

*Acquisition of German pluralization rules
in monolingual and multilingual children*

Eugen Zaretsky

Goethe University, Frankfurt/Main, Germany
yevgen.zaretsky@kgu.de

Benjamin P. Lange

University of Göttingen, Germany
kontakt@benjaminplange.de

Harald A. Euler

Ruhr University, Bochum, Germany
euler@uni-kassel.de

Katrin Neumann

Ruhr University, Bochum, Germany
katrin.neumann@kgu.de

Abstract

Existing studies on plural acquisition in German have relied on small samples and thus hardly deliver generalizable and differentiated results. Here, overgeneralizations of certain plural allomorphs and other tendencies in the acquisition of German plural markers are described on the basis of test data from 7,394 3- to 5-year-old monolingual German and bi/multilingual immigrant children tested with a modified, validated version of the Marburger Sprachscreening (MSS) language test and 476 children tested with the SETK 3-5 language test. Classified correct and wrong answers to MSS and SETK 3-5 plural items were compared. The acquisition patterns of immigrants corresponded to those of younger German children. Both monolingual German and immigrant children demonstrated generally the same universal frequency and phonetically/phonologically based error patterns, irre-

spective of their linguistic background, but with different tendencies such as overgeneralization of -s by German children only.

Keywords: plural acquisition, morphology, German language, pluralization, bilingualism

The highly complicated plural system of modern High German is a long-standing battleground for the proponents of different grammar acquisition models stressing different constellations of factors, such as frequency, applicability, iconicity, and transparency, which influence mental processing and encoding of the plural forms (Köpcke, 1988; Korecky-Kröll & Dressler, 2009; Mugdan, 1977; Park, 1977; Veit, 1986). This article focuses on salient features of the plural formation in the German language in monolingual German and 4-year-old bi/multilingual immigrant preschoolers.

Much attention has been paid to topics concerning plural acquisition in German, especially in monolingual native speakers (for an overview, see Korecky-Kröll, 2011). Comparative studies of dysgrammatically speaking or other linguistically impaired German children and correctly speaking control subjects have also been extensively conducted (Schoeler, Illichmann, & Kany, 1989; Veit, 1986). In these studies, however, sample sizes ranged mostly from only 10 to 20 participants (Clahsen, Rothweiler, Woest, & Marcus, 1992; Korecky-Kröll & Dressler, 2009; Szagun, 2001; Wegener, 1994). Only few studies report sample sizes larger than 30 (e.g., Schaner-Wolles, 1989, 2001). The findings from these small-scale studies are hardly generalizable and are unable to reliably detect differences between subgroups.

Several studies (Marouani, 2006; Wegener, 1994) on plural acquisition in bilingual children have recently been published which mostly opted for case studies or longitudinal designs. The results might thus be of heuristic, but not of parametric value. For instance, Korecky-Kröll and Dressler (2009) found almost no traces of *s*-overgeneralization (-s used instead of other suffixes) in the data of the only child in their study. This led to the conclusion that the dual-route model regarding -s as the default plural marker should be wrong, which fits with the authors' preference for the single-route models. In our studies, however, -s turned out to be the most widespread plural allomorph in the overgeneralizations of native German children. One of the largest studies (Walter, 1975) had 135 subjects, but with an excessive age range from 2.6 to 25.0 years. Therefore, large-scaled cross-sectional studies with maximally unselected samples are needed in order to specify, for example, effects of age and of foreign languages spoken at home on plural acquisition.

The present study addresses the following questions:

1. Which plural acquisition and error patterns are characteristic of 4-year-old monolingual and bi/multilingual children?
2. Do the acquisition patterns of the immigrant children correspond to those of younger native German children?
3. Are the dissimilarities in the answers of the Germans and immigrants of quantitative or qualitative nature, that is, do the immigrants acquire German plurals in the same way that native speakers do, or do they tend to use some other strategies which could be traced back to their native languages?

Substantial influence of native languages would be reflected in significant differences in the distribution of overgeneralized plural markers in the answers of the subgroups with a certain linguistic background. The absence of any qualitative differences between the overgeneralization patterns in the plural forms of German and immigrant children would suggest the universality of the plural acquisition patterns. One would also expect to find such universal patterns reflected in the comparable difficulty levels of the plural allomorphs with obvious correspondences between the older immigrant children and younger German children.

Plurality in German

Estimations of the actual number of different plural markers in German mostly range between four and nine (Mugdan, 1977). The most frequently stated plural allomorphs are *-e*, *-(e)n*, *-er*, *-s*, and zero ($-\emptyset$) or *-e*, *-e* plus umlaut, umlaut, *-s*, *-er*, *-(e)n*, and $-\emptyset$, the latter set being the version adopted in this article. The *-er* and *-er* plus umlaut are not subdivided into two plural allomorphs because *-er*, in contrast to *-e*, always demands umlauting. The *-s* and *-(e)n*, on the contrary, never demand umlauting. For examples, see Table 1.

Table 1 Plural morphology of German: Examples

Suffix	Singular	Plural	English translation
<i>-s</i>	<i>Auto</i>	<i>Autos</i>	'car'
<i>-e</i>	<i>Kreis</i>	<i>Kreise</i>	'circle'
<i>-(e)n</i>	<i>Rabe</i>	<i>Raben</i>	'raven'
<i>-er</i>	<i>Bild</i>	<i>Bilder</i>	'picture'
<i>-e + umlaut</i>	<i>Fall</i>	<i>Fälle</i>	'case'
umlaut	<i>Hafen</i>	<i>Häfen</i>	'harbor'
no suffix	<i>Koffer</i>	<i>Koffer</i>	'suitcase'

The choice of the plural markers is partly regulated by phonotactic rules and morphological structure. For instance, certain word final sound chains like the suffixes *-heit*, *-keit*, *-ung* or a schwa require the plural marker *-(e)n*. There is also a clear link to the grammatical gender, as in neuter *das Haus* – *die Häuser* 'house,' feminine *die Maus* – *die Mäuse* 'mouse.' Because some plural suffixes are more compatible with certain genders than others, one can reduce the range of possible suffixes by identifying the gender of the substantive. For instance, the zero suffix is not compatible with feminine nouns where the suffix *-(e)n* dominates. The only plural formation rule which has almost no exception is the suffixation of *-(e)n*, the most frequent German plural suffix (Bartke, Marcus, & Clahsen, 1995; Elsen, 2001; Köpcke, 1988), after a schwa at the end of feminine nouns: *die Geige* > *die Geigen* 'violin.' In some cases, neither phonotactic rules nor the gender can account for the choice of the appropriate plural allomorph so that language learners have to memorize the plural forms (cf. masc. *der Mast* – *die Masten* 'mast,' masc. *der Geist* – *die Geister* 'ghost').

Some other tendencies in plural formation can be summarized as follows (Bittner & Köpcke, 2001). More than 60% of masculine and neuter nouns are pluralized by adding *-e* with or without umlaut, whereas the form *-e* without umlaut can be found in only 40 feminine nouns. Another tendency is a strong association between the suffix *-s* and masculine and neuter nouns ending in a nonreduced vowel (*Uhus* 'eagle owls,' *Kinos* 'cinemas'). Feminine nouns also show a tendency for *-s* to be added, but are to a certain extent influenced by the preponderance of *(e)n*-suffixes (cf. *Firma* – *Firmas* or *Firmen* 'firm, business,' *Diva* – *Diven* 'diva'). The so called schwa-drop or schwa-deletion rule (Wegener, 1994) is one of the simplest plural rules in German. It does not allow a plural suffix to contain a schwa where the final word syllable also contains a schwa. Thus, nouns ending in the unstressed pseudo-suffixes *-e*, *-en*, *-el*, *-er* are never followed by the suffixes *-er*, *-e*, *-en*: **Apfel-er*, **Apfel-e*, **Apfel-en* ('apple'-PL).

