Vocabulary Knowledge and Word Recognition at the Reading/Spelling Interface

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Julia Edeleva (TU Braunschweig Germany)
Zeynep Arslan (Friedrich Schiller University Jena)

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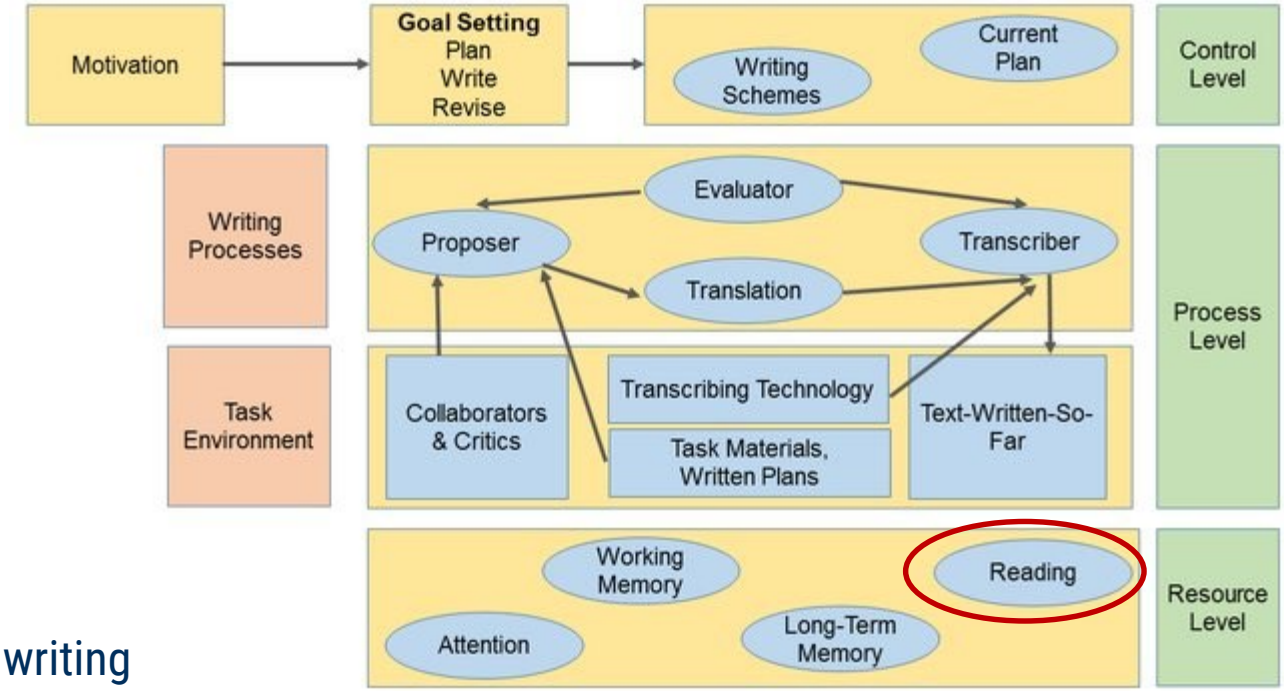
Outline

- The Relation between Reading and Writing
- Reading Fluency and Spelling Inventory
- Reading and Spelling Skills in Adult Emergent Readers with History of Migration
- Summary and Questions

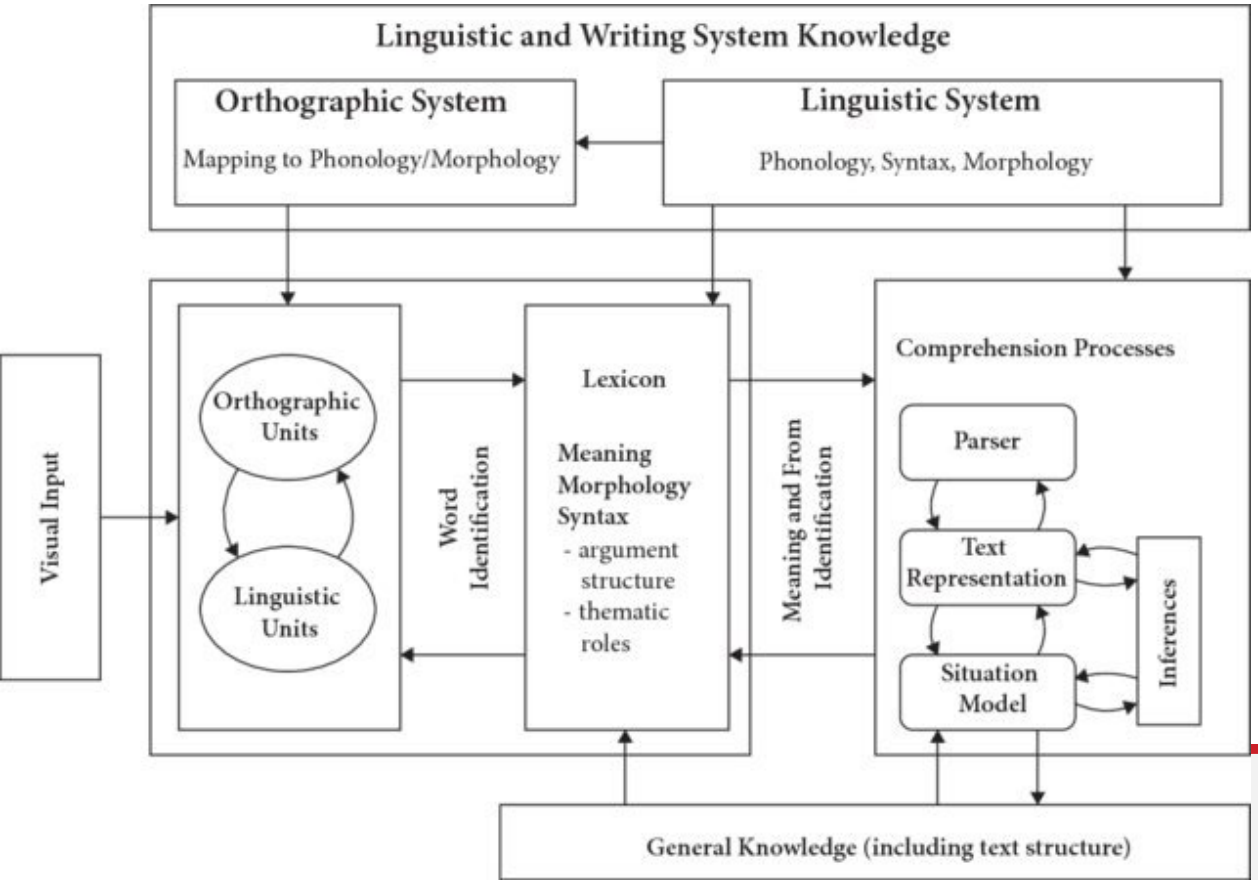
Reading-Writing Relations in Models of Reading and Writing

Hayes (2012) and Breadmore et al. (2019) model of writing.



