub      (Intercept) 587042   766.2
 item     (Intercept) 37776    194.4
 Residual                    1098188 1047.9
Number of obs: 1961, groups: sub, 100; item, 20

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)      3481.59      142.87 138.57  24.368 < 2e-16 ***
con1c2           -778.34      129.45   56.60  -6.013  1.4e-07 ***
con2c2           -344.26       95.83 1841.26  -3.592  0.000336 ***
dysd2            -680.89      182.35  157.49  -3.734  0.000263 ***
viq             -163.79      128.25  157.75  -1.277  0.203444
con1c2:con2c2     151.70      135.45 1841.29   1.120  0.262877
con1c2:dysd2     -28.60      135.51 1841.57  -0.211  0.832848
con2c2:dysd2     -37.01      135.35 1841.80  -0.273  0.784569
con1c2:viq       226.26       95.70 1844.37   2.364  0.018166 *
con2c2:viq        17.98       95.27 1847.27   0.189  0.850350
dysd2:viq       -38.08      183.45  157.95  -0.208  0.835820
con1c2:con2c2:dysd2 233.85      191.71 1841.98   1.220  0.222694
con1c2:con2c2:viq  -13.29      135.10 1846.89  -0.098  0.921648
con1c2:dysd2:viq  -29.30      136.78 1841.88  -0.214  0.830395
con2c2:dysd2:viq  105.25      136.41 1842.04   0.772  0.440457
con1c2:con2c2:dysd2:viq -265.74      193.01 1842.29  -1.377  0.168733
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation matrix not shown by default, as p = 16 > 12.
Use print(x, correlation=TRUE) or
vcov(x) if you need it
```

Section F: R output for the analysis of regressions out.

```
| Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: reg ~ con1 * con2 * dys + (1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
4667.1   4728.7  -2322.5   4645.1     1989

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.8679 -0.7583  0.0389  0.6028  4.0445

Random effects:
Groups   Name      Variance Std.Dev.
sub      (Intercept) 0.1073   0.3276
item     (Intercept) 0.0000   0.0000
Residual                0.5517   0.7428
Number of obs: 2000, groups: sub, 100; item, 20

Fixed effects:
              Estimate Std. Error      df t value Pr(>|t|)
(Intercept)    1.65600    0.06598 255.33830  25.100 < 2e-16 ***
con1c2          0.30800    0.06644 1899.99429   4.636 3.79e-06 ***
con2c2         -0.05600    0.06644 1899.99429  -0.843  0.3994
dysd2          -0.20800    0.09330 255.33830  -2.229  0.0267 *
con1c2:con2c2   -0.08800    0.09396 1899.99429  -0.937  0.3491
con1c2:dysd2   -0.09600    0.09396 1899.99429  -1.022  0.3070
con2c2:dysd2   -0.10400    0.09396 1899.99429  -1.107  0.2685
con1c2:con2c2:dysd2 0.20800    0.13287 1899.99429   1.565  0.1177
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr) con1c2 con2c2 dysd2  cn12:22 cn12:2 cn22:2
con1c2    -0.503
con2c2    -0.503  0.500
dysd2     -0.707  0.356  0.356
cn1c2:cn2c2 0.356 -0.707 -0.707 -0.252
cn1c2:dysd2 0.356 -0.707 -0.354 -0.503  0.500
cn2c2:dysd2 0.356 -0.354 -0.707 -0.503  0.500  0.500
cn1c2:c22:2 -0.252  0.500  0.500  0.356 -0.707 -0.707 -0.707
convergence code: 0
boundary (singular) fit: see ?isSingular
```

Working Memory

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: reg ~ con1 * con2 * dys * wm + (1 | sub) + (1 | item)
Data: paul

      AIC      BIC   logLik deviance df.resid
4673.8   4780.3  -2317.9   4635.8     1981

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.7667 -0.7387  0.0272  0.6269  4.0444

Random effects:
 Groups   Name      Variance Std.Dev.
 sub      (Intercept) 1.032e-01 3.212e-01
 item     (Intercept) 1.128e-16 1.062e-08
 Residual                    5.500e-01 7.416e-01
Number of obs: 2000, groups: sub, 100; item, 20

Fixed effects:
              Estimate Std. Error      df t value Pr(>|t|)
(Intercept)    1.753e+00  1.536e-01 2.607e+02  11.410 < 2e-16 ***
con1c2         4.058e-01  1.560e-01  1.900e+03   2.601  0.00937 **
con2c2         9.156e-02  1.560e-01  1.900e+03   0.587  0.55741
dysd2        -1.129e-01  2.323e-01  2.607e+02  -0.486  0.62736
wm          -5.698e-03  8.207e-03  2.607e+02  -0.694  0.48813
con1c2:con2c2  -4.452e-01  2.207e-01  1.900e+03  -2.018  0.04378 *
con1c2:dysd2   -2.682e-01  2.360e-01  1.900e+03  -1.137  0.25581
con2c2:dysd2   -3.674e-01  2.360e-01  1.900e+03  -1.557  0.11967
con1c2:wm      -5.775e-03  8.337e-03  1.900e+03  -0.693  0.48862
con2c2:wm      -8.711e-03  8.337e-03  1.900e+03  -1.045  0.29625
dysd2:wm       -5.116e-03  1.227e-02  2.607e+02  -0.417  0.67696
con1c2:con2c2:dysd2  8.618e-01  3.337e-01  1.900e+03   2.582  0.00989 **
con1c2:con2c2:wm  2.109e-02  1.179e-02  1.900e+03   1.788  0.07387 .
con1c2:dysd2:wm  9.974e-03  1.246e-02  1.900e+03   0.800  0.42360
con2c2:dysd2:wm  1.525e-02  1.246e-02  1.900e+03   1.223  0.22130
con1c2:con2c2:dysd2:wm -3.783e-02  1.762e-02  1.900e+03  -2.146  0.03198 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation matrix not shown by default, as p = 16 > 12.
Use print(x, correlation=TRUE) or
      vcov(x)      if you need it

convergence code: 0
boundary (singular) fit: see ?isSingular
```

