Students' mother tongue influence on Russian language learning

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NULL HYPOTHESIS:

the language branch of student's mother tongue does not affect the speed of progress of Russian language learning.

ALTERNATIVE HYPOTHESIS:
the language branch of student's mother tongue affects the speed of progress of Russian language learning.

Data

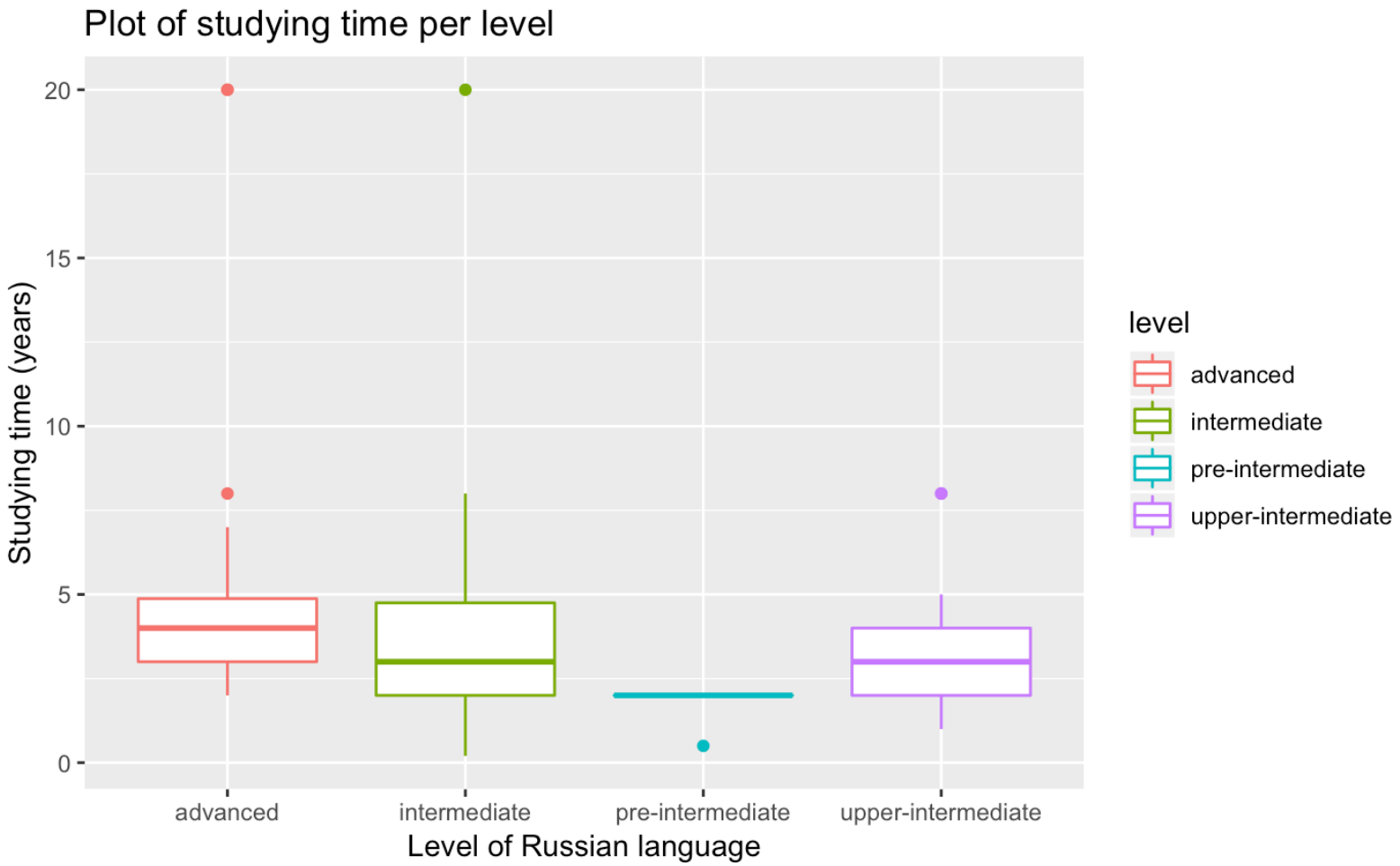
- A survey among 68 Russian language learners
- 4 reading texts in Russian language, belonging to different language levels: A2 (Pre-Intermediate), B1 (Intermediate), B2 (Upper-Intermediate) and C1 (Advanced)
- Each text was followed with 3 multiple choice questions about the text content
- some meta information about students: What is their mother tongue? What other foreign languages do they speak? How long have they been learning Russian?