Despite its rarity in vocabulary and in spoken language, the affix *-s* functions as an almost universally applicable emergency plural form. It preserves the phonological structure of the noun (no umlaut is added) and is used in cases where no other plural allomorph seems to fit. This can be seen in recently borrowed or not yet integrated foreign words, proper names, abbreviations, nonce or onomatopoeic words, and other nouns which do not evoke associations with acquired German words or plural patterns (Bartke et al., 1995) and are considered to be phonologically or lexically conspicuous, or both. Such nouns are classified as not normal language material by Wegener (1994): *LKWs* 'trucks,' *Frankfurts*, *Warums* 'whys,' *Altmanns* 'the Altmanns.' Those conspicuous, marked nouns are believed to be at the opposite end of the more usual, unmarked

nouns with their prototype consisting of two or more syllables, ending in a schwa or schwa plus consonant, or some derivational suffix.

According to Mugdan (1977), the plural allomorphs in basic German vocabulary, namely 2,180 nouns without derivational morphemes or word final sound combinations which correspond to the derivational morphemes, are distributed as follows: (a) masculine nouns: *-e* (*-e* is a very frequent plural affix for masculine nouns) > *-(e)n* > *-er* > zero > other suffixes (very seldom), (b) feminine nouns: *-(e)n* > *-e* > zero > other suffixes, (c) neuter nouns: *-e* > *-er* > *-(e)n* > zero > other suffixes. The plural allomorph *-e* clearly prevails compared to other allomorphs in basic German vocabulary as it was defined by Mugdan (1977): *-e* (77.8%) > *-(e)n* (16.8%) > *-er* (4.6%) > zero (0.7%) > others (about 0.1%). The umlaut was not taken into account. Masculine and neuter nouns show very similar distributions of plural allomorphs. Hence, some authors (Wegener, 1994) believe that for the studies on plural acquisition the classification masculine/neuter versus feminine nouns plays a more important role than a pure gender classification, at least at the early stages of plural acquisition. For instance, Wegener (1994) demonstrated on the basis of a nonce words test with Turkish and Russian children that the Turks, who generally had a poorer command of German than the Russians, tended to ignore the gender distinctions. Instead, they added *-(e)n* to any substantive, whereas the Russians had already acquired the most basic gender-based subdivision of German nouns and were aware of the fact that nonfeminine nouns ending in a consonant often require the *-e* suffix.

According to our calculations, out of the 1,000 most frequently encountered German noun lexemes taken from the DeReWo lexeme list by the Mannheim Institute for German language (Institut für Deutsche Sprache, 2009), 430 require *(e)n*-plurals (43%), 219 (22%) *e*-plurals, 131 (13%) \emptyset -plurals, 115 (12%) *e*-plurals with umlaut, 57 (6%) *s*-plurals, 36 (4%) *er*-plurals, and 12 (1%) umlaut alone. Masculine nouns made up 41.6% of the list, feminine nouns 41.5%, and neuter nouns 16.9%. Our results differ from those by Mugdan (1977), probably due to the consideration of derivative morphemes and similar sound combinations, proper names, compounds, and other words left out by him. The distribution of plural allomorphs for each gender presented in Table 2 can provide insight into the overgeneralization regularities observed in our sample, for instance regarding the question of whether the *-e* marker really dominates for masculine nouns and *-(e)n* for feminine nouns.

Table 2 Frequencies and percentages of the plural allomorphs according to gender in the DeReWo lexeme list (1,000 most frequent noun lexemes)

Suffix	Masculine nouns		Feminine nouns		Neuter nouns	
	#	%	#	%	#	%
-s	21	5	11	3	25	15
-e	133	32	6	1	80	47
-(e)n	44	11	380	92	7	4
-er	7	2	1	0	28	17
-e + umlaut	99	24	15	4	1	1
umlaut	10	0	2	0	0	0
no suffix	103	25	0	0	28	17

Some regularities associated with the plural allomorphs are visualized in Figure 1 by means of a joint plot of category points in a principal component analysis for categorical data. To our knowledge, this method has never been utilized to visualize relations between the most important factors influencing the choice of plural allomorphs before. The language material for Figure 1 was extracted from the Corpus of Leipzig University (Leipzig University, Department for Natural Language Processing, 2010), these were 1,000 most frequent nouns for each of three grammatical genders. The figure reveals, among other things, a close association between nouns of the feminine gender and the *-(e)n* plural marker, a tendency for nouns ending in a full vowel to receive *-s* as the plural marker, and an association between masculine nouns and consonants in the word final position. Also, nouns of masculine gender tend to be shorter than nouns of neuter gender. The *-e* plus umlaut is loosely associated with the masculine gender. In order not to overload the figure, only three categories of word final sounds were chosen: schwa, full vowels, and consonants. It should be noted that the choice of other frequency lists or an extension of this frequency list might result in somewhat different visualizations.

The same data based on the Corpus of Leipzig University were utilized in a classification tree, as shown in Figure 2. To our knowledge, classification trees have also never been used for the visualization of the German plural system. This statistical method illustrates relations between any kind of data (metrical, ordinal, nominal) and calculates tables and/or trees which reveal hierarchical structures in the data and sort out unimportant factors. According to Figure 2, the choice of the plural allomorphs in the target language depends on gender more than on other factors, such as the number of syllables (this factor was of importance for lower nodes not represented in Figure 2), schwa deletion rule, and word final sounds.

Figure 1 Most important factors influencing pluralization in 3,000 most frequent German nouns (1,000 for each grammatical gender), visualized by means of principal components analysis for categorical data.

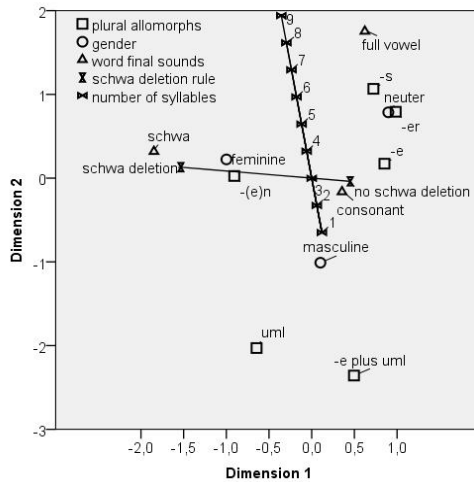
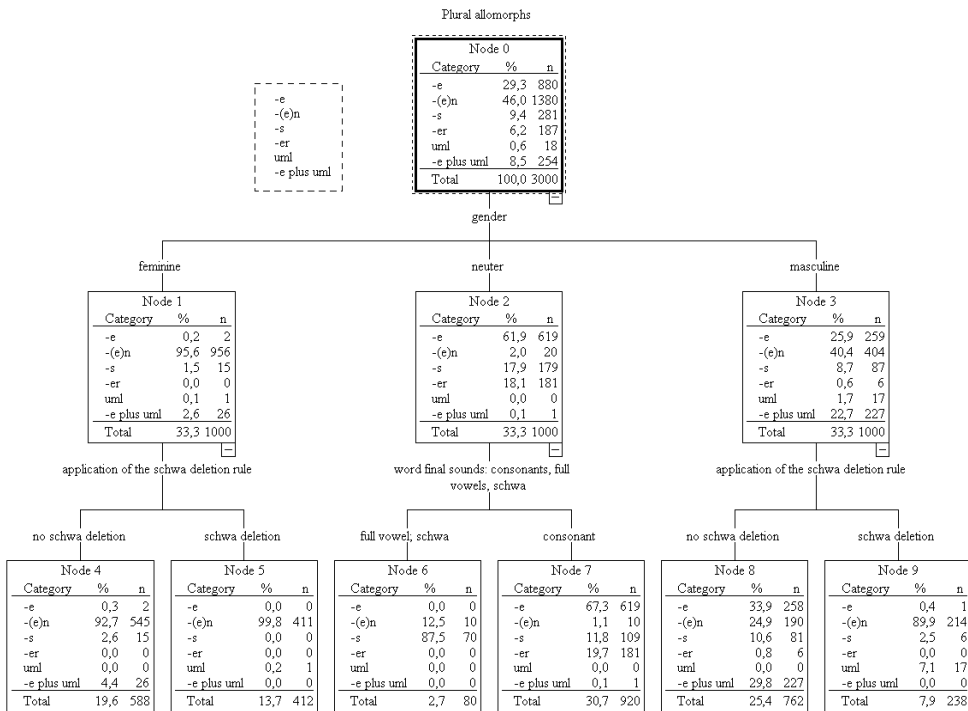


Figure 2 Factors influencing the choice of plural allomorphs in 3,000 most frequent German nouns according to a classification tree



The frequencies of plural allomorphs in adult spoken language directed at children are of interest because of their expected correlations with the corresponding frequencies in the child's language. In the corpus of Clahsen (1999), the frequencies of types and tokens in adults' child-directed language are distributed as follows (types are given in parentheses): *-e* 30% (33%), *-er* 15% (8%), *-(e)n* 49% (53%), *-s* 6% (5%), without zero and umlaut forms. As in the DeReWo lexeme list mentioned above, the *-(e)n* affix is the most widespread one and, according to our assumption, would be the first one to be acquired and actively overgeneralized, followed by *-e*. This would correspond to the assumption made by MacWhinney (1978) that the most frequent plural suffix in the input will be overgeneralized first, and will probably be the first one to be used productively.

