The KaLaKe toolkit for identifying language disorder:

Norming for Russian-Estonian bilingual children

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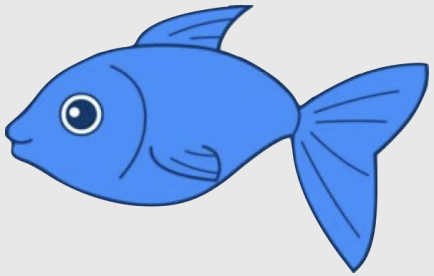
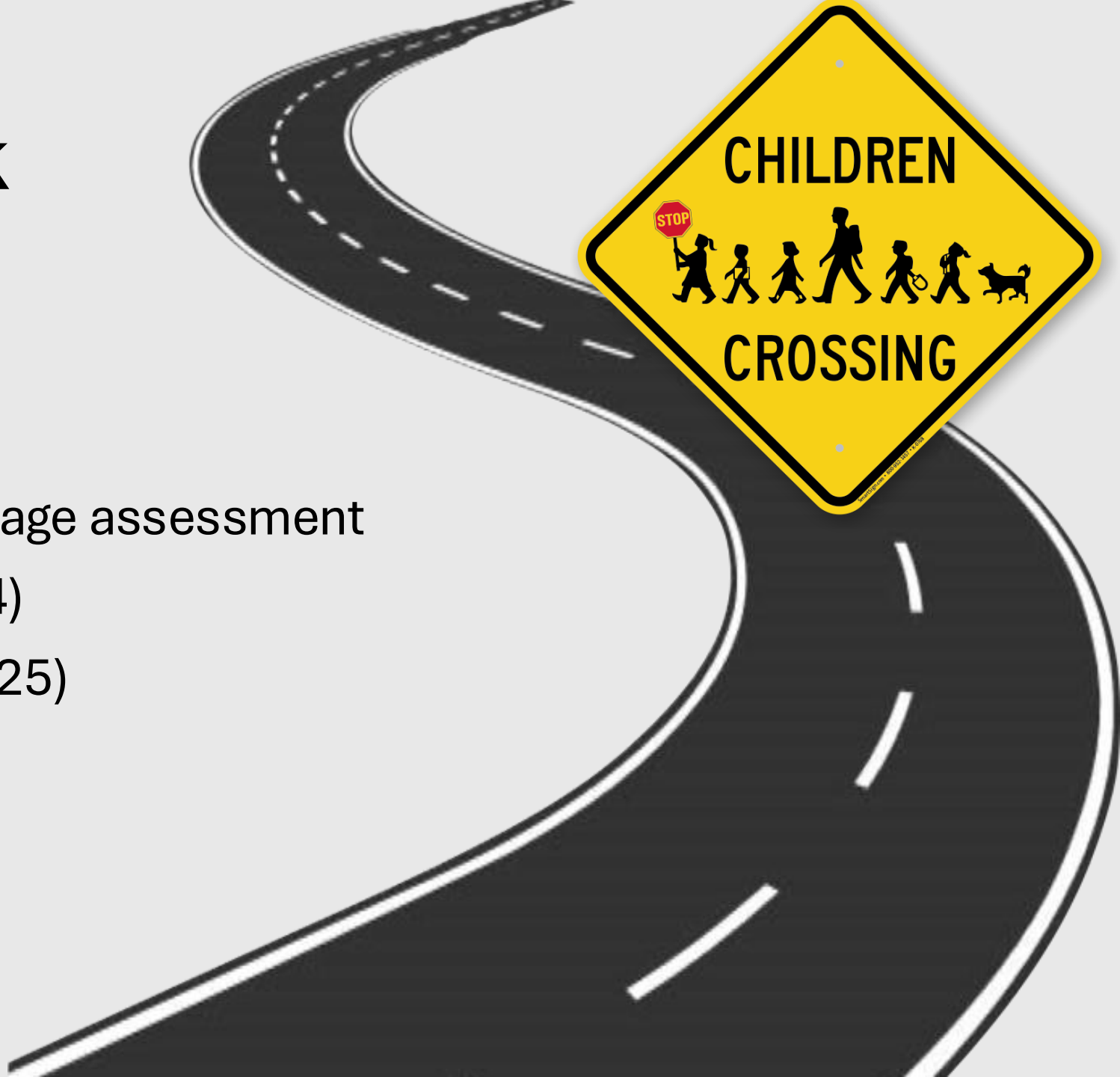


24 April 2026, Tallinn
Eesti Rakenduslingvistika Ühing (ERÜ) kevadkonverents
'Language (Teaching and Learning) in a Changing World'

Roadmap of Talk



- Background: bilingual language assessment
- KaLaKe project (2021-2024)
- Norming process (2024-2025)
- Results

Background: bilingual language assessment

- Differences in *input quantity* for each language of multilinguals, but also likely to have different *quality of input*
- Developmental Language Disorder (DLD):
  - Long-term, systemic language delay
  - Not acquiring language as expected, no other biomedical conditions
  - Language processing impairment
- Assessment instruments usually normed on monolingual populations (Freeman & Schroeder 2022)
- Bilingual children are more heterogenous in terms of background, language exposure and language skills.

Bilingual language assessment

- Risky to compare bilingual development to monolingual baseline
  - Complex skills and experience needed to adapt assessment based on monolinguals to multilingual children
- Assessment of bilingual children's language
  - Ideally based on the child's skills in **both languages**
  - Instruments must be **normed on bilingual populations**
  - Appropriate framing, description and training (De Lamo White & Jin 2011)

Language assessment in Estonia

- Growth in numbers of children in Estonian education system with home languages other than Estonian
- Standardised tests have been developed for identifying DLD among children whose first language is Estonian
  - (Padrik et al. 2013, Hallap et al. 2019)
- Until now, no tests available for children learning Estonian as a second language.

