

## Appendix A

## Language and Social Background Questionnaire



**Lifespan Cognition and Development Laboratory**  
**Ellen Bialystok, Ph.D., Principal Investigator**  
 Department of Psychology, York University

Language and Social Background Questionnaire			
Today's Date:	<div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; width: 30px;"></div> <div style="border-bottom: 1px solid black; width: 30px;"></div> <div style="border-bottom: 1px solid black; width: 30px;"></div> </div> <div style="display: flex; justify-content: space-around; font-size: small;"> <span>Day</span> <span>Month</span> <span>Year</span> </div>	1. Sex:	Male <input type="checkbox"/> Female <input type="checkbox"/>
2. Occupation/Student Status (i.e. FT/PT, current year of study):			
3. Handedness:	Left <input type="checkbox"/> Right <input type="checkbox"/>	4. Date of Birth:	
			<div style="display: flex; justify-content: space-around;"> <span>Day</span> <span>Month</span> <span>Year</span> </div>
5. Do you play first-person shooting (FPS)/action video games?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
If <b>yes</b> , on average how many hours do you play per week?			
6. Do you have hearing problems?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
If <b>yes</b> , do you wear a hearing aid?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
7. Do you have vision problems?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
If <b>yes</b> , do you wear glasses or contacts?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is your vision corrected to normal with glasses or contacts?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
8. Are you colour blind?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
If <b>yes</b> , what type?			
9. Have you ever had a head injury		Yes <input type="checkbox"/>	No <input type="checkbox"/>
If <b>yes</b> , please explain:			
10. Do you have any known neurological impairments? (e.g., epilepsy etc)		Yes <input type="checkbox"/>	No <input type="checkbox"/>
If <b>yes</b> , please indicate:			
11. Are you currently taking any psychoactive medications?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
If <b>yes</b> , please indicate:			

12 Please indicate the highest level of education and occupation for each parent:

Mother		Father	
1. _____	No high school diploma	1. _____	No high school diploma
2. _____	High school diploma	2. _____	High school diploma
3. _____	Some post-secondary education	3. _____	Some post-secondary education
4. _____	Post-secondary degree or diploma	4. _____	Post-secondary degree or diploma
5. _____	Graduate or professional degree	5. _____	Graduate or professional degree
Occupation: _____		Occupation: _____	
First Language: _____		First Language: _____	
Second Language: _____		Second Language: _____	
Other Language: _____		Other Language: _____	

13

Were you born in Canada? Yes ☐ No ☐

If **no**, where were you born? \_\_\_\_\_

When did you move to Canada \_\_\_\_\_

Year

14 Have you ever lived in a place where English is not the dominant communicating language?

Yes ☐ No ☐

	From	To
If <b>yes</b> , where and for how long?	1. _____	_____
	2. _____	_____
	3. _____	_____

Year

Year

<b>Language Background</b>
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15. List all the language and dialects you can speak and understand including English, ***in order of fluency:***

Language	Where did you learn it?	At what age did you learn it? (If learned from birth, write age "0")	Were there any periods in your life when you did not use this language? Indicate duration in months/years.
1. _____	<input type="checkbox"/> Home <input type="checkbox"/> School <input type="checkbox"/> Community <input type="checkbox"/> Other: _____		
2. _____	<input type="checkbox"/> Home <input type="checkbox"/> School <input type="checkbox"/> Community <input type="checkbox"/> Other: _____		
3. _____	<input type="checkbox"/> Home <input type="checkbox"/> School <input type="checkbox"/> Community <input type="checkbox"/> Other: _____		
4. _____	<input type="checkbox"/> Home <input type="checkbox"/> School <input type="checkbox"/> Community <input type="checkbox"/> Other: _____		
5. _____	<input type="checkbox"/> Home <input type="checkbox"/> School <input type="checkbox"/> Community <input type="checkbox"/> Other: _____		

Relative to a highly proficient speaker's performance, rate your proficiency level on a scale of 0-10 for the following activities conducted in English and your other language(s).

**16.1 English**

	No Proficiency 0		5		High Proficiency 10
Speaking	●				●
Understanding	●				●
Reading	●				●
Writing	●				●

**16.2** Of the time you spend engaged in each of the following activities, how much of that time is carried out in English?