Already MacWhinney (1978) pointed out that grammatical forms following regular patterns are seldom incorrect, whereas forms following irregular patterns often tend to be incorrect. Among the German plural formation rules, he mentioned two regular ones which can be explained in purely phonological terms: (a) roots ending in a schwa or /ai/ add *-n* (*Tante* > *Tanten* 'aunt'), (b) roots ending in other vowels add *-s* (*Auto* > *Autos* 'cars'). As in German the first of these two rules has almost no exceptions and the second rule has only about 20 exceptions, we would assume that both of them are the first ones to be acquired. Their universal applicability assures that they are also acquired early by immigrant children, irrespective of their linguistic backgrounds.

We predicted, following the single route models (Dressler, Mayerthaler, Panagl, & Wurzel, 1987, Köpcke, 1988; Korecky, Kröll, & Dressler, 2009), that the plural markers first acquired and hence overgeneralized would be *-(e)n* and *-e*, followed by *-s*. Furthermore, we assumed that the differences between German and immigrant children would correspond to those between younger and older Germans, because the active period of language acquisition at preschool age is not yet completed and thus the acquisition universals (e.g., preference for the most frequent and most salient markers) applied to the native language would be identical to those applied to foreign languages (Pinker & Prince, 1992).

Method

Instruments and Procedure

A series of large-scale language assessment studies was carried out in several cities in Hesse, Germany, in order to validate and establish a norm for a new version of a screening tool called Marburger Sprachscreening (MSS; Euler et al., 2010; Neumann, Holler-Zittlau, van Minnen, Sick, Zaretsky, & Euler,

2011) for 4-year-old children with or without an immigrant background. Children were tested either by language experts or by daycare center teachers with an extensive battery providing sufficient information about their performance in grammar, vocabulary, articulation, phonological short-term-memory, spontaneous speech, and speech comprehension. The subtests called Plural and Accusative and Dative Forms were important for this study.

Apart from MSS, several reference tests were conducted: speech perception, phonological memory, and the SETK 3-5 grammar test (Grimm, 2001) as well as some other tests which are of no relevance here. The constellation of the test battery and also of the MSS items varied from study to study, but the plural items of the MSS never changed: *Apfel-Äpfel* 'apple,' *Ball-Bälle* 'ball,' *Auto-Autos* 'car.' The plural elicitation was carried out in a standardized form by naming a certain object in a picture in singular and asking the child questions such as "Here is one apple and there are many . . ." All test items are normally acquired up to the age of two (von Suchodoletz, 2010) and thus are supposed to be familiar to 4-year-old children.

The SETK 3-5 examines all plural allomorphs except the zero plural. In contrast to MSS, which contains three plural items only, SETK 3-5 is designed to test 18 such items, some of which are nonce words conforming to German phonotactics: (a) real words: *Fisch(-e)* 'fish,' *Bild(-er)* 'picture,' *Stuhl (Stühle)* 'chair,' *Buch (Bücher)* 'book,' *Hand (Hände)* 'hand,' *Schiff(-e)* 'ship,' *Glas (Gläser)* 'glass,' *Gabel(-n)* 'fork,' *Vogel (Vögel)* 'bird;' (b) nonce words for a wug test: *eine Ribane(-n)*, *ein Tulo(-s)*, *eine Plarte(-n)*, *ein Biwo(-s)*, *eine Tapset(-n)*, *ein Ropf (Röpfe)*, *ein Dolling(-e)*, *eine Kland (Klände)*. Because nonce words do not allow the reproduction of memorized plural forms, the SETK 3-5 items are of especially high value for this study, reflecting the internalized plural formation rules and strategies. The elicitation form in SETK 3-5 corresponded to that in MSS.

Participants

Results from MSS tests, including classified wrong answers, were obtained from 893 children (50% Germans, 50% with immigrant background; 54% male, 46% female; age range 4.0 to 4.11 years, median 4.3). The largest immigrant groups were Turks (9%), Russians (6%), Arabs (5%), and Italians (4%). The classification as Germans or immigrants was based not on the nationality but on the languages spoken at home. German children raised bilingually from their birth on were classified as immigrants. For instance, some cases occurred when one parent spoke German and the other spoke English so that the child could learn English from the very beginning. The immigrants were thus a very heterogeneous group in many respects:

- The German language skills of immigrant children were very different when they were enrolled in the daycare centers. Daycare center teachers gave school grades for the German language skills at this point in time. The data were available for 203 immigrants. For 9% of the children the language skills were estimated as excellent, for 11% as very good, for 12% as good, for 15% as satisfactory, for 22% as bad, and for 31% as very bad.
- According to the questionnaire for the daycare center teachers, 35% of the immigrant children had contact with the German language from their birth on, 3% received the first language input in German during their first year of life, 6% in the second year of life, 12% in the third year of life, and 45% in the fourth year of life. This does not mean that the last group immigrated to Germany in the fourth year of life. Rather, many of them were brought up by their family members at home and contacted their mother tongue only. Data were available for 188 children.
- 46% of the immigrant children had no contact with their mother tongue in the daycare center. However, 54% (predominantly Turkish children) had at least one child in their daycare center groups who spoke their mother tongue, which might have influenced their acquisition of German negatively. Data were available for 223 children.
- On average, immigrant children attended daycare centers for 15 months, with a range of 0-50 months according to the questionnaires filled out by daycare center teachers. It must be noted, however, that the numbers exceeding 2 years are not realistic and probably include nursery schools located in the same daycare centers. In the first 2 years of life, children normally attend nursery schools or stay at home.
- According to the parents, 5% spoke only German at home, 83% spoke German and other language(s), 12% spoke only other language(s). According to our classification rules, however, children from families where only German was spoken from the birth of the child on were not considered as immigrants. Hence, 5% of the cases mentioned above relate to families where other languages must have been spoken as well, for instance, according to the questionnaires filled out by daycare center teachers.

In order to compare age effects for both German and immigrant children, 162 3-year-old children and 137 5-year-old children completed the sample of children tested internally, which means that they were tested by language experts from a Department of Phoniatics and Pediatric Audiology.

A database with external MSS results, namely tests administered throughout the state of Hesse by specially trained daycare center teachers, contained 6,144 cases (70% Germans, 51% males; age 4.0 to 4.5 years). This database did not contain all the items of the internal tests, as the external

tests were a screening distilled from the internal MSS test items, but it could be used as a comparison. Descriptive information about the samples and plural items used in the study is shown in Table 3. In order to compare linguistically more proficient groups with less proficient ones, all participants were classified on the basis of their test results by language experts, mostly speech and language therapists, as linguistically typically developed, in need of language training, and requiring medical therapy. Some children needed both language training and medical therapy.

