

On the role of informal vs. formal context of language experience in Italian-German primary school children

Supplementary Material

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Section S1. Questionnaire on the child's linguistic history

To conduct our research, we need some information on your child and on the linguistic habits in the family. All the answers to the questionnaire will be treated confidentially and will be used exclusively to understand the child's relationship with German and Italian. Please answer the questions spontaneously, without thinking too much.

Please insert your child's participant code. Pay attention to copying it correctly. N.B. If more than one child takes part in the study, please fill in a second questionnaire.

Participant code

1. General information on the child

Let's start with some general information on your child. They are important for us to know the child's age and the time at which he/she has started learning German and Italian.

- 1. When was your child born? DD.MM.YYYY**
- 2. Your child is** ☐male ☐female ☐div. ☐no answer
- 3. Your child is** ☐an only child ☐the youngest ☐middle child / twin ☐the oldest
- 4. Where was your child born?**
Place of birth (city, province, region) _____
If not in Germany: how old was your child when you moved to Germany? (years or months) _____
- 5. Where do you live now?**
Please indicate the province of residence. _____
- 6. Have you lived in Italy for a longer period of time?**
After moving to Germany, were there periods in which you went back to Italy with your child? ☐Yes _____ (from age... to age...) ☐No
- 7. At what age did your child start having regular contacts with German (e.g., in the family, at kindergarten, with a babysitter....)?**
☐ from birth or between 0 and 1
☐ later, at _____ years
- 8. At what age did your child start having regular contacts with Italian (e.g., in the family, at kindergarten, with a babysitter....)?**
☐ from birth or between 0 and 1
☐ later, at _____ years
- 9. Which languages does your child speak? When did he/she start saying the first words in each language?**
German _____ Italian _____
Other language: _____ (which language, at what age?)
- 10. Does/did your child have hearing problems?** ☐ Yes ☐ No
- 11. Has your child ever seen a speech therapist? If yes, for what reason?**
☐ Yes _____ ☐ No
- 12. Which languages does your child prefer to use?**
☐ He/she is more comfortable with German than with Italian

- ☐ He/she is more comfortable with Italian than with German
☐ He/she is comfortable with both.

Notes and comments

2. General information on the family

With our study, we would like to understand which role the linguistic environment plays on the way in which the child acquires languages. Therefore, we would like to ask some questions on your family.

13. Who are the components of the family?

Please indicate which people live with the child or are part of his/her familiar life (very frequent contact). For example, partner of the mother/the father, au pair/frequent babysitter, grandparents who see the child everyday...

- ☐ Mother
☐ Father
☐ Brother/sister 1 (age: _____)
☐ Brother/sister 2 (age: _____)
☐ Brother/sister 3 (age: _____)
☐ Maternal grandparents
☐ Paternal grandparents
☐ Other person 1: _____
☐ Other person 2: _____
☐ Other person 3: _____

Notes and comments

14. In which country were you born?

Please indicate the country and region. If born in Germany but of Italian origin, also indicate the Italian region of origin.

- ☐ Mother: _____ ☐ Father: _____

If not in Germany: at what age did you move to Germany?

- ☐ Mother: _____ ☐ Father: _____

15. What language(s), including dialects, have the parents learnt as children (before age 6?)

- ☐ Mother: _____ ☐ Father: _____

16. Which language(s), including dialects, do parents speak with each other?

17. How well do the following people speak Italian? (If not applicable, leave blank)

A little	Quite	Well	Very well	As native	Language is not know
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[illegible]

18. How well do the following people understand Italian? (If not applicable, leave blank)

[illegible]

19. How well do the following people speak German? (If not applicable, leave blank)

[illegible]

20. How well do the following people understand German? (If not applicable, leave blank)

[illegible]

[illegible]

21. Occupation ☐ Mother: _____ ☐ Father: _____

What is the highest level of instruction obtained by the parents?

[illegible]

Notes and comments

3. Use of languages in the family

We are particularly interested in the child's linguistic habits at home. For this reason, we have some questions on this aspect.

Some questions ask about "other people in the house". We refer to the additional people who live with the child (e.g., partner of the mother/the father) or people who see the child very frequently (e.g., babysitter who sees the child everyday, au pair).

22. Which languages are mostly spoken in the family?

- ☐ only German ☐ more German ☐ half German/half Italian
- ☐ more Italian ☐ only Italian

23. Does your child regularly speak German and Italian with people outside the family? How many?

a. Before the pandemic

[illegible]

b. During the pandemic

[illegible]

24. Which languages are used by these people with the child?

If not applicable, leave empty. If other language, write it in the comments.

	Only German	More German	Half German, half Italian	More Italian	Only Italian
Mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maternal grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paternal grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. Which languages does the child speak with...?

If not applicable, leave empty.

	Only German	More German	Half German, half Italian	More Italian	Only Italian
Mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maternal grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paternal grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Brother/sister 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. How much time does the child spend with these people?

If not applicable, leave empty.

a. Before the pandemic

	Once a week	2-3 days a week	4-5- days a week	Every day: about 5 hours	Every day: about 10 hours
Mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maternal grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paternal grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b. During the pandemic

	Once a week	2-3 days a week	4-5- days a week	Every day: about 5 hours	Every day: about 10 hours
Mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maternal grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paternal grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother/sister 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other person 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. Were there periods of at least six months in which the child did not use one of its native languages?

