**Appendices**

## Appendix 1



Figure A.1. Demonstration of the overall procedure of this study. The main aim of the first email is to reach out to these participants, confirm their availability to join the language production tasks online and arrange online meetings with the researcher for this study. After being given links to all online study assignments, including cognitive tasks, language proficiency test and online questionnaires, participants were able to complete all these assignments remotely in their preferred orders using their own computer.

Table A.1. *Fixed effects of the linear mixed effect model for RT (ms) in the verbal Stroop task with congruency\*block and z-scored factors related to habitual bilingual language use and participants’ spontaneous language production performance as reference levels. Formula: RT ~ 1 + block \* congruency + [factors related to habitual bilingual language use] + [spontaneous bilingual language production performance] + (1 + congruency + block | subject)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Estimate | *SE* | *t*-value | *Pr* (>|t|) |
| RTs (ms) |  |  |  |  |
| (Intercept) | -1161.3893 | 8332.75 | -0.14 |  |
| block (single task) | -119.24 | 36.85 | -3.24 | **.003** |
| congruency (incongruent) | 138.99 | 163.67 | 0.85 |  |
| block: congruency | 7.22 | 60.31 | 0.12 |  |
| single-language index | 9.49 | 3.39 | 2.80 | **.02** |
| intersentential switching index | -274.95 | 68.79 | -4.00 | **.003** |
| Bilingual narration P.ratio | 3506.57 | 949.66 | 3.69 | **.005** |
| En\_MulanP.ratio | -2866.56 | 1085.99 | -2.64 | **.03** |
| Conversation P.ratio | -3689.72 | 1255.10 | -2.94 | **.02** |
| MeanEn\_match\_P.dur | -497.61 | 212.94 | -2.34 | **.04** |
| Congruency: Yrs\_in\_EN | -16.28 | 5.84 | -2.79 | **.009** |
| block: home\_entropy | 80.08 | 36.75 | 2.18 | **.04** |
| block: congruency: School\_entropy | 149.89 | 69.56 | 2.16 | **.03** |

\*the whole model is shown in Supplementary Table 4.

## Appendix 2

Table A.2. *Fixed effects of the linear mixed effect model for RT (ms) in the spatial Stroop task with congruency\*block and factors related to habitual bilingual language use and participants’ spontaneous language production performance as reference levels. Formula: RT ~ 1 + block \* congruency + Z\_scored\_LexTALE test score + L2 immersion \* congruency + single-language index + dual-language score + intersentential switching index + intrasentential switching index + Home\_entropy \* block + School\_entropy \* block + Work\_entropy \* block + social\_entropy\*block + pause ratio in English narration of Mulan story + pause ratio in Chinese narration of Mulan story + pause ratio in Chinese narration of match girl story + pause ratio in bilingual narration+ pause ratio in bilingual conversation + intersentential switching frequency in bilingual narration + intrasentential switching in bilingual narration + (1 + congruency \*block | subject)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Estimate | *SE* | *t*-value | *Pr* (>|t|) |
| RTs (ms) |  |  |  |  |
| (Intercept) | 468.31 | 131.95 | 3.55 | **.002** |
| block | -15.51 | 13.73 | -1.12 |  |
| congruency | 88.13 | 8.67 | 10.16 | **<.0001** |
| block:congruency | 70.14 | 10.26 | 6.84 | **<.0001** |
| z\_scored LexTALE score | -36.38 | 12.54 | -2.90 | **.008** |
| L2 immersion | 2.47 | 4.92 | 0.50 |  |
| single-language index | 1.97 | 1.06 | 1.86 |  |
| dual-language score | -2.16 | 6.43 | -0.34 |  |
| intersentential switching index | -83.30 | 21.71 | -3.84 | **.001** |
| intrasentential switching index | 32.84 | 17.08 | 1.28 |  |
| Home\_entropy | 107.21 | 42.45 | 2.53 | **.02** |
| School\_entropy | 28.18 | 50.95 | 0.55 |  |
| Work\_entropy | 26.43 | 35.59 | 0.74 |  |
| Social\_entropy | 78.68 | 43.49 | 1.81 |  |
| En\_MulanP.ratio | -566.80 | 320.51 | -1.77 | **.09** |
| Cn\_MulanP.ratio | -552.42 | 299.87 | -1.84 |  |
| Cn\_matchP.ratio | 869.79 | 308.48 | 2.82 | **.01** |
| Bilingual narration P.ratio | 187.77 | 242.35 | 0.78 |  |
| Conversation P.ratio | -950.86 | 335.16 | -2.84 | **.009** |
| interSw\_freq\_bilingual narration | 427.17 | 160.58 | 2.66 | **.01** |
| IntraSw\_freq\_ bilingual narration | -222.55 | 90.93 | -2.45 | **.02** |
| Congruency: L2 immersion | -5.49 | 1.98 | -2.77 | **.009** |
| block: home\_entropy | 54.38 | 13.99 | 3.89 | **.0004** |
| block: School\_entropy | -37.22 | 15.55 | -2.39 | **.02** |
| block: work\_entropy | 16.77 | 13.35 | 1.26 |  |
| block: social\_entropy | -10.20 | 15.22 | -0.67 |  |