KaLaKe

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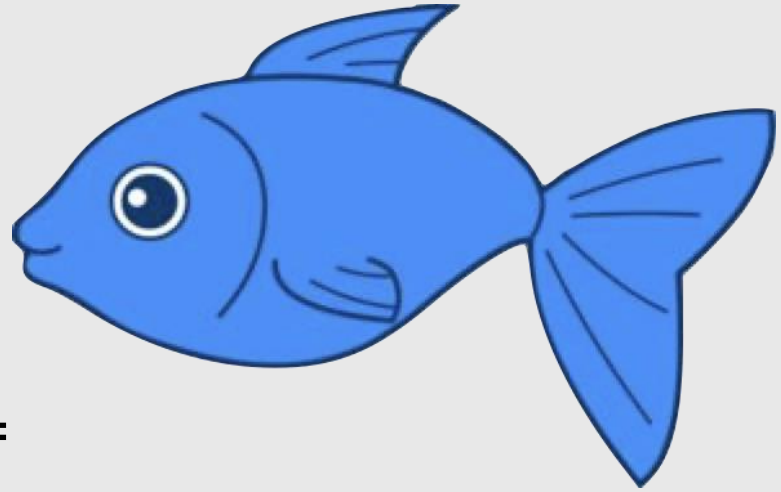
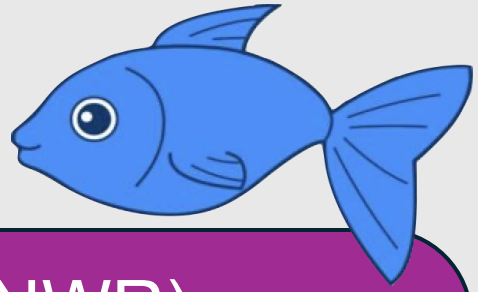


- **Ka**kskeelsete **La**ste **Ke**eleoskuse hindamisvahend =

  Bilingual Children's Language Skills assessment instrument
- 'Development of a diagnostic tool for assessing bilingual children's language skills', PI: Marika Padrik (co-I Virve Vihman; Adele Vaks, project coordinator)
  - Funded by the Estonian Education and Youth Board (HARNO, 2021-2024)
- Based on tests developed for bilingual children, adapted for Estonian
  - LITMUS (Language Impairment in a Multilingual Society) network
  - www.bi-sli.org
  - Armon-Lotem et al. (2015); see also www.litmus-srep.info
- Training Speech and Language practitioners in May

KaLaKe



Nonword repetition task (NWR)

- Measures language processing ability, incl. phonological memory & representation, production, articulatory skill
- Independent of language knowledge: can use with children with little Estonian

Crosslinguistic Lexical Task (CLT)

- Measures knowledge of Estonian vocabulary
- Closely tied to language exposure

Sentence Repetition Task (SRT)

- Measures both language processing and linguistic knowledge
- Involves lexical, syntactic, semantic knowledge
- Ability to decode and encode sentence

SRT in Russian

- Measures same skills as SRT in Estonian, but in home language
- DLD children have difficulty in both

KaLaKe

Nonword repetition task (NWR)

- 36 items
- 2–4 syllables

Crosslinguistic Lexical Task (CLT)

- Naming & comprehension
  - Nouns & verbs
- 4 sub-tests
- 30 items each

Sentence Repetition Task (SRT)

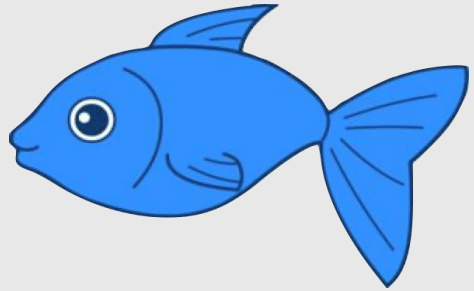
- 30 items
- 4–8 words/stc
- 10 structures
- Challenging items both cross-ling and Est-specifically

Sentence Repetition Task, Russian (R-SRT)

- 30 items, 4–9 words per stc.
- Meir & Novogrodsky (2020)
- Recorded stimuli and made illustrations for KaLaKe

Norming

- Aims to distinguish typical development (TD) & DLD
  - for bilinguals & monolinguals
- Norming sample, n=465:
  - 265 bilingual children
    - 207 TD bilinguals: successive, with Estonian pre-school for at least 2 years, could use Estonian for basic communication
    - 58 DLD, 21 (37.5%) of DLD participants were simultaneous bilinguals
  - 200 monolingual children
    - 52 TD, 48 DLD
  - Age 4;6–6;11
  - 47% boys, 53% girls