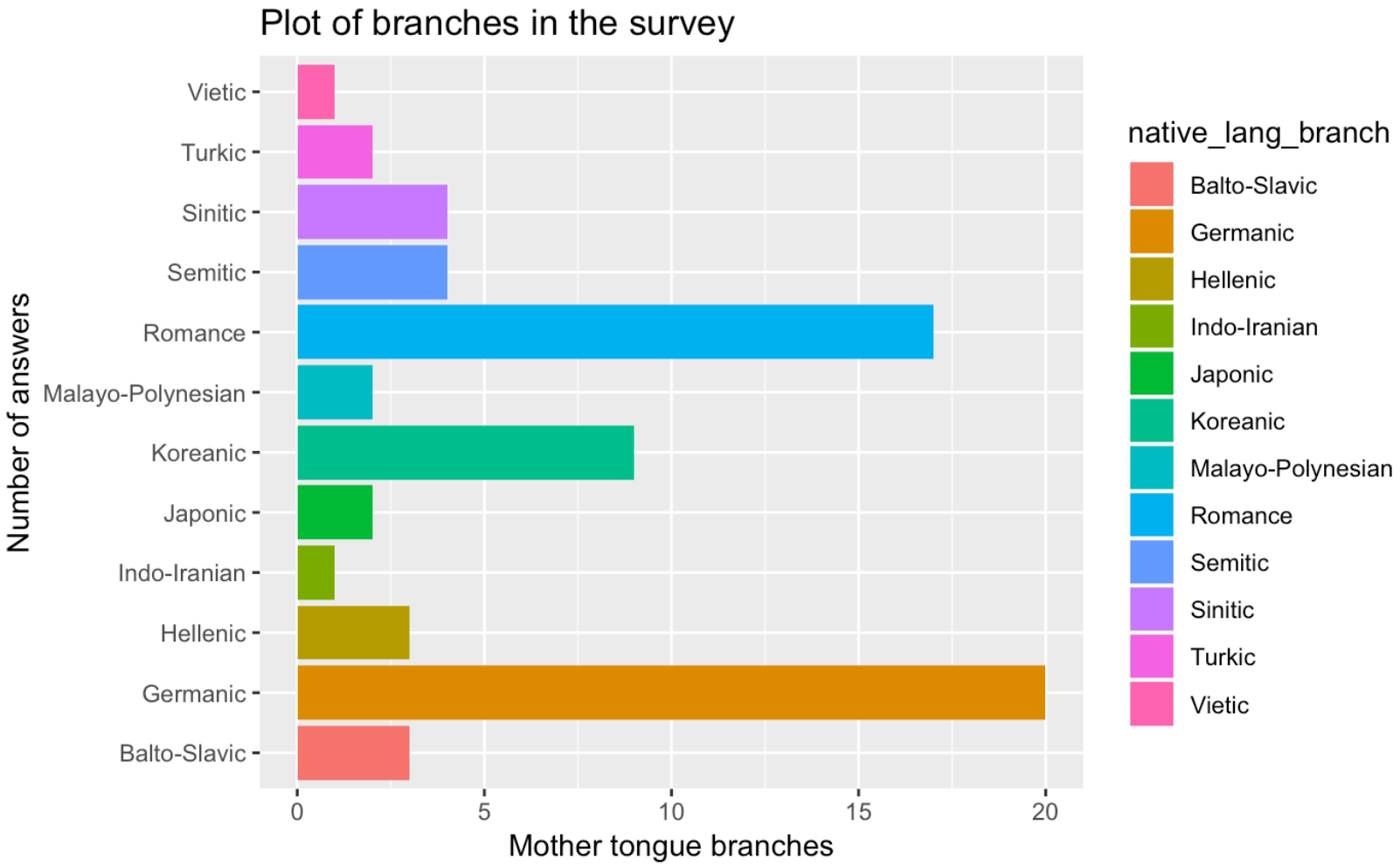
Variables

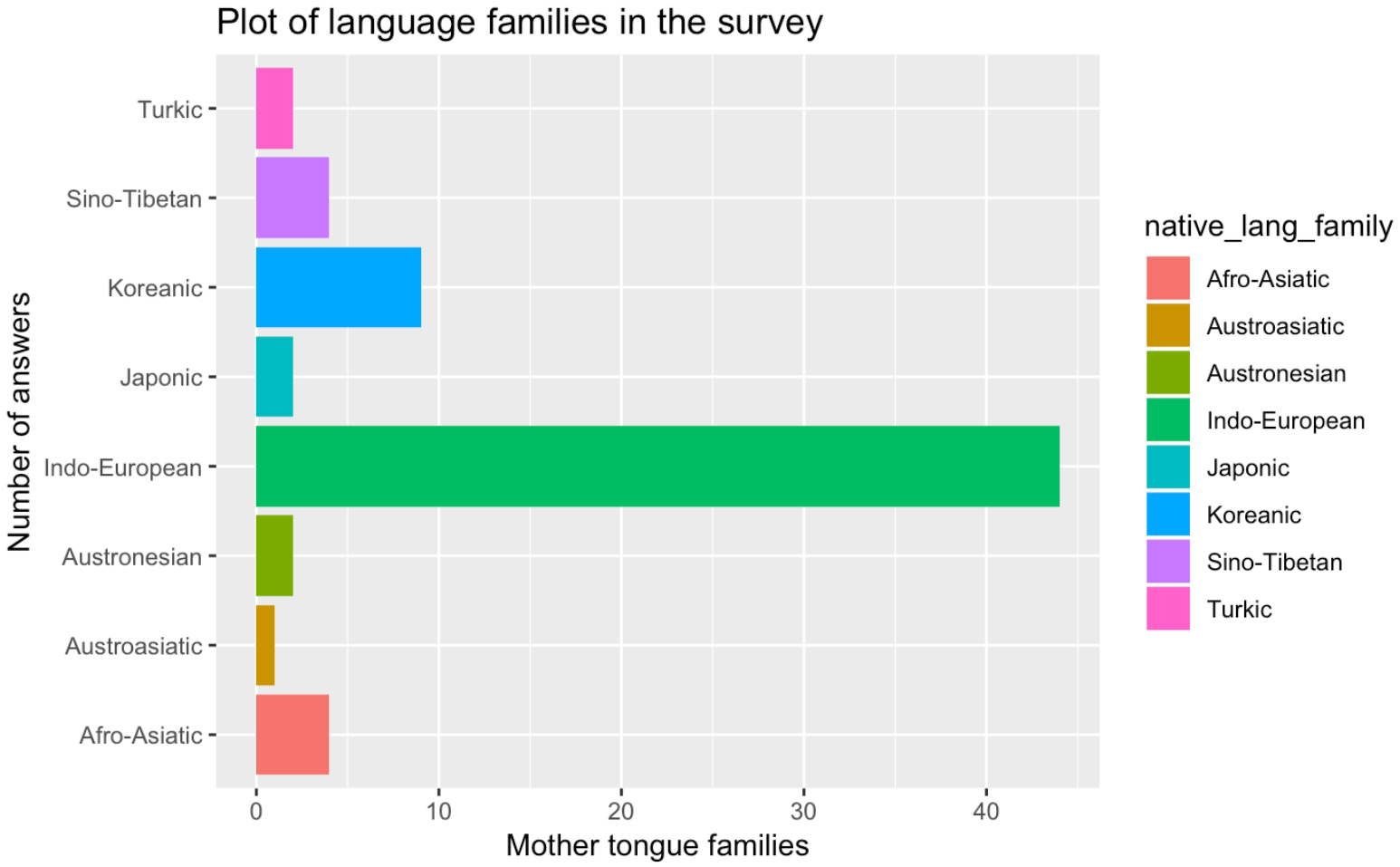
native_lang – student's mother tongue;
native_lang_branch – mother tongue's branch;
native_lang_family – mother tongue's family;