## Appendix 3

Table A.3. *Fixed effects of the linear mixed effect model for mixing and switch costs in RT (ms) in the colour-shape switching task with interactives of RTs cost type and factors related to habitual bilingual language use and language entropy as reference levels. Formula: RT ~ 1 + costs type + z\_scored\_LexTALE test score\*costs type + L2 AoA\* costs type + [factors related to habitual bilingual language use] + Home\_entropy \* costs type + School\_entropy \* costs type + Work\_entropy \* costs type + social\_entropy\* costs type + (1 | subject)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Estimate | *SE* | *t*-value | *Pr* (>|t|) |
| RTs (ms) |  |  |  |  |
| (Intercept) | 953.58 | 350.58 | 2.72 | **.01** |
| Mixing costs (RTrepeated – RTsingle) | -553.98 | 147.20 | -3.76 | **.0002** |
| Switch costs (RTswitch – RTrepeated) | -15.70 | 134.04 | -0.12 | .91 |
| Switch costs: z\_scored LexTALE score | 24.37 | 10.78 | 2.26 | **.02** |
| Mixing costs: L2 AoA | 16.03 | 3.69 | 4.35 | **<.0001** |
| Mixing costs: dual-language score | 45.04 | 6.69 | 6.74 | **<.0001** |
| Mixing costs: intersentential switching index | 88.11 | 21.11 | 4.17 | **<.0001** |
| Mixing costs: intrasentential switching index | -57.37 | 16.74 | -3.43 | **.0006** |
| Mixing costs: School\_entropy | -143.41 | 54.12 | -2.65 | **.008** |
| Mixing costs: work\_entropy | 115.70 | 38.27 | 3.02 | **.003** |

\* the whole model is shown in Supplementary Table 5.

## Appendix 4

Table A.4. *Fixed effects of the generalized linear mixed effect model for switch and mixing costs in response accuracy in the colour-shape switching task with interactives of trial type and language entropy in different contexts. Formula: accuracy ~ 1 + costs type + Home\_entropy \* costs type + Work\_entropy \* costs type + social\_entropy \* costs type + (1 | subject)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Estimate | *SE* | z-value | *Pr* (>|z|) |
| Accuracy |  |  |  |  |
| (Intercept) | 3.99 | 0.50 | 7.91 | **<.0001** |
| Mixing costs (RTrepeated – RTsingle) | -0.18 | 0.55 | -0.33 |  |
| Switch costs (RTswitch – RTrepeated) | 0.81 | 0.40 | 2.04 | **.04** |
| Home\_entropy | 0.01 | 0.50 | 0.02 |  |
| Work\_entropy | 0.08 | 0.42 | 0.20 |  |
| Social\_entropy | -1.00 | 0.55 | -1.82 |  |
| Mixing costs: home\_entropy | 2.24 | 0.47 | 4.77 | **<.0001** |
| Switch costs: home\_entropy | -0.39 | 0.35 | -1.12 |  |
| Mixing costs: work\_entropy | 1.95 | 0.40 | 4.88 | **<.0001** |
| Switch costs: work\_entropy | 0.05 | 0.25 | 0.21 |  |
| Mixing costs: social\_entropy | -0.73 | 0.57 | -1.29 |  |
| Switch costs: social\_entropy | -0.56 | 0.42 | -1.33 |  |