☐ No ☐ Yes: _____ (which language? from age... to...)

28. How often do you travel to Italy?

On average, thinking about your habits before the pandemic.

- ☐ 3 months a year
- ☐ 1-2 months a year
- ☐ 1-3 weeks a year
- ☐ every two years
- ☐ rarely/never

Notes and comments

4. Childcare and education (without pandemic!)

These questions help us understand the linguistic habits of the child at school and in other educational settings. Please answer thinking about the situation when the child is NOT in lockdown, without the current restrictions.

N.B. The following questions refer to the current institution attended by the child.

29. Does your child regularly attend school or another childcare institution (e.g., kindergarten, baby sitter)?

- ☐ Yes: _____ (type of structure; if school, which class)
- ☐ No

30. Is it a multilingual environment?

- ☐ Yes: _____ (which languages?)
- ☐ No

31. For how many years has the child attended this institution?

If less than a year, indicate the number of months _____

32. How often does he/she attend it?☐ 5 days a week ☐ 3-4 days a week ☐ 1-2 days a week**33. How many hours on average?** _____**34. What languages does the child use in this institution?**

	Only German	More German	Half German, half Italian	More Italian	Only Italian
a. child and teachers/educators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. child and peers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

35. Does your child attend other schools/structures or did he/she do so in the past?☐ Yes ☐ No**Notes and comments**

36. Structure 1

What type of institution? _____

Multilingual structure? If yes, which languages? _____

From when to when (age)? _____

How often?

☐ 5 days a week ☐ 3-4 days a week ☐ 1-2 days a week**37. How many hours (on average)?** _____

Which languages did the child use in this institution?

	Only German	More German	Half German, half Italian	More Italian	Only Italian
child and teachers/educators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
child and peers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Structure 2

What type of institution? _____

Multilingual structure? If yes, which languages? _____

From when to when (age)? _____

How often?

☐ 5 days a week ☐ 3-4 days a week ☐ 1-2 days a week

How many hours (on average)? _____

Which languages did the child use in this institution?

	Only German	More German	Half German, half Italian	More Italian	Only Italian
child and teachers/educators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
child and peers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Use of languages in free time

With the following questions, we would like to get an idea of which languages your child uses in his/her free time.

38. What language(s) does the child speak with his/her best friends?

- ☐ only German ☐ more German ☐ half German / half Italian
☐ more Italian ☐ only Italian

39. How much time does your child spend with his/her best friends?

(if not weekly, write how often, e.g., how many times per month)

Before the pandemic: _____ a week

During the pandemic: _____ a week

40. How many children's books (including e-books) do you have at home for each language?

	none	1-20	21-50	more than 50
German	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Italian	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other language: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

41. How often do you read together with your child or how often does your child read books?

	Very rarely	Once a month	Once a week	Several times a week	Every day
German	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Italian	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other language: ☐ ☐ ☐ ☐ ☐

42. How often does your child do these activities?

a. German

	Never	Almost never	Once a month	Once a week	Several times a week	Every day
TV, films, series	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Audiobooks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer, smartphone, tablet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b. Italian

	Never	Almost never	Once a month	Once a week	Several times a week	Every day
TV, films, series	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Audiobooks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer, smartphone, tablet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

43. Does the child attend an Italian language course or did he/she attend one before the pandemic?

In the following answers, think of the situation without covid restrictions

☐ No

☐ Yes: _____ (where? consulate, private class...)

How many times a week? _____

For how long? _____ (hours)

Since when does he/she attend the class _____ (age)

Notes and comments

6. Pandemic Situation

The current pandemic has brought several important changes to our lives. It is important for us to understand how your child's habits changed in this situation.

44. For how long was your child in lockdown? _____

45. If he/she attends school: how many hours of homeschooling on average?

46. In which language is homeschooling? _____

47. Was the Italian language class affected by the pandemic? How?

☐ No ☐ Yes: _____ (How? e.g., less hours, cancelled...)

Notes and comments _____

Section S2. Questionnaire scoring

Only questions pertaining to current language experience were considered. When the information was available and relevant, data from before and during the pandemic was averaged. Questions were scored according to two dimensions, Formal / Informal and Quantity / Quality, which were crossed to form four categories: *informal quality*, *informal quantity*, *formal quality*, *formal quantity*. For each part, an *Italian score* and a *German score* were calculated separately.

Each of the four categories have a different total amount of points, but after the separate calculation, all categories are proportioned to a total of 5 points. Since the goal of the paper was to investigate the effect of Formal and Informal, we added Formal Quality and Informal Quantity (total = 10 points), as well as Informal Quality and Informal Quantity (total = 10 points).