Table 3 Description of databases

	MSS 3-yr-olds internal tests	MSS 4-yr-olds internal tests	MSS 4-yr-olds external tests	MSS 5-yr-olds internal tests	SETK 4-yr-olds internal tests
<i>N</i> (Germans)	107	446	4,280	137	300
<i>N</i> (immigrants)	55	447	1,864	58	176
Age (median)	3;8	4;3	~4;2	5;5	4;2
No. of plural items	3	3	3	3	18
No. of overgeneralizations and zero forms	129	852	n.a.	71	3,282

n.a. = not available

Data Analysis

The answers were entered into SPSS 15 in binary form (right-wrong) and as a string (wrong answers as words) for a later detailed classification of overgeneralization patterns. Wrong answers were categorized according to the plural allomorphs (e.g., *Apfels* = *s*-overgeneralization, *Apfeln* = (*e*)*n*-overgeneralization). The data were controlled and corrected by the first author. Overgeneralizations were classified independently by two clinical linguistics students. In the plural items of MSS with 4-year-old children, the kappa index was .95, in the plural items of SETK 3-5 .94, indicating a very high concordance of the classifications.

Zero forms were generally analyzed separately from overgeneralizations because there was enough evidence to suggest that in most cases these were not overgeneralizations of the plural allomorph $-\emptyset$ but repeated singular forms. For instance, of the 4-year-olds who produced three zero forms in the MSS test out of three possible ones ($N = 95$), 79% were classified as requiring language training, whereas only 26% of all other children ($N = 787$) belonged to this group ($\chi^2_{(1)} = 108.74, p < .001$). Children who required language training ($N = 120$) produced, in a correct or incorrect way, on average 2.5 plural allomorphs in SETK 3-5 ($SD = 1.85$), whereas children who did not require language training ($N = 335$) produced 5.3 plural allomorphs ($SD = 1.01, Z = -13.30, p <$

.001). Altogether, 24% ($N = 95$) of the children who repeated all three singular forms in MSS belonged to the group which repeated at least one MSS question completely or partly in other subtests, whereas all other children ($N = 783$) belonged to this group in 8% of the cases ($\chi^2_{(1)} = 27.82, p < .001$). Obviously, children who used fewer than three plural allomorphs on average and tended to repeat test questions were hardly capable of overgeneralizing $-\emptyset$, one of the most difficult German plural markers. Hence the following calculations will mostly refer to overgeneralizations only, without zero forms. Because the data in most cases were not normally distributed, differences were tested nonparametrically, with 2-tailed p values if not stated otherwise. Distribution of plural markers in the error patterns was examined by calculating chi-square. Differences between Germans and immigrant children were assessed by the Mann-Whitney U test, a nonparametric equivalent of a t test for two independent variables.

Results

Preferred Plural Markers: Linguistically Less Versus More Proficient Groups

In order to examine whether the overgeneralization patterns of the immigrants correspond to those of younger Germans, 3-year-old Germans were compared to 4- and 5-year-old Germans. The discrepancies in the distribution of plural markers in the error patterns in MSS between 3-year-olds and 4-year-olds, and between 4-year-olds and 5-year-olds were not significant according to cross-table chi-square tests; all $ps > .05$. The same applies to the frequency differences in the MSS test results between 4-year-old Germans and immigrants. As was shown in Zaretsky, Neumann, Euler, and Lange (2013), the error patterns of the Germans and the largest immigrant groups (34 Turks, 12 Russians, 15 Italians, 18 Arabs, 176 other immigrants versus 300 Germans) in the SETK 3-5 were also rarely significant: Arabs, Italians, and Turks demonstrated with all 18 nouns the same error patterns (not significantly different, all $ps > .05$). Russian children produced significantly different results for only one item (*Dolling*: $\chi^2_{(3)} = 25.51, p < .001$). Here degrees of freedom do not refer to the number of immigrant groups compared, but to the number of overgeneralized plural markers (overgeneralizations of $-s$, $-(e)n$, $-er$, etc.) documented for this item. All immigrants added together produced only 3, out of possible 18, significantly different error patterns in comparison to the Germans (the items *Vogel*, *Apfel*, *Ropf*, $ps < .05$).

The fact that the differences between younger and older Germans and between 4-year-old Germans and immigrants were not significant in most cases does not mean that the frequencies of overgeneralizations of certain plural allomorphs were equal in the groups. The frequency of the zero forms

was significantly lower at age 5 than at age 3 according to the Mann-Whitney *U* test, as shown in Table 4. The 3-year-old Germans overgeneralized *-(e)n* significantly more often than the 5-year-olds. The differences in the frequencies of other plural allomorphs were not significant.

Table 4 Frequency of plural allomorphs and zero forms in the answers of German and immigrant children in SETK 3-5

		<i>-er</i>	<i>-s</i>	<i>-e</i> plus umlaut	<i>-(e)n</i>	Umlaut	<i>-e</i>	Zero forms
Germans	#	10	237	0	150	10	172	1,304
	%	1	13	0	8	1	9	69
Immigrants	#	2	62	1	184	11	98	1,041
	%	0	4	0	13	1	7	74

The percentages of the plural allomorphs from the total number of the overgeneralizations in the SETK 3-5 sample demonstrated the following tendencies: *-(e)n* and zero forms were preferred by immigrants, *-s* by Germans. Furthermore, the immigrants used *-(e)n* significantly more often than *-s* in the correct or wrong way (on average 1.5 *en*-occurrences, *SD* = 2.18, versus 0.6 *s*-occurrences, *SD* = 0.97; Wilcoxon-Test: *Z* = -4.06, *N* = 162, *p* < .001). Germans, on the contrary, used *-s* almost significantly more often than *-(e)n* (1.1 *en*-occurrences, *SD* = 1.28, versus 1.2 *s*-occurrences, *SD* = 1.29; *Z* = -1.88, *N* = 294, *p* = .06). However, although *-s* was the plural marker of choice for the Germans, it never clearly dominated over other plural allomorphs even in the nonce words: on average 0.09 *s*-overgeneralizations (total number of *s*-overgeneralizations divided by the number of items not demanding *-s*; *SD* = 0.13) versus 0.07 other overgeneralizations (total number of overgeneralizations divided by the total number of items), without zero forms (*SD* = 0.10, *N* = 295, *Z* = -1.49, *p* > .05).

Differences in Plural Errors Between Germans and Immigrants

Corroborating our initial hypothesis, the error patterns of immigrants in their plural forms correspond to those of younger Germans. In order to look for parallels between younger Germans and older immigrants, umlauting as a component of pluralization was examined first. As many as 29% of 3-year-old Germans (*N* = 105) and 12% of the 4-year-old Germans (*N* = 137) used it at least once in an incorrect way in the MSS plural items subtest ($\chi^2_{(1)} = 11.02$, *p* < .001). It could be assumed that significant differences in average numbers with respect to umlaut errors could also be found between Germans and immigrants. Indeed, on average, immigrants produced 1.3 wrong umlaut forms in SETK 3-5 (*SD* =

1.11, $N = 163$), while the Germans produced 0.9 such forms ($SD = 0.91$, $N = 294$, $Z = -4.22$, $p < .001$). Seventy-one percent of the immigrants ($N = 163$) and 61% of the Germans ($N = 294$) made at least one umlaut error in SETK 3-5 ($\chi^2_{(1)} = 4.54$, $p < .05$). One might expect to note higher rates of correct umlaut forms or at least of attempted umlaut productions in the answers of the Arabs ($N = 18$) than in the answers of other immigrants ($N = 157$), due to the phenomenon of internal plurals in Arabic. However, there was no significant difference in this respect.

It could be assumed that younger children, like any other linguistically less proficient group, often produce plural forms which are nonexistent in the language of adults, thus trying to verify their hypotheses concerning possible plural rules of the target language (Korecky-Kröll & Dressler, 2009). Indeed, for instance, in forms like *Röpfel* instead of *Röpfe*, which occurred in SETK 3-5 4 times, the element *-el* was misused as a plural allomorph, even though the only meaning which *-el* has as a suffix in German is the diminutive one. In MSS, such forms including double plural markers (*Apfelns*) could be found in the answers of 4% of the 5-year-old Germans ($N = 107$) and 12% of the 3-year-olds ($N = 137$; $\chi^2_{(1)} = 6.35$, $p < .05$). In SETK 3-5, 74% of the immigrant children ($N = 165$) and 62% of the Germans ($N = 295$) produced at least one nonexistent plural form ($\chi^2_{(1)} = 6.36$, $p < .05$), thus showing a further parallel between younger Germans and older children with a foreign language background.

