Appendix

Appendix 1

Table A.1. *Linear mixed effect model of the log-response times in the mixed blocks (repetition trials and switch trials, switching costs analysis, fixed effects). Model formula: log(RT) ~ trialtype * bilingualism * age * memoryspan + (1 + trialtype | subject). The reference levels are repetition trials (trialtype), monolingual (bilingualism), age = 60, and an average working memory span score of six. Effects with an absolute t-value larger than 2 are considered significant and marked as bold. A log-scale estimate x for a given factor level f can be converted to the RT scale (milliseconds) by means of the following formula: exp(e(intercept) + e(f)) - exp(e(intercept)).*

Factor	Estimate	Std. Error	t-value
(Intercept)	6.6095501	0.0335004	197.3
Switch trials (A)	0.2030448	0.0130153	15.6
Bilingual (B)	-0.0083552	0.0459906	-0.18
Age (C)	0.0124233	0.0024063	5.16
Working memory span (D)	-0.0643661	0.0340273	-1.89
A x B	-0.0479578	0.0178326	-2.69
A x C	0.0035451	0.0009371	3.78
B x C	-0.000611	0.0032101	-0.19
A x D	0.0220077	0.0131845	1.67
B x D	0.0065547	0.0441883	0.15
C x D	-0.004494	0.0026536	-1.69
A x B x C	-0.0026994	0.0012487	-2.16
A x B x D	-0.0338823	0.0171086	-1.98

A x C x D	0.0012914	0.0010254	1.26
B x C x D	0.0075077	0.0033513	2.24
A x B x C x D	-0.0018236	0.0012985	-1.4

Appendix 2

To analyze the effects of Bilingualism and Age on the mixing costs, a linear mixed effect model was fitted to the non-aggregated response times in the single blocks and the repetition trials in the mixed blocks. The fixed effects that were included in the model were Bilingualism (two levels, monolingual vs. bilingual), Age (continuous, centered, with an average of sixty years), Trial Type (within-subject, two levels, single block trials vs. repetition trials), Memory Span (Corsi Forward Span, continuous, centered) as well as the full set of interactions. As random effects, by-subject random intercepts were included, with by-subject random slopes for the factor Trial Type. Again, we here convert the estimates back to the RT scale (for exact, log-scale estimates, standard errors and t-values, please refer to Table A.2). Here, the unconditional expected mean of 551 ms represents the condition in which a monolingual sixty-year old participant with an average Corsi Forward span responds to a single block trial. According to the fitted model, the response times in the repetition trials of the mixed blocks are significantly longer than in the single block trials (mixing costs 194 ms, $\beta = 0.3$, SE = 0.02, t = 12.36) and further increase with age (3 ms, $\beta = 0.005$, SE = 0.002, t = 2.97). The type of trial and the factor Age show a significant interaction, with response times in the repetition trials showing an additional increase with age, and thus larger mixing costs (4 ms, $\beta = 0.007$, SE = 0.002, t = 4.07). The only reliable effects of bilingualism and working-memory span that we find in our data are manifested in the form of a significant quadruple interaction that does not have a straightforward interpretation. A formal model comparison of the present model with a model that does not include an effect of Memory span shows that the

present model is superior (Chi-square = 17.179, p = 0.0283). A formal model comparison with a model that does not include Bilingualism shows that this factor does not add significantly to the model (Chi-square = 12.492, p = 0.1306).

Table A.2. *Linear mixed effect model of the log-response times in the single blocks and the repetition trials in the mixed blocks (mixing costs analysis, fixed effects). Model formula: log(RT) ~ trialtype * bilingualism * age * memoryspan + (1 + trialtype | subject). The reference levels are single block trials (trialtype), monolingual (bilingualism), age = 60, and an average working memory span score of six.*

Factor	Estimate	Std. Error	t-value
(Intercept)	6.3114495	0.0249531	252.93
Repetition trials (A)	0.3016978	0.0244124	12.36
Bilingual (B)	-0.0266561	0.0342922	-0.78
Age (C)	0.0053267	0.0017931	2.97
Working memory span (D)	-0.0352575	0.0255769	-1.38
A x B	0.0176993	0.0335418	0.53
A x C	0.0071421	0.0017552	4.07
B x C	0.0019366	0.0023934	0.81
A x D	-0.0300949	0.0250199	-1.2
B x D	-0.0213429	0.0331269	-0.64
C x D	-0.0009527	0.0019804	-0.48
A x B x C	-0.002624	0.0023419	-1.12
A x B x D	0.0297461	0.0323992	0.92
A x C x D	-0.0035335	0.0019368	-1.82

B x C x D	0.0012239	0.002502	0.49
A x B x C x D	0.0062792	0.0024469	2.57