DIFFERENCES IN PLURAL FORMS OF MONOLINGUAL GERMAN PRESCHOOLERS AND ADULTS

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Abstract – Pluralization strategies of monolingual German children aged 3-6, median 4;2 ($N = 810$), and adults aged 18-96, median 24;0 ($N = 582$), were compared on the basis of eight nonce nouns from the language test SETK 3-5. Differences between younger and older Germans resembled previously described differences between German and immigrant preschoolers for most aspects, e.g., use of fewer plural allomorphs (types), more errors in umlauting, and more avoidance strategies in the linguistically weaker groups. However, both German children and adults demonstrated the same universal frequency- and phonology-based pluralization patterns. Surprisingly, ungrammatical plural forms were equally frequent in both children's and adults' answers.

Keywords: plural acquisition, morphology, German, gender, pluralization.

1. Introduction

Plural acquisition by German children has been described during recent decades in numerous or, rather, innumerable cross-sectional and longitudinal studies (Dressler 2009; Köpcke 1988; Korecky-Kröll, Mugdan 1977; Park 1977; Veit 1986). However, the sample sizes were mostly small ($N = 1$-30) and generalizations of results to all children of a certain age, region, or societal group were not possible. In our previous studies, considerable sample sizes were analyzed in a cross-sectional design (Zaretsky *et al.* 2013; Zaretsky *et al*. in press). These consisted of thousands of German and immigrant preschool children acquiring German.

This article focuses on the differences between monolingual German children and adults in the pluralization strategies they use with nonce words, that is, words without meaning but resembling existing German words in their phonological structure. None of the items contained morphological elements, so that study participants could add plural markers only on the basis of associations with certain phonological features, e.g., consonants in the word final position, and on the basis of accompanying indefinite articles signalizing classification of test items as nouns of feminine or non-feminine (masculine or neuter) gender. Hence, the scope of the study is restricted to pluralization strategies associated with phonology and grammatical gender. The study is not aimed at providing evidence for or falsifying any plural acquisition model.

Studies examining the pluralization strategies of German adults are quite rare (Mudgan 1977; Spreng 2004). The only study (Phillips, Lowell 1980) directly comparable with the study presented here focused on pluralization strategies of German children ($N = 29$, age range 4-9 years) and adults ($N = 16$) tested with nonce words. Additionally, 22 American students learning German were tested. The German adults' answers to nonce words ending in suffixes, which require certain plural markers (e.g., *Verknöpfnis > Verknöpfnisse*, *Borchheit > Borchheiten*), were so homogeneous (up to 100%) and so

clearly associated with morphology that the replication of these findings seems unnecessary. For the items without clear associations with morphology, the results were much more heterogeneous. Therefore, only nonce words without morphological elements were included in our study.

In one of our previous studies, we demonstrated that four-year-old immigrant children speaking mother tongues other than German produced the same error patterns and used the same pluralization strategies (including avoidance strategies) as younger Germans (three-year-olds) and that the differences between four-year-old German and immigrant children corresponded exactly to the differences between three-year-old and five-year-old Germans. Only quantitative, but no qualitative differences were found. We expect that the differences between young and adult Germans will resemble the differences between Germans and immigrants of the same age. The following significant differences between monolingual German preschoolers and their bilingual peers were found in our previous study (Zaretsky *et al*. in press), with the same nonce words which are used in the present study:

- less plural allomorphs (types) and umlauting, less correct answers, consideration of gender (*-e* with nouns of non-feminine gender, *-(e)n* with nouns of feminine gender) in the immigrant children's answers;
- more singular forms, word distortions, and avoidance strategies (e.g., numerals instead of pluralized substantives) in the immigrant children's answers;
- both Germans and immigrants followed the simplest phonology-based regularities (e.g., *-e* after consonants in the word final position, *-s* after full vowels in the word final position, *-n* after a schwa in the word final position), although immigrants did so less consequently than Germans, and both groups used a sort of emergency plural (*-s* or *-(e)n*) in some cases when they could not find any better solution;
- both groups followed the schwa deletion rule, which has no exceptions and forbids schwa sounds in the adjacent syllables (e.g., *Tápsel > Tápselen*), and used predominantly plural allomorphs *-e*, *-(e)n*, and *-s* (and not *-e* with umlaut, *-er*, and umlaut).