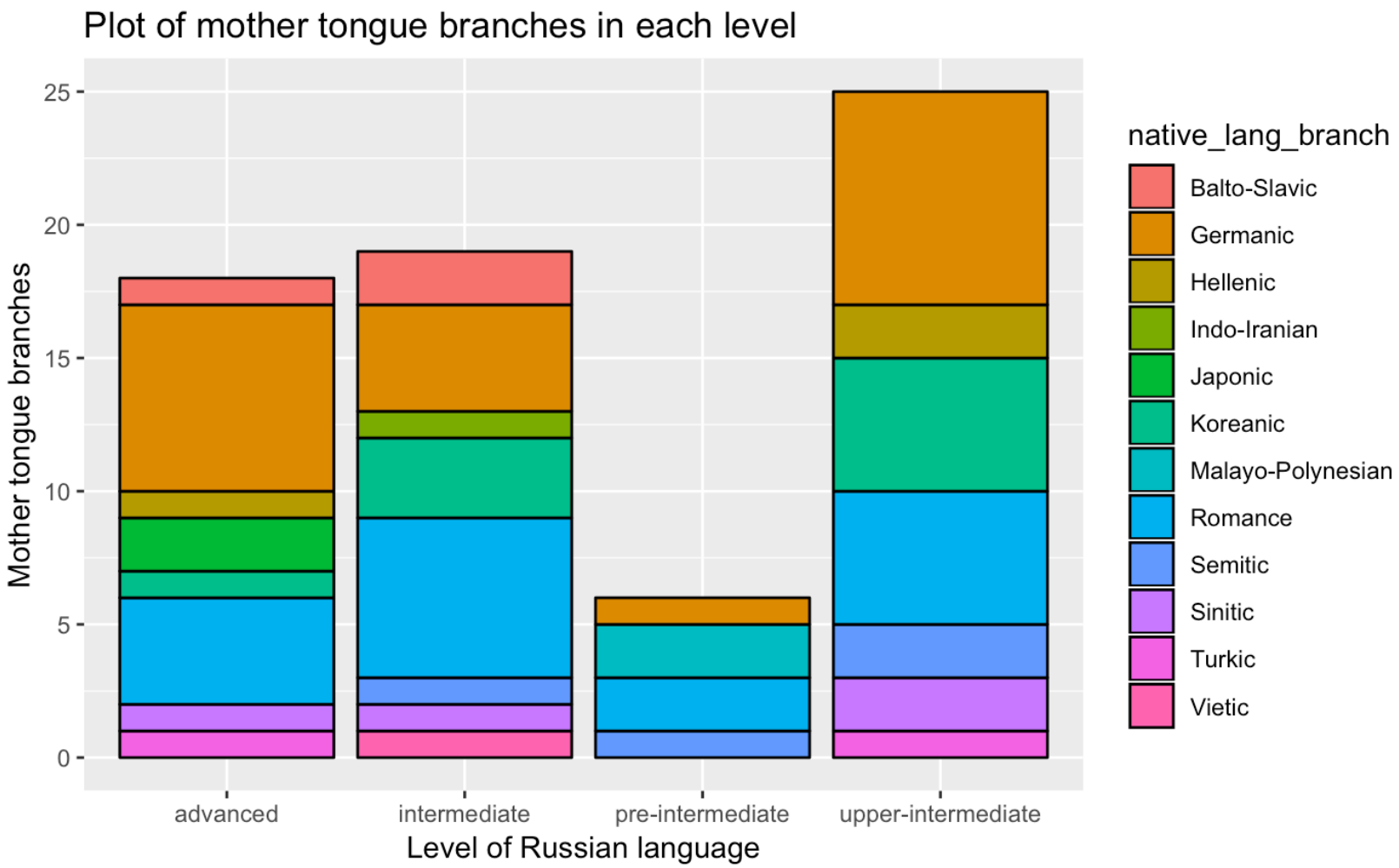
studying_time_years – years of studying Russian language;
studying_time_period – years of studying Russian language turned into 4 periods manually;