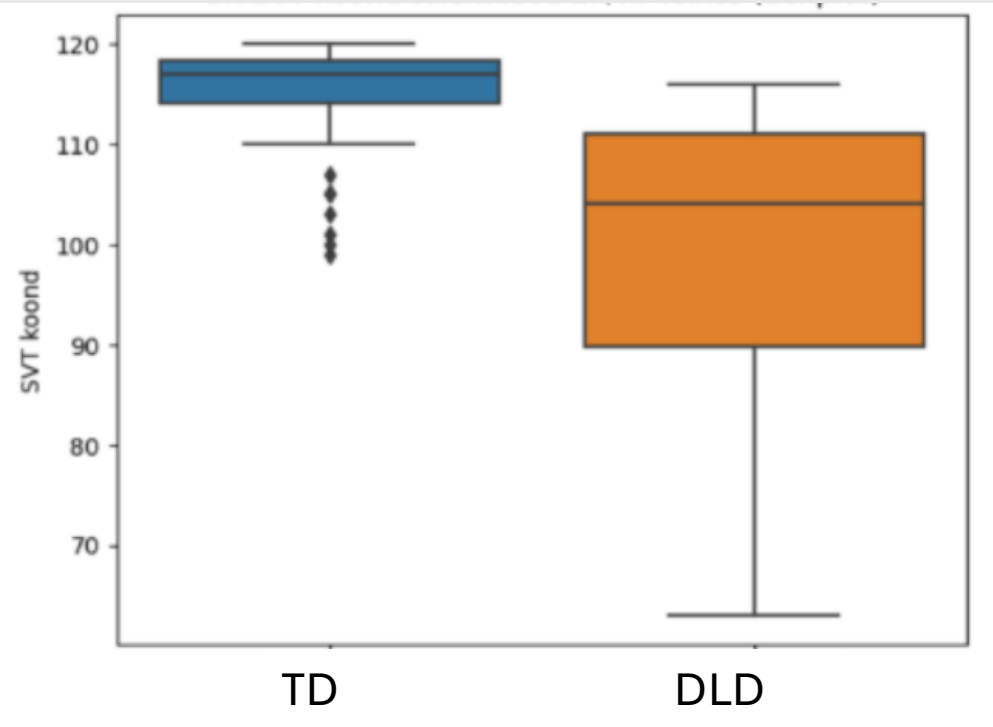


Norming

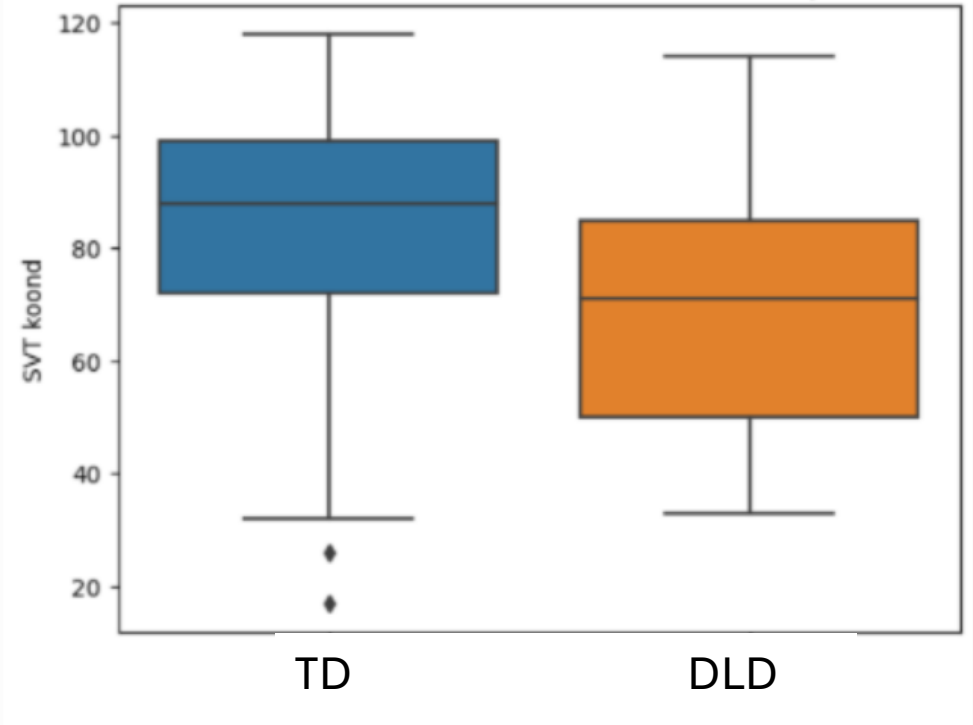
- Norming sample:
  - 265 bilingual children
    - 207 TD, 58 DLD (based on SLT's assessment)
    - 14 children's Russian S-Rep score indicated further analysis to determine TD/DLD status (7 TD, 7 DLD). Prior to norming, each of their test scores was analysed for SD from group mean. Based on the combined test scores, the children's group was reassessed. All 14 remained as initially assessed.
  - 200 monolingual children
    - 52 TD, 48 DLD

Norming results: CLT total score (Vocabulary)

