

**The Case of the German plural:  
Can too many rules mean no rule-governed system at all?**

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**Abstract**

Previous research on the acquisition of morphological markers has focused on whether they are learned via rule induction (Marcus et al., 1992) or through an instance-based manner (Marchman, Plunkett & Goodman, 1997). To provide evidence on this debate, this paper focuses on the German plural as it is a case where there are many morphological markers used to mark the same inflectional class. Two native German speakers were asked to form plurals from singular pseudo-nouns and nouns borrowed from French. The results suggest that it is possible a 'rule' exists for words which are noticeably borrowed from French. However, in the more common case, novel words which sounded similar to or reminded the native speakers of real German plurals were made plural in that way, even across speakers. This provides evidence for a frequency or instance-based account where generalizing from specifically experienced instances to new instances occurs based on the novel stems' similarity to known instances.

## **The Case of the German plural: Can too many rules mean no rule-governed system at all?**

Learning derives from specific experiences in specific instances. The question for theories of learning is how one generalizes to new instances. How does one take learning beyond the encountered cases? One domain in which these questions are addressed is the learning of morphological markers, particularly the English past tense and the English plural. But one may ask, is this the appropriate language in which to find answers to this debate? This paper will present evidence that a more inflectionally rich language, such as German, may provide more answers as to the nature of learning morphological markers and extending them to novel situations.

Classic textbook descriptions of the development of the English plural present it as a case of rule induction. Given specific instances, dog + s, rock + s, radio + s, etc, one induces the rule, “nouns are made plural by adding s”. There are two competing theories of the acquisition of the regular plural, one of which indicates that this rule-based account may not necessarily be the way individuals incorporate single nouns they first encounter into a paradigm in which they exist in plural form. One account, known as the dual process account, is a more modern or sophisticated version of the traditional idea that individuals learn rules and store those rules in a mental lexicon. By this account, early in development, individuals acquire rules that operate over the variables of nouns, verbs, etc. (Marcus et al., 1992); so, the rule for the regular plural in English would be to concatenate the suffix “s” to the variable noun stem. The key claim, according to the dual process account, is that individuals learn rules that are represented in terms of symbols and it is for this reason that the regular form is productive.

This theory accounts for irregular forms (e.g. child to children) by actually positing different processes for the production of regular and irregular forms. The rule for regular forms can actually be blocked by the successful retrieval of an individual instance of an irregular form from memory. For example, “men” blocks “mans” in the plural formation of “man”. While this account seems to suffice for the case of the English plural where there is one productive rule and several irregular cases which could be memorizable, one must question what happens in a language with more potential “regular” productive forms.

Another approach which may shed light on this problem is that of an associative and similarity or frequency based account (Marchman, Plunkett & Goodman, 1997). The production of the plural in this approach is expected to be dependent on the similarity of novel surface forms to learned instances. In this case, regular plurals are not necessarily all acquired at one decisive point in time in which one has a rule “nouns are made plural by adding s”, as the symbolic account would predict. Instead, this theory posits that when given new instances which are similar to previously learned instances, the “rule” would not be applied, but instead the morphological marker which is chosen would be one which is applied to those previously learned similar instances. This easily accounts for the different allomorphs of the regular plural as well as the similarities within the irregular plurals, without having to call for separate systems of rule-governed allomorphy, which is presumably how the dual process account would handle this situation.

Given these two highly debated accounts, it is important at this point to note that many have argued that English inflection is a relatively poor case to consider (Clahsen, 1992), especially the past tense and plural morphological markers. This is because, as described, there is only one productive plural marker, 's'. (Admittedly, there are three allomorphs of the plural which are dependent on the phonological properties of the final phoneme of the noun stem, however, these are all allomorphs of the same morpheme.) Therefore, English can be considered inflectionally poor in that there is only one productive plural marker and likely only one productive past tense marker ('ed').

