# Between phonology and morphology

**Hilke Elsen**

**Angaben zur Veröffentlichung / Publication details:**

Elsen, Hilke. 2010. "Between phonology and morphology." In *Cognitive Perspectives on Word Formation*, edited by Alexander Onysko and Sascha Michel, 127–46. Berlin [u.a.]: Mouton de Gruyter. https://doi.org/10.1515/9783110223606.127.



# Trends in Linguistics

## Studies and Monographs 221



De Gruyter Mouton

# Cognitive Perspectives on Word Formation

*Edited by*
Alexander Onysko
Sascha Michel

De Gruyter Mouton

# Table of contents

# Between phonology and morphology

*Hilke Elsen*

## 1. Introduction

Usually, grammatical models work with good, unambiguous examples or even with idealized data. These data generally fit in nicely with the theory – but what about doubtful examples and exceptions? Should they be ignored or should the theory be refined? This paper deals with transitional phenomena and the relevance of holistic processing in lieu of and in addition to regular morphology and presents three sets of data to support this view: (a) data from language acquisition, (b) terminology of the special language of chemistry, and (c) names of fantasy and science fiction novels. These case studies first of all show that in addition to the analytic processing of individual sounds and morphemes the overall sound shape or *Gestalt* seems to play a role. Secondly, the borderline between phonology and morphology is not clear-cut.

## 2. Language acquisition

The first research project was concerned with first language acquisition. The findings reported in this paper are based on the diary data of a German-speaking girl, collected continuously up to the age of 2 years and 5 months (Elsen 1991). All new words, word forms, and novel pronunciations of established items were documented in IPA phonetic transcription. Striking facts about situation and referents, comments on frequency and mortality of individual lexical items, and notes on morphology and syntax were recorded. Imitations were distinguished from deferred imitations and spontaneous productions. Notes were transferred to filing cards twice a day. Additional comments were added as necessary on situation, frequency of use, and changes in articulation. The entire corpus was cross-checked three times a month. Afterwards, notes were taken, at first daily, then in longer intervals.

## 2.1. Phonology

In the following, I will present several unusual examples from children like [lædʌdʌ] *apple juice* (Menn 1978), [gipətul] *difficult* (Smith 1973) or [wasmatʉ̈ª] *Tastatur* 'key board' (Elsen 1991). They demonstrate that segmental and prosodic features are tackled with varying degrees of precision. On the one hand, prosodic information is correctly processed, partly at the expense of segmental information. Partly, correct sounds are only found in prominent syllables.

The data show varying degrees of proximity to the targets. Of course, there are many examples of perfect or near-perfect production:

(1) *Mama* ['mama], 0;8,25, 'mommy'
*die Raupe Nimmersatt* [dī ʁaupə 'nɪm̀ə̀naz], 2;3,0, book character
*Schlumpf* [ʃlʊmpf], 2;5,3, book and comic strip character

However, deviations are found which can be graded according to their similarity to adult words.

(2) *Henry* ['hɛndʁɪ], 2;1,1 name
*Kohlrabi* [kōl'ʁɑ̄bīç], 2;0,28, 'kohlrabi'

The words in (2) simply contain an additional sound (epenthesis). This can be found in language change, in synchronic variation, as well as in child language. The same holds true for the examples in (3). Here sounds change their position within the word (metathesis). In (4) the child uses reduplicated syllables to produce the words.

(3) *dreckig* ['dɛkʁɪç], 1;9,21, 'dirty', coll.
*Hilke* ['ɪkl̩], 1;3,1; ['līkə], 1;5,30 name
*Glühbirne* ['gɪlbɪˀnə], 1;11 'lightbulb'

(4) *Badewanne* ['maṅɪmaṅɪ], 1;6,3, 'bath-tub'
*Brombeermarmelade* ['maməmaməlūdə], 2;0,24, 'blackberry jam'

Reduplication is not found too often in language change, but it seems to be used systematically in some creoles (Mühlhäusler 1986: 123, McMahon 1994, chapt. 10.3). Related to this are consonant- and vowel harmonies, cf. (5).

(5) *Helikopter* [hɔl̇ɔkɔktə̇], 2;2,28, 'helicopter'
*Lasagne* [sɑ̃n'sanjə], 2;4,2, Italian dish

Assimilation is likewise found in language change and synchronic variation.

More interesting, however, are the following examples. The child replaced unstressed syllables with [a], cf. (6). She also added [aja], [ala], [alaɪ] etc. to the first syllable of a three syllable item with initial stress (7).