## Appendix 5

Table A.5. *Overview of key findings in this study.*

|  |  |  |
| --- | --- | --- |
| **Cognitive control abilities** |  | **Factors** |
| Verbal inhibitory control enhancement  | is jointly affected by bilinguals’ | 1. frequent intersentential switching practices;
2. increasing intensity of L2 environment immersion;
3. fluent bilingual language production.
 |
| Nonverbal inhibitory control enhancement | is jointly affected by bilinguals’ | 1. frequent intersentential switching practices
2. improved L2 proficiency level;
3. increasing intensity of L2 environment immersion;
4. frequent code-switching practices in spontaneous bilingual speeches.
 |
| Proactive inhibitory control enhancement | is affected by bilinguals’ | habitual language use in the single-language context |
| Conflict monitoring and goal maintenance enhancement  | is affected by bilinguals’ | habitual language use in the single-language context |

**Supplementary Materials**

Supplementary Table 1. *Questions asked in the naturalistic conversation task. English translations for non-English questions are shown in brackets.*

|  |  |
| --- | --- |
|  | Questions |
| Chinese single-language | 如果不考虑一些限制条件, 就是理想状态下，让你好好规划一次你的周末, 你打算怎样安排呢？(What will you do for your weekends if you were given a chance to plan your weekends ideally?) |
| English single-language | What kind of activities you love to do most on weekend? With friends? Or just alone? Why? |
| Code-switching | 那你觉得你目前的activities on weekend, 还有对weekend 的expectations啊,相比COVID-19之前，have any changes 或者说 differences 吗？(Compared to weekends before the outbreaks of COVID-19, do you think you have experienced some differences on your weekend plans and activities, or your expectations to holidays?) |

*Supplementary Transcription Texts*

*Transcription examples of participants’ language production in the naturalistic conversation task and the story narration task\*.*

*\*In the bilingual story narration, the researcher instructed participants to imagine that they were telling this story to one of their Chinese-English bilingual friends. As the friend they imagined can understand both Chinese and English very well, they could use the two languages in their preferred way to narrate the story and make this friend understand the story clearly. Therefore, participants feel free to narrate the story with Chinese and English switching back and forth. Transcription examples of participants’ language production performance in the conversational task and narrative task can be found in the supplementary materials.*

The naturalistic conversation task:

Episode 1:

上周末，嗯，纽约下雨， 然后我就和男朋友，我俩出门去遛狗,哈哈哈。*welcome to my boring life*. [intersentential switching] *Oh, last weekend is Halloween*. 然后我们还去了一个*Halloween Parade*, 在纽约，很多人都会*dress up*.[intrasentential switching: insertion] 主要是我们今年没有*dress up*, 所以感觉*Halloween* 也就*Halloween*了。[intrasentential switching: insertion] 但是有的人就是会穿那种很大的那种衣服，像一个机器人，有的人就会真的很*commit to it*. [intrasentential switching: insertion]

Episode 2:

因为*last week*我都很忙。[intrasentential switching: insertion] 所以就是*weekends for* 那些*weekdays*，我也没干啥，就待在家看看*Netflix*什么的，看看剧， 就很*relaxing*. [intrasentential switching: insertion] 然后我感觉就是上周睡得比较好，这我感觉就比较*impressive*. [intrasentential switching: insertion] 以后有假期的话，我应该会开车开到，你比如说，就是*up states New York*,就会有很多*hiking*之类的小村子。[intrasentential switching: insertion] 我有可能两天都是去*hiking*, 就天亮的时候去*hiking*, 天暗了就去*restaurants*, 搞点小酒喝喝。[intrasentential switching: insertion]

Episode 3:

一般我的*weekend plan* 就是，那种随到随吃。就是走到哪个地方，我看上这个店，我想去尝尝，然后我就可以直接*walk in* 去吃吃。这样子，一般我都不会提前 *book table*. 一般我就是吃那种，*street foods*之类的小摊嘛， 门店嘛。但是*COVID*之后呢，你就没办法那么自由，那么随心了。然后就是涉及到这个*social distance*，很多*events* 它开不了，或者推迟了。[intrasentential switching: insertion]

Episode 4:

上一周I had a conference, 然后，这个conference 就是关于我的专业， dance studies的。[intrasentential switching: insertion]然后我present 了一个文章。 然后上周我还错过了飞机，因为 United Airlines 他们不知道为啥突然cancel 了我的booking。[intrasentential switching: insertion]周六的话，我打算去camping, 但是就还是等 final due过了以后吧。[intrasentential switching: insertion]

Story narration task (bilingual version):

Episode 1:

*Today, I will tell you a new story of three pigs.* 从前猪妈妈有三只小猪。[intersentential switching]它们长大后就离开了家，各自生活。猪老大是一个美食家，一个*foodie*. [intrasentential switching: insertion] 它就很喜欢在家做*cupcakes*. 他就是立志成为一只烘焙猪,*Ok, so he would like to be a bakery*. [intersentential switching] 然后老二猪呢，它虽然穿着白领的白衬衫，但它想要成为一个*carpenter*. [intrasentential switching: insertion]老三就只喜欢睡觉。然后就来了两只狼， 两只很饿的*homeless wolves*. [intrasentential switching: insertion]它们敲了敲门说，小猪猪，我们可以吃你们的*cupcakes* 吗？[intrasentential switching: insertion] *We are very hungry now*. [intersentential switching] 然后小猪说，*go away*！[intersentential switching]

Episode 2:

我今天要讲一个很新奇的story, 是关于three little pigs 的。[intrasentential switching: insertion] It is not the traditional story of three little pigs, so, long time ago, 有三只小猪跟着它们的妈妈居住。[intersentential switching]后来这三只小猪成年了，所以他们决定要在离家不远的地方开始自己新的生活，要盖房子。The three pig brothers, they all have their own preferences and ideas on what kind of house they want to build. They will not live together, and they will build their own house. [intersentential switching] 老大哥呢，他决定用砖块，bricks，去盖一座比较西式的房子。[intrasentential switching: insertion]这个房子有一个很大的窗户和厨房，因为老大呢，对cooking and cuisine arts 比较感兴趣。[intrasentential switching: insertion]

Supplementary Table 2. *Data collected in the spontaneous language production tasks*

|  |  |
| --- | --- |
|  | Description |
| 1. Pauses data
 |
| Pause frequency | Total number of pauses over 250ms |
| Pause duration | Length of each pause in milliseconds |
| Total pause duration | Total length of all pauses in a speech in seconds |
| Mean pause duration | Total duration of all pauses over 250ms divided by the total number of pauses in a given speech sample |
| Total Speech duration | Overall length (including pauses) of the entire language production. |
| Total phonation duration | Total speaking time in a speech sample, calculated as total speech duration – total pause duration |
| Pause frequency ratio | Total number of pauses divided by the total phonation duration in a speech sample |
| 1. Code-switching data
 |
| Intersentential switching frequency | Total number of utterances containing intersentential switching in the speech. |
| Intrasentential switching frequency | Total number of utterances containing intrasentential switching (i.e., insertion) in the speech. |
| English frequency | Total number of English monolingual utterances in the speech. |
| Chinese frequency | Total number of Chinese monolingual utterances in the speech. |
| Total utterances | Total number of utterances in a speech sample |
| Percentage of intersentential switching | Total number of intersentential switching utterances divided by total number of utterances in a speech sample  |
| Percentage of intrasentential switching | Total number of intrasentential switching (insertion) utterances divided by total number of utterances in a speech sample |
| Percentage of English utterances | Total number of English monolingual utterances divided by total number of utterances in a speech sample |
| Percentage of Chinese utterances | Total number of Chinese monolingual utterances divided by total number of utterances in a speech sample |