	None	Little	Some	Most	All
Speaking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Listening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Writing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**17.1 Other Language:** \_\_\_\_\_

	No Proficiency 0		5		High Proficiency 10
Speaking	●				●
Understanding	●				●
Reading	●				●
Writing	●				●

**17.2** Of the time you spend engaged in each of the following activities, how much of that time is carried out in this language?

	None	Little	Some	Most	All
Speaking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Listening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Writing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>Community Language Use Behavior</b>
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18. Please indicate which language(s) you most frequently heard or used in the following life stages, both inside and outside home.

		All English	Mostly English	Half English half other language	Mostly the other language	Only the other language
18.1	Infancy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.2	Preschool age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.3	Primary School age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.4	High school age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Please indicate which language(s) you generally use when speaking to the following people.

		All English	Mostly English	Half English half other language	Mostly the other language	Only the other language
19.1	Parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.2	Siblings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.3	Grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.4	Other Relatives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.5	Partner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.6	Roommates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.7	Neighbours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.8	Friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Please indicate which language(s) you generally use in the following situations.

		All English	Mostly English	Half English half other language	Mostly the other language	Only the other language
20.1	Home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.2	School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.3	Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.4	Social activities (e.g. hanging out with friends, movies)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.5	Religious activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.6	Extracurricular activities (e.g. hobbies, sports, volunteering, gaming)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.7	Shopping/ Restaurants/ Other commercial services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.8	Health care services/ Government/ Public offices/ Banks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. Please indicate which language(s) you generally use for the following activities.

		All English	Mostly English	Half English half other language	Mostly the other language	Only the other language
21.1	Reading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.2	Emailing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.3	Texting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.4	Social media (e.g. Facebook, Twitter etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.5	Writing shopping lists, notes, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.6	Watching TV/ listening to radio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.7	Watching movies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.8	Browsing on the Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.9	Praying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. Some people switch between the languages they know within a single conversation (i.e. while speaking in one language they may use sentences or words from the other language). This is known as “language-switching”. Please indicate how often you engage in language-switching. If you do not know any language(s) other than English, fill in all the questions with 0, as appropriate.

		Never	Rarely	Sometimes	Frequently	Always
22.1	With parents and family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.2	With friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.3	On social media (e.g. Facebook, Twitter)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Thank you for participating!**

## Appendix B

### Language and Social Background Questionnaire Administration and Scoring Manual

#### Administering the Language and Social Background Questionnaire

It is possible for participants to complete the LSBQ on their own, but it is recommended that researchers administer the LSBQ in an interview format so that questions can be clarified and responses discussed. If the instrument is administered as a self-completion questionnaire, responses should be checked with the participant to clarify any ambiguous or contradictory responses. Language backgrounds are inherently complex, so discussion between the researcher and the participant is essential.

#### Administering the LSBQ in interview format

The first section contains demographic questions. Some items are specific to neuroimaging studies and may not be applicable to other research (e.g., **Items 9, 10, 11**). These questions should be tailored to the needs of the specific study and are not relevant to determining the participant's language status.

**Item 12** asks for parents' education, occupation, and language(s) they can speak. Parents' education is used as an estimated measure of the participants' socioeconomic. Parents' language knowledge is not included in the final factor structure, but it is important to ask to get a better picture of the participant's language background, particularly if other factors are ambiguous.

To help participants remember all of the answer options, turn the questionnaire so the participant can see the question page upright.

**Item 13** asks if the participant was born in Canada (or insert your home country). If their response is "no", then proceed to ask which country they were born in and when they moved to Canada.

**Item 14** asks if the participant ever lived in a country or region where English was not the dominant communicating language. While this question was not included in the final factor structure, it is useful for determining if the participant was in a community or society where they would be routinely exposed to or likely to practice a Non-English language. This question does not include vacations; it refers specifically to long term residence at least one year or longer. Participants who were not born in Canada, or another country where English is the dominant communicating language, should indicate their country of birth, year of birth and year they moved from that country in addition to any other countries in which they lived.

**Item 15** is the beginning of the Language Background section. The question contains a table on which the participants list all the languages and dialects they know in descending order of fluency. This refers to all the languages and dialects that they can speak and



understand, or just understand. The first column lists the languages the participant knows, the second asks where they learned the language, the third asks at what age they learned it and the last asks if there were any periods in their life that they did not use that language. The participant is asked to rank the languages in order from the language they can speak/understand the best to the poorest, irrespective of order of acquisition. Literacy is not relevant to these judgments, and dialects (e.g. Jamaican Patois, French Creole) are considered to be different languages.

