

Measuring Visual Word Recognition in L2 German & L1 Arabic

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INTRODUCTION

Visual word recognition is a prerequisite of (higher-level) text comprehension: For example, the *Simple View of Reading* (Gough & Tunmer 1986) assumes that text comprehension is the product of two independent abilities: (i) the general ability to understand (oral)

language and (ii) visual word recognition (e.g. Richter & Müller 2017).

Visual word recognition refers to a basic process of reading, in which a word is identified by recognizing its written form and associating it with the appropriate semantic properties. Like other lower-level cognitive processes it proceeds without conscious attention and can be automatized by training.

The influential *Dual Route Model* (Coltheart et al. 2001) assumes two main processing routes:

- a direct semantic route involving orthographical decoding and
- a phonological route involving phonological recoding.

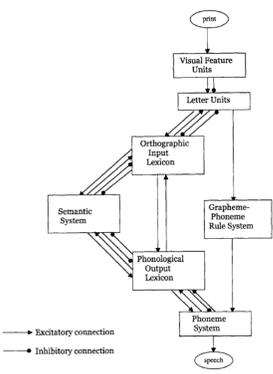


Figure 7. The dual-route cascaded model of visual word recognition and reading aloud.

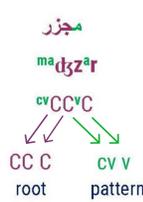
READING IN ARABIC

Arabic orthography differs significantly from e.g. English or German. The Arabic language is written in abjad, i.e. a type of script only mapping consonants and long vowels (Verhoeven & Perfetti 2022). Due to this underspecified nature of the script lexical ambiguity is prevalent. The composition of words is ruled by a **nonlinear, derivational and inflectional morphology** (see table): Words are derived by roots, typically three ordered consonants bearing the core meaning.

Root	جزر /dʒzr/					
Core meaning	engl. to slaughter; to ebb					
Written word	جزر	جزر	جزيرة	جزرة	جزار	مجزر
Root & word pattern phonology	dʒzr	dʒzʔr	dʒzʔrʔ	dʒzʔrʔ	dʒzʔzʔr	mʔdʒzʔr
Morphosyntax	verbal N	N pl.	N sg. f.	N sg. f.	adj. N sg. m.	N of place sg. m.
Meaning	slaughter	islands	island	carrot	butcher	slaughter-house

Roots interlock with word patterns, i.e. vocalic patterns and affixes conveying morpho-syntactic and semantic information (Hermena & Reichle 2020).

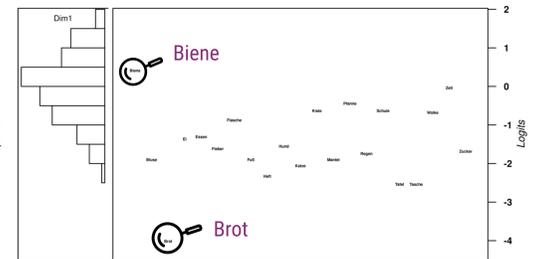
In Arabic, all content words undergo a process called „obligatory morphological decomposition“ (OMD): the written word is decomposed by the reader into a root and a word pattern (see image, model adapted from Boudelaa 2014). Because lexical entries are built up by consonantal roots and word patterns, models for reading in Arabic differ from the **dual-route-model** or others developed from researching European languages (Hansen 2014, Boudelaa 2014).



RESULTS & DISCUSSION

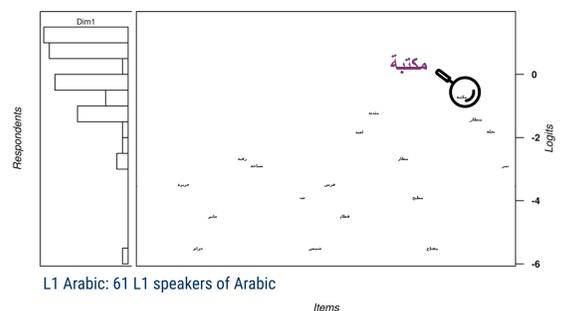
Rasch modelling confirmed that the test results for both word recognition tasks conformed to psychometric criteria of test quality, although there was an obvious mismatch between test takers (left side of the graph) and items (right side of the graph): most items are too simple for test takers in L2 German and even more so in L1 Arabic.

WED: WrightMap of item and person parameters in Rasch model



L2 German: 108 learners, incl. L1 speakers of Farsi-Dari and Turkish

WEA: WrightMap of item and person parameters in Rasch model



L1 Arabic: 61 L1 speakers of Arabic

ELIKASA PICTURE SELECTION TASKS FOR WORD RECOGNITION

Our aim was to devise an instrument to measure the ability for visual word recognition in **adult beginning L2 learners with low L1 literacy**.