Abbreviations: IT = Italian, GE = German, Chi = child, Q = question number in Appendix A (e.g., Q28 refers to question 28 in appendix A)

Note on scoring: the notation “Q29: scoring 0-1, pace 0.25” means that, if Q29 is on a scale (e.g. only IT / more IT / half GE half IT / more GE / only GE”), the scale will be scored from 0 to 1, with 0.25 breaks (i.e., 0 / 0.25 / 0.5 / 0.75 / 1)

Table S2.1 Informal quantity

Italian score	Max	German score	Max
<i>A. Languages in the family</i> • Q 22: Scoring 1-0, pace 0.25	1	<i>A. Languages in the family</i> • 1 - Italian score	1
<i>B. Amount of IT spoken <u>by family members</u> to Chi (average weighted by amount of time spent with Chi before and during pandemic)</i> • For each person <i>i</i> in Q 24 and Q 26 a, a language score (l_i) and a time score (t_i), the latter averaged for before and after pandemic ▪ l_i = Scoring Q 24 _i 1-0, pace 0.25 ▪ t_i = (Scoring Q 26 a _i 0-1, pace 0.2 + Scoring Q 26 b _i 0-1, pace 0.2) / 2 • Score: average of quantity of IT weighted by time ▪ $\text{Score} = \frac{l_1*t_1+l_2*t_2+\dots+l_n*t_n}{t_1+t_2+\dots+t_n}$	1	<i>B. Amount of GE spoken by family members to Chi</i> • 1 - Italian score	1
<i>C. Amount of IT spoken <u>by Chi</u> to family members (average weighted by amount of time spent with Chi before and during pandemic)</i> • For each person <i>i</i> in Q 25 and Q 26 a, a language score (l_i) and a time score (t_i) ▪ l_i = Scoring Q 25 _i 1-0, pace 0.25 ▪ t_i = (Scoring Q 26 a _i 0-1, pace 0.2 + Scoring Q 26 b _i 0-1, pace 0.2) / 2	1	<i>C. Amount of GE spoken <u>by Chi</u> to family members</i> • 1 - Italian score	1

<ul style="list-style-type: none"> • Score: average of quantity of IT weighted by time ▪ $\text{Score} = \frac{l_1*t_1+l_2*t_2+\dots+l_n*t_n}{t_1+t_2+\dots+t_n}$ 			
<i>D. Trips to Italy</i> <ul style="list-style-type: none"> • Q28: Scoring 1-0, pace 0.25 	1	<i>D. Trips to Italy</i> <ul style="list-style-type: none"> • 1 - Italian score 	1
<i>E. Language with best friends (weighted by amount of time spent with Chi before and during pandemic)</i> <ul style="list-style-type: none"> • 1 = Q38: Scoring 0-1, pace 0.25 • t = (Q39a: Scoring 0-1, pace 0.25 + Q39b: Scoring 0-1, pace 0.25) / 2 • Score = 1 * t / t 	1	<i>E. Language with best friends</i> <ul style="list-style-type: none"> • 1 - Italian score 	1
<i>Total</i>	5	<i>Total</i>	5

Table S2.2 Informal quality

Italian score	Max	German score	Max
<i>A. Language outside the family: IT</i> <ul style="list-style-type: none"> • Q23a and Q23b: Scoring 0-1, pace 0.2 • Average: Q23a + Q23b / 2 	1	<i>A. Language outside the family: GE</i> <ul style="list-style-type: none"> • Q23a and Q23b: Scoring 0-1, pace 0.2 • Average: Q23a + Q23b / 2 	1
<i>B. N. of people speaking IT to Chi in the family</i> <ul style="list-style-type: none"> • n = count how many people speak IT to Chi (Q24) AND see Chi at least once a week (Q26a,b) • score = n * 0.2 , for a maximum of 1 	1	<i>B. N. of people speaking GE to Chi in the family</i> <ul style="list-style-type: none"> • n = count how many people speak GE to Chi (Q24) AND see Chi at least once a week (Q26a,b) • score = n * 0.2 , for a maximum of 1 	1
<i>C. Trips to Italy</i> <ul style="list-style-type: none"> • Q28: 0 points if less than 1 month, 1 point otherwise 	1	<i>C. Trips to Italy</i> <ul style="list-style-type: none"> • 1 - Italian score 	1
<i>D. Language with best friends</i> <ul style="list-style-type: none"> • Q38: 0 points if “only German”, 1 point otherwise 	1	<i>D. Language with best friends</i> <ul style="list-style-type: none"> • Q38: 0 points if “only Italian”, 1 point otherwise 	1
<i>E. TV, PC, music</i> <ul style="list-style-type: none"> • Q42b {PC, TV, music}: score 0-1, pace 0.25 • Average: PC + TV + music / 3 	1	<i>E. TV, PC, music</i> <ul style="list-style-type: none"> • Q42a {PC, TV, music}: score 0-1, pace 0.25 • Average: PC + TV + music / 3 	1
<i>Total</i>	5	<i>Total</i>	5

Table S2.3 Formal quantity

Italian score	Max	German score	Max
<i>A. Amount of IT in Chi-teachers interaction</i> <ul style="list-style-type: none"> • Q34a: Scoring 0-1, pace 0.25 	1	<i>A. Amount of GE in Chi-teachers interaction</i> <ul style="list-style-type: none"> • 1 - Italian score 	1

<i>B. Amount of IT in Chi-school peers interaction</i> • Q34b: Scoring 0-1, pace 0.25	1	<i>B. Amount of IT in Chi-school peers interaction</i> • 1 - Italian score	1
<i>Total</i>	2	<i>Total</i>	2