Functional account of the reading-writing relations
Reading as a resource for writing

The Multi-Component View of Reading: The Reading System Framework by Stafura & Perfetti (2017)

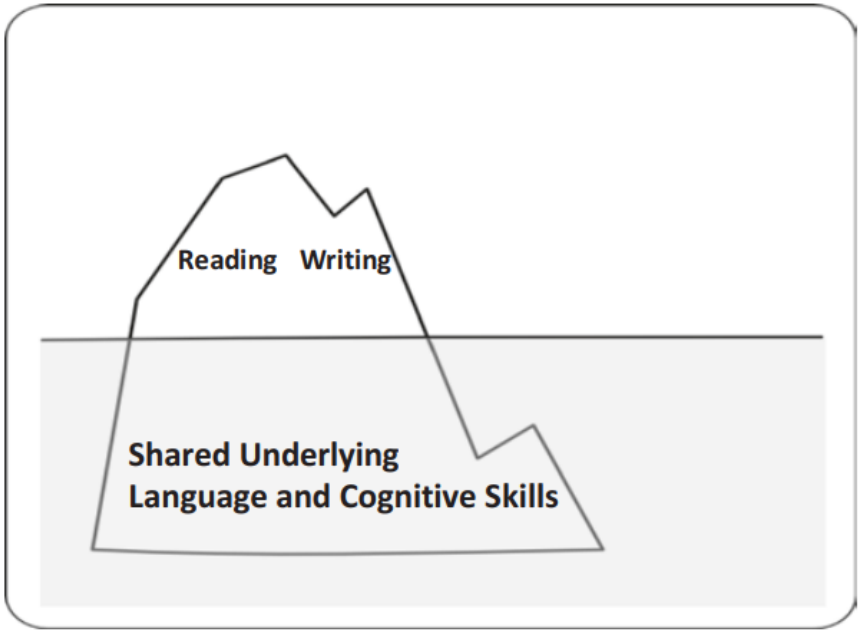


Reading relies on individual knowledge components within a language-cognitive architecture

- Linguistic knowledge
- Orthographic knowledge
- General knowledge

The Reading-Writing Relations

- Shared Knowledge (Fitzgerald & Shanahan, 2000)
  - metaknowledge (purposes and functions of reading and writing)
  - domain knowledge (vocabulary and content knowledge)
  - knowledge about universal text attributes (graphophonics)
  - processing strategies



The Interactive Dynamic Literacy Model (Kim, 2020)

Reading and writing emerge from multiple shared knowledge cognitive processes in visual, phonological, and semantic systems and memory

Reading and writing are not modular or unidirectional, but instead interact, influence, mutually reinforce and develop together

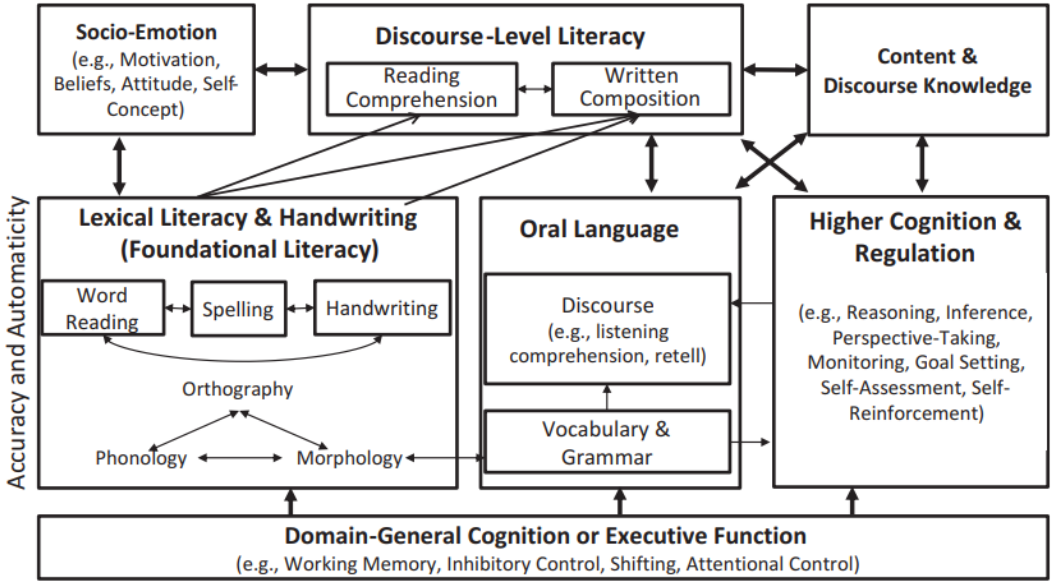


Fig. 2.3 Interactive dynamic literacy model

The Interactive Dynamic Literacy Model (Kim, 2020)

Dynamic relations between component skills as a function of (a) development; (b) **learner characteristics (language learner status, learning disability)**, (c) reading and writing measurement

„Although both reading and writing draw on a highly similar set of skills and knowledge, **the extent to which skills and knowledge contribute to reading versus writing is likely different**, resulting in dissociations between reading and writing“ (Kim, 2020)

Different magnitudes of reading-wiriting relations as a function of grain size, i.e. the relations at the lexical level literacy skills is stronger than at the discourse level literacy skills

Students with reading difficulties are likely to have writing difficulties („the co-morbidity hypothesis, Kim 2020)

- *ELIKASA: The development of basic literacy skills by contrastive literacy education*

- **Homogenous groups regarding L1**: Turkish, Arabic, Farsi-Dari, trained bilingual teachers (German and L1), contrastive literacy approach

- The progress of literacy acquisition in emergent adult literates in German as a second language with respect to their **basic reading and spelling skills**

L1 Arabic (N = 62, 2 male); L1 Turkish (N = 23; all female); L1 Farsi-Dari (N = 32, 8 male)

- not all the participants provided their written consent to make audio-recordings of their read-aloud performance
- particularly Farsi-Dari speakers display limited to no first language literacy

Measuring Reading Fluency and Spelling Skills

Reading fluency

Three Ralf-texts from Fellmer & Feldmeier (2012)

all the three conform to A1 in terms of lexis (~ 80% of lexical coverage according to the language level evaluator by L-Pub GmbH)

Spelling skills

Spelling Inventory German (Do Manh et al., 2021)

- Knowledge of (partial) regularities of the German writing system
- Knowledge of transparent correspondence rules
- Knowledge of syllables, morphemes and individual phenomena such as elongation and sharpening,
- orthographically correct writing (e.g., with loan words)

Measuring Spelling:
Spelling Inventory German

Spelling Inventory (Bear et al. 2020)

Spelling Inventories for L1 and L2 learners of different age groups, so far: English, Spanish, Korean, Chinese.

