Specially designed children´s books and songs for training the acquisition of German gender and case

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Children acquiring German often have persistent difficulties to acquire the nominal inflection system (Ruberg, 2015; Scherger, 2019), partly because the grammatical gender of nouns is notoriously hard to acquire – both for children with German as a second language and those with German as their first language (Ruberg, 2015). Even though there are a number of phonological and some semantic regularities for the assignment of monomorphematic nouns to gender subclasses, virtually all of these regularities have many exceptions, rendering noun cues unhelpful in the acquisition of grammatical gender (Maratsos, 1983). Morphosyntactic cues, such as determiners and adjective inflections may not be helpful either, however, because there is substantial form overlap among markers in the gender-case system (App. A).

We designed children's books (von Lehmden et al., 2017a, 2017b, 2017c) and songs (Kauffeldt et al., 2014) featuring contents and texts that lent themselves to presenting morphosyntactic cues to the German gender-case system in an optimized way. The texts included frequent repetitions of cues, redundant morphological cues, contrasts, and a presentation of cues in a grouped, structured fashion (Bebout & Belke, 2017). In a training study, we assessed the effectiveness of these materials in fostering the acquisition of the nominal inflection system. To this end, we assigned a total of 68 bilingual and 48 monolingual typcially developing preschool children (aged 3;5 to 5;11 years, M = 4;4 years) to three groups:
- an experimental group (EG) trained with three pairs of custom-made children's books and corresponding songs, administered six times each in training (App. B presents a stanza of a song with a structured presentation of inflectional cues towards grammatical gender),
- one control group (CG1) trained with children's books and songs featuring similar contents as the ones used with EG, but no optimized textual input,
- another control group (CG2) with no training.

The 18 training sessions took place twice a week over three months in kindergarten. Sessions lasted ca. 15 minutes and were administered to groups of two to five children.
In order to assess the children's performance in processing German gender and case we designed a custom-made test battery (see App. C), which we administered individually pre (T1) and post (T2) intervention as well as six weeks after the training (T3) with tests at T1 being administered by different persons than at T2 and T3. For data analysis, we fitted linear mixed models on square-root transformed composite scores of the battery. In all models, we contrasted the performance of EG and CG1 to CG2 (treatment contrasts), assessing children's improvement from T1 to T2 and T2 to T3 (repeated contrasts). We additionally entered principle components established previously based on the children's age, their grammatical abilities at T1 as assessed by TROG-D (Fox, 2006), and the time elapsing between T1 and T2 and T2 and T3, respectively.The principle components loading on TROG-D and age were highly significant predictors of the children's composite scores in our test, attesting its validity.