Table S2.4 Formal quality

Italian score	Max	German score	Max
<i>A. Language of schooling and external IT class (weighted by hours spent at school)</i> • Hours at school coefficient (max 8 hrs) ▪ h = Q33 scoring 0-1, pace 0.175 • Multilingual coefficient: Q30 and Q43 ▪ m = 1 if bilingual school, no IT class ▪ m = 0.5 if GE school + IT class ▪ m = 0 if GE school, no IT class • Score = m * h	1	<i>A. Language of schooling and external GE class (weighted by hours spent at school)</i> • Hours at school coefficient (max 8 hrs) ▪ h = Q33 scoring 0-1, pace 0.175 • Multilingual coefficient: Q30 and Q43 ▪ m = 0.5 if bilingual school, no IT class ▪ m = 0.75 if GE school + IT class ▪ m = 1 if GE school, no IT class • Score = m * h	1
<i>B. TV, PC, music</i> • Q41: score 0-1, pace 0.25 • Q42b {audiobooks}: score 0-1, pace 0.25 • Average: books + audiobooks / 2	1	<i>B. TV, PC, music</i> • Q41: score 0-1, pace 0.25 • Q42a {audiobooks}: score 0-1, pace 0.25 • Average: books + audiobooks / 2	1
<i>Total</i>	2	<i>Total</i>	2

Section S3. Additional (descriptive) results of individual questions

The tables and figures below report the detailed results by group and language of the individual parts of the four scores described in Appendix B1-B4. The question labels (e.g., Question A) refer to the labels defined in the tables in Appendix B1-B4.

Table S3.1 Informal quantity

	Question A <i>M (SD)</i>		Question B <i>M (SD)</i>		Question C <i>M (SD)</i>		Question D <i>M (SD)</i>		Question E <i>M (SD)</i>	
Age Group	Ge	It	Ge	It	Ge	It	Ge	It	Ge	It
Biki 6	0.3 (0.27)	0.7 (0.27)	0.28 (0.24)	0.72 (0.24)	0.31 (0.28)	0.69 (0.28)	0.36 (0.18)	0.64 (0.18)	0.83 (0.24)	0.17 (0.24)
Biki 7	0.39 (0.3)	0.61 (0.3)	0.39 (0.31)	0.61 (0.31)	0.46 (0.32)	0.54 (0.32)	0.36 (0.22)	0.64 (0.22)	0.87 (0.18)	0.13 (0.18)
Biki 8	0.28 (0.26)	0.72 (0.26)	0.24 (0.24)	0.76 (0.24)	0.27 (0.24)	0.73 (0.24)	0.43 (0.21)	0.57 (0.21)	0.75 (0.27)	0.25 (0.27)
Biki 9	0.38 (0.3)	0.62 (0.3)	0.43 (0.34)	0.57 (0.34)	0.5 (0.35)	0.5 (0.35)	0.41 (0.21)	0.59 (0.21)	0.85 (0.26)	0.15 (0.26)

Figure S3.1 Informal quantity

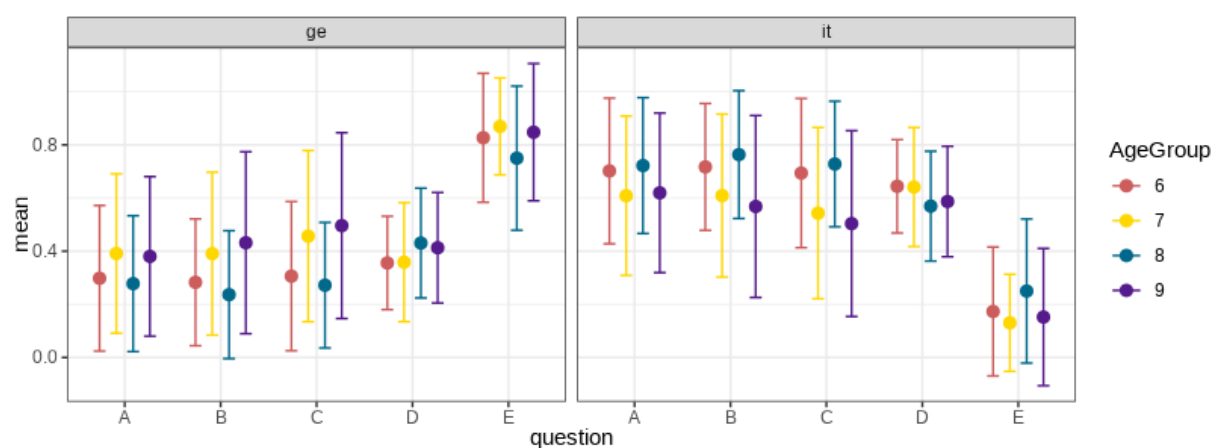


Table S3.2 Informal quality

	Question A <i>M (SD)</i>		Question B <i>M (SD)</i>		Question C <i>M (SD)</i>		Question D <i>M (SD)</i>		Question E <i>M (SD)</i>	
Age Group	Ge	It	Ge	It	Ge	It	Ge	It	Ge	It
Biki 6	0.82 (0.18)	0.52 (0.17)	0.29 (0.22)	0.55 (0.16)	0.46 (0.51)	0.54 (0.51)	1 (0)	0.42 (0.5)	0.57 (0.24)	0.53 (0.22)
Biki 7	0.79 (0.22)	0.43 (0.2)	0.43 (0.31)	0.6 (0.28)	0.52 (0.51)	0.48 (0.51)	1 (0)	0.39 (0.5)	0.55 (0.26)	0.44 (0.29)
Biki 8	0.75 (0.27)	0.63 (0.16)	0.27 (0.24)	0.62 (0.19)	0.56 (0.51)	0.44 (0.51)	1 (0)	0.56 (0.51)	0.72 (0.19)	0.48 (0.3)
Biki 9	0.86 (0.16)	0.55 (0.23)	0.43 (0.32)	0.57 (0.24)	0.48 (0.51)	0.52 (0.51)	1 (0)	0.3 (0.47)	0.61 (0.31)	0.49 (0.3)