Dictated words are evaluated with respect to orthography: three language-independent layers of orthography, developed for L1 and L2 learners of different age groups (Invernizzi & Hayes 2004, Templeton & Bear 2018, Treiman, Stothard & Snowling 2013)

3 progressive layers

- **letter-name alphabetic**, e.g. <fish> → <fes>
- **within word pattern**, syllable structure, e.g. <snake> → <snaik>, <popping> → <poping>
- **meaning**, e.g. <invitation> → <invutation>

Spelling Inventory - Procedure ELIKASA

- Spelling Inventory by Bear at al. (2020) adapted for German (A1), Turkish, Arabic, Farsi-Dari
- 30 items, max. duration 20 min.
- Each item is read out 3 times (1x in sentence context): trial item „Bus“: Bus – Nayla ist im Bus. – Bus
- Abort possible if too many target items are written incorrectly or not at all, or frustration level too high
- Resource-oriented evaluation

Bear et al. (2020) designed for L1 and L2 learners of different age groups, so far: English, Spanish, Korean, Chinese

Spelling Inventory German - task example

		emergent	letter name - alphabetisch (Grapheme)				bedeutungsunmotiviert within word patterns (Silben)				bedeutungsmotiviert Affixe & Basismorpheme (Flexion und Derivation)				Feature Points	richtig geschriebene Wörter
		late	early	middle	late		early/ middle	middle	late		early	middle	late			
		Konsonanten-schreibungen	Konsonanten-schreibungen		Vokalschreibungen		Dehnung/ silben-trennendes h	Schärfung/ Silben-gelenk-schreibung	Konso-nanten-cluster	Reduktions-silben-schreibung	Flexions-endungen/ Auslaut-verhärtung	Affixe mit Reduktions-silben	Affixe mit Vollsilben	Basis- und Wurzel-morpheme		
		Initial	Final	Poly-graphen	Einzel-vokale	Diphthonge (mit vokalischem r)										
1	Hut	h	t		u											
2	Fisch	f		sch	i											
3	Topf				o				pf							
4	groß				o				gr							
5	Käse	k			ä					se					3	1
...																
27	Frühling						üh		fr				ling	früh		
28	unbequem												un			
29	verheiratet										et	ver		heirat		
30	Thermometer					er								Thermomet er		
	gesamt	**/8**		**/5**	**/8**	**/5**	**/7**	**/5**	**/8**	**/5**	**/6**	**/3**	**/4**	**/5**	**/68**	**/30**

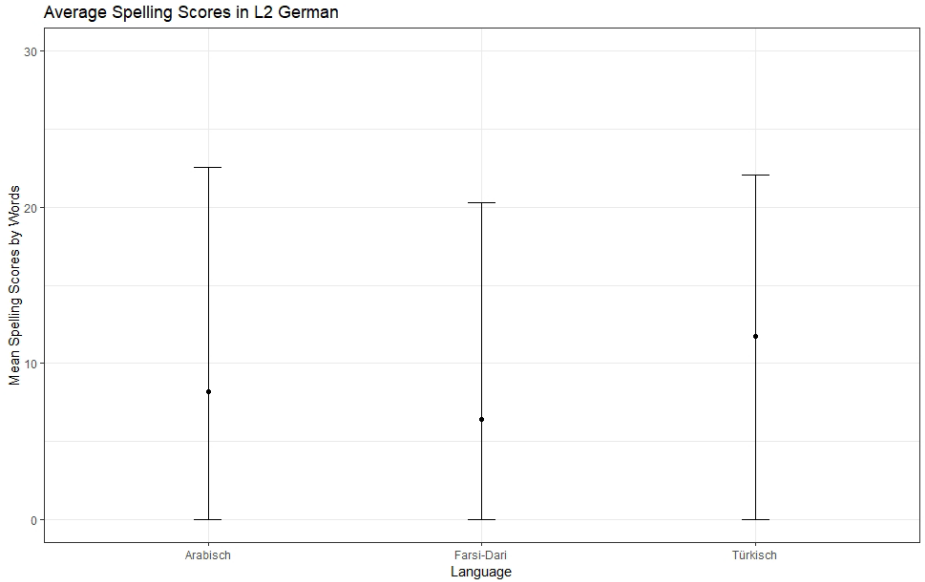
Dictation: Target Item: **Käse** – Feroz isst zum Frühstück ein Brot mit **Käse**. – **Käse**

Cheese – *Feroz eats bread with **cheese** for breakfast.* - ***Cheese***

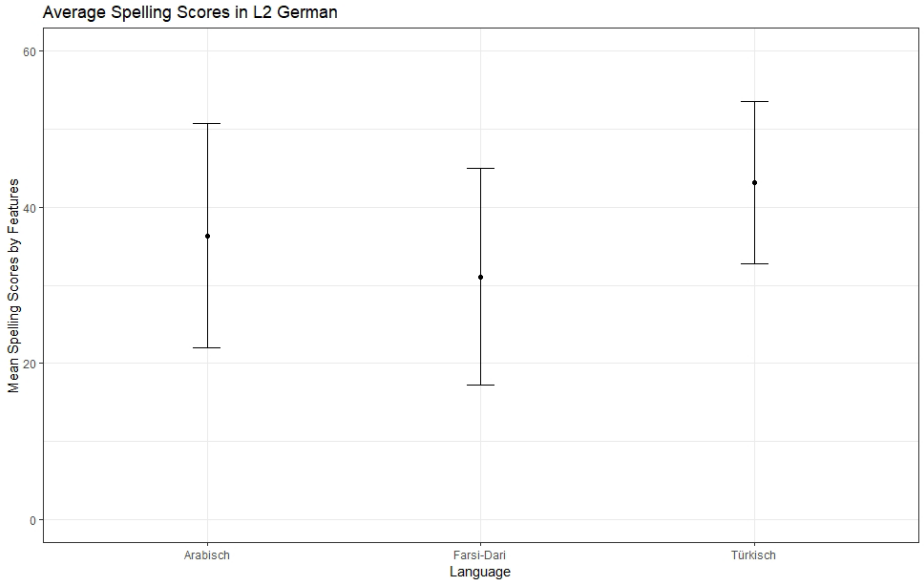
Frühling – Nach dem Winter kommt der **Frühling**. – **Frühling**

Spring - *After winter comes **spring**.* - ***Spring***

Average Spelling Scores in L2 German



by the number of words realised correctly



by the number of features realised correctly

Measuring Reading Fluency: Spelling Inventory German

Reading Fluency as a Diagnostic Tool

Identification of...