Supplementary Table 3. Descriptive of pauses and code-switching information among bilinguals’ speech samples in the two language production tasks

|  |
| --- |
| **Naturalistic Conversation Task** |
|  | **Mean** | **SD** |
| *Pause frequency ratios* |
| in monologue part | 0.06 | 0.04 |
| in answering Chinese question | 0.05 | 0.05 |
| in answering English question | 0.06 | 0.06 |
| in answering mixed-language question | 0.05 | 0.05 |
| in entire conversation | 0.05 | 0.04 |
| *Mean pause duration (in seconds)* |
| in monologue part | 1.28 | 0.51 |
| in answering Chinese question | 0.74 | 0.60 |
| in answering English question | 1.01 | 0.91 |
| in answering mixed-language question | 0.90 | 0.69 |
| in entire conversation | 1.37 | 0.92 |
| *Percentages of code-switching*  |
| Intersentential switching in conversation | 0.04 | 0.05 |
| Intrasentential switching in conversation | 0.30 | 0.14 |
| English in conversation | 0.15 | 0.20 |
| Chinese in conversation | 0.51 | 0.21 |
| Intersentential switching in answering Chinese question | 0.04 | 0.12 |
| Intrasentential switching in answering Chinese question | 0.23 | 0.20 |
| English in answering Chinese question | 0.06 | 0.17 |
| Chinese in answering Chinese question | 0.68 | 0.27 |
| Intersentential switching in answering English question | 0.06 | 0.11 |
| Intrasentential switching in answering English question | 0.23 | 0.29 |
| English in answering English question | 0.29 | 0.39 |
| Chinese in answering English question | 0.42 | 0.36 |
| Intersentential switching in answering mixed-language question | 0.03 | 0.07 |
| Intrasentential switching in answering mixed-language question | 0.36 | 0.25 |
| English in answering mixed-language question | 0.10 | 0.26 |
| Chinese in answering mixed-language question | 0.51 | 0.29 |
| **Story Narration Task** |
|  | **Mean** | **SD** |
| *Pause frequency ratios* |
| English narration of Hua Mulan story | 0.19 | 0.05 |
| Chinese narration of Hua Mulan story | 0.13 | 0.06 |
| English narration of the little match girl story | 0.19 | 0.05 |
| Chinese narration of the little match girl story | 0.13 | 0.05 |
| Bilingual narration of three little pigs’ story | 0.14 | 0.06 |
| *Mean pause duration (in seconds)* |
| English narration of Hua Mulan story | 1.62 | 0.58 |
| Chinese narration of Hua Mulan story | 1.51 | 0.36 |
| English narration of the little match girl story | 1.56 | 0.35 |
| Chinese narration of the little match girl story | 1.47 | 0.50 |
| Bilingual narration of three little pigs’ story | 1.50 | 0.40 |
| *Percentages of code-switching* |
| Intersentential switching in bilingual narration | 0.06 | 0.08 |
| Intrasentential switching in bilingual narration | 0.15 | 0.14 |
| English in bilingual narration | 0.14 | 0.28 |
| Chinese in bilingual narration | 0.65 | 0.32 |