Figure S3.2 Informal quality

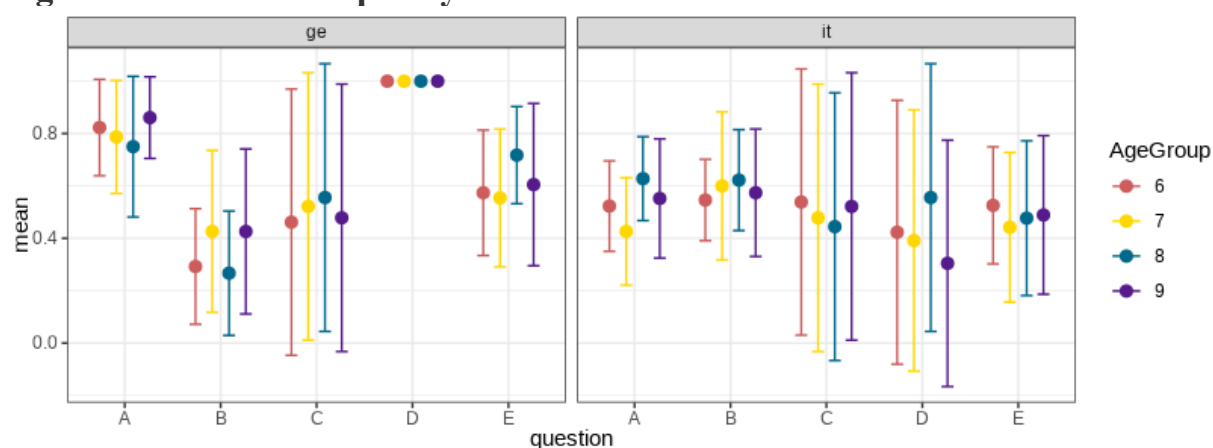


Table S3.3 Formal quantity

	Question A <i>M (SD)</i>	Question B <i>M (SD)</i>

Age Group	Ge	It	Ge	It
Biki 6	0.96 (0.15)	0.04 (0.15)	0.95 (0.16)	0.05 (0.16)
Biki 7	0.97 (0.09)	0.03 (0.09)	0.96 (0.1)	0.04 (0.1)
Biki 8	0.79 (0.27)	0.21 (0.27)	0.78 (0.32)	0.22 (0.32)
Biki 9	0.91 (0.18)	0.09 (0.18)	0.91 (0.19)	0.09 (0.19)

Figure S3.3 Formal quantity

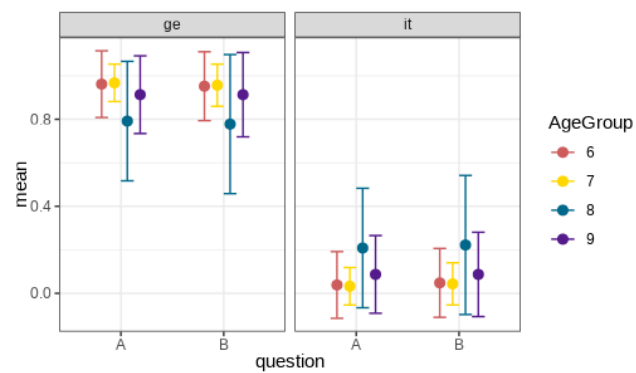
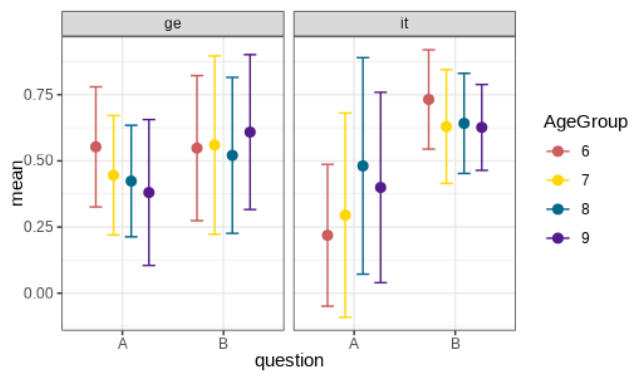


Table S3.4 Formal quality

	Question A <i>M (SD)</i>		Question B <i>M (SD)</i>	
Age Group	Ge	It	Ge	It
Biki 6	0.55 (0.23)	0.22 (0.27)	0.55 (0.27)	0.73 (0.19)
Biki 7	0.45 (0.23)	0.29 (0.39)	0.56 (0.34)	0.63 (0.21)
Biki 8	0.42 (0.21)	0.48 (0.41)	0.52 (0.29)	0.64 (0.19)
Biki 9	0.38 (0.28)	0.4 (0.36)	0.61 (0.29)	0.63 (0.16)

Figure S3.4 Formal quality



Section S4. Statistical models

Linear models were fitted with the `lm()` function included in the R package *stats* (R core Team, 2019). Summary tables were obtained with the `tab_model()` function from the package *sjPlot* (Lüdtke 2022).