Words

- Automation
- Accuracy

Sentences

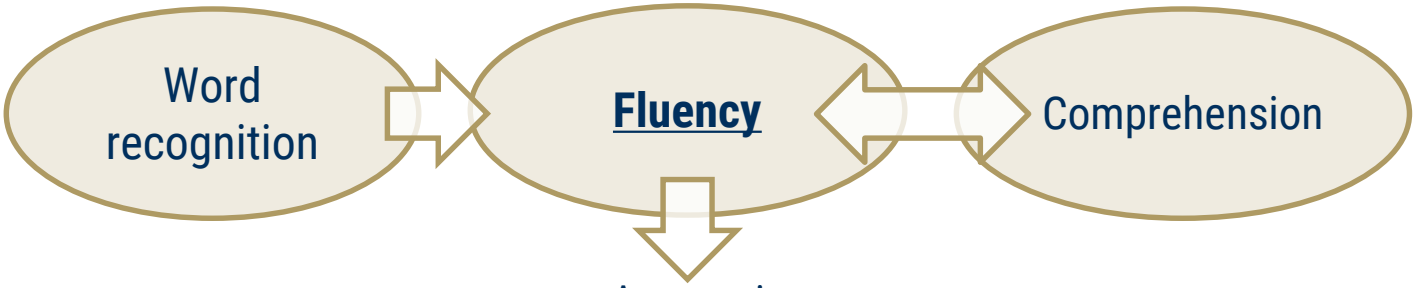
- Speed
- Intonation

The ability to read texts…
… automated at word level,
… without errors,
… at an appropriate pace and
… in a prosodically sequenced manner.

Rosebrock et al. 2011

Rasinski 2003; Rosebrock/ Nix 2006

A Bridge in Reading



- Automation
- Speed
- Accuracy
- Prosody

Reading fluency is a predictor of reading ability

Richter & Müller 2017; Schaffner 2009

Pikulski/ Card 2005; Rosebrock et al. 2021

Benchmarks in Reading Fluency

Studies measuring **silent reading** of **students & monolingual adults**:

- 100-200 wpm, extracting information from texts
- 250-300 wpm, normal reading modus
- 400-600 wpm, skimming texts

Speed **reading aloud: Adults**
under 200 WpM (good readers)
120-150 WpM (professional readers, e.g. Harry Potter audio books in German: 115 WpM)

for **school practice**: If you make more than five mistakes per 100 words, you will hardly be able to understand the text.

Rosebrock et al. 2021; Rosebrock/Gold 2018

Measuring Reading Fluency in ELIKASA

Paper-based: accuracy in word decoding

Text type:
3 texts in L2 German (level A1 GeR, increasing level)
3 newspaper articles in L1
test subjects read every text for 1 min. aloud

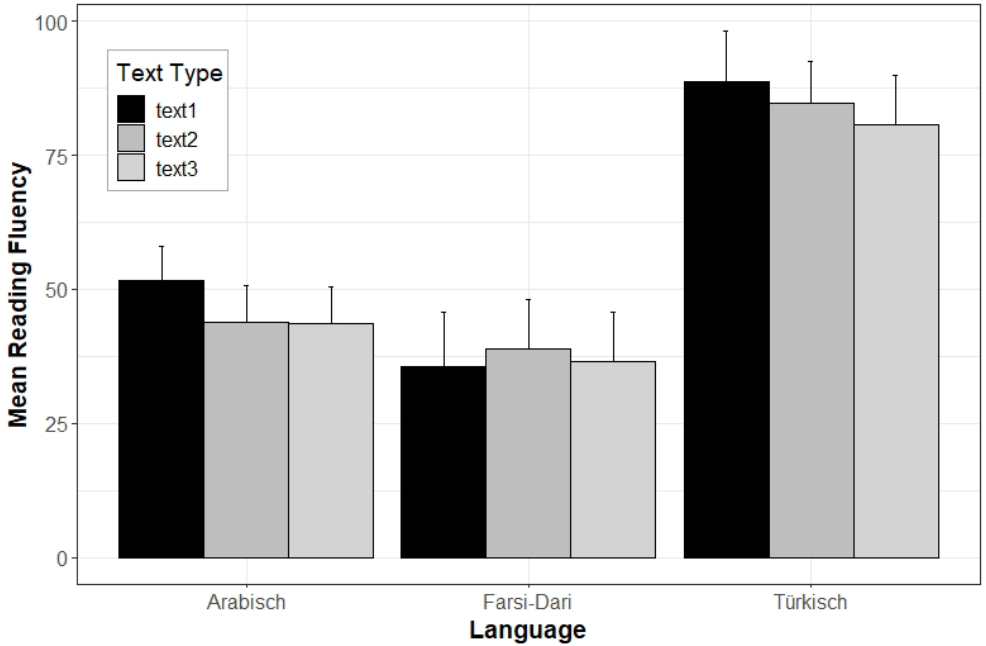
Analyse: correct words per minute (reading protocol)
rater with L1

number of words read aloud in 1 min. - miscues = cwpm

e.g.: 100 words/min.– 5 miscues = 95 cwpm

Average Reading Fluency in cwpm for L2 German grouped by L1

- Avg. reading fluency
  - Text 1 ~ 58,18
  - Text 2 ~ 51,2
  - Text 3 ~ 49,7
- L1 Turkish >>> L1 Arabic >>> L1 Farsi-Dari

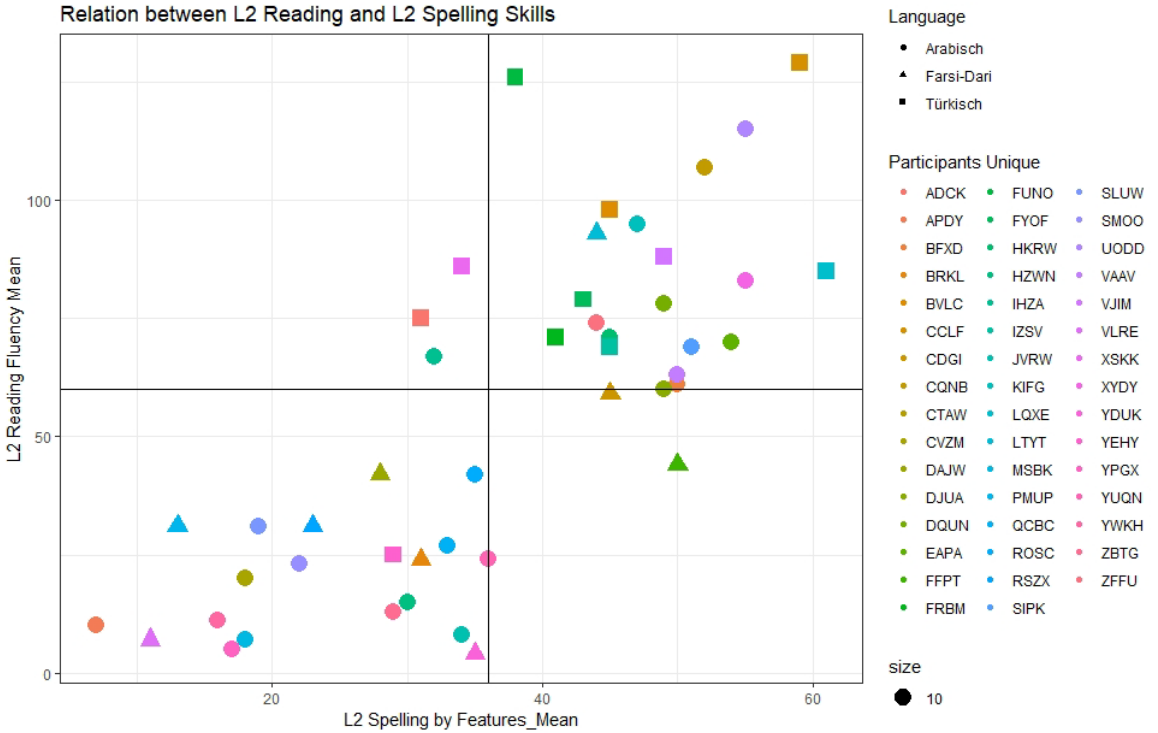


„Students with reading difficulties are likely to have writing difficulties“
(Kim, 2020)