It was hypothesized that these differences would correspond to those between pre-school and adult Germans' samples, except that the use of emergency plural markers is probably no longer necessary in the adults' language because the acquisition of plural rules is completed. However, it should be noted that the plural marker *-s* is also used frequently in German with foreign words and names. Nonce words utilized in this study resembled both categories, which could result in the high frequency of this plural marker in the adult sample.

2. Methods

Preschoolers were recruited from daycare centers in the states of Hesse and North-Rhine-Westphalia in Germany during 2008-2012. Monolingual children acquiring German were carefully selected for the study on the basis of (a) questionnaires for parents, (b) questionnaires for daycare center teachers, (c) in cases where there was contradictory information, interviews with heads of daycare centers. All in all, information on 1,209 children whose parents signed informed consent was examined. Children acquiring German as their second, third etc. language and also all Germans who were raised bilingually since birth were excluded from this study and tested for other studies. All

remaining children (N = 812) were included and 810 of them produced at least one plural form. The age range of the participants was 3;8-6;0 years, median 4;2. Boys (N = 433, 53.5%) outnumbered girls (N = 377, 46.5%). No exclusion criteria except bilingualism/mother tongue other than German were applied.

Adults were recruited from local communities, universities, and by addressing people on the streets during the years 2011-2013. All in all, 582 adults filled out questionnaires (age range 18-96, median 24;0): 206 males (35.4%), 367 females (63.1%), and nine participants with unknown gender (1.5%).

Both children and adults were tested with nonce words from the validated language test SETK 3-5 (Grimm 2001).[1] All items had phonological structures typical of real German words. The classification as 'correct' answers was taken from the test manual: *eine Ribane > Ribanen, eine Plarte > Plarten, ein Biwo > Biwos, ein Tulo > Tulos, eine Kland > Klände, ein Dolling > Dollinge, ein Ropf > Röpfe, eine Tapsel > Tapseln*. The gender of all items was classified as feminine or non-feminine (masculine or neuter) by means of indefinite articles. Nonce words were chosen instead of real words to avoid the possibility of real words being merely reproduced from memory.

Children were shown pictures of abstract objects and asked questions like 'Look, this is called a kland. Here is one kland, and there we can see two…?'. Children with low compliance were re-tested in several days or weeks. Adults were given sheets with test items in the singular forms and had to write down the plural forms. Children were more likely than adults to avoid plural formation, whereas adults filled out their sheets completely. Therefore, more children than adults were included in the study. All in all, 2,835 plural markers in the children's answers and 4,130 plural markers in the adults' answers were documented in SETK 3-5 (excluding questionable plural markers in word distortions etc.). Furthermore, 3,452 responses other than the unambiguous addition of a plural allomorph were registered in the children's answers and 526 in the adults' answers. There were also some cases of no reaction at all in the children's sample.

Children were tested by clinical linguistics students and researchers specialized in speech and language disorders. The tasks were incorporated into a large test battery with other tasks on language skills utilized in other studies. Although it normally took only about five minutes to elicit the eight plural forms, the whole test battery took between one and two hours to complete.

Children's and adults' answers (addition of plural allomorphs *-s*, *-er*, *-e* with umlaut, *-e* without umlaut, and *-(e)n*) were classified according to plural allomorphs and compared. Apart from these pluralization patterns, the following pluralization strategies were investigated: addition of German plural allomorph (e.g., *Biwo > Biwon*) or foreign plural allomorph (e.g., *Biwo > Biwi*), repetition of the singular form (e.g., *Biwo*), word deformation with a plural allomorph (e.g., *Biwo > Piwomps*) or without it (e.g., *Biwo > Piwomp*), other words (e.g., *Biwo > Kreis* 'circle'), numerals and quantifiers instead of pluralized substantives (e.g., *Biwo > Ja, es gibt drei* 'Yes, there are three').

The study design included documentation of foreign languages spoken by the adults' group. However, all but two adults chose English as the foreign language they

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[1] SETK 3-5 is a German language development test for 3- to 5-year-olds. It is also available as a short form, the language screening for pre-school children (SSV), and is widely used for the detection of language impairments in German mother-tongue children. The long version consists of tasks on speech comprehension, grammar (plural items only!), and phonological short-term memory (words and sentences to be repeated). SSV contains only tasks on repetition of words and sentences.

spoke best, thus making subdivision into groups impossible. Apart from this variable, only information on the adults' educational level was collected in the questionnaire.