Supplementary Table 4. *Fixed effects of the linear mixed effect model for RT (ms) in the verbal Stroop task with congruency\*block and factors related to habitual bilingual language use and participants’ spontaneous language production performance as reference levels. Formula: RT ~ 1 + block \* congruency + Z\_scored\_LexTALE test score + L2AoA + L2 immersion \* congruency + L1 switch tendency + L2 switch tendency + Contextual switch + unintended switch + single-language index \* congruency + dual-language score \* congruency + intersentential switching index \* congruency + intrasentential switching index \* congruency + Home\_entropy \* block \* congruency + School\_entropy \* block \* congruency + Work\_entropy \* block \* congruency + social\_entropy\*block\*congruency+ pause ratio in English narration of Mulan story + pause ratio in Chinese narration of Mulan story + pause ratio in English narration of match girl story + pause ratio in Chinese narration of match girl story + pause ratio in bilingual narration+ pause ratio in bilingual conversation + mean pause duration in conversation + intersentential switching frequency in conversation + intrasentential switching in conversation + Chinese frequency in conversation + English frequency in conversation + mean pause duration in English narration of match girl story + mean pause duration in Chinese narration of match girl story + mean pause duration in English narration of Mulan story + mean pause duration in Chinese narration of Mulan story + mean pause duration in bilingual narration + (1 + congruency + block | subject)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Estimate | *SE* | *t*-value | *Pr* (>|t|) |
| RTs (ms) |  |  |  |  |
| (Intercept) | -1161.3893 | 8332.75 | -0.14 |  |
| block | -119.24 | 36.85 | -3.24 | **.003** |
| congruency | 138.99 | 163.67 | 0.85 |  |
| block:congruency | 7.22 | 60.31 | 0.12 |  |
| single-language index | 9.49 | 3.39 | 2.80 | **.02** |
| intersentential switching index | -274.95 | 68.79 | -4.00 | **.003** |
| Bilingual narration P.ratio | 3506.57 | 949.66 | 3.69 | **.005** |
| Conversation P.ratio | -3689.72 | 1255.10 | -2.94 | **.02** |
| MeanEn\_match\_P.dur | -497.61 | 212.94 | -2.34 | **.04** |
| Congruency: L2 immersion | -16.28 | 5.84 | -2.79 | **.009** |
| block: home\_entropy | 80.08 | 36.75 | 2.18 | **.04** |
| block:congruency: School\_entropy | 149.89 | 69.56 | 2.16 | **.03** |
| z\_scored LexTALE score | -8.22 | 40.21 | -0.20 |  |
| L2AoA | -12.86  | 9.83 | -1.31 |  |
| L2 immersion | 29.96 | 16.65 | 1.80 |  |
| L1 switch tendency | 37.42 | 19.89 | 1.88 |  |
| L2 switch tendency | 20.51 | 20.25 | 1.01 |  |
| Contextual switch | -7.73 | 11.79 | -0.66 |  |
| Unintended switch | 27.43 | 16.89 | 1.62 |  |
| dual-language score | -27.11 | 21.71 | -1.25 |  |
| intrasentential switching index | 122.65 | 54.46 | 2.25 |  |
| Home\_entropy | 230.63 | 126.78 | 1.82 |  |
| School\_entropy | 465.34 | 228.29 | 2.04 |  |
| Work\_entropy | 64.69 | 110.82 | 0.58 |  |
| Social\_entropy | 221.89 | 117.64 | 1.89 |  |
| En\_MulanP.ratio | -2866.56 | 1085.99 | -2.64 |  |
| Cn\_MulanP.ratio | -2451.84 | 1072.15 | -2.29 |  |
| En\_matchP.ratio | -867.76 | 899.76 | -0.96 |  |
| Cn\_matchP.ratio | 1068.19 | 855.82 | 1.25 |  |
| Mean\_conversation\_P.dur  | 30.79 | 30.83 | 1.00 |  |
| interSw\_freq\_conversation | 1224.08 | 8535.33 | 0.14 |  |
| IntraSw\_freq\_conversation | 1379.23 | 8111.09 | 0.17 |  |
| Cn\_freq\_conversation | 1994.78 | 8276.73 | 0.24 |  |
| En\_freq\_conversation | 1377.61 | 8188.55 | 0.17 |  |
| MeanCn\_match\_P.dur  | -193.79 | 111.31 | -1.74 |  |
| MeanCn\_mulan\_P.dur | -126.38 | 67.24 | -1.88 |  |
| MeanEn\_mulan\_P.dur | 387.33 | 168.36 | 2.30 |  |
| Mean bilingual narration\_P.dur | 66.48 | 124.62 | 0.53 |  |
| congruency: single-language index | 0.15 | 1.27 | 0.12 |  |
| congruency: dual-language score | 14.76 | 7.63 | 1.93 |  |
| congruency: intersentential switching index | 18.79 | 23.05 | 0.82 |  |
| congruency: intrasentential switching index  | -10.26 | 19.44 | -0.53 |  |
| congruency: home\_entropy | -76.43 | 52.83 | -1.45 |  |
| block: School\_entropy | 54.12 | 42.42 | 1.28 |  |
| congruency: School\_entropy | 2.92 | 56.40 | 0.05 |  |
| block: work\_entropy | -30.54 | 35.56 | -0.87 |  |
| congruency:work\_entropy | 28.66 | 42.11 | 0.68 |  |
| block: social\_entropy | 25.54 | 41.18 | 0.62 |  |
| congruency: social entropy | -8.26 | 49.28 | -0.17 |  |
| block:congruency: home\_entropy | 48.95 | 60.08 | 0.82 |  |
| block:congruency: work\_entropy | -113.80 | 58.34 | -1.95 |  |
| block:congruency: social entropy | -23.28 | 67.39 | -0.35 |  |