Results

Median split at correct words per minute (cwpm) and correctly realised spelling features

„Students with reading difficulties are likely to have writing difficulties“ (Kim, 2020)

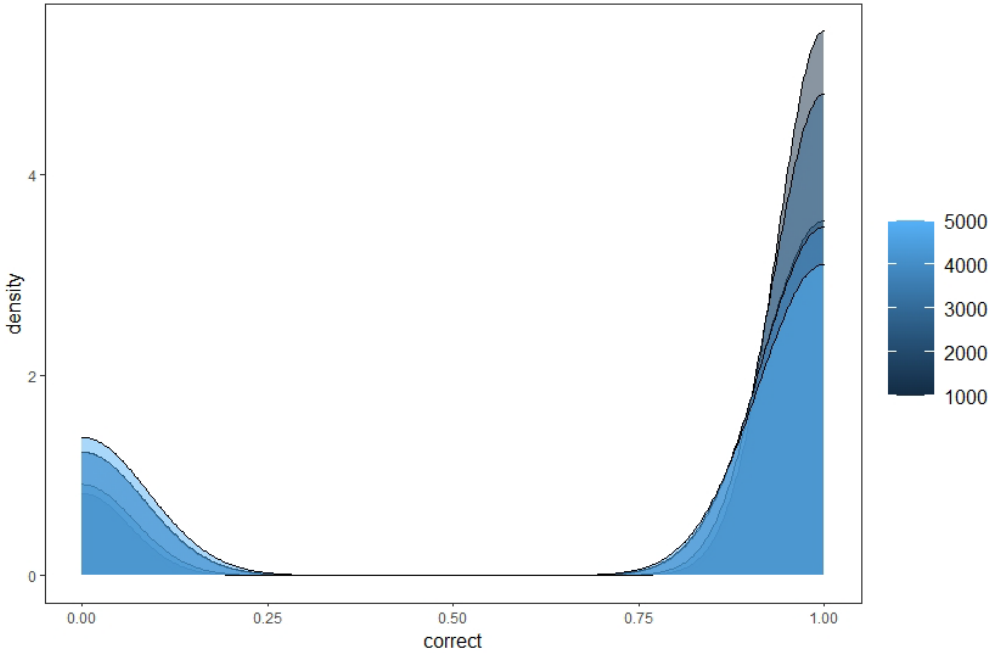


„Although both reading and writing draw on a highly similar set of skills and knowledge, **the extent to which skills and knowledge contribute to reading versus writing is likely different**, resulting in dissociations between reading and writing“ (Kim, 2020)

The Role of Vocabulary in Reading and Spelling

Tailor-made vocabulary test:

- Picture selection with one target and three competitors;
- based on frequency families, but the items remain within the A1 level of CEFR;
- 5 sets; frequency decreasing with every higher set



Response distributions on the vocabulary test by set

The Role of Vocabulary in Reading and Spelling

Internal consistency within a set (Kuder-Richardson criterion for dichotomous variables)

	Raw Consistency	Consistency correcting for item difficulty
Set 1000	0,78	0,76
Set 2000	0,79	0,74
Set 3000	0,82	0,80
Set 4000	0,76	0,68
Set 5000	0,75	0,68

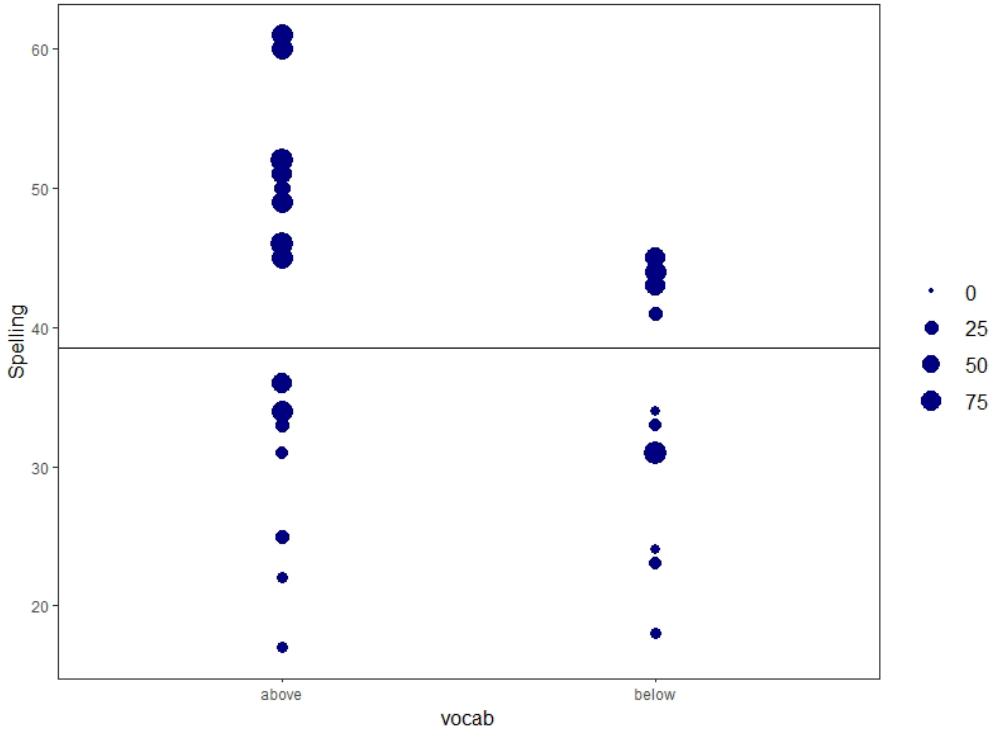
The Role of Vocabulary in Reading and Spelling

Linear discriminant analysis (LDA)

Null classifier, i.e., an observation is always classified to the majority class

„above“ = 0,62

Participant data were split up into a training and a test dataset in the 0,7 to 0,3 ratio