For another study arm, where the link between grammatical gender and choice of plural markers was examined, all adults were asked to pluralize some more nonce words with very similar phonological structures: 12 one-syllable nouns with consonants in word initial and word final positions. For one half of the adult sample ($N = 292$), the first half of the item pool was presented with indefinite feminine articles and the second half with indefinite non-feminine articles. For the second half of the adult sample ($N = 292$), the grammatical gender of nouns was reversed to examine whether it has any influence on the choice of plural markers.

The data were analysed using the SPSS 20 software (IBM). After entering the data in SPSS, they were compared with the original questionnaires by linguistics students and one researcher with a PhD in linguistics. In order to examine interrater-reliability, classification of pluralization patterns (e.g., *Ribanen-Ribanes-Ribaner-Ribanens* etc.) was carried out for 40% of the data by two students independently. An average kappa of $\kappa =$ 0.94 was reached.

Both pluralization patterns and pluralization strategies were compared by chisquared tests. Because data were not normally distributed according to the Kolmogorov-Smirnov test,[2] other comparisons were conducted using non-parametric tests: Mann-Whitney U-test for two independent groups,[3] Wilcoxon test for two paired groups,[4] Kruskal-Wallis test,[5] and Spearman's correlations.[6] A probability p value of less than 0.05 was considered statistically significant.

3. Results

With all eight nonce words, pluralization strategies were significantly different between children and adults: $\chi^2_{(6)} > 131.95$, ps < 0.001. Therefore, single categories of pluralization strategies were analyzed by means of a Mann-Whitney U-test. Children added both German ($U = 51{,}014$, $Z = -25.37$, $p < 0.001$) and foreign ($U = 222{,}543$, $Z = -6.03$, $p < 0.001$) plural suffixes significantly less often than adults. Children used more frequently than adults: singular forms instead of plural ($U = 62{,}886$, $Z = -24.01$, $p < 0.001$), word deformations with ($U = 226{,}810$, $Z = -2.58$, $p < 0.05$) and without plural markers ($U = 205{,}162$; $Z = -8.20$, $p < 0.001$), as well as quantifiers ($U = 233{,}934$, $Z = -2.53$, $p < 0.05$) and other words instead of nonce words ($U = 214{,}623$, $Z = -7.31$, $p < 0.001$).

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[2] Kolmogorov-Smirnov test is a non-parametric test utilized, among other things, to control whether metric data are normally distributed. For this, metric data, e.g., test scores, are compared with a standard normal distribution. In case of a significant result, non-parametric tests should be utilized to analyze such data. If the result is not significant, less conservative parametric tests can be used.

[3] Mann-Whitney U-test is a non-parametric test used to examine whether statistically significant differences can be found between two independent groups, e.g., between boys and girls.

[4] Wilcoxon test is a non-parametric test used to investigate whether statistically significant differences can be found between two dependent (paired) groups, e.g., patients before and after treatment.

[5] Kruskal-Wallis test is a non-parametric test used to assess whether statistically significant differences can be found between more than two independent groups, e.g., German, Italian, and Spanish children acquiring English.

[6] Spearman's correlation is a non-parametric measure of statistical dependence between two variables, e.g., between speech comprehension and grammar scores.

The choice of pluralization allomorphs was also significantly different between children and adults with all eight nouns: $\chi^2_{(5)} > 11.93$, ps < 0.05. Therefore, frequencies of single plural allomorphs were compared. Adults used all plural allomorphs significantly more often than children (Us $= 108,737$-$222,942$, Zs < -5.37, ps < 0.001), including double plural markers like *Biwons* ($U = 222,896$, $Z = -3.91$, $p < 0.001$) and the total number of plural allomorphs used (types; $U = 67,714$, $Z = -23.45$, $p < 0.001$).

More frequent use of all plural allomorphs by adults does not explain, however, the significant differences between pluralization patterns of children and adults. It could be assumed that children preferred one or two plural allomorphs, whereas adults had more variability in their answers. Indeed, greater uniformity of children's results is reflected in the fact that in table 1 for five out of eight nonce words, the most frequent plural forms in the children's answers had much higher percentage than the most frequent plural forms in the adults' answers, which resulted in shorter lists of the plural forms explaining 90% of all pluralized forms in the children's group.