One more parallel between these groups is evident in the frequency of strong deviations from the expected answers: numerals or other quantifiers without substantives ("four" instead of "four cars;" Elsen, 2001; Stephany, 2002; Vollmann, Sedlak, Müller, & Vassilakou, 1997), semantically inappropriate answers ("trees" instead of "pictures"), and phonetic deformations of the items which do not allow interpretations concerning overgeneralized plural allomorphs ("tra" instead of "trees;" Laaha, Ravid, Korecky-Kröll, Laaha, & Dressler, 2006). Altogether, 8.6% of the 3-year-old Germans ($N = 105$) had acquired some of these strategies to avoid plural formation at least once in MSS, whereas among the 5-year-olds this figure was only 2.2% ($N = 136$, $\chi^2_{(1)} = 5.08$, $p < .05$). Such strategies were found in the answers of 20% of the 4-year-old Germans ($N = 293$) and 33% of the immigrants ($N = 162$, $\chi^2_{(1)} = 9.44$, $p < .01$) in the SETK 3-5 data. Although in the Turkish language the plural suffix is usually omitted after numerals, there were no significant differences between the Turks ($N = 34$) and other immigrants ($N = 301$).

The total number of correctly used plural allomorphs in the answers of the linguistically less proficient groups was expected to be smaller than in those of linguistically more proficient groups. The MSS results allowed such comparisons only for 3 allomorphs (*-s*, *-e* plus umlaut, umlaut). The number of correctly used plural allomorphs corresponded to the number of correctly produced plural forms. Older Germans produced significantly more of these forms in MSS, as shown in

Table 5. In SETK 3-5, Germans employed on average more plural allomorphs in a correct way than immigrants (see Table 5). Furthermore, the proportion of Germans who used all six plural allomorphs in SETK 3-5 was significantly higher than that of the immigrants: 41% ($N = 293$) versus 18% ($N = 162$, $\chi^2_{(1)} = 25.84$, $p < .001$).

As shown in the section "Plurality in German," the choice of the plural allomorph depends to some extent on the gender of the nouns. Because German uses overt and covert morphosyntax to mark nouns and articles for number, gender, and case, it can be assumed that a correlation between the MSS subtest called Plural and correct gender markers in the Accusative and Dative Forms subtest would be rather high. Accusative and dative cases are marked in this task on the articles: *auf das* (acc. sg. neutr.) *Dach*, *auf der* (dat. sg. fem.) *Wippe*. For the summarized overall results of the 3-, 4-, and 5-year-old MSS participants, the correlation between the sum of correct plural forms and the sum of correct gender forms marked on articles was $r = .68$ ($p < .001$, $N = 1,248$). Three-year-old Germans produced on average more correct gender forms than 4-year-olds (see Table 5). Four-year-old immigrant children in MSS produced on average less correct gender markers than Germans (see Table 5), which demonstrates a further parallel between younger German and older immigrant children.

Table 5 Comparisons between younger versus older German children and German versus immigrant children. Results of Mann-Whitney U-tests for MSS and SETK 3-5 items

Topic		<i>N</i>	<i>M</i>	<i>SD</i>	<i>Z</i>
Frequency of zero forms	Germans	295	4.42	3.44	-2.26*
	Immigrants	163	6.39	5.90	
	Younger Germans	105	0.43	0.66	-3.78***
	Older Germans	137	0.15	0.38	
Frequency of the plural marker -(e)n	Germans	295	0.51	1.19	-2.77**
	Immigrants	163	1.13	2.02	
	Younger Germans	105	0.11	0.35	-2.74**
	Older Germans	137	0.02	0.15	
Frequency of the plural marker -s	Germans	295	0.80	1.10	-4.80***
	Immigrants	163	0.38	0.80	
	Younger Germans	105	0.03	0.17	-0.31
	Older Germans	137	0.02	0.15	
Number of correctly used plural allomorphs	Germans	294	5.1	1.12	-9.89***
	Immigrants	162	3.0	2.19	
	Younger Germans	105	2.1	0.93	-7.00***
	Older Germans	147	2.8	0.49	
Correct gender forms	Germans	446	2.9	1.22	-15.64***
	Immigrants	447	1.4	1.30	
	Younger Germans	107	2.5	1.36	-2.92**
	Older Germans	446	2.9	1.22	

Not classified answers	Germans	293	1.0	2.51	-5.01***
	Immigrants	162	3.3	5.41	
	Younger Germans	105	0.30	0.66	-4.27***
	Older Germans	137	0.04	0.19	

* <.05

** <.01

*** <.001

The fact that the immigrant children's command of gender is deficient should also find its reflection in overgeneralization patterns. According to our calculations based on the DeReWo corpus, the plural allomorph *-e* must be closely associated with masculine and neuter nouns, because in adult language only 1% of the commonly used feminine nouns are pluralized by adding *-e*, whereas 32% of the masculine nouns and 47% of the neuter nouns demand this plural suffix (cf. Wegener, 1994). German SETK 3-5 participants, being more aware of the regularities controlled by the category of gender, overgeneralized *-e* with neuter and masculine nouns significantly more often (0.14, $N = 296$, $SD = 0.14$) than immigrant participants (0.10, $N = 162$, $SD = 0.12$, $Z = -3.12$, $p < .01$), whereas the difference for feminine nouns was not significant.

No qualitative differences relating gender to the error patterns of Germans and immigrants were identified. Yet immigrants with the category of gender in their native languages (e.g., Italians), $N = 266$, demonstrated in MSS significantly higher rates of correct gender forms than children without such a distinction in their native languages (e.g., Turks), $N = 126$: 1.6 ($SD = 1.29$) versus 1.2 ($SD = 1.26$, $Z = -3.12$, $p < .01$). As the second group was generally significantly weaker in grammar (5.1 correct answers, $SD = 3.70$, $N = 265$, versus 3.9, $SD = 3.43$, $N = 125$, $Z = -3.22$, $p < .01$), this discrepancy cannot with certainty be attributed to the influence of the native languages. Yet it is noticeable that those immigrants whose native languages lack gender demonstrated numerically higher percentages of gender errors (from the total number of article errors) in all four MSS items checked. This difference reached significance for only one item: $\chi^2_{(1)} = 7.53$, $p < .01$, $N = 76$ immigrants without gender category in their native languages, 137 with gender category.

Both immigrants and younger Germans produced significantly more answers which could not be classified (usually no answer at all) in the Plural subtest than the corresponding linguistically proficient groups (see Table 5).

Common Features of Plural Acquisition in Germans and Immigrants

Further analyses of the overgeneralization patterns revealed some of the regularities common for both Germans and immigrants, but they did not imply

any further comparisons between younger and older Germans. Such comparisons between Germans and immigrants were impossible with our MSS data, so only SETK 3-5 data could be considered.

The simplest plural rule in German demanding *-n* after a schwa in the word final position can be illustrated by comparing the correct answers for the SETK 3-5 plural items *Ribane* and *Plarte*, which are generated according to this rule, with the correct plural forms of the items *Tapsel*, *Dolling*, *Ropf*, and *Kland*, which follow other more complicated plural formation rules. The Germans produced on average 0.5 correct answers in the first group of test items ($N = 293$, $SD = 0.40$) and 0.2 in the second item group ($SD = 0.20$, $Z = -11.53$, $p < .001$), the immigrants 0.3 in the first item group ($SD = 0.40$) and 0.1 in the second one ($SD = 0.20$, $N = 162$, $Z = -6.05$, $p < .001$).