Working Memory – Dyslexics

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: reg ~ con1 * con2 * wm + (1 + con1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
2343.1    2406.9   -1158.5   2317.1     987

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.8326 -0.7778  0.0123  0.5614  4.0817

Random effects:
Groups   Name              Variance Std.Dev. Corr
sub      (Intercept)    0.03940   0.1985
         con1c2         0.03312   0.1820   1.00
item     (Intercept)    0.00000   0.0000
Residual                   0.55202   0.7430
Number of obs: 1000, groups:  sub, 50; item, 20

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)    1.752518   0.128759 151.169975   13.611   <2e-16 ***
con1c2         0.405824   0.167640 257.186189    2.421   0.0162 *
con2c2         0.091560   0.156324 950.000618    0.586   0.5582
wm            -0.005698   0.006880 151.169975   -0.828   0.4089
con1c2:con2c2  -0.445211   0.221076 950.000619   -2.014   0.0443 *
con1c2:wm      -0.005775   0.008957 257.186189   -0.645   0.5197
con2c2:wm      -0.008711   0.008353 950.000617   -1.043   0.2973
con1c2:con2c2:wm 0.021087   0.011813 950.000619    1.785   0.0746 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
              (Intr) con1c2 con2c2 wm      cn12:22 cn1c2: cn2c2:
con1c2        -0.381
con2c2        -0.607  0.466
wm            -0.905  0.345  0.549
cn1c2:cn2c2    0.429 -0.659 -0.707 -0.389
con1c2:wm      0.345 -0.905 -0.422 -0.381  0.597
con2c2:wm      0.549 -0.422 -0.905 -0.607  0.640  0.466
cn1c2:cn22:   -0.389  0.597  0.640  0.429 -0.905 -0.659 -0.707
convergence code: 0
boundary (singular) fit: see ?isSingular
```


Working Memory – Controls

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: reg ~ con1 * con2 * wm + (1 + con1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
2326.3    2390.1   -1150.1   2300.3      987

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.6430 -0.6992 -0.0055  0.6949  3.2188

Random effects:
Groups   Name              Variance Std.Dev. Corr
sub      (Intercept)    0.088805 0.29800
         con1c2         0.011643 0.10790  1.00
item     (Intercept)    0.002909 0.05393
Residual                    0.532705 0.72987
Number of obs: 1000, groups:  sub, 50; item, 20

Fixed effects:
              Estimate Std. Error      df t value Pr(>|t|)
(Intercept)    1.641794    0.167748 101.285652   9.787 2.57e-16 ***
con1c2         0.132400    0.180651 431.738950   0.733  0.4640
con2c2        -0.280164    0.174450 944.236129  -1.606  0.1086
wm            -0.010936    0.008732 100.335434  -1.252  0.2133
con1c2:con2c2   0.426982    0.246710 944.236127   1.731  0.0838 .
con1c2:wm       0.004492    0.009368 472.337743   0.479  0.6318
con2c2:wm       0.006781    0.009130 945.719125   0.743  0.4578
con1c2:con2c2:wm -0.017324    0.012911 945.719123  -1.342  0.1800
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
              (Intr) con1c2 con2c2 wm      cn12:22 cn1c2: cn2c2:
con1c2        -0.360
con2c2        -0.520  0.483
wm            -0.922  0.327  0.485
cn1c2:cn2c2   0.368 -0.683 -0.707 -0.343
con1c2:wm     0.328 -0.919 -0.452 -0.355  0.639
con2c2:wm     0.482 -0.448 -0.927 -0.523  0.656  0.487
cn1c2:cn22: -0.341  0.633  0.656  0.370 -0.927 -0.689 -0.707
convergence code: 0
boundary (singular) fit: see ?isSingular
```