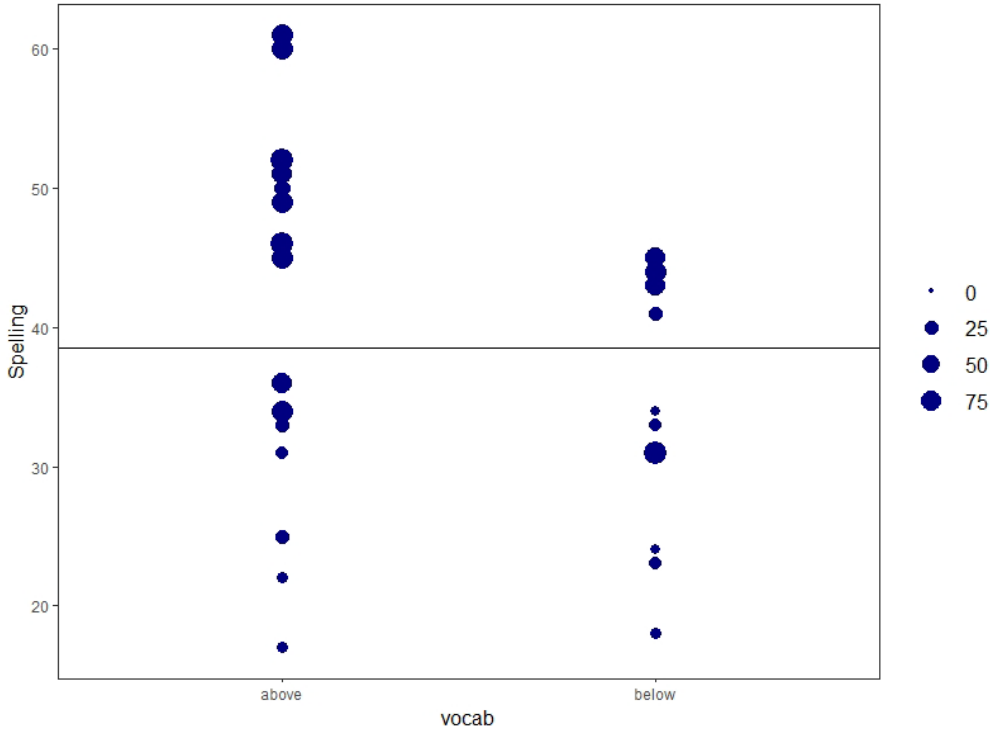
Interaction of reading fluency, spelling skills and vocabulary (set 4000)

The Role of Vocabulary in Reading and Spelling

Linear discriminant analysis (LDA)

Spelling-based model had an accuracy of 0.75

Reading fluency decreased model accuracy (0.62)



Interaction of reading fluency, spelling skills and vocabulary (set 4000)

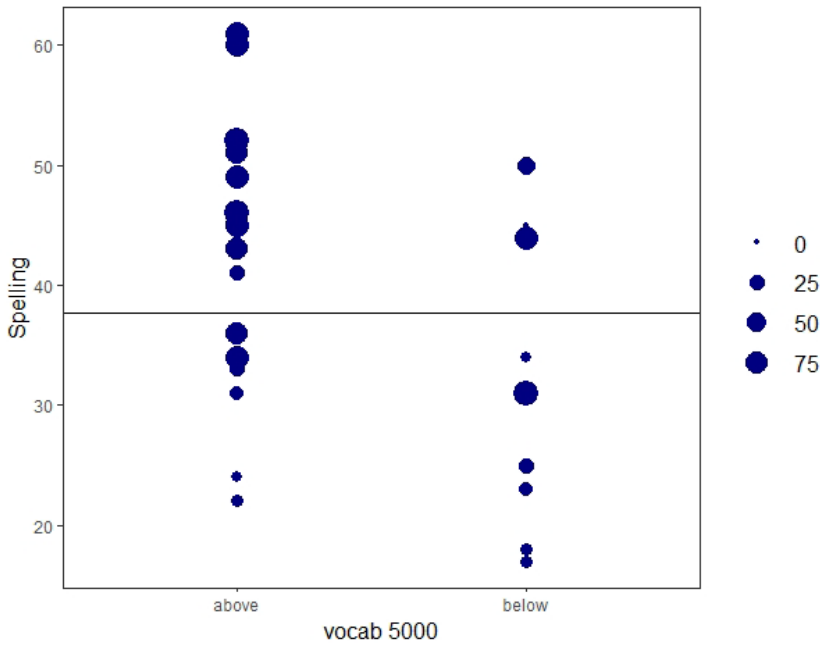
The Role of Vocabulary in Reading and Spelling

Linear discriminant analysis (LDA)

Null classifier – 0.57

Spelling-based model had an accuracy score of 0.71

Reading fluency was not a reliable predictor (0.57)



Interaction of reading fluency, spelling skills and vocabulary (set 5000)

Conclusions

Linear discriminant analysis (LDA)

Spelling-based model had an accuracy score of 0.75 (set 4000) and of 0.71 (Set 5000)

Reading fluency as a predictor decreased the model accuracy (0.62) for Set 4000

Knowing a word means being able to spell it; stronger lexical activation involved in spelling compared to reading

Participants with high reading fluency scores and strong spelling skills, but with relatively poor vocabulary knowledge were the most challenging to identify

Practical Implications

Probably the best way to produce diagnostic instruments is with reliance on

- specific properties of a particular writing system which underlie both the reading and the spelling
- some developmental trajectories (e.g. vocabulary acquisition) that could be predictive of item difficulty

Test with appropriate statistical metrics

- whether the assumed difficulties got confirmed
- whether the participants can be accurately assigned to a particular stage in their development

Work in progress:

Dynamic relations between component skills as a function of (a) development; (b) **learner characteristics (language learner status, learning disability)**, (c) reading and writing measurement

Learner Profiles

Kyröläinen & Kuperman (2021) describe an ideal reader as:

- having acquired and **acquiring reading experience** over the **lifetime** from a broad variety of activities
  → **experiential factors**

- displaying **motivation** and ability to enhance literacy supported by the environment in which they are raised as well as genetic predispositions → **Filters**

- living in an **environment** that provides stronger incentives and supports higher literacy levels

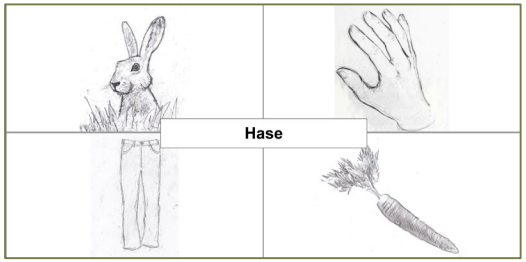
Learner profiles

How are the participants with low and high reading and spelling skills different in terms of their biographic data?

- history of migration and social environment;
- linguistic biography;
- history of formal education and literacy acquisition;
- print literacy (i.e., the frequency and regularity of contact with texts in the conceptually written domain, e.g. news, audio-books etc.)