The simplicity of the second rule demanding *-s* after full vowels also finds confirmation in the SETK 3-5 data. The comparison of the means of the correct answers for the word groups *Biwo* and *Tulo* versus *Tapsel*, *Dolling*, *Ropf* and *Kland* yielded significantly different results between Germans and immigrants: (a) Germans: 0.4 correct answers for the first item group ($SD = 0.42$) versus 0.2 for the second item group ($SD = 0.20$, $N = 293$, $Z = -8.52$, $p < .001$), (b) immigrants: 0.2 ($SD = 0.38$) versus 0.1 ($SD = 0.20$, $N = 162$, $Z = -3.69$, $p < .001$). Only one of 455 children tested with SETK 3-5 was able to produce correct plural forms for all of the comparatively difficult items including *Tapsel*, *Dolling*, *Ropf* and *Kland*, whereas the correct forms for the simpler items *Plarte*, *Ribane*, *Biwo* and *Tulo* were produced by 57 children.

The close association of the suffix *-n* with the word final schwa and that of *-s* with the word final full vowels is reflected in further analysis: 12% of the immigrants ($N = 162$) and 7% of the Germans ($N = 294$) used at least one overgeneralization with the items *Ribane*, *Plarte*, *Biwo* and *Tulo* ($\chi^2_{(1)} = 4.62$, $p < .05$), thus deviating from the two rules mentioned. This is a very low value in comparison, for instance, with the percentage of overgeneralizations with the SETK 3-5 item *Kland*, demanding *-e* plus umlaut in analogy to *Hand* 'hand:' 38% in the German group, 26% in the immigrant group. Furthermore, we found other plural markers in only approximately 10% of the classifiable incorrect answers for the items *Ribane*, *Plarte*, *Biwo* and *Tulo*. Hence, children who produced incorrect forms of these items seldom overgeneralized plural allomorphs and repeated singular forms in more than 90% of cases instead. The items with the plural allomorph *-e* plus umlaut (*Ropf* and *Kland*) were obviously associated with three incorrect plural formation patterns (*-e*, *-s*, *-(e)n*: *Ropfe*, *Ropfs*, *Ropfen*) which, taken together with the zero forms, accounted for 90% of the errors. The close association of certain plural allomorphs with a certain phonetic-phonological environment seems to block the overgeneraliza-

tion of other plural markers, which results in the abundance of zero forms with *Ribane*, *Plarte*, *Biwo* and *Tulo*. No difference between Germans and immigrants was observed in this respect.

One closer, yet not so obvious, association of a plural allomorph with a certain phonetic-phonological environment is the suffix *-e* following a word final consonant: *Wort* > *Worte* 'word.' Marouani (2006) demonstrated that even immigrant children (Arabs in her study) tend to recognize this pattern in the initial stages of L2 acquisition of German. This is supported by our SETK 3-5 data, even if one disregards the schwa deletion rule and gender, when *-e* is compared with the otherwise most frequently overgeneralized allomorph *-(e)n*: (a) Germans: 1.6 correct or wrong *e*-uses in SETK 3-5 items ending in a consonant ($SD = 0.07$) versus 0.4 *en*-uses ($SD = 0.06$, $N = 300$, $Z = -15.81$, $p < .001$), (b) immigrants: 1.6 ($SD = 1.92$) versus 0.9 ($SD = 1.69$, $N = 176$, $Z = -7.49$, $p < .001$).

The schwa deletion rule, which is universally applicable and seems to be acquired before the very first actively produced plural, prohibits the occurrence of two schwas in adjacent syllables (in SETK 3-5: *Apfele*, *Vögele*, *Ribane*). No deviations of the rule in the SETK 3-5 data and only one deviation (*Apfele*) in the MSS data of all the 3-, 4- and 5-year-olds evaluated together were found. Obviously, even children with a minimal command of German had already internalized this rule and did not doubt its applicability.

The simplicity or, in other words, the universality or wide-ranged applicability of the plural rules as one of the dominant factors in the plural acquisition can also be illustrated by the data of the umlauting in SETK 3-5. Because the plural allomorph *-(e)n* is not compatible with the umlaut (as a part of plural allomorph) in the nominative case, both Germans and immigrants overgeneralized *-(e)n* significantly more often without umlaut: (a) Germans: 0.4 *en*-overgeneralizations without umlaut ($SD = 0.76$) versus 0.1 with umlaut ($SD = 0.33$, $N = 296$, $Z = -6.72$, $p < .001$), (b) immigrants: 0.5 ($SD = 0.98$) versus 0.2 ($SD = 0.56$, $Z = -4.45$, $p < .001$). The same applies to combinations of *-s* with the umlaut which are also impossible in the target language: (a) Germans: 0.8 *-s* without umlaut ($SD = 1.07$) versus 0.0 with umlaut ($SD = 0.16$, $N = 295$, $Z = -10.25$, $p < .001$), (b) immigrants: 0.4 ($SD = 0.77$) versus 0.0 ($SD = 0.08$, $N = 163$, $Z = -5.84$, $p < .001$). The almost total lack of combinations of *-s* with the umlaut can obviously be explained by the fact that *-s*, in contrast to *-(e)n*, is not compatible with the umlauts in any grammatical case.

Yet the case of umlauting demonstrates that the nonnominative noun forms could be mistakenly transferred into the nominative declension system, resulting, theoretically, in overgeneralizations corresponding to accusative, dative, and genitive forms, particularly because these forms are equivalent to the plural suffixes (Gen.: *des Buches* = *-s* 'of the book,' Dat.: *mit den Händen* =

-(e)n 'with the hands,' Acc.: *über den Bären* = -(e)n 'about the bear'). Whether SETK 3-5 participants indeed tended to overgeneralize such forms was verified by dividing all overgeneralizations into two groups: potential nonnominative forms and all other incorrect plural forms without equivalents in the adult language. On average, immigrants produced 0.5 potential nonnominative forms ($SD = 1.15$) and 1.0 other forms ($SD = 1.26$, $N = 163$, $Z = -4.27$, $p < .001$). The ratio in the answers of the Germans was 0.3 ($SD = 0.69$) versus 0.6 ($SD = 0.95$, $N = 296$, $Z = -6.41$, $p < .001$). This means that both Germans and immigrants tended to produce nonexistent forms twice as often as potential case forms. Hence, the plural forms produced by our participants mostly could not be viewed as memorized forms in other grammatical cases.

As was demonstrated in Zaretsky, Neumann, Euler, and Lange (2013), both Germans and immigrants stick to the same overgeneralization patterns: -e > -(e)n (*Fische* > *Fischen*), -e + umlaut > -e (*Hände* > *Handen*), -er > (e)n (*Bilder* > *Bilden*), -(e)n > -s (*Ribanen* > *Ribanes*), umlaut > -(e)n (*Vögel* > *Vogeln*), -s > -(e)n (*Autos* > *Auten*). Because both Germans and immigrants demonstrate the same acquisition strategies resulting in the same overgeneralization patterns, the levels of difficulty of the plural allomorphs might also be the same. The common denominator of the plural allomorphs tested in MSS and SETK 3-5 is -e plus umlaut, -s, and umlaut. The database of the external MSS tests demonstrated the following tendencies: Umlaut (Germans: 68% of the correct answers, $N = 4,280$, immigrants: 29%, $N = 1,864$) was more difficult than -e plus umlaut (Germans: 84%, $\chi^2_{(1)} = 539.70$, $p < .001$, immigrants: 42%, $\chi^2_{(1)} = 389.78$, $p < .001$), and -e plus umlaut was more difficult than -s (Germans: 93%, $\chi^2_{(1)} = 512.48$, $p < .001$, immigrants: 67%, $\chi^2_{(1)} = 444.74$, $p < .001$). In SETK 3-5, real words supply evidence that umlaut was more difficult than -e plus umlaut, whereas nonce words reflected a higher level of difficulty of -e plus umlaut compared to -s: (1) items *Apfel* and *Vogel* were answered significantly less often correctly than the items *Hand* and *Stuhl*: (a) Germans: on average 0.9 ($SD = 0.29$) versus 0.6 ($SD = 0.39$, $N = 296$, $Z = -8.65$, $p < .001$), (b) immigrants: 0.4 ($SD = 0.45$) versus 0.3 ($SD = 0.38$, $N = 162$, $Z = -4.54$, $p < .001$); (2) the items *Kland* and *Ropf* were answered significantly less often correctly than *Biwo* and *Tulo*: (a) Germans: 0.1 ($SD = 0.22$) versus 0.4 ($SD = 0.42$, $N = 293$, $Z = -9.55$, $p < .001$), (b) immigrants: 0.1 ($SD = 0.23$) versus 0.2 ($SD = 0.38$, $N = 162$, $Z = -4.64$, $p < .001$).