If the participant indicates that they learned a language “from birth”, record a “0”, otherwise record the age the participant indicates. If the participant indicates a school grade, estimate the age and confirm with the participant.

The last column asks if there were any periods in which the participant did not use English. A response of “yes” requires specifying that period and stating that they did not use other languages. If the participant moved to another country and used another language but called their parents once a month and spoke with them in English, this does not count towards non-use of English, and the answer would be “no”. If the participant says they “only use it a little bit”, this also does not count because technically they are still using the language, although the frequency of use is low. If the participant did indeed stop using (hearing, speaking, reading, and writing) the language completely for a period of time then record the number of years that they did not use the language.

If the participant indicated knowing any other languages, proceed to ask the same questions for all of the languages on the list, in the same manner. If the research is being conducted in a country where the regular school curriculum requires students to take a foreign language course, researchers should inquire about the participants’ knowledge of that language even if they do not mention it themselves.

**Items 16 and 17** ask participants to rate their proficiency and language use for English and a second language for speaking, understanding, reading and writing on a scale from 0 to 10, where 0 indicates no proficiency and 10 indicates high proficiency. Researchers should instruct participants to indicate how they would rate their proficiency by drawing a vertical line that intersects the scale. Sometimes participants indicate with circles or X shapes on the scale, to avoid difficulties with interpretation, we recommend the researcher demonstrate by drawing a vertical line through the first scale in item 16.1 as an example and then handing the pen to the participant to fill out the remaining scales. The scale is formatted to be 10 cm long. To calculate the participant’s score, use a ruler to measure where their vertical line intersects the scale.

Item 16.2 asks how much time is carried out in English for speaking, understanding, reading and writing. The participant should check off one answer option for each activity in this language. Make sure that the participant does not check off more than one box.

If the participant has indicated knowledge of a second language, ask the same questions again for the other language. Replace the word “English” for the name of their other language when phrasing the questions verbally.

**Items 18 to 21** constitute the Community Language Use Behavior (CLUB) section of the questionnaire. Item 18 asks about language use throughout different life stages. Item 19 asks about language use with different people. Item 20 asks about language use in different situations. Item 21 asks about language use for different activities. Lastly, item

21 asks about language-switching. Items 18 to 20 are on a 5 point scale of All English, mostly English, half English half other language, mostly the other language, or only the other language. Item 21 is also on a 5 point scale of never, rarely, sometimes, frequently, or always. Monolinguals, who do not know a second language, should indicate “All English”. The participant may indicate “not applicable” for some items; the researcher should make a note of this beside that item. The option of “not applicable” is not included in the questionnaire to avoid participants from choosing “not applicable” inappropriately or excessively (e.g., monolinguals choosing “not applicable” instead of “All English”). Item 22 inquires about language switching, something that participants may not be aware of doing. The researcher should clearly explain **“Some people switch between the languages they know within a single conversation, for example, speaking in one language but then using a sentence or word from another language. This is known as “language-switching.”** At this point it is always useful to confirm that the participants understand the explanation. If they do not understand, it is be useful to illustrate with an example using the participants’ own languages. For instance, if the participant knows English and French, explain: **“It would be like speaking in French to someone and then saying one sentence in English. Or speaking all French but using one English word.”** Confirm that the participant understand what language-switching is before they answer the questions. Monolinguals, who do not know a second language, should indicate “Never” as they do not have a second language to switch between.

Sometimes inconsistencies or ambiguities appear in participants’ responses. Researchers should always clarify any conflicting responses.

## Language and Social Background Data Entry and Factor Score Calculator

### The Spreadsheet

Data entry is done in the excel document titled, “LSBQ Factor Score Calculator”. Some cells are locked to prevent changes from being made to constant values and formulas. These include:

- The second row which contains variables’ weights, as derived from the factor analysis. This value refers to the variables weight on the factor on which it loads.
- The third and fourth row which contain the variables’ means and standard deviations, which are used to calculate standard score.
- Columns AS- CM which contains formulas to calculate the factor score.

The factor score is calculated by multiplying the standard score ((Observed Score-Mean)/Standard Deviation) by the variable’s weight and then summing all the variables that load onto that factor. The Factor Scores appear in columns CJ-CL.