Monolinguals

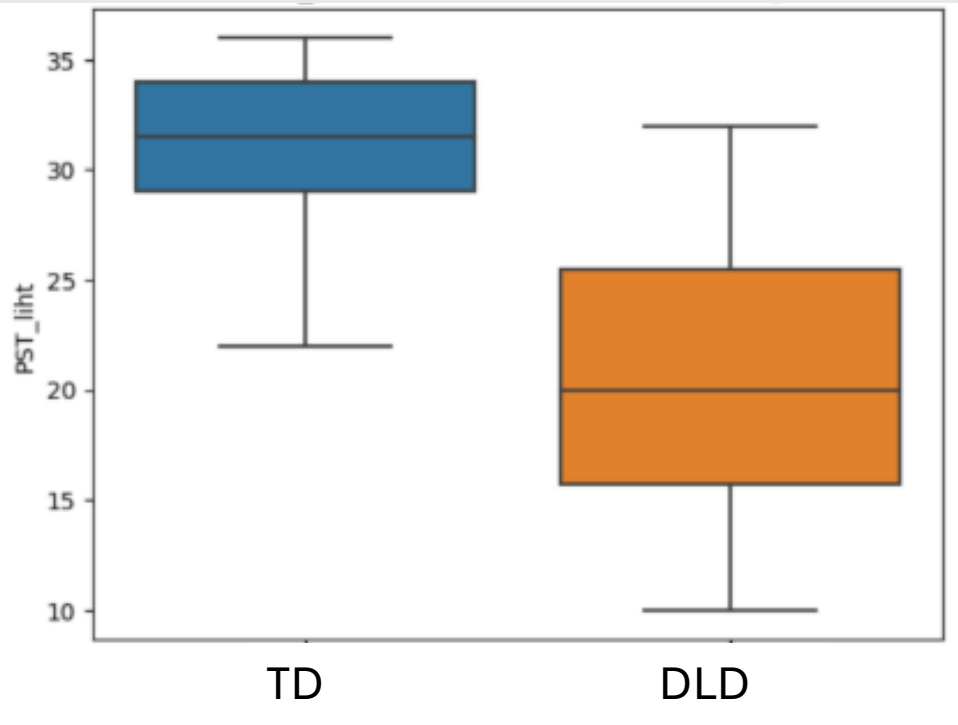


Bilinguals

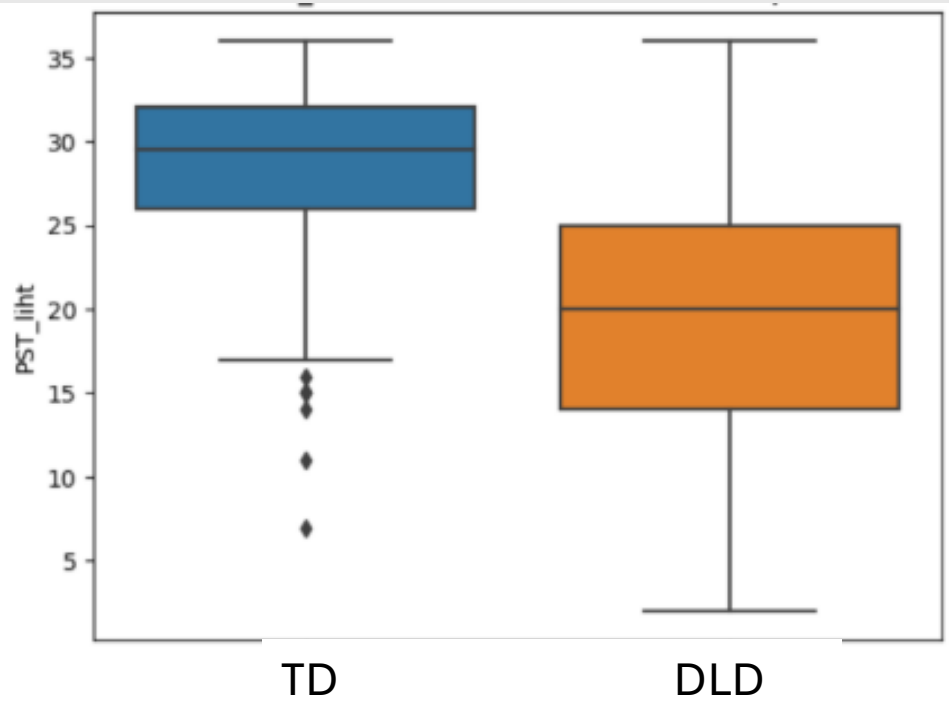


Norming results: Nonword repetition

Monolinguals

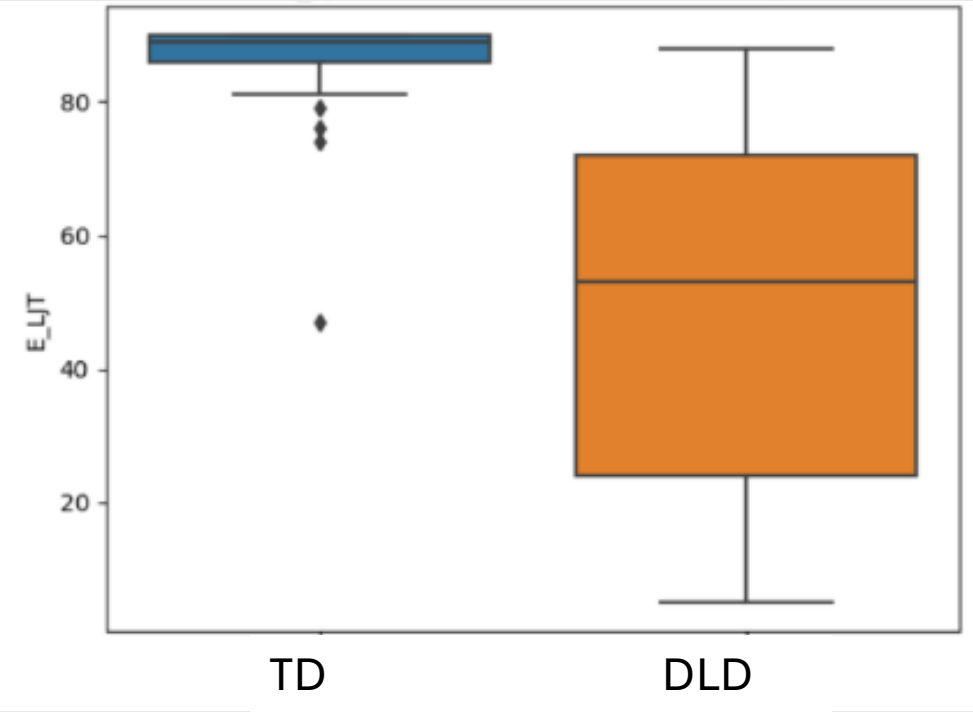


Bilinguals

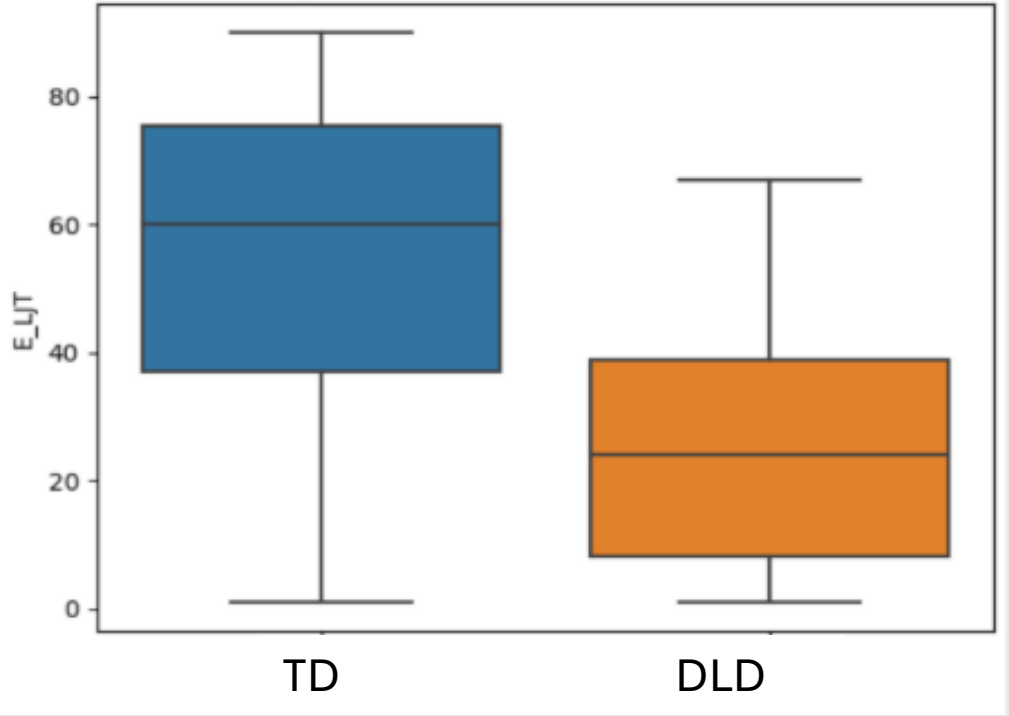


Norming results: S-Rep (in Estonian)