Verbal Intelligence

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: reg ~ con1 * con2 * dys * viq + (1 | sub) + (1 | item)
Data: paul

      AIC      BIC    logLik deviance df.resid
4675.7   4782.2   -2318.9   4637.7     1981

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.7959 -0.7497  0.0418  0.5993  4.1450

Random effects:
Groups   Name              Variance Std.Dev.
sub      (Intercept)  0.1064     0.3262
item     (Intercept)  0.0000     0.0000
Residual                    0.5498     0.7415
Number of obs: 2000, groups:  sub, 100; item, 20

Fixed effects:
              Estimate Std. Error      df t value Pr(>|t|)
(Intercept)   1.650e+00  6.655e-02  2.560e+02  24.801 < 2e-16 ***
con1c2        2.968e-01  6.709e-02  1.900e+03   4.424 1.02e-05 ***
con2c2       -5.314e-02  6.709e-02  1.900e+03  -0.792  0.4285
dysd2        -1.982e-01  9.413e-02  2.560e+02  -2.106  0.0362 *
viq          3.668e-02  6.618e-02  2.560e+02   0.554  0.5799
con1c2:con2c2 -6.614e-02  9.488e-02  1.900e+03  -0.697  0.4858
con1c2:dysd2  -7.945e-02  9.491e-02  1.900e+03  -0.837  0.4026
con2c2:dysd2  -1.091e-01  9.491e-02  1.900e+03  -1.149  0.2507
con1c2:viq     7.340e-02  6.672e-02  1.900e+03   1.100  0.2715
con2c2:viq    -1.885e-02  6.672e-02  1.900e+03  -0.283  0.7775
dysd2:viq     -9.134e-03  9.463e-02  2.560e+02  -0.097  0.9232
con1c2:con2c2:dysd2 1.849e-01  1.342e-01  1.900e+03   1.378  0.1684
con1c2:con2c2:viq -1.439e-01  9.436e-02  1.900e+03  -1.525  0.1275
con1c2:dysd2:viq -3.785e-02  9.541e-02  1.900e+03  -0.397  0.6916
con2c2:dysd2:viq  4.462e-03  9.541e-02  1.900e+03   0.047  0.9627
con1c2:con2c2:dysd2:viq 1.359e-01  1.349e-01  1.900e+03   1.008  0.3138
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation matrix not shown by default, as p = 16 > 12.
Use print(x, correlation=TRUE) or
vcov(x) if you need it

convergence code: 0
boundary (singular) fit: see ?isSingular
```

Section G: Analysis of reading times, regressions, and comprehension comparing correct and incorrect trials.

In the tables below, we present the correlations between eye movement measures and comprehension accuracy.

Table S1 presents correlations between total sentence reading time and comprehension, and Table S2 presents correlations between regressions and comprehension. Results are provided for the full sample and also broken down by the two groups (control and dyslexics). In addition, in Table S3 we have also provided the means for correct and incorrect responses separately for controls and dyslexics.

Table S1. *Bivariate correlations between comprehension accuracy and reading time.*

	Full Sample	Controls	Dyslexics
Active-plausible	-.08	-.04	-.06
Active-implausible	-.02	.03	-.04
Passive-plausible	.02	.01	.04
Passive-implausible	-.01	.05	.02

Note. [#] $p < .08$, $*p < .05$, $**p < .01$.

Table S2. *Bivariate correlations between comprehension accuracy and regressions.*

	Full Sample	Controls	Dyslexics
Active-plausible	-.03	-.02	.11
Active-implausible	.06	.02	.01
Passive-plausible	.05	.07	.03
Passive-implausible	.03	.08	.02

Note. [#] $p < .08$, $*p < .05$, $**p < .01$.

Table S3. Mean reading times (msec) and regressions for correct and incorrect responses by group and experimental condition.

	<u>Incorrect</u> Reading times	<u>Incorrect</u> Regressions	<u>Correct</u> Reading times	<u>Correct</u> Regressions
<u>Controls</u>				
Active-implausible	2739	1.41	2838	1.45
Active-plausible	2608	1.36	2420	1.28
Passive-implausible	1908	1.52	2008	1.69
Passive-plausible	2016	1.43	2038	1.65
<u>Dyslexics</u>				
Active-implausible	3545	1.49	3381	1.69
Active-plausible	3327	1.58	3069	1.60
Passive-implausible	2658	1.93	2724	1.98
Passive-plausible	2361	1.75	2538	1.83