Items	Groups	Forms	%	Forms	%	Forms	%	Forms	%
	Children	*Ribanen*	95						
Ribane	Adults	*Ribanen*	88	*Ribaner*	5				
	Children	*Tulos*	91						
Tulo	Adults	*Tulos*	75	*Tulen*	18				
	Children	*Plarten*	95						
Plarte	Adults	*Plarten*	89	*Plartes*	5				
	Children	*Biwos*	92						
Biwo	Adults	*Biwos*	82	*Biwen*	15				
	Children	*Tapseln*	78	*Tapsels*	21				
Tapsel	Adults	*Tapseln*	82	*Tapsels*	10				
	Children	*Ropfe*	33	*Röpfe*	24	*Ropfs*	24	*Ropfen*	16
Ropf	Adults	*Röpfe*	63	*Ropfe*	18	*Ropfen*	14		
	Children	*Dollings*	62	*Dollinge*	33				
Dolling	Adults	*Dollinge*	73	*Dollings*	12	*Dollinger*	8		
	Children	*Klande*	41	*Klanden*	23	*Klands*	20	*Klände*	10
Kland	Adults	*Klände*	40	*Klanden*	23	*Klande*	20	*Kländer*	15

Table 1
Most frequent plural forms accounting for 90% of all pluralizations
(most frequent to less frequent forms from left to right).

Table 1 reveals also that adults tended to use the plural markers *-s* and *-(e)n* in cases where children used only *-s*, namely in nouns ending in full vowels (*Biwo*, *Tulo*). The difference in the *en*-frequency was highly significant according to a Mann-Whitney *U*-Test ($U = 198,072$, $Z = -9.52$, $p < 0.001$).

If one takes all used plural markers as 100%, the frequency of plural markers in the answers of children can be summarized as follows: *-(e)n* (45.6%) > *-s* (35.2%) > *-e* (12.5%) > *-e* with umlaut (4.8%) > *-er* (1.2%) > umlaut (0.7%). This corresponds exactly to the frequency order in the adults' answers: *-(e)n* (39.8%) > *-s* (23.9%) > *-e* (16.1%) > *-e* with umlaut (14.2%) > *-er* (4.5%) > umlaut (1.5%).

With all nonce words except *Tulo* ($\chi^2_{(1)} = 2.09$, ps > 0.05), there were significant differences in the use or non-use of umlauts by children and adults in the plural forms: $\chi^2_{(1)}$

> 8.57, ps < 0.01. Also, according to Mann-Whitney U-Test, adults used significantly more umlauts than children ($U = 78{,}415$, $Z = -22.16$, $p < 0.001$). There was no statistically significant difference between children and adults in the combination of umlauts with the plural marker -s ($\chi^2_{(1)} = 0.87$, $p > 0.05$). Adults used, however, umlauts significantly more often with -er ($\chi^2_{(1)} = 53.36$, $p < 0.001$) and -$(e)n$ ($\chi^2_{(1)} = 29.39$, $p < 0.001$). For these calculations, all study participants were divided into those who used such umlaut combinations at least once and those who did not use them at all. This subdivision was necessary due to very low frequencies of umlaut combinations with -s, -$(e)n$, and -er.

Adults produced correct forms of all eight nonce words significantly more often than children ($\chi^2_{(1)} > 81.50$, ps < 0.001). However, the high variability in the answers of adults found its reflection also in this respect. Adults produced correct answers in only 36-80% of the cases (median 69%) depending on the item. With the item *Kland*, for instance, the rate of wrong answers was 63%, which makes the rationale for inclusion of this item in a language test questionable. Interestingly, although there were no statistically significant differences in the rates of correct answers between the samples of German boys and girls ($U = 80{,}612$, $Z = -0.30$, $p > 0.05$), this difference turned out to be highly significant between German men and women, with men scoring lower ($U = 29{,}000$, $Z = -4.64$, $p < 0.001$). Because women outnumbered men in the adult sample, it is to be assumed that the rate of correct answers in the balanced sample would be even lower than 69%.