RQ1: Formal and informal language use

- Model 1: Informal_GE ~ Age_Months
- Model 2: Informal_IT ~ Age_Months

Table S4.1

	Model 1: Informal GE				Model 2: Informal IT			
Predictors	Estimates	SE	t	p	Estimates	SE	t	p
(Intercept)	4.08 **	1.23	3.33	0.001	5.98 ***	1.43	4.19	<0.001
Age (months)	0.01	0.01	1.18	0.240	-0.01	0.01	-0.52	0.606
R ² / R ² adjusted	0.016 / 0.005				0.003 / -0.009			
AIC	346.654				373.108			
					<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001			

- Model 3: Formal_GE ~ Age_Months
- Model 4: Formal_IT ~ Age_Months

Table S4.2

	Model 1: Formal GE				Model 2: Formal IT			
<i>Predictors</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	9.12 ***	1.14	8.00	< 0.001	1.03	1.28	0.80	0.424
Age (months)	-0.02	0.01	-1.35	0.181	0.02	0.01	1.14	0.257
R ² / R ² adjusted	0.021 / 0.009				0.013 / 0.001			
AIC	325.143				344.213			
					<i>p</i> <0.05	** <i>p</i> <0.01	*** <i>p</i> <0.001	

- Model 5: Formal_GE ~ Age_Group
- Model 6: Formal_IT ~ Age_Group

Table S4.3

Predictors	Model 7: Formal GE				Model 8: Formal IT			
	Estimates	SE	t	p	Estimates	SE	t	p
(Intercept)	6.83 ***	0.38	18.16	<0.001	3.34 ***	0.42	7.94	<0.001
Group: Biki6	1.11 *	0.50	2.25	0.027	-1.13	0.56	-2.05	0.044

Group: Biki7	0.98 *	0.51	1.94	0.056	-1.20 *	0.57	-2.12	0.037
Group: Biki9	0.82	0.50	1.64	0.110	-0.95	0.56	-1.70	0.093
R ² / R ² adjusted		0.065 / 0.031				0.064 / 0.030		
AIC		334.070				353.408		
<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001								

RQ2: Language experience and proficiency

For each proficiency measure (microstructure and macrostructure), two linear models were fitted. The first had German formal and informal experience as independent variables, the second with Italian formal and informal experience.

MATTR

MATTR German

- Model 1: MATTR_ge ~ Formal_GE + Informal_GE
- Model 2: MATTR_ge ~ Formal_IT + Informal_IT

Table S4.4

	Model 1: MATTR GE				Model 2: MATTR GE			
<i>Predictors</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	0.94 ***	0.01	81.5	<0.00 1	0.96 ***	0.01	146.1 5	<0.001
Formal GE	0.00	0.00	0.50	0.615				
Informal GE	0.00	0.00	1.41	0.163				
Formal IT					0.00	0.00	0.35	0.729
Informal IT					-0.00	0.00	-1.40	0.164
R2 / R2 adjusted	0.035 / 0.012				0.023 / -0.000			
AIC	-419.771				-418.648			
					<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001			

MATTR Italian

- Model 3: MATTR_it ~ Formal_GE + Informal_GE
- Model 4: MATTR_it ~ Formal_IT + Informal_IT

Table S4.5

<i>Predictors</i>	Model 3: MATTR IT				Model 4: MATTR IT			
	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	0.96 ***	0.02	62.74	<0.001	0.88 ***	0.01	101.06	<0.001

Formal GE	0.00	0.00	0.32	0.753				
Informal GE	-0.01 ***	0.00	-4.44	< 0.001				
Formal IT					0.00	0.00	1.72	0.089
Informal IT					0.01 ***	0.00	3.59	0.001
R ² / R ² adjusted	0.203 / 0.184				0.195 / 0.176			
AIC	-370.368				-369.552			
<i>p<0.05 **p<0.01 ***p<0.001</i>								

Speech rate

Speech rate German

- Model 1: SpeechRate_ge ~ Formal_GE + Informal_GE
- Model 2: SpeechRate_ge ~ Formal_IT + Informal_IT

Table S4.6

	Model 1: Speech rate GE				Model 2: Speech rate GE			
<i>Predictors</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	1.09 ***	0.22	5.03	<0.001	2.36 ***	0.13	18.54	<0.001
Formal GE	0.05	0.03	1.78	0.078				
Informal GE	0.08 **	0.03	3.15	0.002				
Formal IT					-0.03	0.03	-1.21	0.229
Informal IT					-0.07 **	0.02	-2.98	0.004
R ² / R ² adjusted	0.186 / 0.167				0.134 / 0.114			
AIC	91.156				96.518			
<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001								

Speech rate Italian

- Model 3: SpeechRate_it ~ Formal_GE + Informal_GE
- Model 4: SpeechRate_it ~ Formal_IT + Informal_IT