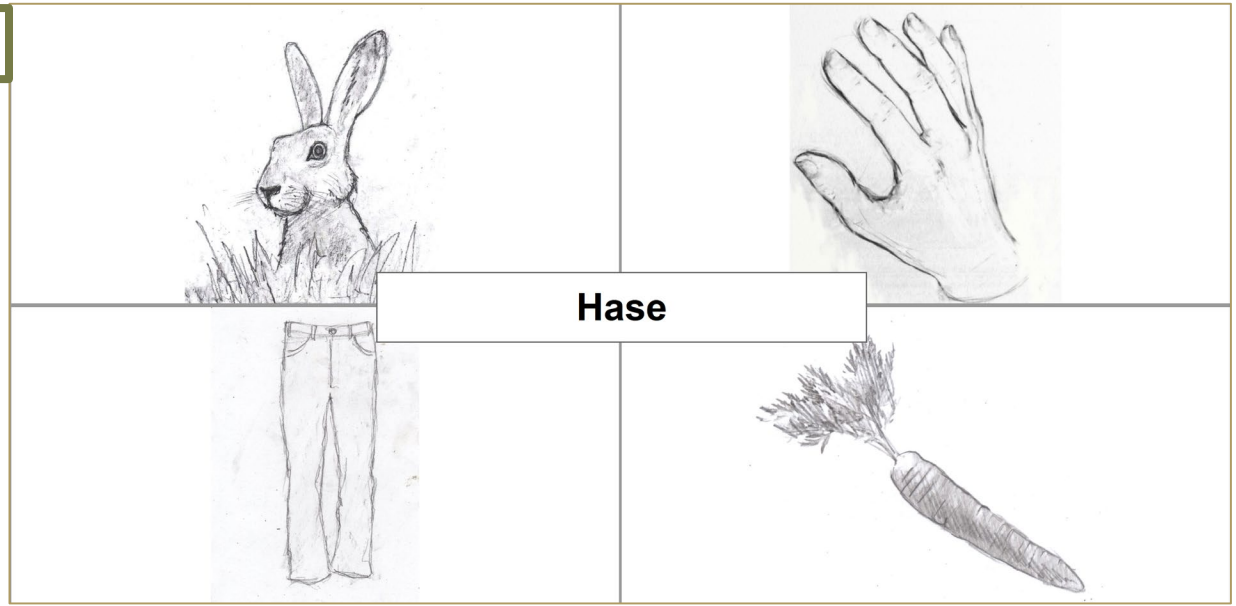
L2 German: Word Recognition

- **Word Recognition:** phonological recoding (phonological route) and orthographical decoding (semantic route) are essential for reading comprehension (Knoepke, Richter et al. 2014)
- **Item selection**: everyday vocabulary up to A1 level of CEFR, construction of new sets based on existing pictures to match German orthography and phonology
- **Item administration**: about 20 items, random order of presentation, random placement of 4 pictures in a set, time out function



L2 German: Word Recognition ELIKASA

TI: Hase = rabbit



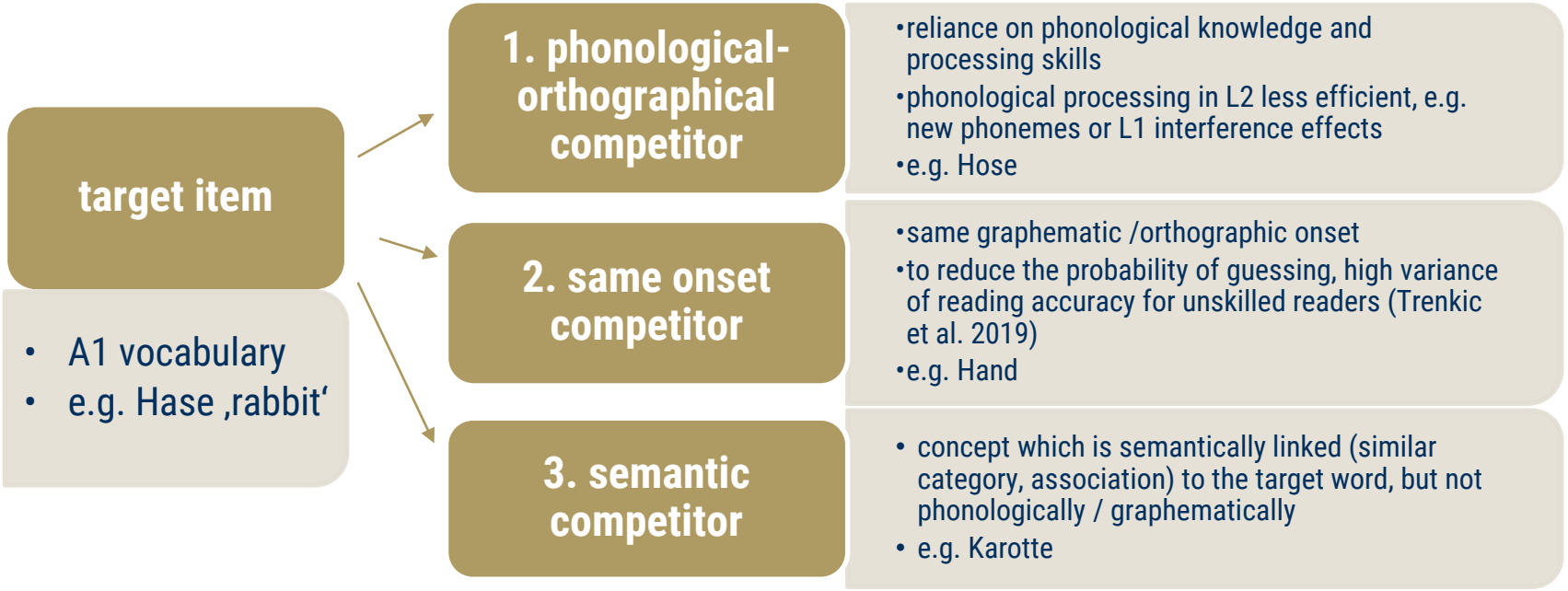
C2: Hand = hand

C1: Hose = trousers

C3: Karotte = carrot

Czinglar et al. 2022

L2 German: Word Recognition ELIKASA



Czinglar et al. 2022

QUESTIONS

Bibliography

Andringa, S., & Godfroid, A. (2020). Sampling Bias and the Problem of Generalizability in Applied Linguistics. Annual Review of Applied Linguistics, 40, 134–142. https://doi.org/10.1017/S0267190520000033

Baurmann, J. & Ludwig, O. (2001). Schreibaufgaben und selbst organisierendes Schreiben. Praxis Deutsch, 168, 6-11

Bereiter, C. & Scardamalia, M. (1987). The psychology of wirtten composition. Hillsdale, NJ: Erlbaum.

Berninger, V. W., Fuller, F. & Whitaker, D. (1996). A process approach to writing development across the life span. Educational Psychology Review, 8, 193-182.