The composite factor score is calculated by multiplying the individual factor scores by the variance they explain and then summing the three weighted factors. The Composite Factor Score appears in column CM.

Data entry is completed in columns A-AR. These cells are not locked.

### Data Entry

Enter the data from your collected LSBQs in columns A-AR. Listed below is a table with all the variable names in the spreadsheet, the item they correspond to, and the value to enter.

Value Legend:

A = number ranging from 0 to 10

B = None=0 Little=1 Some=2 Most=3 All=4

C = All English= 0 Mostly English=1 Half English half other language=2 Mostly the other language= 3 Only the other language= 4

D = Never=0 Rarely=1 Sometimes=2 Frequently= 3 Always=4

Variable Name in Spreadsheet	Item number on LSBQ	Value
ID	Subject ID	Subject ID
Grandparents	CLUB Q 19	C
Infancy	CLUB Q 18	C
Switching_with_Family	CLUB Q 22	D
Non-Eng_Understanding	Language Background 17.1	A
Non-Eng_Speaking	Language Background 17.1	A
Relatives	CLUB Q 19	C

Preschool	CLUB Q 18	C
Parents	CLUB Q 19	C
Non-Eng_Listening_Frequency	Language Background 17.2	B
Non-Eng_Speaking_Frequency	Language Background 17.2	B
Home	CLUB Q 20	C
Primary	CLUB Q 18	C
Religious	CLUB Q 20	C
Siblings	CLUB Q 19	C
English_Listening_Frequency	Language Background 16.2	B
Praying	CLUB Q 21	C
HighSchool	CLUB Q 18	C
English_Speaking_Frequency	Language Background 16.2	B
Work	CLUB Q 20	C
School	CLUB Q 20	C
Health_Care	CLUB Q 20	C
Shopping	CLUB Q 20	C
Social_Activities	CLUB Q 20	C
Email	CLUB Q 21	C
Friends	CLUB Q 19	C
Extra_Curricular	CLUB Q 20	C
Roommates	CLUB Q 19	C
Text	CLUB Q 21	C
Social_Media	CLUB Q 21	C
Movies	CLUB Q 21	C
Internet	CLUB Q 21	C
Switching_on_Social_Media	CLUB Q 22	D
Neighbours	CLUB Q 19	C
TV	CLUB Q 21	C
Lists	CLUB Q 21	C
Reading	CLUB Q 21	C
Partner	CLUB Q 19	C
Switching_With_Friends	CLUB Q 22	D
English_Understanding	Language Background 16.1	A
English_Reading	Language Background 16.1	A
English_Writing	Language Background	A

	16.1	
English_Speaking	Language Background 16.1	A
English_Writing_Frequency	Language Background 16.2	B

### The Individual and Composite Factor Scores

The individual and composite factor scores are automatically calculated in the spreadsheet.

- Column CJ, labelled “Non-English\_Home\_Use\_And\_Proficiency”, is the factor score for Factor 1. A higher score on this factor indicates greater second language proficiency and greater second language use in more private life, home, and with family members. Lower score on this factor indicates poor or no second language ability and more English use in these contexts.
- Column CK, labelled “Non-English\_Social\_Use”, is the factor score for Factor 2. A higher score indicates more second language use in societal and community contexts and a lower score indicates more English use.
- Column CL, labelled “English\_Proficiency”, is the factor score for Factor 3. A Higher score indicates High English proficiency and a lower score indicates low English proficiency.
- Column CM, labelled “Composite\_Factor\_Score” is the Composite Factor score and represents the overall Bilingualism Score. A higher score indicates bilingualism and a lower score indicates monolingualism.

### Interpreting the Composite Factor Score

The composite factor score can be used both as a continuous variable and as a criterion to define groups categorically.

To classify participants in discrete groups, we recommend that only participants with composite factor scores below -3.13 be classified as monolingual and only participants with composite factor scores above 1.23 be classified as bilingual. Participants who lie between -3.12 and 1.22 may have ambiguous language backgrounds that cannot be classified as monolingual or bilingual, for example, receptive bilinguals. Receptive bilinguals have very different language profiles from both monolinguals and balanced bilinguals. Receptive bilinguals can understand a second language, however does not speak that language. It would not be appropriate for studies that aim to make comparisons between monolinguals and bilinguals to include these participants in either group because they are neither monolingual nor bilingual.