Table S4.7

<i>Predictors</i>	Model 3: Speech rate IT				Model 4: Speech rate IT			
	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	2.37 ***	0.25	9.36	<0.001	1.06 ***	0.14	7.39	<0.001
Formal GE	0.02	0.03	0.50	0.615				
Informal GE	-0.14 ***	0.03	-4.74	<0.001				
Formal IT					-0.00	0.03	-0.15	0.883
Informal IT					0.12 ***	0.03	4.84	<0.001

Complexity index

Complexity index German

- Model 1: CI_ge ~ Formal_GE + Informal_GE
- Model 2: CI_it ~ Formal_IT + Informal_IT

Table S4.10

	Model 1: CI GE				Model 2: CI GE			
Predictors	Estimates	SE	t	p	Estimates	SE	t	p
(Intercept)	1.09 ***	0.10	11.43	<0.001	1.19 ***	0.05	21.93	<0.001
Formal GE	0.01	0.01	1.01	0.313				
Informal GE	0.00	0.01	0.37	0.709				
Formal IT					0.01	0.01	1.06	0.294
Informal IT					-0.00	0.01	-0.21	0.833
R ² / R ² adjusted	0.019 / -0.004				0.013 / -0.010			
AIC	-51.923				-51.414			
p<0.05 ** p<0.01 *** p<0.001								

Complexity index Italian

- Model 3: CI_it ~ Formal_GE + Informal_GE
- Model 4: CI_it ~ Formal_IT + Informal_IT

Table S4.11

	Model 3: CI IT				Model 4: CI IT			
Predictors	Estimates	SE	t	p	Estimates	SE	t	p
(Intercept)	1.36 ***	0.10	13.23	<0.001	1.15 ***	0.06	19.99	<0.001
Formal GE	0.00	0.01	0.18	0.855				
Informal GE	-0.02	0.01	-1.75	0.083				
Formal IT					0.02	0.01	1.76	0.082
Informal IT					0.01	0.01	1.03	0.306
R ² / R ² adjusted	0.037 / 0.015				0.061 / 0.038			
AIC	-39.296				-41.433			
<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001								

Score B

Score B German

- Model 1: ScoreB_ge ~ Formal_GE + Informal_GE
- Model 2: ScoreB_ge ~ Formal_IT + Informal_IT

Table S4.12

	Model 1: Score B GE				Model 2: Score B GE			
Predictors	Estimates	SE	t	p	Estimates	SE	t	p
(Intercept)	4.15 ***	1.20	3.48	0.001	4.28 ***	0.68	6.32	<0.001
Formal GE	-0.00	0.15	-0.01	0.992				
Informal GE	0.05	0.14	0.34	0.734				
Formal IT					0.12	0.13	0.92	0.362
Informal IT					-0.03	0.12	-0.26	0.794
R ² / R ² adjusted	0.002 / -0.022				0.010 / -0.014			
AIC	387.725				386.990			
<i>p<0.05 ** p<0.01 *** p<0.001</i>								

Score B Italian

- Model 3: ScoreB_it ~ Formal_GE + Informal_GE
- Model 4: ScoreB_it ~ Formal_IT + Informal_IT

Table S4.13

	Model 3: Score B IT				Model 4: Score B IT			
Predictors	Estimates	SE	t	p	Estimates	SE	t	p
(Intercept)	3.82 ***	1.04	3.66	<0.001	4.09 ***	0.59	6.92	<0.001
Formal GE	-0.00	0.14	-	0.994				
			0.01					
Informal GE	0.03	0.13	0.27	0.790				
Formal IT					0.08	0.12	0.68	0.500
Informal IT					-0.05	0.11	-	0.605
							0.52	
R ² / R ² adjusted	0.001 / -0.023				0.007 / -0.017			
AIC	364.231				363.707			
<p><i>p<0.05 ** p<0.01 *** p<0.001</i></p>								

Score D

Score D German

- Model 1: ScoreD_ge ~ Formal_GE + Informal_GE
- Model 2: ScoreD_ge ~ Formal_IT + Informal_IT

Table S4.14

	Model 1: Score D GE				Model 2: Score D GE			
Predictors	Estimates	SE	t	p	Estimates	SE	t	p
(Intercept)	8.55 ***	0.56	15.35	<0.001	9.42 ***	0.31	30.02	<0.001
Formal GE	0.02	0.07	0.27	0.791				
Informal GE	0.06	0.07	0.83	0.410				
Formal IT					0.02	0.06	0.27	0.786
Informal IT					-0.09	0.06	-1.57	0.120
R ² / R ² adjusted	0.012 / -0.011				0.029 / 0.006			
AIC	254.832				253.352			
					<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001			

Score D Italian

- Model 3: ScoreD_it ~ Formal_GE + Informal_GE
- Model 4: ScoreD_it ~ Formal_IT + Informal_IT

Table S4.15

	Model 3: Score d IT				Model 4: Score d IT			
Predictors	Estimates	SE	t	p	Estimates	SE	t	p
(Intercept)	9.38 ***	0.54	17.40	<0.001	8.76 ***	0.31	28.38	<0.001
Formal GE	-0.09	0.07	-1.31	0.193				
Informal GE	0.04	0.07	0.62	0.539				
Formal IT					0.04	0.06	0.70	0.487
Informal IT					0.01	0.06	0.16	0.877
R ² / R ² adjusted	0.020 / -0.003				0.007 / -0.016			
AIC	249.277				250.451			
					p<0.05 ** p<0.01 *** p<0.001			

RQ3: Dominance across age

We fitted linear models with either ‘MATTR differentials’, ‘speech rate differentials’, ‘MLU differentials’, ‘Complexity Index differentials’, ‘score B differentials’, or ‘score D differentials’ as dependent variable. We used ‘age in months’, ‘formal differentials’ and ‘informal differentials’ as independent variables. The most complex models we considered consisted of two two-way interactions between age and the other two predictors. Non-significant interactions were removed, but non-significant main effects were kept.