Supplementary Table 5. *Fixed effects of the linear mixed effect model for mixing and switch costs in RT (ms) in the colour-shape switching task with interactives of trial type and factors related to habitual bilingual language use and language entropy as reference levels.* *Formula: RT ~ 1 + costs type + Z\_scored\_LexTALE test score\*costs type + L2 AoA\* costs type + single-language index\* costs type + dual-language score\* costs type + intersentential switching index\* costs type + intrasentential switching index \* costs type + Home\_entropy \* costs type + School\_entropy \* costs type + Work\_entropy \* costs type + social\_entropy\* costs type + (1 | subject)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Estimate | *SE* | *t*-value | *Pr* (>|t|) |
| RTs (ms) |  |  |  |  |
| (Intercept) | 953.58 | 350.58 | 2.72 | **.01** |
| Mixing costs (RTrepeated – RTsingle) | -553.98 | 147.20 | -3.76 | **.0002** |
| Switch costs (RTswitch – RTrepeated) | -15.70 | 134.04 | -0.12 |  |
| z\_scored LexTALE score | 7.66 | 28.79 | 0.27 |  |
| L2 AoA | -2.28 | 8.61 | -0.26 |  |
| single-language index | 1.90 | 2.76 | 0.69 |  |
| dual-language score | 13.06 | 16.03 | 0.82 |  |
| intersentential switching index | 22.13 | 47.96 | 0.46 |  |
| intrasentential switching index | -12.29 | 39.68 | -0.31 |  |
| Home\_entropy | 41.90 | 113.13 | 0.37 |  |
| School\_entropy | 211.67 | 128.67 | 1.65 |  |
| Work\_entropy | -116.88 | 89.80 | -1.30 |  |
| Social\_entropy | -109.89 | 110.39 | -1.00 |  |
| Mixing costs: z\_scored LexTALE score  | -14.99 | 11.88 | -1.26 |  |
| Switch costs: z\_scored LexTALE score | 24.37 | 10.78 | 2.26 | **.02** |
| Mixing costs: L2 AoA | 16.03 | 3.69 | 4.35 | **<.0001** |
| Switch costs: L2 AoA | -4.69 | 3.39 | -1.38 |  |
| Mixing costs: single-language index | 1.27 | 1.15 | 1.01 |  |
| Switch costs: single-language index | -0.60 | 1.05 | -0.57 |  |
| Mixing costs: dual-language score | 45.04 | 6.69 | 6.74 | **<.0001** |
| Switch costs: dual-language score | 10.09 | 6.00 | 1.68 |  |
| Mixing costs: intersentential switching index | 88.11 | 21.11 | 4.17 | **<.0001** |
| Switch costs: intersentential switching index | 6.82 | 19.91 | 0.34 |  |
| Mixing costs: intrasentential switching index | -57.37 | 16.74 | -3.43 | **.0006** |
| Switch costs: intrasentential switching index | -8.89 | 15.23 | -0.58 |  |
| Mixing costs: School\_entropy | -143.41 | 54.12 | -2.65 | **.008** |
| Mixing costs: work\_entropy | 115.70 | 38.27 | 3.02 | **.003** |
| Mixing costs: home\_entropy | 69.13 | 48.01 | 1.44 |  |
| Switch costs: home\_entropy | 83.31 | 44.10 | 1.89 |  |
| Switch costs: School\_entropy | -49.03 | 19.48 | -0.99 |  |
| Switch costs: work\_entropy | -1.04 | 35.32 | -0.03 |  |
| Mixing costs: social\_entropy | -83.76 | 46.65 | -1.80 |  |
| Switch costs: social\_entropy | 59.38 | 43.25 | 1.37 |  |