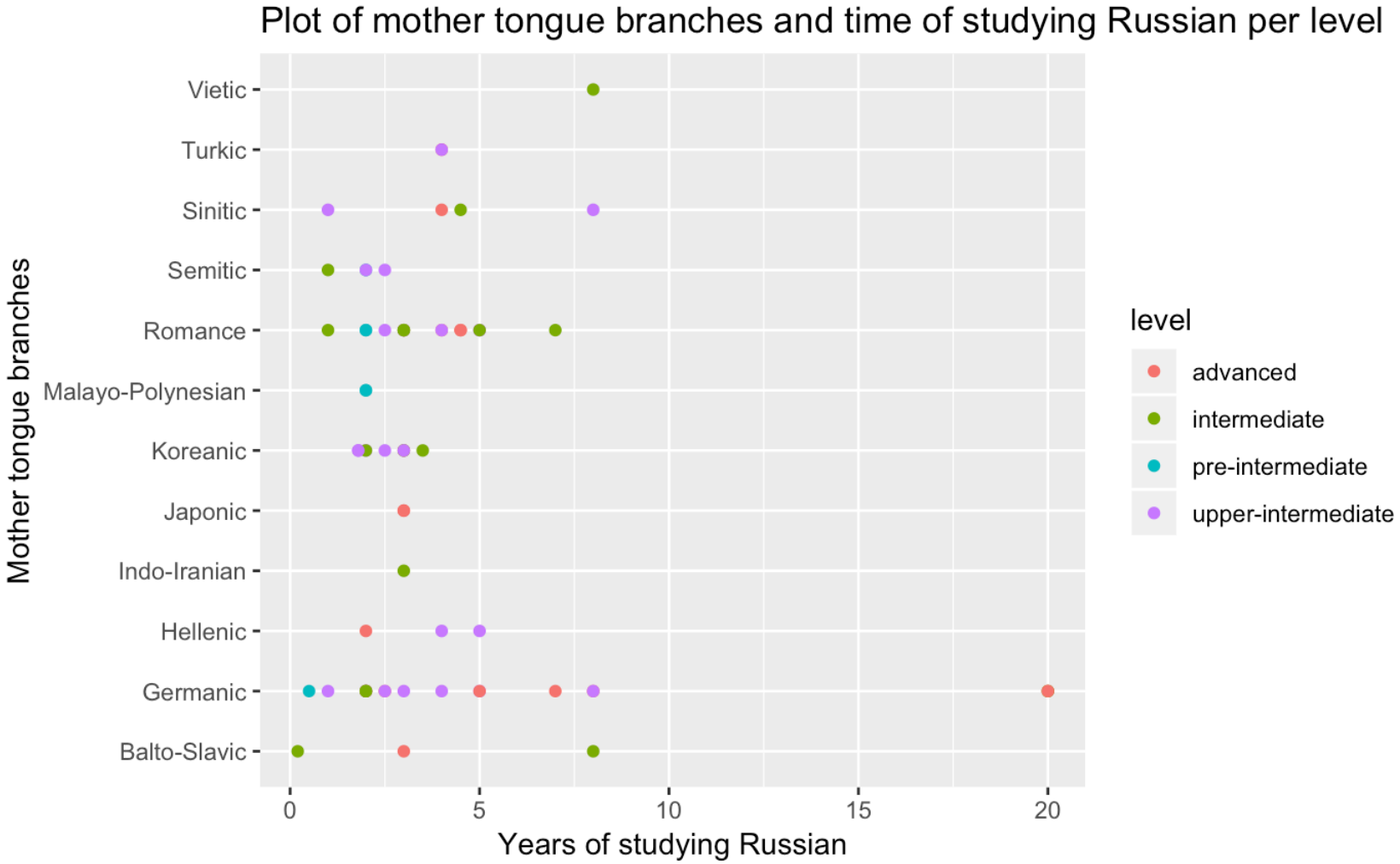
level – level of Russian language which was defined through this survey (pre-intermediate, intermediate, upper-intermediate, advanced);
level_numeric – level of Russian language written with numbers (for correlation and regression);