Taking the low scores of umlaut on the scales of iconicity, frequency, cue validity, and productivity (Köpcke, 1988) into account, one would expect very low rates of overgeneralizations of this plural marker. In our SETK 3-5 data, such overgeneralizations accounted for only 2% of all overgeneralizations in the Germans' answers and for 3% in the immigrants' answers.

Some authors postulated a variability of the error patterns within a short speaking period in spontaneous speech or test situation without notable semantic variation: *Stühle*, *Stühl*, *Stühlen* 'chairs' (Elsen, 2001; Korecky-Kröll & Dressler, 2009; Park, 1977). The same tendency was observed when comparing the item *Apfel* in MSS with the same item in SETK 3-5. As many as 88 % of the 4-year-old Germans who produced the correct form of *Apfel* in MSS ($N = 95$) could also produce it in SETK 3-5 ($\chi^2_{(1)} = 35.92$, $p < .001$, $\kappa = 0.50$, $p < .001$). The same values for the immigrants were 70% ($N = 46$) and 92% ($N = 117$, $\chi^2_{(1)} = 67.14$, $p < .001$, $\kappa = 0.64$, $p < .001$). This means that a considerable subgroup of both Germans and immigrants changed their mind concerning the correct form of the *Apfel* plural within approximately 20 minutes.

Discussion and Conclusions

The following parallels between immigrants compared to Germans and younger Germans compared to older Germans were identified:

1. The distribution of plural allomorphs in incorrect answers was basically the same, which means that the discrepancies in the error patterns were of quantitative and not of qualitative nature. However, linguistically less proficient groups tended to overgeneralize $-(e)n$, repeat singular forms, produce quantifiers without pluralized nouns or forms strongly deviating from the rules of the target language. Linguistically stronger groups overgeneralized $-s$ and produced more correct plural forms.
2. Although no plural allomorph could be considered to be the default plural marker universally compatible with any phonetic-phonological environment, $-(e)n$ had certain features of the default plural, especially in the linguistically weaker groups, whereas $-s$ possessed such features in the proficient groups.
3. Linguistically weaker groups used fewer plural allomorphs (types) than proficient ones.
4. The umlauting was more problematic for the linguistically weaker groups. The parallels between younger Germans and older immigrants allowed us to draw the conclusion that the plural acquisition patterns in both cases were basically the same.

Furthermore, the following parallels could be found in the error patterns of both Germans and immigrants:

1. The choice of the plural allomorph depended on its frequency in the input $-(e)n$, $-e$, simplicity, and applicability (universality) of the rules, and to a lesser extent on the command of the gender category, because some plural allomorphs are closely associated with certain genders.
2. The wrong plural forms mostly did not correspond to the accusative, dative, and genitive forms in the adult language, which means that these were not merely memorized items, but the result of actively applied rules or schemata.
3. Both Germans and immigrants stuck to the following overgeneralization patterns: $-e > -(e)n$, umlaut plus $-e > -e$, $-er > -(e)n$, $-(e)n > -s$, umlaut $> -(e)n$, $-s > -(e)n$.
4. The difficulty levels of the plural allomorphs were universal: Umlaut alone was more difficult than $-e$ plus umlaut, and $-e$ plus umlaut was more difficult than $-s$.
5. Both Germans and immigrants overgeneralized $-s$, $-(e)n$, and $-e$, while other plural allomorphs could be encountered only sporadically.
6. Error patterns were variable even within a single test session.

One of the main findings of the study, the tendency to overgeneralize $-(e)n$ at a young age, $-s$ at a later age, and $-e$ independently of age, or at least to prefer these plural markers to all the others, has been described by a number of authors. Scupin and Scupin (1910) reported overgeneralizations of $-(e)n$ at the age of 3 and those of $-s$ at the age of 5. Walter (1975) did not find $-s$ in the early overgeneralizations, whereas $-(e)n$ and $-e$ were overgeneralized at all ages. In a single case study of Elsen (2001), a German girl observed up to the age of 2.5 produced en - and e -overgeneralizations in spontaneous speech in the early stages, $-(e)n$ being the most frequently overgeneralized plural allomorph (types, not tokens, are meant), and s -overgeneralizations in the later stages. Solely the phonological form of the nouns and the frequency of the plural allomorphs in the input, and not the morphology (suffixes), gender or animacy of the nouns, determined the choice of the plural allomorphs in this study, which confirms our observations (e.g., $-(e)n$ strongly associated with schwa in the word final position, $-s$ strongly associated with full vowels, non-syllabic plural allomorphs associated with the schwa in the final syllable).

The $-(e)n$ as the most frequent plural allomorph in the input language is expected to be overgeneralized in models such as natural morphology or cognitive morphology represented in plural acquisition studies by Köpcke's schema model (Bittner & Köpcke, 2001). According to Köpcke (1988), $-(e)n$ is overgeneralized frequently due to its high scores on the scales of salience, type frequency, and cue validity, $-s$ due to its high scores on the first and the third

ones, -e on the first and (moderately) on the second ones, whereas -er is high only on salience and umlaut is (moderately) high only on cue validity.

Constant oscillations between different plural forms of the same nouns, which occurred in our tests in the different forms of the item *Apfel* produced in the course of about 20 min, probably demonstrate the continuous work of associative learning mechanisms, which weight different cues from the input, cause frequent shifts of the determining criteria, and result in new overgeneralizations. According to Wegener (1995), such form and error variations falsify the approach of a single regular plural allomorph in German, namely -s, and demonstrate that German children have several regular and marked-regular plural classes at their disposal. The term marked-regular plural refers to somewhat less regular classes, that is, those following the subsidiary rules and not the main rules.

Accounts of zero forms dominating in the answers of children are omnipresent in the literature on plural acquisition (Clahsen et al., 1992; Gawlitzek-Maiwald, 1994; Mugdan, 1977; Schaner-Wolles, 2001). MacWhinney (1978) mentioned a strong tendency to use zero suffixes with real and especially nonce words in any age group between 3.0 and 12.0.

Phillips and Lowell (1980) assumed all correct forms to be a mere reproduction of the plural forms learnt by rote at least up to the age of 7. Our data did not confirm this assumption: Not a single German child and only 4 immigrant children, all in need of language training, repeatedly produced only zero forms or not classifiable answers in the case of wrong answers. Hence, it is rather to be assumed that the pluralization patterns result from some rules or schemata, probably based on probabilistic analysis of the frequency of certain plural allomorphs with certain word final sounds, certain genders, and other factors. The fact that the great majority of the documented incorrect plural forms in our data did not correspond to any forms of adult language also reveals the active use of some pluralization rules or schemata internalized during preschool age.

Schaner-Wolles (1989) assumed that the first productive plural rules are applied by German preschoolers at the comparatively late age of 5 or 6, preceded by frequency-based patterns resulting mostly in overgeneralizations of -(e)n. Only at later stages do they switch to overgeneralizations such as *Auto* > *Auten* 'car,' following a rare plural formation pattern observed only in approximately 20 German nouns such as *Fresko* > *Fresken* 'frescos' and *Konto* > *Konten* 'deposit account.' Yet the difference between the overgeneralization of the frequency-based suffix -(e)n, on the one hand, and the use of the internalized rules extracted from such rare patterns in the input, on the other hand, (i.e., the demarcation of the frequency-based and "real" plural rules) remained opaque. In the MSS studies, forms such as *Auten*, which disregard one of the simplest German plural rules, were mostly produced by linguistically less profi-

cient groups such as immigrants and cannot be considered as a result of some advanced pluralization strategies. Yet such forms are definitely based on some internalized pluralization rules at the age of 4 and even 3.