Items following very simple rules with very few exceptions (*Ribane*, *Plarte*, *Biwo*, *Tulo*) were produced correctly both by children ($Z = -18.98$, $p < 0.001$) and adults ($Z = -9.73$, $p < 0.001$) significantly more often than items following more sophisticated rules (*Tapsel*, *Dolling*, *Kland*, *Ropf*). Adults scored significantly higher both with easier and more difficult groups of items (Zs < -14.77, ps < 0.001).

Suffix -el, which is normally used as a diminutive one, is sometimes misinterpreted as a plural marker, e.g., *Kland* > *Klandel*. Such misinterpretations were found in both children's and adults' answers, but children used -el significantly more often ($\chi^2_{(1)} = 7.32$, $p < 0.01$).

The schwa deletion rule, which forbids schwas in adjacent syllables, was violated only once in the children's answers (*Tapsele*) and never in the adults' answers.

One would expect a tendency to use -$(e)n$ with nouns of feminine gender (*Kland* and *Tapsel*) because of the association of this suffix with the feminine gender in the target language. One would also expect the use of -e (with and without umlaut) with non-feminine nouns (*Dolling* and *Ropf*) because of the association of -e with masculine and neuter nouns in the target language. Both children (Zs < -9.90, ps < 0.001) and adults (Zs < -7.86, ps < 0.001) produced expected forms significantly more often than not expected forms according to the Wilcoxon tests. Expected forms were produced significantly more often by adults than by children both for *Kland* and *Tapsel* ($U = 163{,}366$, $Z = -11.01$, $p < 0.001$) and for *Dolling* and *Ropf* ($U = 65{,}902$, $Z = -24.61$, $p < 0.001$).

However, the association of -e with *Dolling* and *Ropf* and the association of -$(e)n$ with *Kland* and *Tapsel* cannot be directly traced back to the gender of these nouns because, firstly, -e is also closely associated with consonants in the word final position, secondly, the schwa deletion rule forbids the use of -e with the item *Tapsel*. Therefore, two additional groups of items were pluralized by the same adults' sample. These test items were taken from the study by Marcus *et al.* (1995). One half of the adults' sample pluralized six items *Bnaupf*, *Pläk*, *Plaupf*, *Snauk*, *Bneik*, and *Pleik* as non-feminine nouns and six items *Fnöhk*, *Bröhk*, *Pröng*, *Fnähf*, *Pnähf*, and *Fneik* as feminine nouns. The second half of the adults' sample pluralized the same items with reversed grammatical genders. Irrespective of gender, -e was used significantly more often than -$(e)n$ in all four

pairwise comparisons of nouns with feminine and non-feminine gender (Zs < -5.71, ps $<$ 0.001, Ns = 293). This finding calls into question the link between pluralization patterns and gender regularities in the SETK 3-5 items.

However, among additional nonce words there were three items with diphthongs which might be associated with umlauting (*Bnaupf, Plaupf, Snauk*). Umlauting, in turn, is closely associated with the plural marker *-e*, and not with *-(e)n*, in the target language. Therefore, in the next step, these nonce words were re-examined. Indeed, the average values of *-e* and *-e* plus umlaut with the items *Bnaupf, Plaupf*, and *Snauk* were significantly higher than the average values of these plural allomorphs with other items ($Z = -7.54$, $p < 0.001$), although there were no differences in the use of *-(e)n* ($Z = -0.33$, $p > 0.05$). However, exclusion of these three items did not change the results significantly. In three out of four comparisons, *-e* still dominated over *-(e)n* irrespective of grammatical gender (Zs < -5.71, ps < 0.001), the fourth result was not significant ($Z = -1.24$, $p > 0.05$), but the value of *-e* was numerically higher than the value of *-(e)n*. In these calculations, average values, not sums, of plural markers were utilized because of the exclusion of three items. Due to the clear domination of *-e* over *-(e)n*, the link between gender-based regularities and the choice of plural allomorphs remains questionable.

It must be noted, however, that the gender shift did result in a significantly different distribution of plural allomorphs in these additional plural items ($\chi^2_{(5)} = 99.43$, $p < 0.001$), including the significantly different distribution of *-(e)n* ($\chi^2_{(1)} = 37.31$, $p < 0.001$), but not the significantly different distribution of *-e* ($p > 0.05$). Again, the link between gender and plural markers remained not quite clear because *-e* was obviously added irrespective of gender.