IN L2 GERMAN to capture slow-paced learning progress in beginners
IN L1 ARABIC to measure fine grained differences in low L1 literacy

Participants of the study

- 108 adult German L2 learners, 61 of them speaking Arabic
- participants in KASA literacy courses, voluntary participation, 2x3h/week, situative and contrastive methods (Marschke 2022)
- homogenous groups regarding knowledge of Arabic (mostly L1), trained bilingual teacher (L1 Arabic, L2 German)
- heterogenous groups**: refugees and work migrants, immigration recently and a long time ago, education, L1 literacy ...

Word Recognition in L2 German and L1 Arabic

- Task is similar to the picture selection task WLLP (*Würzburger Leise Lese Probe*, Schneider et al. 2011) for German; paper & pencil test for elementary school children; used by Rüsseler et al. (2022) for low literacy adult L1 readers of German
- Design of new items for two tasks: for (i) adult beginning L2 learners of German and (ii) adult native speakers of Arabic
- Pictures used are b/w drawings, partly familiar from KASA textbooks
- naming agreement and rating of comprehensibility in different regions (cf. Haman et al. 2015)
- no cognates/internationalisms as target item or distractors



21 TARGET ITEMS FOR GERMAN

A1 level of CEFR, only nouns, concrete/everyday life vocabulary e.g. **Hase** (engl. *rabbit*)



DISTRACTOR 1

Orthographic knowledge, same onset or coda e.g. **Hand** (engl. *hand*)



DISTRACTOR 2

Phonological and/or graphematic competitor e.g. **Hose** (engl. *pants*)



DISTRACTOR 3

same semantic category or association, no phonological or graphematic similarity with the target item e.g. **Karotte** (engl. *carrot*)



25 TARGET ITEMS FOR ARABIC

only nouns, concrete and everyday life vocabulary e.g. جزيرة [dʒazi:ra] (engl. *island*)



DISTRACTOR 1

derivation of the same root, here: dʒ-z-r e.g. جزرة [dʒazara] (engl. *carrot*)



DISTRACTOR 2

same pattern, but different root, here: dʒ-b-r e.g. جبيرة [dʒabi:ra] (engl. *cast*)



DISTRACTOR 3

same semantic category or association, no phonological, graphematic or morphological similarity with target item e.g. صدفة [ʔsadafa] (engl. *muschel*)

Adaptation of Word Recognition Task to L1 Arabic

- Distractors** are constructed using the same root or the same pattern as the target item (see item set above), following the priming experiments conducted in the **OMD Model** (see Boudelaa 2014 above)
- Diglossia**: Two criteria have been considered in choosing the target items. (i) All items belong to *Standard Arabic*; (ii) They are likely to be understood by speakers of different varieties.

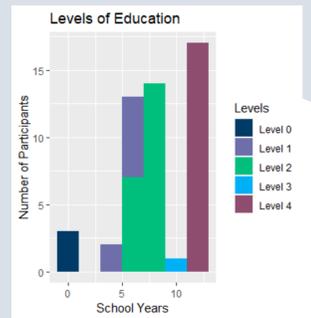
We want to thank Ulrich Mehm for his helpful advice on with Arabic.

High level of correctness in L2 German: correctness rate 75%

Due to the pandemic, data were collected one year later than planned, no beginning readers of L2 German anymore, after one year of KASA literacy courses, participants are able to read at the word level

Ceiling Effect in L1 Arabic: correctness rate almost 90%

Most participants had more than 6 years of schooling, literacy in L1 Arabic was higher than usual in the KASA learner groups, probably because courses have shifted in online mode during the pandemic, which caused more low literacy learners to drop out (see graph on the right on ISCED levels and school years).



Both tasks were designed for a different learner group. For mid-to-high literacy learners **more items of higher difficulty in the L1** are needed. Still, **reaction times** reveal differences between learners: the participant medians range from 1,3 to 13,3 sec in L2 German (median: 2,3 sec) and from 1,6 to 9,3 sec in L1 Arabic (median 2,18). These have to be further analyzed.

Directions for further research:

- explore tasks with beginning low literacy L2 learners
- adjustment of time-out phase: 20 sec is too long, should be reduced to 10 seconds in the L2 and even less in the L1 to test for automaticity of visual word recognition

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GEFÖRDERT VOM



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