Berninger, V. W., Vaughan, K., Abbott, R. D., Begay, K. Coleman, K.B., Curtin, G. et al. (2002). Teaching spelling and composition alone and together. Implications for the simple view of writing. Journal Of Educational Psychology, 94, 291-304.

Bialystok, Ellen (2002). Acquisition of literacy in bilingual children: A framework for research. *Language Learning, 52*(1), 159-199.

Bialystok, Ellen & Poarch, Gregory (2014). Language experience changes language and cognitive ability. *Zeitschrift für Erziehungs-wissenschaft ZfE, 17*(3), 433-446.

Black, Paul & Dylan Wiliam (1998). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan* (October): 139-148.

Breadmore, H.L., Vardy, E.J., Cunningham, A.J., Kwok, R.K.W., & Carroll, J.M. (2019). Literacy Development: Evidence Review. London: Education Endowment Foundation. The report is available from: https://educationendowmentfoundation.org.uk/public/files/Literacy_Development_Evidence_Review.pdf

Czinglar, C.; Edeleva, Y.; Do Manhn; G.; Förster, F.; Arslan, Z.; Aboamer, Y.; Nuranfar, F. & Mashhadi, P. (2022): ELIKASA – ein mehrsprachig ausgerichtetes Forschungsprojekt zur Entwicklung basaler Literalität von erwachsenen DaZ-Lernenden in Alphabetisierungskursen. In: Zeynep Kalkavan-Aydın (Hrsg.): Schriftspracherwerb und Schriftvermittlung bei Mehrsprachigkeit. Münster, New York: Waxmann, 157-180

Bibliography

Council of Europe (in prep.). Literacy And Second Language Learning for the Linguistic Integration of Adult Migrants (LASLLIAM) – Framework of Reference in Validation Phase.

Deygers, B.; Bigelow, M.; Bianco, J.; Nadarajan, D. & Tani, M. (2021): Low Print Literacy and Its Representation in Research and Policy, Language Assessment Quarterly, DOI: 10.1080/15434303.2021.1903471

Dunn, Lloyd M. & Douglas M. Dunn (2007): Peabody Picture Vocabulary Test, Fourth Edition (PPVT 4). Minneapolis: Pearson.

Ehlich, K. (1983). Text und sprachliches Handeln. Die Entstehung von Texten aus dem Bedürfnis nach Überlieferung. In A. Assmann, J. Assmann & C. Hardmeier (Hrsg.) Schrift und Gedächtnis. Beiträge zur Archäologie der literarischen Kommunikation (Archäologie der literarischen Kommunikation, Bd. 1). 24-43. München: Fink

Feldmeier, Alexis (2010): Von A bis Z - Praxishandbuch Alphabetisierung. Deutsch als Zweitsprache für Erwachsene. Stuttgart: Klett.

Guerrero Calle, S. (2020): Zweitschriftlernende in der deutschsprachigen Schweiz : In 300 Kurslektionen Alpha und A1? Philosophische Fakultät. Freiburg, Schweiz: Universität Freiburg (Schweiz). Dissertation.

Gold, A. (2009): Leseflüssigkeit. Dimensionen und Bedingungen bei leseschwachen Hauptschülern. In: A. Bertschi-Kaufmann/ C. Rosebrock (Hrsgb.) Literalität. Weinheim. S. 151-164

Grabowski, J. (2010). Speaking, writing and memory span in children: Output modality affects cognitive performance. International Journal of Psychology , 45, 28-39.

Graham, S., Berninger, V. W., Abbott, R. D., Abbott, S. P. & Whitaker, D. (1997). Role of mechanics in composing of elementary school students. A new methodological approach. Journal of Educational Psychology, 89, 170-182.

Hayes, J. R. (2012). Modeling and remodeling writing. Written Communication, 29, 369-388.

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? Behavioral and Brain Sciences, 33(2/3), 1–75. doi:10.1017/S0140525X0999152X

Bibliography

Herman, Joan & Kilchan Choi (2012). Validation of ELA and mathematics assessment: A general Approach. National Cnter for Research on Evaluation, Standards and Student Testing.

Hudson, Thom. 2012. Standards-based Testing. In: Glenn Fulcher and Fred Davidson (eds.).*The Routledge Handbook of Language Testing*, 479–494. London and New York: Routledge

Kuperman, V. (2022): Text reading in English as a second language: Evidence from the Multilingual Eye-Movements Corpus.

Mathiebe, M. (2022). Sprachliche Fähigkeiten als Voraussetzung der Schreibkompetenz. In: M. Becker-Mrotzek & J. Grabowski (Hrsg.), Schreibkompetenz in der Sekundarsrtufe: Theorie, Diagnose und Förderung, 43-56.

McCutchen, D. (2006). Cognitive factors in the development of children‘s writing. In C. A. MacArthur, S. Graham & J. Fitzgerald (Hrsg.), Handbook of writing research, New York, NY: Guilford Press.

Jones, D. & Christensen, J. (1999). Relationship between automaticity in handwriting and students‘ ability to generate written text. Journal of Educational Psychology, 91, 44-49

Ortega, L. (2005). For what and for whom is our research? The ethical as transformative lens in instructed SLA. The Modern Language Journal, 89(3), 427–443. doi:10.1111/j.1540-4781.2005.00315.x

Ossner, J. (2006). Kompetenzen und Kompetenzmodelle im Deutschunterricht. Didaktik Deutsch, 21, 5-19

Ott, M. (2000). Schreiben in der Sekundarstufe I. Differenzierte Wahrnehmung und gezielte Förderung von Schreibkompetenzen. Deutschdidaktik aktuell, Bd. 9. Baltmannsweiler: Schneider Verlag Hohengehren.

Bibliography

Pikulski, J.J. (2006): Fluency: A developmental and language perspective. In: S.J. Samuels/ A. Farstrup (eds.): What research hast o say about reading instruction. Newark. DE/. S.70-93.

Rosebrock, C.; Nix, D. (2006): Forschungsüberblick: Leseflüssigkeit (Fluency) in der amerikanischen Leseforschung und –didaktik. In: Didaktik Deutsch 20, 90-112.

Rosebrock, C.; Nix, D.; Rieckmann, C.; Gold, A. (2021): Leseflüssigkeit fördern. Lautleseverfahren für die Primar- und Sekundarstufe. Hannover: Kallmeyer mit Klett Verlag.

Tarone, E. (2010). Second language acquisition by low-literate learners: An understudied population. Language Teaching, 43(1), 75–83. doi:10.1017/S0261444809005734

Tarone, E., & Bigelow, M. (2005). Impact of literacy on oral language processing: Implications for second language acquisition research. Annual Review of Applied Linguistics, 25, 77–79. doi:10.1017/S0267190505000048

Thank you!

Questions? Feedback?

E-Mail: zeynep.arslan@uni-jena.de