Both transparency and productivity concepts disfavor the umlaut plurals in any form: umlaut, *-e* plus umlaut, *-er* plus umlaut. Partial plural marking such as *-e* without umlaut, which was one of the most common plural errors in the MSS studies (*Klände* > *Klande* and alike), has been recognized in a number of studies (Schaner-Wolles, 2001; Szagun, 2001). Park (1977), who conducted a longitudinal study with two German children without developmental disorders or delays up to the age of almost 4 years, reported, apart from omnipresent *en*-overgeneralizations, a tendency to omit either the umlaut or the suffix *-e* in the nouns demanding *-e* plus umlaut in plural. The author stressed an all-pervasive strategy to replace the less iconic plural allomorphs by the more iconic ones, *-e* plus umlaut being less iconic than *-e*. Marouani (2006) observed the tendency to avoid umlauting with *-e* in the answers of Arab children learning German, with a clear trend towards omitting umlaut as a plural marker per se.

The data shown in Zaretsky, Neumann, Euler, and Lange (2013) suggest that overgeneralizations of unproductive plural allomorphs (namely umlaut, *-er*, and *-e* plus umlaut) are rare. This supports the findings of Korecky-Kröll and Dressler (2009) and contradicts the results of Behren (2002), who claimed that the child she studied quickly identified all plural allomorphs and overgeneralized all of them. In fact, not a single overgeneralization of *-e* plus umlaut was found in the SETK 3-5 answers of the Germans and only one such overgeneralization in the immigrants' answers in the present study.

The fact that the plural rules without exceptions or with very few exceptions are hardly violated even at the youngest age finds further support in the literature. According to Walter (1975), the schwa deletion rule in words such as *Junge* > *Jungen* 'boy,' where one of the schwas is deleted after vowels or liquids, was never violated in any age group between 2.5 and 25.0. Using a nonce words task, Wegener (1994) demonstrated that both Russian and Turkish learners of German closely associated the nouns ending in a schwa with the suffix *-n*, which accounted for over 90% of the answers. Marouani (2006) noted that Arab preschoolers learning German seemed to disregard the plural rules associated with gender for the benefit of the simplest phonetic-phonological regularities such as schwa (*-n*), full vowels (*-s*), or consonants (*-e*) in the word final position. This was especially prominent in one of the tests with the nonce words presented either as masculine or feminine nouns, which did not result in any variations in the choice of the plural allomorphs (*der/die Trul* > *Trule*, *der/die Fnör* > *Fnöre*). Köpcke (1988) found that young German adults tended to use *-s* with nonce words ending in a full vowel (69% of all

answers), *-n* with feminine nouns ending in *-e* (94%) and tended to avoid plural allomorphs containing a schwa with the nouns having a schwa in the final syllable (schwa deletion rule). Schaner-Wolles (1989) pointed out that one could hardly find combinations of the umlaut with *-(e)n* in the answers of 40 2- to 6-year-old Germans, 10 thereof being 4 years old. All of these patterns, that is, *-s* after full vowels, *-(e)n* after a schwa in the word final position, *-e* after consonants in the word final position, strict application of the schwa deletion rule, and incompatibility of umlaut with *-(e)n*, were verified here.

Our results contradict those of Wegener (1994), who demonstrated that even 9-year-old Germans produce correct *s*-forms of nonce words with full vowels in the word final position (*Kafti*, *Ziro*) only 40% of the time. In fact, 40% was the average rate of correct answers for the nonce words *Biwo* and *Tulo* given already by the 4-year-old German children reported here.

Gawlitzeck-Maiwald (1994) conducted one of the few studies directly comparable to ours, using nonce words from the H-S-E-T test (Grimm & Schöler, 1978), *ein Mattau*, *ein Kolz*, *ein Maling*, *ein Naloß*, *die Findin*, *ein Luch*, with a sample of 33 children aged 3 to 6 years. The participants closely associated the items *Zawo* and *Mattau*, which follow one of the simplest pluralization rules, with *-s*. In the cases of incorrect answers they preferred not to use any suffix at all (cf. *Biwo*, *Tulo* in SETK 3-5 here). Because masculine and neuter nouns are closely associated with the suffix *-e*, this suffix was dominant in the items *Naloß*, *Luch*, and *Kolz*. As there were no immigrants among the participants and only 4 children were 3 years old in the sample of Gawlitzeck-Maiwald (1994), the suffix *-(e)n* was not as prominent in the answers as in our study, whereas *-s* and *-e* dominated. This also explains why children “clearly observe gender distinctions” (Gawlitzeck-Maiwald, 1994, p. 263), while many of our test subjects did not.

This overview should suggest that the results of the present study do not deviate from any important results of most of the previous studies on plural acquisition. The large sample size, without any limitations in recruitment, as well as including immigrant children of a certain age make it possible to generalize the results of the present study to 4-year-old preschoolers learning German as their native or foreign language and attending daycare centers in Germany.

Some of the conclusions which can be drawn from the results contribute to the dispute about the psycholinguistic background of overgeneralization patterns reflected in the distribution of plural allomorphs and zero forms. The most obvious point supported by our data is that at the early stages, German L1 and L2 learners clearly abide by the frequency-based phonetic-phonologically motivated regularities extracted from the input:

1. Because $-(e)n$ is the most frequent plural allomorph, followed by $-e$, children tend to overgeneralize $-(e)n$ and $-e$.
2. Because the umlaut is not compatible with the plural allomorphs $-(e)n$ and $-s$, one can hardly find occurrences of such combinations (e.g., *Äpfels*), either in SETK 3-5 or in MSS.
3. Because the schwa in the word final position requires $-n$, the full vowel requires in the overwhelming majority of the cases $-s$ and a consonant requires, at least as a tendency, $-e$, these plural markers dominate with these word final sounds.
4. Because the schwa deletion rule is never violated in German, it seems to be acquired prior to the very first actively produced plural form.

One of the weakest tendencies is not phonetically-phonologically, but grammatically motivated. As $-e$ is closely associated with masculine and neuter nouns, and not with feminine ones, the tendency to use $-e$ with masculine and neuter nouns is to a certain extent represented in the answers of the children who already have a certain command of the gender category.

The development of the plural system is reflected in the growing consideration of gender and the applicability or compatibility of the plural allomorphs, in the transition from purely iconic plural markers $-(e)n$, $-e$, $-s$ to the less iconic markers $-e$ plus umlaut and umlaut, in the transition from phonetic-phonological patterns (word final sounds, presence of the schwa in the last syllable) to a more complex system based on more subtle regularities encoded in the input. There is no evidence that $-s$ or $-(e)n$ or any other allomorph fulfils the functions of a universal default plural, although $-(e)n$ seems to have some features of the default form in the group with a limited command of German (immigrants) and $-s$ in the linguistically more proficient group (Germans).

The fact that the plural acquisition patterns are basically universal and abide by the same rules is supported by the quantitatively and not qualitatively different distribution of the plural allomorphs in the error patterns, by the same difficulty levels of the plural allomorphs, and by the same overgeneralization patterns like $-e$ plus umlaut $>$ $-e$, $-s >$ $-(e)n$.

There are inherent limitations of our study. A cross-sectional study design presupposes a short inventory of test items which should be chosen very carefully. Although two validated tests were utilized in this case, another set of items might result in somewhat different tendencies and, hence, conclusions. Also, the examination of the zero plural allomorph was not possible. However, a longitudinal study with thousands of participants or an extended list of test items was not feasible. It should be taken into account that tasks with nonce words are rejected by a considerable number of young test subjects. An exten-

sion of the test battery might be an option for children of the middle school age, but not for preschoolers. Hence, test items must be chosen carefully and correspond exactly to the purpose of the study. Also, multivariate statistics might be utilized in the future research for more sophisticated analyses.

In summary, there is no evidence that monolingual Germans and bi/multilingual children use qualitatively different pluralization strategies. The tendencies demonstrated by 4-year-old bi/multilingual children correspond to those employed by 3- and 4-year-old monolingual Germans. Because the time window for first language acquisition is still open at the preschool age, children with foreign linguistic background adopt the same plural acquisition strategies that can be detected in the answers of native German children.

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