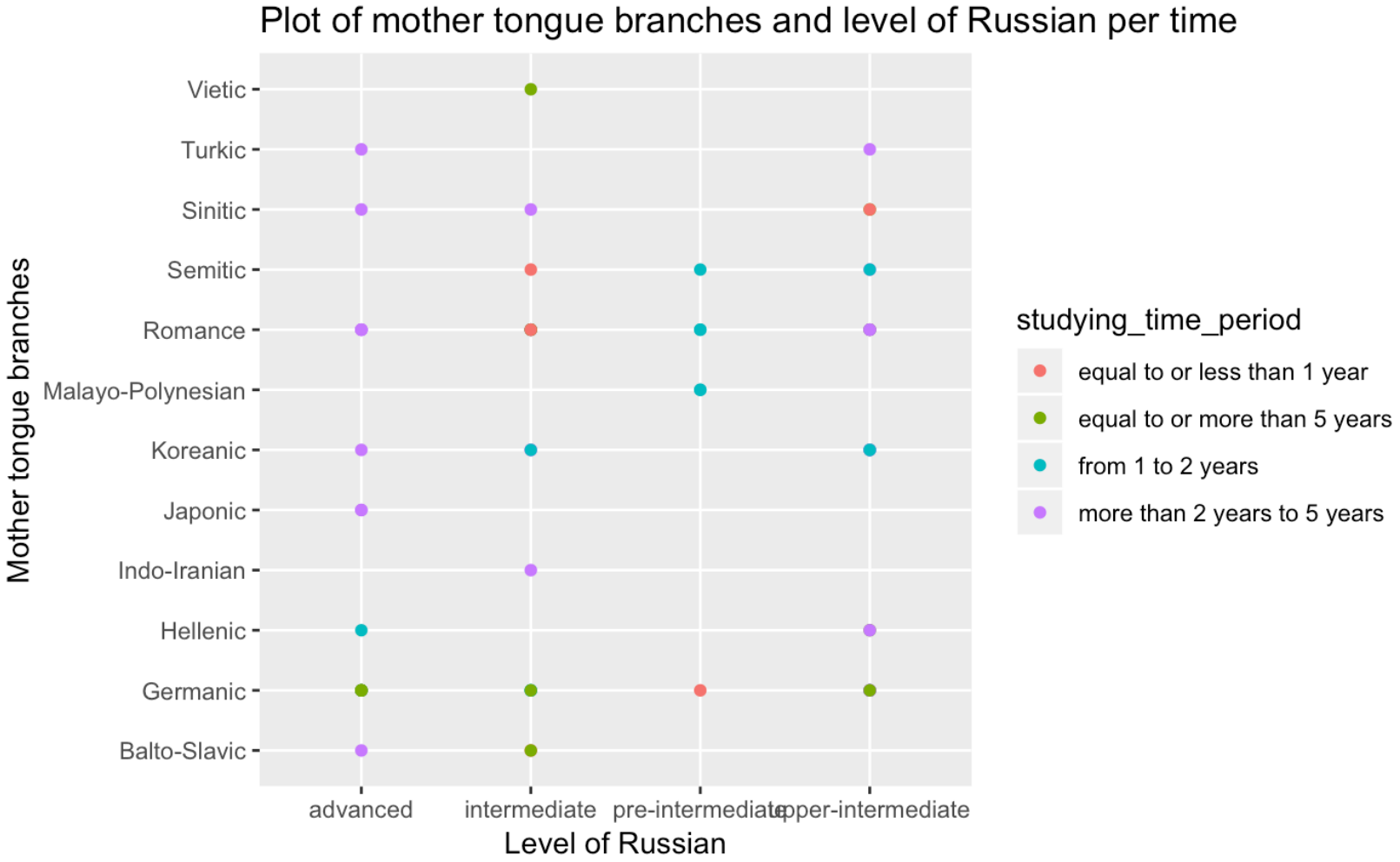

Plot of studying time per level
Studying time (years)
20
15
10
5
0
advanced
intermediate
pre-intermediate
upper-intermediate
Level of Russian language
level
advanced
intermediate
pre-intermediate
upper-intermediate


Plot of branches in the survey
Number of answers
Vietic
Turkic
Sinitic
Semitic
Romance
Malayo-Polynesian
Koreanic
Japonic
Indo-Iranian
Hellenic
Germanic
Balto-Slavic
0
5
10
15
20
Mother tongue branches
native_lang_branch
Balto-Slavic
Germanic
Hellenic
Indo-Iranian
Japonic
Koreanic
Malayo-Polynesian
Romance
Semitic
Sinitic
Turkic
Vietic


Plot of language families in the survey
Turkic
Sino-Tibetan
Koreanic
Japonic
Indo-European
Austronesian
Austroasiatic
Afro-Asiatic
Number of answers
0
10
20
30
40
Mother tongue families
native_lang_family
Afro-Asiatic
Austroasiatic
Austronesian
Indo-European
Japonic
Koreanic
Sino-Tibetan
Turkic


Plot of mother tongue branches in each level
Mother tongue branches
25
20
15
10
5
0
advanced
intermediate
pre-intermediate
upper-intermediate
Level of Russian language
native_lang_branch
Balto-Slavic
Germanic
Hellenic
Indo-Iranian
Japonic
Koreanic
Malayo-Polynesian
Romance
Semitic
Sinitic
Turkic
Vietic


Plot of mother tongue branches and time of studying Russian per level
Mother tongue branches
Vietic
Turkic
Sinitic
Semitic
Romance
Malayo-Polynesian
Koreanic
Japonic
Indo-Iranian
Hellenic
Germanic
Balto-Slavic
0
5
10
15
20
Years of studying Russian
level
advanced
intermediate
pre-intermediate
upper-intermediate


Plot of mother tongue branches and level of Russian per time
Mother tongue branches
Vietic
Turkic
Sinitic
Semitic
Romance
Malayo-Polynesian
Koreanic
Japonic
Indo-Iranian
Hellenic
Germanic
Balto-Slavic
advanced
intermediate
pre-intermediate
upper-intermediate
Level of Russian
studying_time_period
equal to or less than 1 year
equal to or more than 5 years
from 1 to 2 years
more than 2 years to 5 years

Testing hypotheses

- filter the data according to the level of Russian language;
- use ANOVA for each of 4 datasets.

Pre-intermediate
Pr(>F) <2e-16 ***

Reject null hypothesis

Intermediate
Pr(>F) 0.944

Upper-intermediate
Pr(>F) 0.633

Advanced
Pr(>F) 0.752

Do not reject null hypothesis

Correlations

- filter dataset on branch variable - Germanic and Romance;
- conduct Spearman correlation test.