Monolinguals

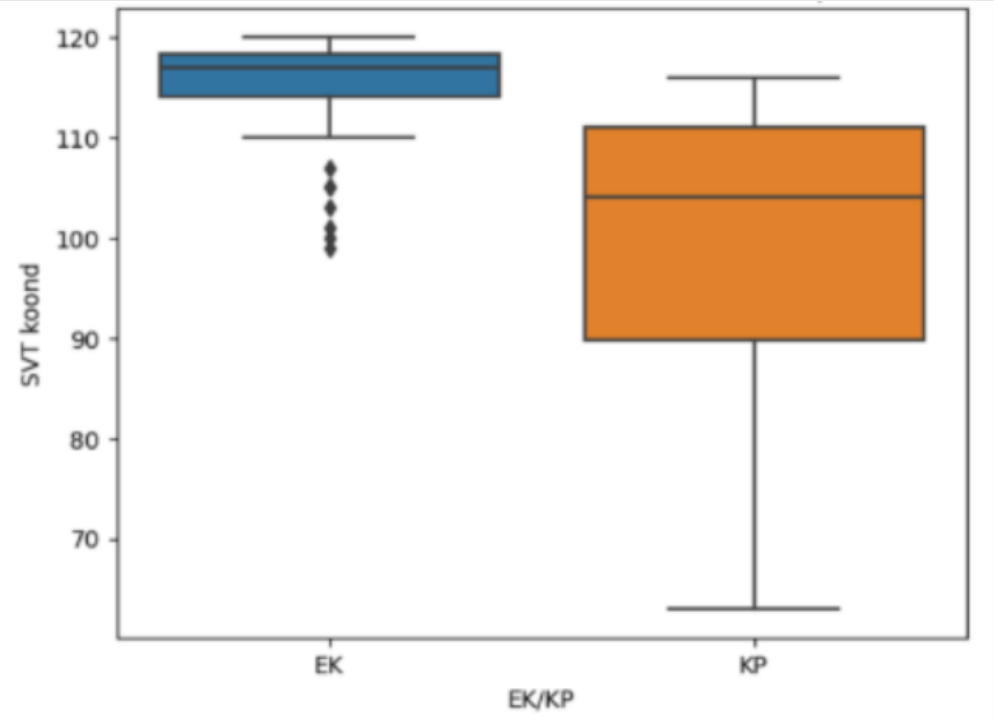


Bilinguals

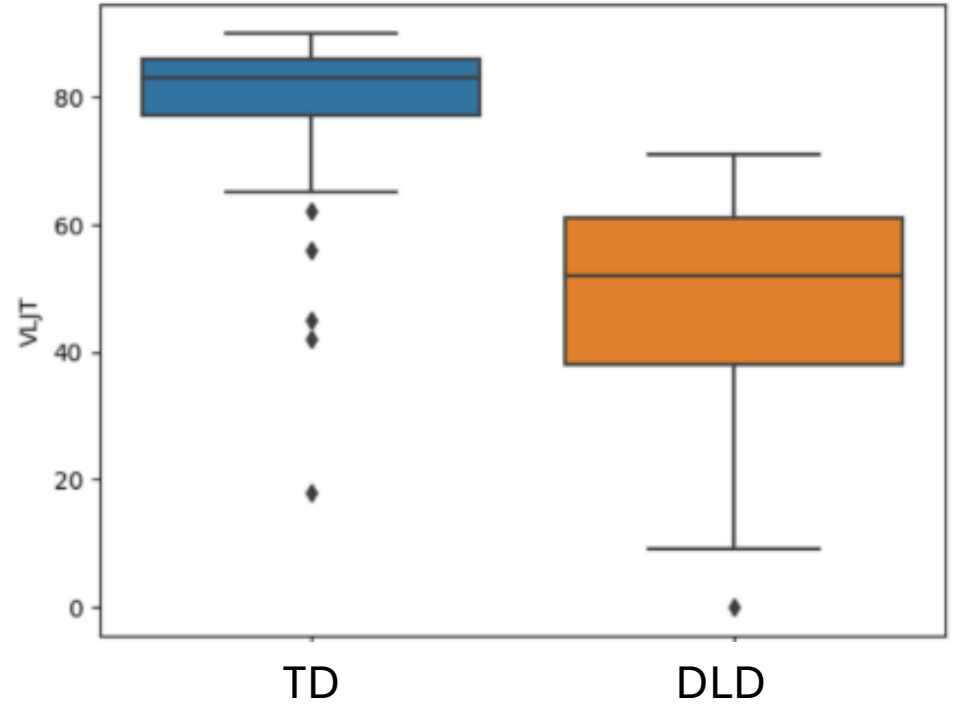


Norming results: S-Rep (in Russian)

- Very similar to **monolinguals' results in Estonian**



Bilinguals

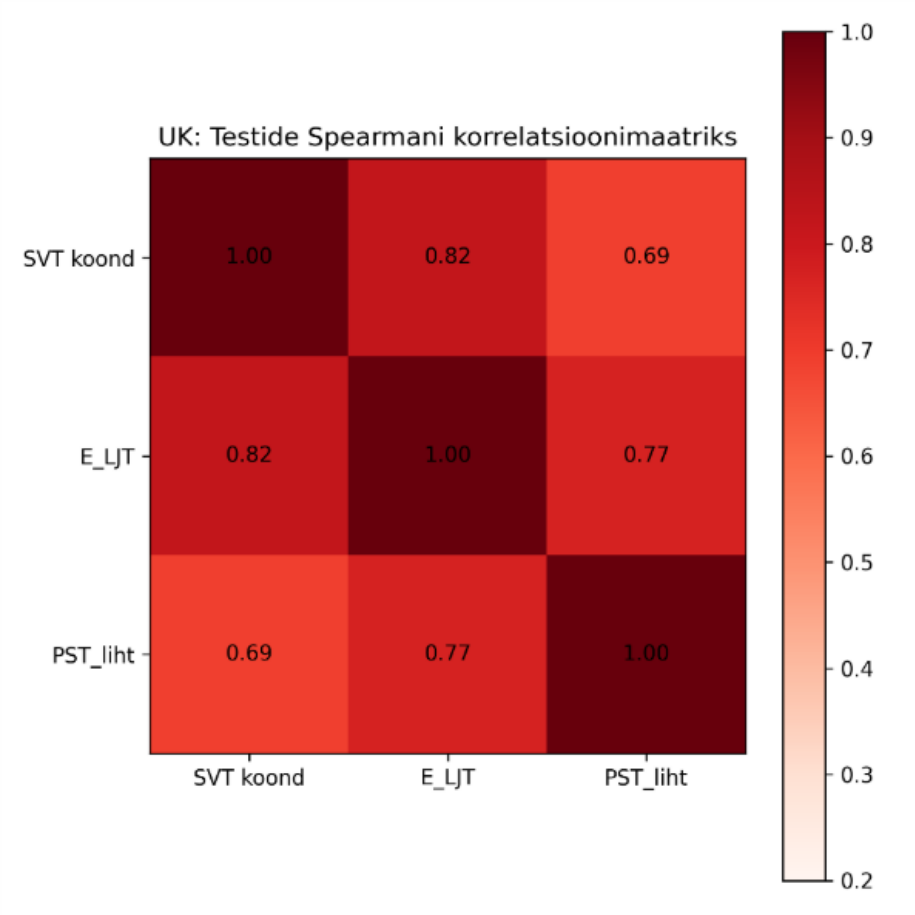


Summary (KaLaKe norming results)