The next logical step, then, is to look to a language which has many morphological markers to mark the same inflectional class. German has been heavily researched as a language which fills this requirement. In the case of the German plural, there are five potential morphological markers: -en, -s, -e, -er, and zero. Within these possibilities, the -en, -er, and -e also allow for (morpho)phonemic vowel changes. Past research has demonstrated that the use of these suffixes on nouns to mark plurality is mainly arbitrary. Moreover, one attempt to describe the German plural marking system into rules has led to the postulation of ten rules and fifteen lists of exceptions (Mugdan, 1977; cited in Marcus et al., 1995). With this complicated system comes the issue of whether or not there is a distinct default rule which native German speakers apply when given a novel noun.

One distinct rule would be predicted if the German plural was learned through a rule-based approach. In this instance the blocking mechanism would ensure all learned instances which did not follow the specified rule were pluralized in their respective manners. In this case, novel instances would have plurals created through the use of that one rule. Proponents of this account (Clahsen, 1992; Marcus et al., 1992) have argued that the -s plural marker is the default plural rule, "the plural affix -s occurs with nouns that do not yet have a marked lexical entry for plural" (Clahsen, 1992, p. 170). The main reasoning behind choosing -s as the default plural marker is that -s appears when no other suffix is allowed; thus, it is considered morphophonologically free. Alternatively, Bybee (1991) is in favor of a more similarity or frequency based account of morphological development. In this case, German does not have a regular default rule which would be applied to novel instances.

These two accounts, then, make very different predictions about what will occur when a native German speaker is given a novel noun in the singular form. The rule-based account would predict that the marker deemed the default rule suffix would be added to all new instances which themselves have yet to "have a marked lexical entry for plural". The specific plural marker suggested by this account to be the default rule is the morphological marker "-s". The prediction, then, regarding the other four morphological markers is that they will not be used for the novel instances. The similarity or frequency based account would predict that plural markers would be added to the novel words based on the frequency of the suffixes themselves (and, notably, the frequency of the stem – but in this case the native German speaker has only one exposure to the novel words, so frequency of the stem is irrelevant ).

According to these predictions, the two accounts differ in their reliance on frequency. For example, though the rule-based account has deemed the -s the default plural marker, it happens to be the least frequent plural marker in the German language. Janda (1990) reported that out of the 200 most common nouns used in the German

language, 42% required the –en marker, 35% the –e marker, 12% required a zero marker, 10% the –er marker, and just 1% took the –s marker. Obviously, a similarity or frequency based account would predict the –en would be the marker which would be used when novel nouns are presented to a native German speaker. The question, then, is how do native German speakers create plurals from novel, single stems?

In order to provide an answer to this question, thirty-three words were selected based on several properties. Twenty-four novel words were taken from a previous study by Marcus et al. (1995). Half of these novel words were created to rhyme with real German nouns and the other half of the novel words did not rhyme with real German nouns. These novel words are presented in Tables 1 and 2. The prediction is that if the twelve novel nouns which rhyme with real German nouns words are pluralized by adding the same plural marker as the real words with which these words rhyme, then native German speakers are using a similarity and frequency based system. On the other hand, if the words are pluralized by adding “–s”, then it is possible the default rule is used.

**Table 1. Twelve novel nouns which rhyme with real German nouns.**

<b>Pisch</b>	<b>Vag</b>
<b>Bral</b>	<b>Spert</b>
<b>Pind</b>	<b>Mur</b>
<b>Kach</b>	<b>Raun</b>
<b>Pund</b>	<b>Nuhl</b>
<b>Klot</b>	<b>Spand</b>

**Table 2. Twelve novel nouns which do not rhyme with real German nouns.**

Bnaupf	Fnöhk
Pläk	Bröhk
Plaupf	Pröng
Snauk	Fnähf
Bneik	Pnähf
Pleik	Fneik

In the original study, these twenty-four words were used in German sentences in which the novel word received one of the possible five plural markers. The subjects were then asked to rate how natural the sentence sounded. Based on their answers, the researchers concluded the –s marker was in fact a default used with novel nouns when making the plural. Certainly, the fact that these words were used in a sentence format may have influenced their choice of plural marker (i.e. it is possible that the phoneme following the pluralized form could have influenced the marker chosen; see Gallagher and Shriner, 1975). Thus, a baseline of pluralization based solely on the noun stem is needed to ensure that the selection of the plural marker is based on the stem alone.