Germanic branch

p-value = 0.02743
cor = 0.4923679

Romance branch

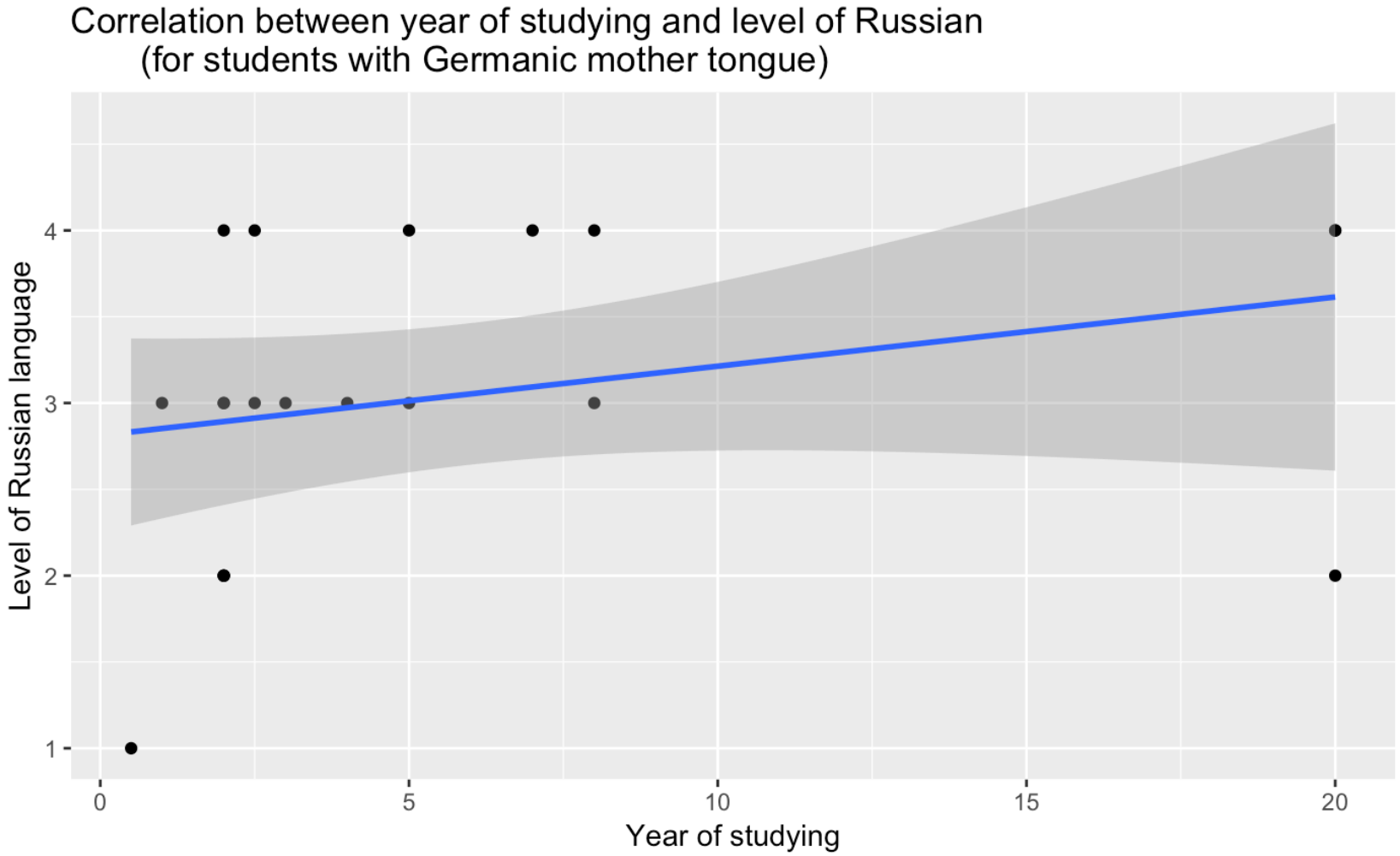
p-value = 0.2881
cor = 0.2830336

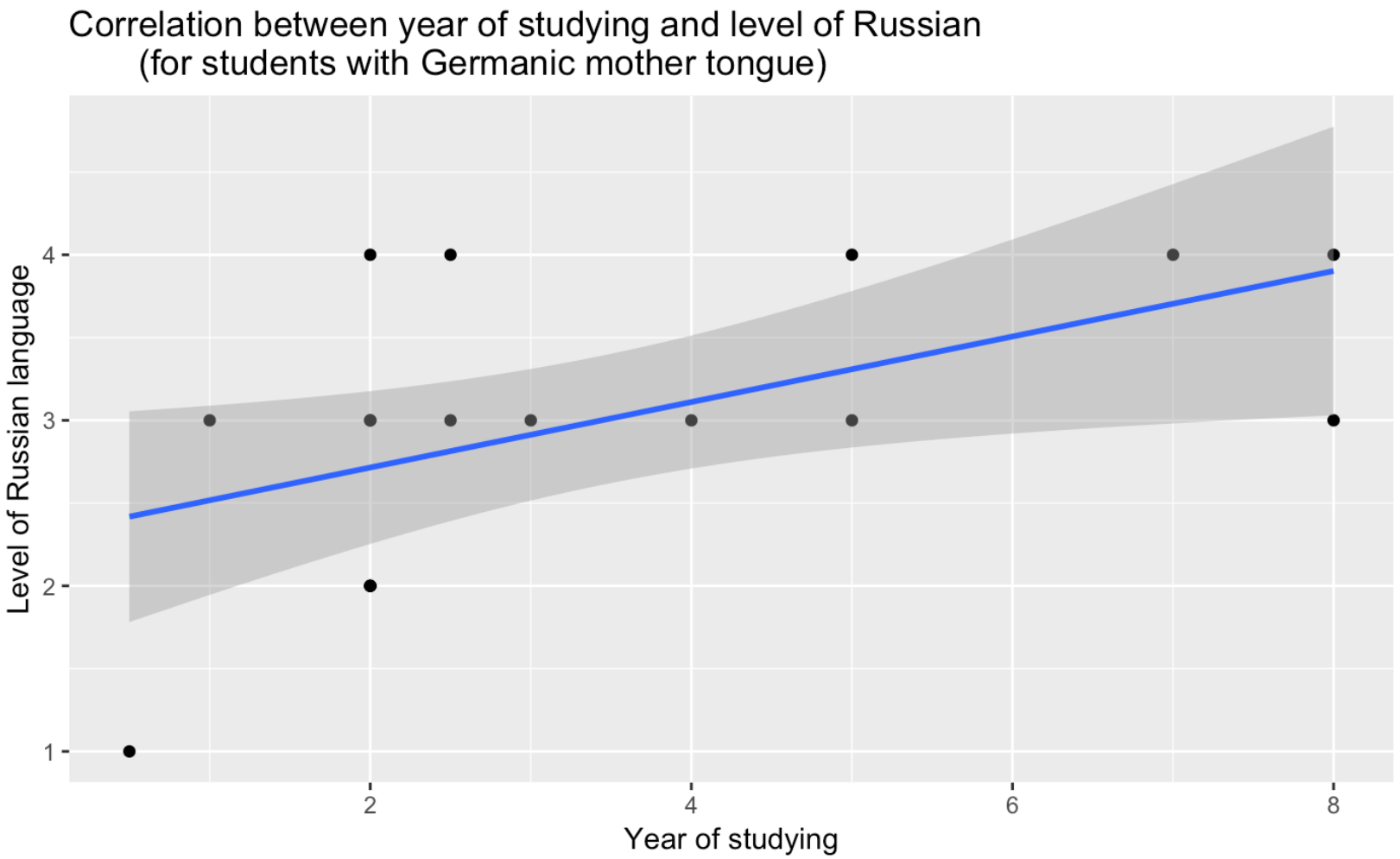
Linear regression model

- How does level of Russian language change (on average) if time of studying increases by one point?

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	2.81248	0.26813	10.49	4.26e-09	***
studying_time_years	0.04009	0.03107	1.29	0.213	

2.81 + 0.04*studying_time_years


Correlation between year of studying and level of Russian
(for students with Germanic mother tongue)
Level of Russian language
4
3
2
1
0
5
10
15
20
Year of studying


Correlation between year of studying and level of Russian
(for students with Germanic mother tongue)
Level of Russian language
4
3
2
1
2
4
6
8
Year of studying

Conclusion

- The results of the ANOVA tests:
  - the language branch of student's mother tongue does not affect the speed of progress of Russian language learning when student has reached intermediate or higher level.
  - the mother tongue does affect the speed of learning on a low level of Russian language proficiency.

- We have found a positive correlation for Germanic languages using Spearman correlation test and performed regression analysis.

Limitations

- More observations are needed for more detailed and accurate analysis.

- Two variables of the branches of foreign languages were not used in this research – they can help to reach more sophisticated results.

Thank you!

Any questions?

Code on Github:
https://github.com/NatalieIsupova/dataanalysis_project