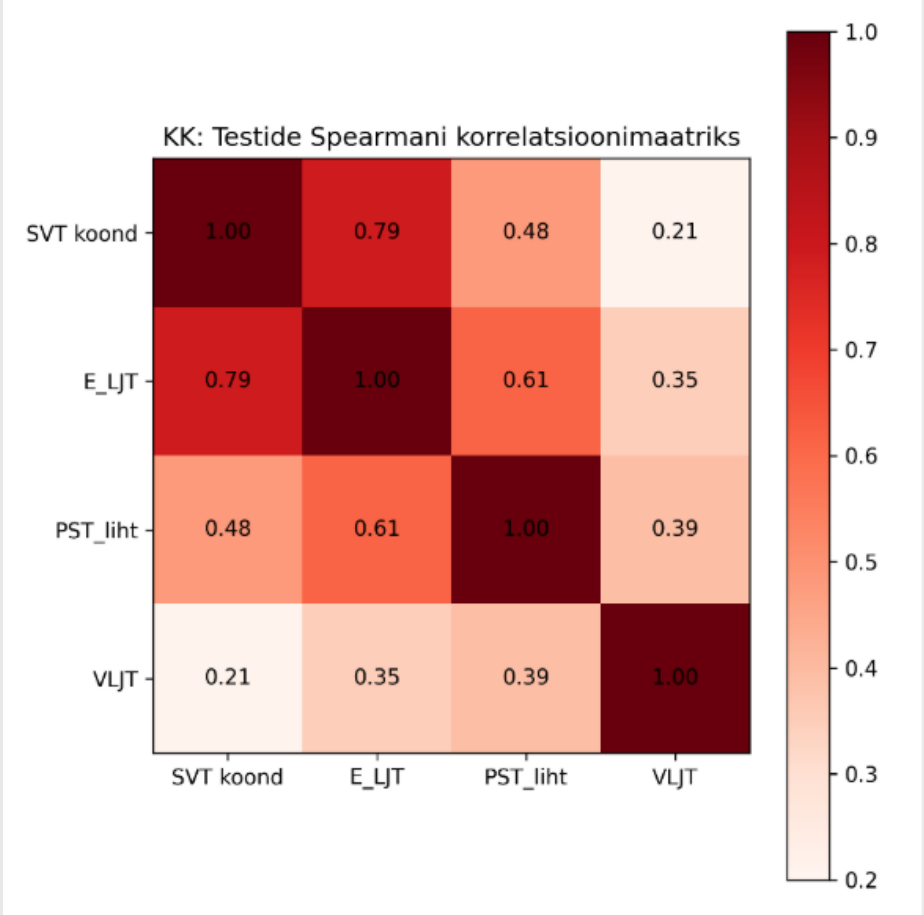
- Vocabulary knowledge (CLT):
  - Monolingual TD > Monolingual DLD > Bilingual TD > Bilingual DLD
- SRT and NWR:
  - Monolingual TD > **Bilingual TD > Monolingual DLD** > Bilingual DLD
  - These tasks involve language processing skills
    - impaired in DLD children, monolingual and bilingual alike.
  - Monolingual and bilingual DLD children's NWR scores very similar
    - less dependent on linguistic knowledge, relying on phonological processing.