As shown in Table 3, the additional nine test words were chosen as borrowed words from French. This is due to the fact that the –s is noted as being the sole plural marker selected for borrowed words (Clahsen, 1992). If –s is added to these words to mark plurality, one should not be surprised, as it would be predicted by a rule-account. However, if any of the other plurality markers are used, it may be that frequency is important even in pluralizing borrowed words.

**Table 3. Nine borrowed words from French.**

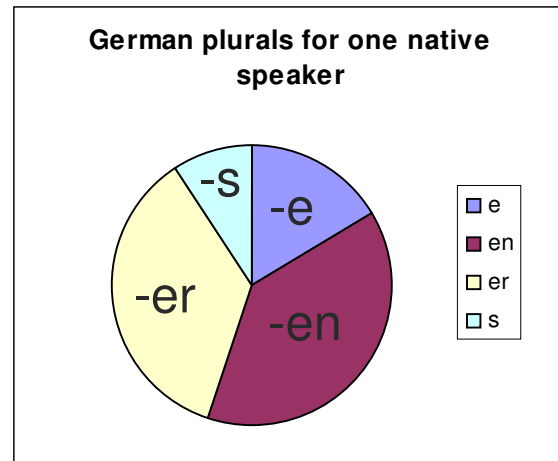
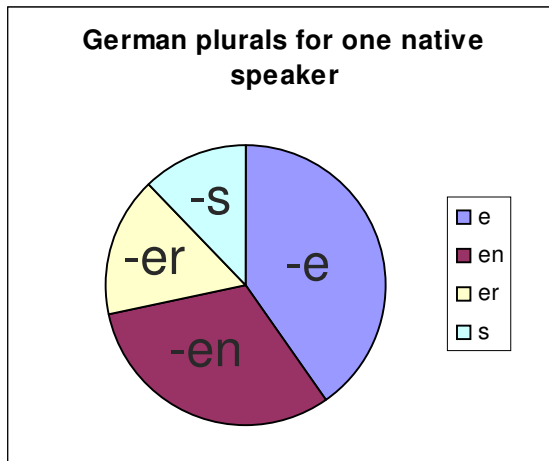
Aerostat	Plume	Drapeau
Verre	Stylo	Renseignement
Loupe	Avertisseur	Recherche

These words were given to two native German speakers. Each word was given in three forms, first in the masculine form (der NOUN), followed by the feminine form (die NOUN) and lastly in the neuter form (das NOUN). Thus, a total of 99 words were made plural by two native German speakers. Each speaker was asked to give the noun in the plural form and also, if possible, give a reason for his choice. It is the case that each speaker was presented with the words in the same order and that their having seen the same words in all three genders may have influenced their pluralized forms. However, before each subject began pluralizing the novel forms instructions were given to rate each form *independent* of any other form.

The results from each subject were remarkably different, as is apparent from Figures 1 and 2. The actual percentages for both subjects appear in Table 4. First, neither subject used the zero plural marker. Most likely this is due to the fact that the subjects were encouraged to actually write down a plural, and it is possible that with the method of the experiment they felt the need to actually make a change within the word when pluralizing it.

**Figure 1. Percentage of plurals for Subject One.**

**Figure 2. Percentage of plurals for Subject Two.**



**Table 4. Percentage of subject's responses.**

	S1	S2
e	40%	16%
en	31%	39%
er	16%	36%
s	12%	9%

The second similarity between the two subjects' responses is the relatively infrequent use of the –s phoneme as a plural marker. In fact, as became apparent from subject's responses as to why they pluralized words in the way they did, the only words which received the –s marker were words the subjects recognized as being borrowed from French. An example of this appears in (1), where both subjects recognized the singular form of the word as being borrowed from French and then, for each gender, pluralized the form by adding the –s marker. This result supports past research which suggests that –s is the sole plural marker selection for borrowed words (Clahsen, 1992). Certainly further experiments should be done to determine whether this applies just to French words, as in this study, or whether borrowed words from English or other languages also take the –s marker when pluralized.