Compared to group CG2, group EG improved significantly from T1 to T2, arguably due to the specific language training the children in group EG received (see Figure 1). Their performance remained stable from T2 to T3. Group CG1 showed a similar pattern as group EG, but the children's improvement from T1 to T2 failed to reach significance. From T2 to T3 there was an overall improvement regardless of type of the intervention. Separate analyses of the children with German as L1 yielded no significant effects of testing time or type of intervention. For children acquiring German as a second language, by contrast, the pattern of results corresponded to that seen in the full model. Unsurprisingly, these children had yielded worse TROG-D scores at T1 than their monolingual peers, suggesting that the intervention was particularly effective in children with poorer language skills. All in all, the present study makes a strong case for the use of children's books and songs as a means for optimizing the input in training interactions.
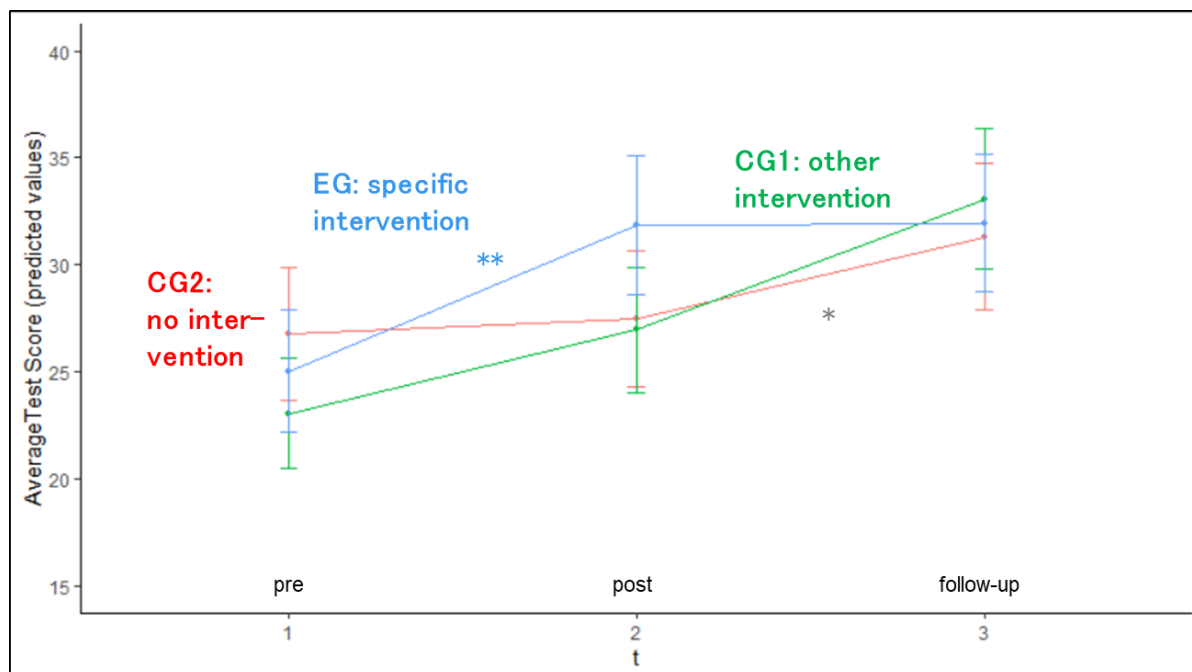
Figure 1. Fitted data as predicted by the final linear mixed model of the full data set (score ~ t * group + PC1 + PC2 + PC3 + t:PC2 + group:PC2 + (1|DaZ_DaM/Ppt). It included the interaction of testpoint (t) and intervention (group) along with the three principle components (plus interactions) as fixed effects, and random intercepts for participants nested within language group (DaZ_DaM) distinguishing children acquiring German as a first or second language, respectively. PC1 loaded on a composite of the TROG-D score at T1 and Age, which were highly correlated, PC2 on the time elapsing between T1-T2 and T2-T3, and PC3 separated the TROG-D score and Age from each other. There were main effects of PC1 and PC3 but not of PC2; however, PC2 interacted with the contrast between CG1 and CG2 and the contrast between t2 and t1.

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Case	Gender		
	Masculine	Feminine	Neuter
Nominative	der	die	das
Dative	dem	der	dem
Accusative	den	die	das

Ein	*klein-er*	*Vampir*	*fliegt durch die Nacht*
a.NOM.M.SG[m]	little-NOM.M.SG[m]	vampire.m	

'A little vampire flies through the night'

er	*fliegt ganz sacht, hättest du das gedacht?*
he.NOM	

'he flies very softly, would you have thought that?'

Der	*kleine*	*Vampir*	*fliegt durch die Nacht,*
the.NOM.M.SG[m]	little-NOM.M.SG[m]	vampire.m	

'The little vampire flies through the night'

er	*fliegt ganz sacht, hättest du das gedacht?*
he.NOM	

'he flies very softly, would you have thought that?'

Sieh nur er dreht sich auf der Stell', einmal ganz langsam, plötzlich ganz schnell
'Look he is turning round and round, first very slowly, suddenly quite fast'

– repeat first four lines to complete first stanza –

Appendix C: *Subtests of the custom-made test battery assessing gender & case processing.*

Subtest & Modality	Task Content and Verbal Task	Items
1	Packing a suitcase: derive definite determiner from indefinite determiner in nominative case and add inflected attributive adjective	three real words (one per gender subclass), six pseudowords (two per gender subclass)
2	Furnishing a room: produce the correct case for PPs expressing directions (accusative) and locations (dative)	six real words (two per gender subclass)
3a	Complete missing parts in faces of creatures generate possessive determiners marking the possessor (lexeme) and the possessed item (inflection)	three creatures (possessors, one per gender subclass) with three missing pieces (posessed items, one per gender subclass)
3b	sentence-picture matching with sentences containing possessive determiners, adapted to the materials and procedure of the TROG-D	sentences containing possessive determiners referring to one of two persons (possessors, a boy and a woman) with one of three possessed items (one per gender subclass)

(Subtests 1–3a: production; Subtest 3b: comprehension)