Correlations between tests

Monolinguals

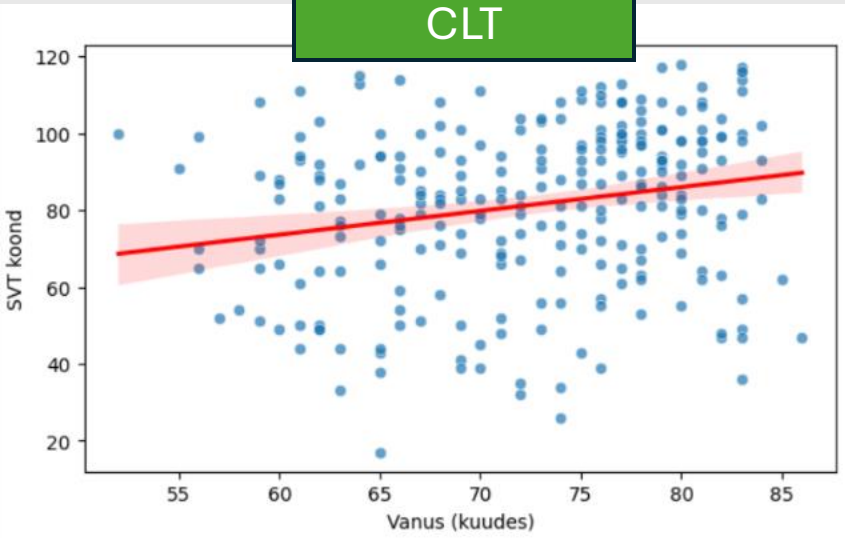


Bilinguals

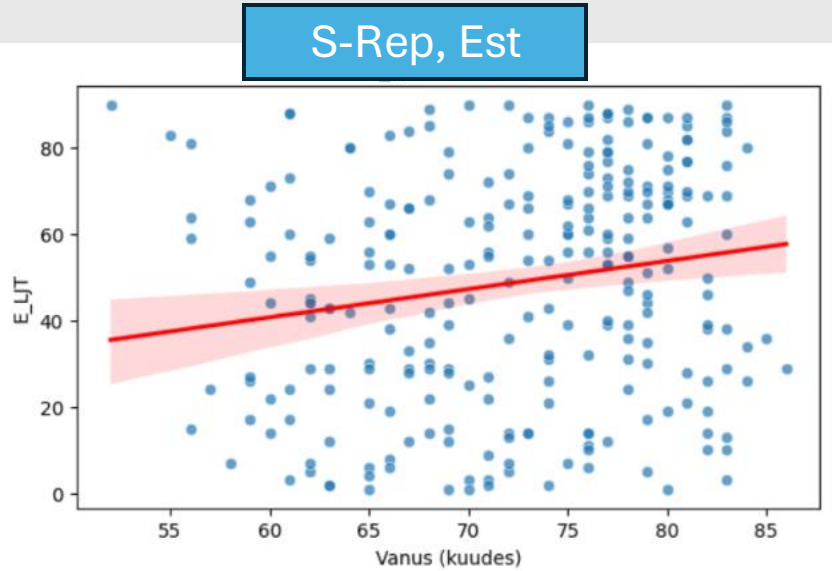


Scores and age

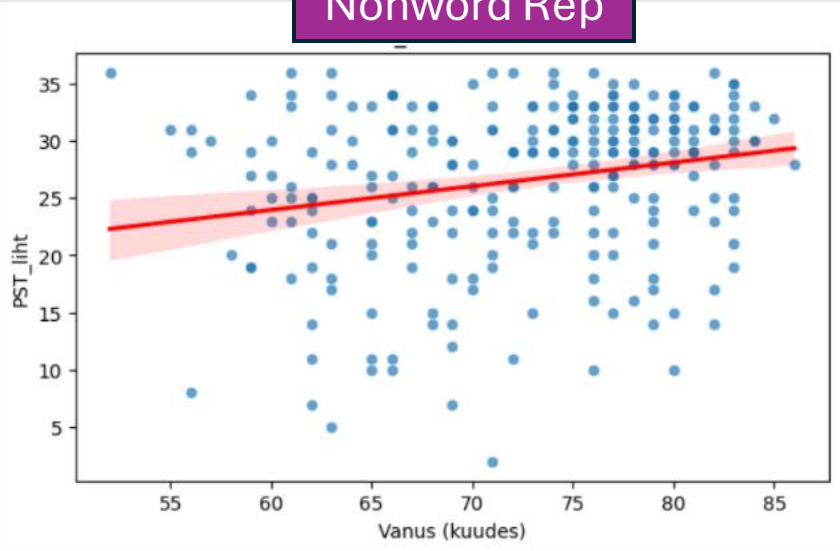
CLT



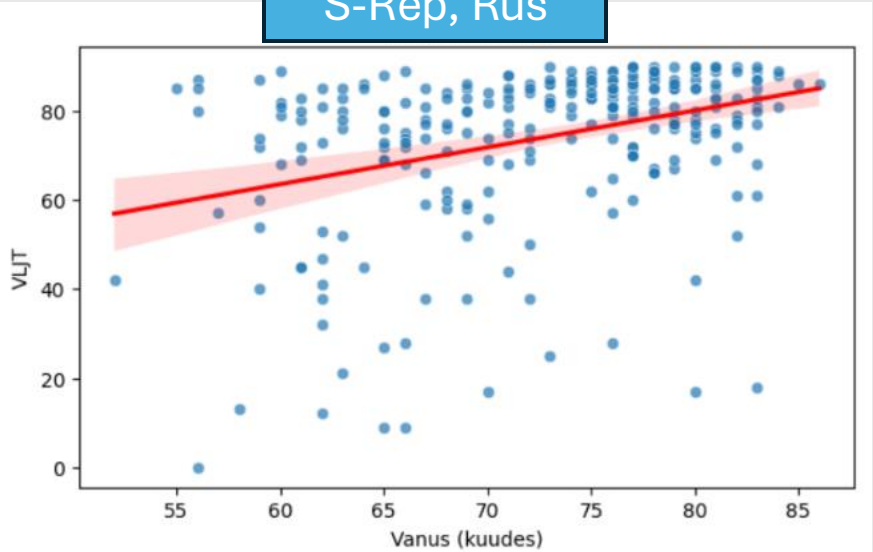
S-Rep, Est



Nonword Rep



S-Rep, Rus



Accuracy of the toolkit

- **Test sensitivity:** proportion of DLD children accurately identified.
- **Test specificity:** proportion of TD children accurately identified.

Based on the norms established for use with the KaLaKe toolkit:

	Bilinguals			Monolinguals		
Task	**Sensitivity**	**Specificity**	**AUC**	**Sensitivity**	**Specificity**	**AUC**
CLT	68%	62%	0.68 WEAK	90%	77%	0.90 GOOD
SRT Est	86%	65%	0.82 GOOD	92%	90%	0.96 V GOOD
SRT Rus	94%	93%	0.98 V. GOOD			
NWR	86%	69%	0.84 GOOD	85%	81%	0.92 V GOOD
Combined with R-SRT	**98%**	**95%**	**0.99 V. GOOD**			
Combined, w/o R-SRT	86%	78%	0.88 GOOD	**96%**	**90%**	**0.97 V GOOD**

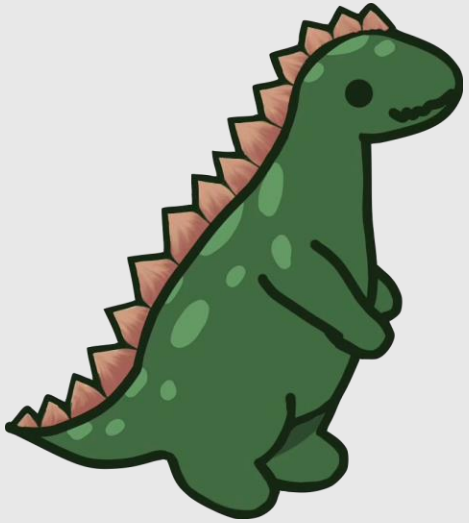
Is any single test sufficient?

- **Most reliable result: combined test scores**
  - Reduced rates of false positives (DLD assessment for TD children) and false negatives (TD assessment for DLD children).
  - No single test score is sufficient for identifying impairment.
- For bilinguals, Russian SRT scores contribute significantly to accuracy of identification of DLD, and they are
  - Similar to Estonian monolinguals' SRT-Estonian scores
  - And very similar to Russian monolinguals Russian SRT (no sig. difference).
- The KaLaKe test doesn't replace existing 5–6-year-old language test (Padrik et al., 2013), which aims to describe children's language profile
  - Not sufficient for setting goals for speech and language therapy.

Thanks to...