- (1) der/die/das Stylo → Stylos  
 (2) der/die/das Drapeau → Drapeaus

From Table 4 it is numerically apparent that the use of –e, -er and –en does not remain consistent across native German speakers. From the responses of the speakers, it is the case that both speakers replied similarly when they realized the novel word rhymed with (or was similar to) a real German noun. In (2), the speakers responses were the identical for the novel word 'das Pund' which both noted as being similar to the real German noun 'das Pfund'. Similarly, the novel word 'das Kach' reminded both speakers of 'das Dach', a real German noun and so the pluralization occurred identically for both speakers as demonstrated in (3). However, in no case were the plurals for all three noun genders identical across speakers, as demonstrated by examples (4) and (5).

- (2) das Pund → Punder  
 (3) das Kach → Kächer  
 (4) Novel Noun                      Subject One                      Subject Two  
     der Bral                      → Bräler                      → Brale  
     die Bral                      → Brale                      → Bräler  
     das Bral                      → Bräler                      → Brale  
 (5) Novel Noun                      Subject One                      Subject Two  
     der Snauk                      → Snauke                      → Snauker  
     die Snauk                      → Snauken                      → Snäuker  
     das Snauk                      → Snauker                      → Snauken

One potential reason for this may be due to the fact that the speakers use different dialects of German in their everyday speech. Although it is known that both speakers attended the same high school, their dialect of origin was not obtained. Thus, there may be different intuitions as to how one pluralizes new instances based on the dialect one speaks. Alternatively, it may be the case that one speaker looked solely at the words on the paper and created plural forms from the written words, while the other speaker read

the words aloud. Thus, it is possible the pluralization process was affected by the oral presentation of the stimuli to the subject. Certainly further experiments should be done to ascertain whether mode of presentation of stimuli affects German speakers' pluralization of novel instances.

A final note is that of the importance of the gender of the noun in creating pluralized forms. One may argue that this is the key to determining which plural marker is used on any given novel instance. Table 5 shows a breakdown of the plural marker by gender and by subject. It is evident that there is not an overwhelming 'rule' based on gender, as the speakers differ greatly on their choice of plural. Although subject one appears to prefer the -en marker to pluralize feminine nouns and the -er marker to pluralize neuter nouns, subject two demonstrates no such pattern. More research, including counterbalanced stimuli across subjects and a more controlled manner of stimuli presentation, may give us insights into the potential pattern of these pluralizations.

**Table 5. Percentage of subjects' responses by gender of noun.**

	Masculine		Feminine		Neuter	
	S1	S2	S1	S2	S1	S2
e	<b>55%</b>	<b>50%</b>	55%	25%	64%	25%
er	25%	46%	0%	31%	<b>75%</b>	23%
en	10%	6%	<b>81%</b>	<b>46%</b>	10%	<b>49%</b>
s	25%	33%	25%	33%	25%	33%

In conclusion, it appears that a rule for pluralization in German may exist solely for words borrowed from other languages. In this analysis, -s was the least common plural marker which does not support the idea that 'the plural affix -s occurs with nouns that do not yet have a marked lexical entry for plural' (Clahsen, 1992, p. 170). For each novel noun, a plural form was not provided and, therefore, it had yet to have a lexical entry marked for plural. According to Clahsen (1992), then, these nouns should have been marked in the plural form by the addition of an -s affix. The only case in which this occurred was with words recognized to be borrowed from the French language. If the words were borrowed from French, but the speaker did not realize it, they pluralized the form as arbitrarily as they pluralized the novel forms. Thus, it is possible a 'rule' exists for borrowed words and more work should be done concerning words borrowed from other languages (i.e. Italian) in order to see if this result is consistent with words of those additional languages.

Support for a frequency or similarity-based account is demonstrated from speaker's intuitions and performance on novel nouns which were similar to real German nouns. Novel words which sounded similar or reminded the native speakers of real German plurals were made plural in that way, even across speakers. This provides evidence for a frequency or instance-based account where generalizing from specifically experienced instances to new instances occurs based on the novel stems' similarity to known instances.

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