MATTR

- Maximal model: $\text{MATTR_diff} \sim \text{Formal_diff} * \text{Age_Months} + \text{Informal_diff} * \text{Age_Months}$
- Final model: $\text{MATTR_diff} \sim \text{Formal_diff} + \text{Informal_diff} + \text{Age_Months}$

Table S4.16

MATTR differential				
Predictors	Estimates	SE	t	p
(Intercept)	-0.02	0.02	-1.00	0.318
Formal diff.	0.00	0.00	1.18	0.243
Informal diff.	0.00 ***	0.00	4.12	<0.001
Age (months)	0.00 *	0.00	2.32	0.023
R ² / R ² adjusted	0.272 / 0.246			
AIC	-348.027			
<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001				

Speech rate

- Maximal model: $\text{SpeechRate_diff} \sim \text{Formal_diff} * \text{Age_Months} + \text{Informal_diff} * \text{Age_Months}$
- Final model: $\text{SpeechRate_diff} \sim \text{Formal_diff} * \text{Age_Months} + \text{Informal_diff}$

Table S4.17

Speech rate differential				
Predictors	Estimate <i>s</i>	SE	<i>t</i>	<i>p</i>
(Intercept)	-1.35	0.87	-1.54	0.127
Formal diff.	0.31 *	0.14	2.27	0.026
Age (months)	0.01	0.01	1.68	0.096
Informal diff.	0.11 ***	0.02	7.36	<0.001
Formal diff. * Age	-0.00 *	0.00	-2.19	0.032
R ² / R ² adjusted	0.454 / 0.428			
AIC	128.847			
<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001				

MLU

- Maximal model: $\text{MLU_diff} \sim \text{Formal_diff} * \text{Age_Months} + \text{Informal_diff} * \text{Age_Months}$
- Final model: $\text{MLU_diff} \sim \text{Formal_diff} + \text{Informal_diff} + \text{Age_Months}$

Table S4.18

MLU differential				
<i>Predictors</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	0.56	1.24	0.45	0.653
Formal diff.	-0.01	0.06	-0.13	0.895
Informal diff.	0.12 *	0.05	2.36	0.021
Age (months)	-0.01	0.01	-0.78	0.435
R ² / R ² adjusted	0.071 / 0.037			
AIC	335.085			
<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001				

Complexity index

- Maximal model: CI_diff ~ Formal_diff * Age_Months + Informal_diff * Age_Months
- Final model: CI_diff ~ Formal_diff + Informal_diff + Age_Months

Table S4.19

CI differential				
<i>Predictors</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	-0.11	0.18	-0.59	0.556
Formal diff.	0.01	0.01	0.68	0.498
Informal diff.	0.01	0.01	1.26	0.213
Age (months)	0.00	0.00	0.18	0.861
R ² / R ² adjusted	0.272 / 0.246			
AIC	-348.027			
<i>p</i> <0.05 ** <i>p</i> <0.01 *** <i>p</i> <0.001				

Score B

- Maximal model: ScoreB_diff ~ Formal_diff * Age_Months + Informal_diff * Age_Months
- Final model: ScoreB_diff ~ Formal_diff + Age_Months + Informal_diff

Table S4.20

Score B differential				
Predictors	Estimates	SE	t	p
(Intercept)	-1.00	1.86	-0.54	0.592
Formal diff.	-0.00	0.09	-0.01	0.994
Age (months)	0.01	0.02	0.83	0.409
Informal diff.	-0.01	0.08	-0.16	0.875
R ² / R ² adjusted	0.009 / -0.027			

AIC	405.648
	$p < 0.05$ $** p < 0.01$ $*** p < 0.001$

Score D

- Maximal model: $\text{ScoreD_diff} \sim \text{Formal_diff} * \text{Age_Months} + \text{Informal_diff} * \text{Age_Months}$
- Final model: $\text{ScoreD_diff} \sim \text{Formal_diff} + \text{Informal_diff} + \text{Age_Months}$

Table S4.21

Score D differential				
<i>Predictors</i>	<i>Estimates</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	1.66	0.84	1.96	0.053
Formal diff.	0.02	0.04	0.50	0.619
Informal diff.	0.04	0.03	1.27	0.208
Age (months)	-0.02 *	0.01	-2.16	0.034
R ² / R ² adjusted	0.080 / 0.047			
AIC	267.870			
	$p < 0.05$ $** p < 0.01$ $*** p < 0.001$			

References

- (Lüdtke 2022) Lüdtke Daniel. 2022. *sjPlot: Data Visualization for Statistics in Social Science*. R package version 2.8.11. Available online: <https://CRAN.R-project.org/package=sjPlot> (accessed on 18 July 2022).
- (R Core Team 2021) R Core Team. 2021. R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/> (accessed on 24 June 2022).