HARIDUS- JA NOORTEAMET

- HARNO (Estonian Education & Youth Board) for funding the project and supporting the technical aspects
- Merit Hallap
- SLTs who have helped with testing
- Kaisa and Meelo Kriisa for designing pictures for the Estonian and Russian SRT tasks



All the students who have tested children and written theses on various stages of the project

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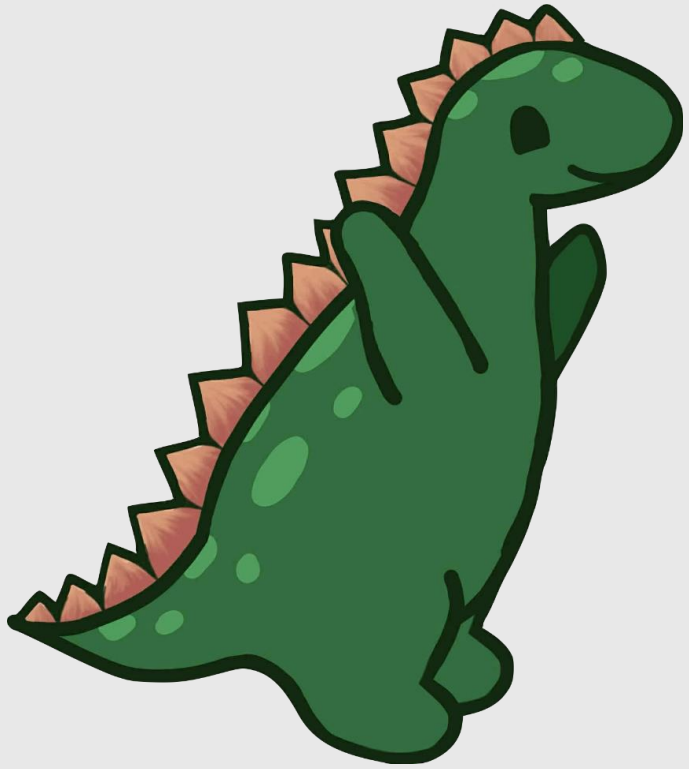
- Laura Grihin 2020
- Olga Fil 2021
- Katrin Pree 2021
- Reelika Voitk 2021
- Kristina German 2021
- Viktoria Tereštšuk 2022
- Annika Labent 2023
- Ere Tuunas, Hanna Marta Sirel 2023
- Julia Tross 2025
- Paula Nõmme 2026

Questions?



Thanks for listening!
Aitäh!

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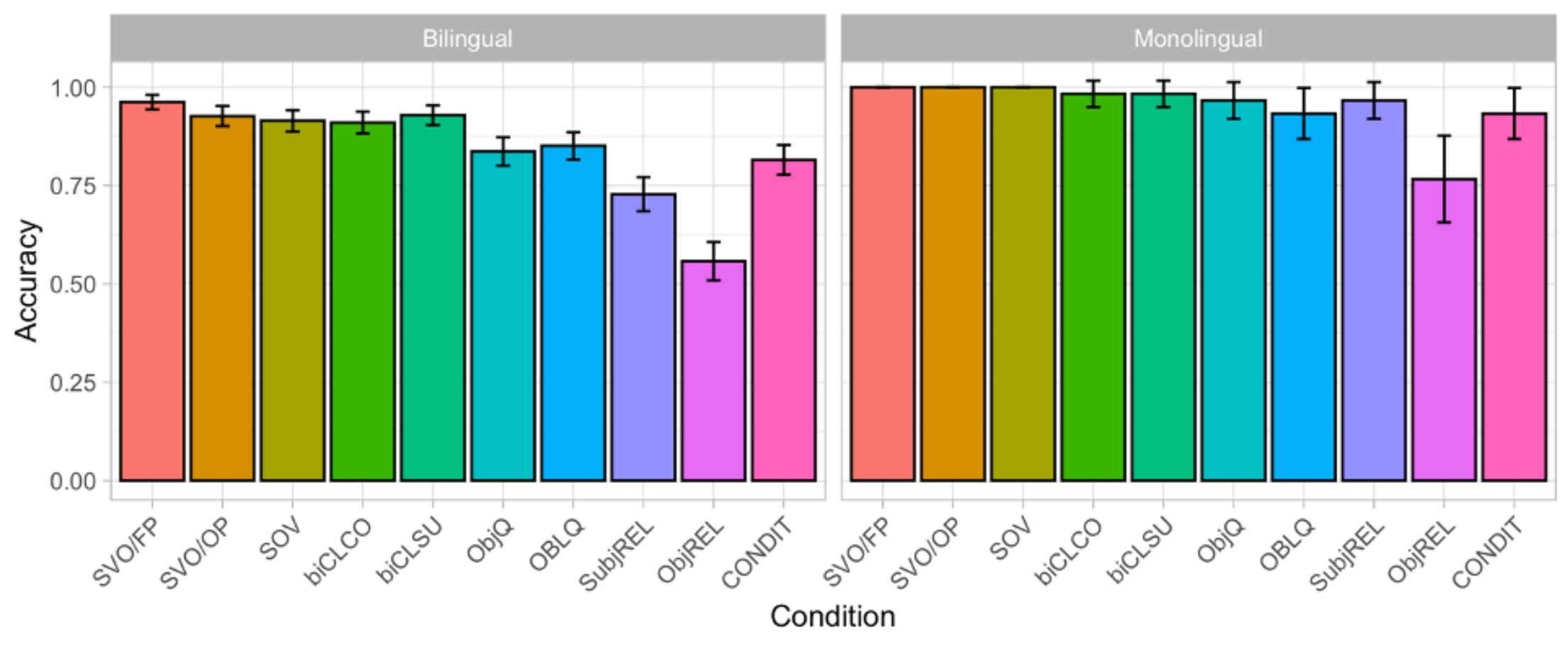
Side note: Comparison of children bilingual with Russian HL across countries

- Children speaking Russian as a Heritage Language have been tested using the same S-Rep task in multiple countries
- A sample of 166 children aged 4–9
- Bilinguals acquiring Russian alongside:
  - Cypriot Greek (n=20)
  - English (n=19)
  - Estonian (n=31)
  - Finnish (n=21)
  - Hebrew (n=32)
  - Swedish (n=20)
- 20 Monolinguals

- Collaboration with Natalia Meir; Stanislava Antonijevich-Elliot; Sergey Minor; Sviatlana Karpava; Natalia Ringblom; Gali Bloch; Tetiana Vysotska; Natalia Mitrofanova

S-Rep results in Russian as a Heritage Lang: Comparison across sentence structures



S-Rep results in Russian as a Heritage Lang.: Cross-country comparison