No significant differences were found in the numeric variables described above (such as number of correct answers, of *s-, en-* etc. plural markers) in Kruskal-Wallis tests with the educational status of adults as the independent variable (secondary modern school certificate, intermediate school leaving certificate, qualification to attend a technical university, Matura/end of school examination, university degree) (ps > 0.05). Also, no significant Spearman's correlations were found with this (ordinal) variable (ps > 0.05), which means that the level of education did not influence the distribution of plural allomorphs in SETK 3-5 items.

4. Discussion

The differences between German children and adults corresponded in most respects to those demonstrated in our previous study (Zaretsky *et al.* in press) for monolingual German preschoolers in comparison with their immigrant peers acquiring German as their second, third etc. language. Adults used significantly more plural suffixes and plural allomorphs (types), more umlauting, avoided deformations of words and repetitions of singular forms, and answered more questions correctly. Children used other words, numerals, and other quantifiers instead of expected plural forms significantly more frequently; all of these means can be classified as avoidance strategies. Although both pre-school and adult test participants preferred plural markers *-s, -(e)n*, and *-e*, children used *-s* as a sort of emergency plural form, whereas in the adults' answers this tendency was not recognizable. This is reflected, among other things, in the lower proportion of *s*-forms in the adults' answers (24% of all plural formations) than in the children's answers (35%). Interestingly, neither children nor adults used *-s* − a marker of choice for foreign words

and names – as the most frequent one, probably because SETK 3-5 nonce words did not violate the rules of German phonotactics and were not presented as names.

From the preference for the markers *-s*, *-(e)n*, and *-e* in our sample one cannot draw the conclusion that these plural markers would dominate with any other set of items. The choice of items pre-determines to a certain degree the plural allomorphs the test participants will choose. One would not expect, for example, frequent use of *-er*, *-en*, and *-e* with items like *Nadel* and *Rabe* because such forms would violate the schwa deletion rule, which was never violated by adults and was violated only once by children in our sample. However, the high frequency of *-s*, *-(e)n*, and *-e* in our sample can be explained without any reference to the chosen items. Plural allomorphs *-(e)n* and *-e* appear very frequently in adult German language (Bittner, Köpcke 2001), with *-(e)n* being the most frequent one (Köpcke 1988), and *-s* the most applicable plural allomorph with very few restrictions in its use (Bartke *et al.* 1995; Wegener 1994).

Obviously, children from our sample had already recognized one of the simplest rules of German umlauting, namely the incompatibility of umlaut with the plural marker *-s* (Mugdan 1977), so that there was no difference in this respect between children and adults. This was not the case with the plural marker *-er*. Apart from the fact that *-er* always requires umlauting when pluralizing nouns, such combinations are also very frequent in comparative forms of adjectives (*arm* 'poor' > *ärmer*) and in cases when *-er* functions in nouns not as a plural marker, but as a suffix with other semantics (e.g., *Anfang* 'beginning' > *Anfänger* 'beginner'). However, the association between suffix *-er* and umlaut in nouns had not been yet internalized by our group of children and the adults used umlauts with *-er* significantly more often. Surprisingly, adults used combinations of umlaut with the plural allomorph *-(e)n* significantly more often than children, although pluralization by means of this combination is ungrammatical in the German nominative case. Obviously, adults were often misled by forms in accusative and dative cases which do require such combinations, e.g., *von den Händen* 'from the hands'.

Children, but also some adults, used the diminutive suffix *-el* as a plural marker (e.g., *Kland > Kländel*), although children did so significantly more often. This might be related to the fact that in German numerous nouns ending in *-el* are pluralized by means of the zero plural allomorph (e.g., *Ärmel* 'sleeve, sleeves'), which results in the frequent use of nouns ending in *-el* in the plural context without any iconic plural marker in adult speech. Obviously, *-el* is sometimes misinterpreted as a plural marker in such cases.

No clear link between gender and pluralization strategies could be established. It was expected that study participants would tend to use plural marker *-e* with non-feminine (masculine and neuter) nouns and the plural marker *-(e)n* with feminine nouns (Bittner, Köpcke 2001; Mugdan 1977). The fact that adults used expected plural markers significantly more often than children is relativized by the fact that adults used all plural markers significantly more often. Furthermore, additional tasks for adults revealed that they added *-e* (with or without umlaut) rather than *-(e)n* to any noun with consonants in the word final position irrespective of the nouns' grammatical gender. This unexpected finding leads one to speculate that even adults utilize only phonological structures of nouns for pluralizations, when no obvious morphological markers like the suffix *-heit* (also ending in a consonant, but always demanding the plural allomorph *-(e)n* and always marking nouns of feminine gender) are missing in the noun structure. A clear consideration of morphological elements in nonce nouns has already been demonstrated by Phillips, Lowell (1980). In future, multivariate analyses are needed to quantify the influence of factors like word final sound chains and gender on the choice of plural allomorphs.

Two of the simplest phonology-based tendencies with very few exceptions in the target language are the addition of -*n* after a schwa in the word final position (e.g., *Rabe* > *Raben*) and the addition of -*s* after full vowels (e.g., *Kino* > *Kinos*) (Bittner, Köpcke 2001). For both children and adults, it was comparatively easy to produce expected plural forms of corresponding SETK 3-5 items, although adults succeeded more in this task. On the other hand, both children and adults were highly confused by the nonce word *Kland*. As a feminine noun, it might by pluralized with a plural marker -*(e)n* in analogy to the vast majority of feminine nouns. But as a noun ending in a consonant, it is also compatible with -*e*. As a word with unclear meaning, it might demand the plural marker -*s* which is associated with foreign words. Because the schwa deletion rule is not applicable here, one also cannot exclude the use of -*er*. Hence, only 4% of children and 37% of adults produced the 'correct' (according to the test manual) form *Klände*, which is supposed to be associated with nouns like *die Hand* 'hand' > *Hände* and *die Wand* 'wall' > *Wände*. These two nouns are in fact seldom exceptions among innumerable *en*-forms of feminine nouns.

It is also noteworthy that adults applied one of the very infrequent pluralization patterns to the nonce words *Tulo* and *Biwo*. This pattern is reflected in very few German nouns like *Konto* 'bank account' > *Konten*, namely addition of the plural marker -*(e)n* instead of -*s*. Children, as a result of more restricted vocabulary, used very uniformly the suffix -*s* in this case or, if they were unable to, they repeated singular forms instead.

The items *Tulo* and *Biwo* must also be mentioned in another respect. There might have been certain problems with the presentation of the tasks, including nonce words, to children in the study by Phillips and Lowell (1980), which resulted in very distinct avoidance strategies. For instance, 90% of the answers of four-year-olds and 80% of the answers of five-year-olds were mere repetitions of singular forms. In the sample of the study presented here, mere repetitions made up only 46.2% of the answers, although most children were four years old. This might have caused certain differences in the results between the two studies. For instance, in the sample of Phillips and Lowell (1980), four- and five-year-old children only repeated the singular form of the nonce word *Eimo*, whereas in our study, nonce words with comparable structure (ending in full vowels) *Biwo* and *Tulo* were frequently pluralized by children of the same age and belonged to the simplest ones.

In spite of obvious parallels between younger Germans and older immigrants described in our previous study (Zaretsky *et al.* in press), on the one hand, and German children and adults on the other hand, some differences between German children and German adults were not of a quantitative, but of a qualitative nature. The distribution of plural allomorphs in nonce words was not significantly different between pre-school Germans and immigrants, although immigrants tended to overgeneralize -*(e)n* and Germans to overgeneralize -*s*. In the present study, however, the differences were significant due to a more balanced distribution of plural markers in the adults' answers than in the children's answers. Furthermore, a very frequent reaction of both German and immigrant pre-school aged children to the forms in singular was not a production of a plural form, but the repetition of the form in singular or some other avoidance strategy (we classify zero forms as avoidance strategies (Schaner-Wolles 1989) and not as a result of the pluralization hypothesis considering zero forms as sufficient plural markers (Phillips, Lowell 1980)). In the adults' answers, avoidance strategies were virtually non-existent and their classification as such was questionable. For instance, a certain percentage of answers categorized as word deformations in the adult group can be explained by a wish to express creativity rather than by an inability to produce plural forms. In fact, deformations

produced by the adults are not simplified plural items; these deformations were comparatively sophisticated and designed in analogy to the names of fantasy creatures, exotic countries etc. Several adults filled out their forms completely with fantasy words with or without recognizable plural markers. Some more adults substituted test items with other nonce words. This wish to express creativity (or, maybe, sometimes unwillingness to take the task seriously) might explain why the difference in the frequency of word deformations (with recognizable plural allomorphs) between children and adults was not highly, but rather marginally significant ($p < .05$).

All linguistic phenomena documented in this study have already been mentioned in other studies with children (however, with numerous counter-examples): high frequency of zero forms (Clahsen *et al.* 1992; Phillips, Lowell 1980; Szagun 2001; Schaner-Wolles 1989), high frequency of plural markers *-s*, *-(e)n*, and *-e* (Elsen 2001; Szagun 2001), omission/non-use of umlauts (Park 1977; Szagun 2001), preference of *e*-forms with nonce nouns ending in consonants irrespective of grammatical gender (Phillips, Lowell 1980; Marouani 2006), higher plural allomorph variability in the adults' results than in the children's results (Phillips, Lowell 1980), and low frequency of umlauting with *-(e)n* (Schaner-Wolles 1989). The fact that adults (Phillips, Lowell 1980), including immigrants learning German (Krollpfeiffer 1996), avoid repetition of singular forms and try to utilize a comparatively seldom plural marker *-s* for unfamiliar words, has also already been described.

Other studies with German children and adults utilizing nonce words (e.g., Spreng 2004) are not directly comparable with the present study.

To sum up, in most respects, differences between pre-school and adult Germans do resemble differences between pre-school Germans and immigrants. However, adults do not use emergency plural suffixes and do not avoid plural formation by means of repeated singular forms. Word distortions do occur in adults' answers, but rather as an expression of creativity than as an avoidance strategy. Surprisingly, our results demonstrated that not only German children but also German adults produced numerous ungrammatical plural forms. Apart from highly frequent ungrammatical combinations of the plural marker *-(e)n* with umlaut, some adults even utilized the diminutive suffix *-el* for pluralization. Plural forms which were considered correct by the authors of the language test SETK 3-5 were only produced by 69% (median) of the adult sample.

Several conclusions can be drawn for the L1 and L2 teaching. First, our results indicate that numerous errors in the production of nonce words are characteristic not only of children, but also of adults, although only native speakers were recruited for this study. This might indicate that adults follow certain internalized pluralization schemata which do not necessarily result in the grammatical forms of the target language. For instance, the SETK 3-5 test item *Kland* can be pluralized as *Klände* in analogy to *Wand – Wände* (schema 1), or one can follow the most obvious pluralization strategy used with nouns of the feminine gender: *Klanden* (schema 2). The most striking finding of this study was the inability of some adults to utilize even those rules which do not have exceptions in German, e.g., no umlaut with *-(e)n*. Obviously, even for adults the pluralization remains to a certain degree a matter of reproduction of forms learnt by rote. Although this is not surprising for a highly sophisticated plural system like German with its numerous exceptions, yet, we expected adults to have internalized all more or less clearly represented regularities of their mother tongue. Tasks emphasizing regularities of the target language (e.g., no umlaut with the plural marker *-(e)n*) might facilitate the learning process for the German plural system.

Second, a special attention must be paid to the psychometric criteria of test quality

in the language assessment. SETK 3-5 is one of the most widely used tests for the language assessment with German native speakers. However, as was shown above, even adults can hardly cope with some of its tasks, and the information on the validity of this test is scarce. According to a novel study by Keilmann, Moein, and Schöler (2012), the sensitivity of SETK 3-5 for clinical cases of language impairments was only 72%, in spite of a good specificity (94%). Also, no special reference norms for immigrant children are available.

Finally, it should not be underestimated that the plural forms are the best indicators for the grammar acquisition (SETK 3-5 grammar subtest contains only plural items!) and for the overall level of language development. Inability to produce plural forms (repetition of singular forms, numerals without substantives in plural) indicates language deficits in grammar, speech comprehension, vocabulary, and even articulation. Overgeneralizations of *-(e)n* and *-e* – the most frequent German plural markers – signalize basic grammar skills, whereas overgeneralizations of *-s* are rather associated with advanced grammar skills (Zaretsky *et al.* in press). Nonce words are an optimal task to assess the phenomenon of overgeneralization and, hence, level of language skills, but if SETK 3-5 is taken for this purpose, neither high percentage of correct forms can be expected nor absolutely reliable reference norms are available.

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