(6) *Zitrone* [ˀa'zōnə], 1;6,17, 'lemon'
*Melone* [ˀa'lōnə], 1;5 - 1;7, 'melon'
*Laterne* [ˀa'dǣna], 1;5,6, 'lantern'

(7) *Schmetterling* ['mɛtaja], often 1;5, 'butterfly'
*Hustensaft* ['hɯθajaɪ], 1;4, 'cough-syrup'
*aufräumen* ['aɯfajaɪ], often 1;4, 1;5, 'to clear up'
*Michael* ['mɪçajaɪ], 1;4 - 1;9, name

These fillers or master syllables were generally used as closing syllables in a word following the stressed syllable.

In (8), the child reproduced the correct number of syllables and the position of word stress. Both child and adult words share several sounds. But this is not the case in (9).

(8) *Oregáno* [ɑ̄ko'kɑ̄no] 2;5,18, Italian herb
*Schlafanzug* ['vaðəgɯk], 1;8,16, 'pyjamas'
*Computer* [bɔ'jɯ̄ta], 1;10,14, 'computer'
*Portemonnaie* ['mɔˀtənē], 1;8,27, 'purse'
*Tomate* [ma'lɑtə], 1;3,12, 'tomato'

(9) *Schüppe* ['mɛẗə], 1;4,16, 'shovel'
*Käfer* ['wīça], 1;4,20, 'beetle'
*Suse* ['tɯ̄fə], 1;6, name

In (9) the number of syllables and the position of main stress are correct, but the child and adult words have hardly any segments in common.

To show that the child whose data are investigated here is not an exotic or extraordinary speaker, some forms from other children are presented (for the master syllables cf. 10, for the group in 8 cf. 11).

(10) *confiture* ɑ:titü:t, 'jam'
*costume* ɑ:tüm, 'costume'
*noisette* ɑsɛt, 'hazel nut'
*fermé* ɑme:, 'closed, shut' (Grégoire 1937)

*attack* [ri:tæk]
*disturb* [ristə:v]
*enjoy* [ridzɔi]
*infection* [rifɛksən]
*conductor* [ri:dʌktə] (Smith 1973)

(11) *Charlemagne* ɑnɑnɑñ, name,
*confitüre* kɔtütü, 'jam' (Grégoire 1937)

*alphabet book* [æpʌbʌbʌ]
*apple sauce* [æpʌχɔ] (Menn 1978)

*aeroplane* [ɛ:bəˀeɪn]
*telephone* [d̥ɛwi:bu:n]
*Copydex* [dɔpi:gɛk] (Smith 1973)

The examples in (12) show words that are only minimally similar to their target forms.

(12) *apple juice* [lædʌdʌ]
*Lise* [mʷixʌ] (Menn 1978)

*Christmas* [giptit]
*rhinoceros* [h̥aɪnɔrətət]
*difficult* [gipətul] (Smith 1973)

When we look at these data, we see a very strong tendency to produce primarily the number of target syllables and the position of target stress. The reproduction of some segmental features in the stressed syllables is of secondary importance. To preserve syllable number and position of stress, the children use various strategies. One is simply reduplication or using some sounds of stressed syllables for neighbouring ones. This can be found for all children. Secondly, the use of master syllables appears. Note that the substituted syllables in all three languages are not stressed and precede or

follow a stressed syllable. Obviously, children at an early age cannot cope with long forms and instead master less salient parts of words with easily manageable templates or master syllables to maintain syllable number and position of stress (Elsen 1996). However, sometimes children's words are even less accurate. Examples like those in (8) show that the number of syllables, the position of word stress, and nearly all stressed vowels are preserved (disregarding lip-rounding). In the case of penultimate stress both final vowels are target-like while for prepenultimate stress all three final vowels tend to be correct or the middle one is weakened to schwa. This is a regular process in colloquial German and English when adults speak fast. Usually, pretonic vowels are retained.

We see that the number of syllables, the position of word stress, and the vowel skeleton show a high degree of similarity with the target expressions. As far as consonants are concerned, the final or the two final consonants of a word tend to be preserved. Words with penultimate stress show similarities with the target consonants in the final two syllables. In three syllable words with prepenultimate stress, the onset of the first syllable is very often retained to a high degree. In those with final stress, the last syllable is retained. Word final consonants and those of stressed syllables are relatively close to their targets.

Looking at examples such as those given in (9) and (11), it is again obvious that syllable number and word stress are target like. Vowels show nearly always target length. Consonants of child and adult stressed syllables only have some features in common, generally nasality, plosiveness, labiality, or alveolarity. There is a tendency to replace difficult sounds like /h/, velars, and fricatives by easier ones like front plosives and nasals. This can be found for all children in all languages (Locke 1983).

Thus, the similarity between children's utterances and target words varies gradually from precise production to hardly any similarity. Other studies, for example comparisons between French and German clippings and acronyms (Ronneberger-Sibold 1996) or contaminations (Ronneberger-Sibold 2005), also showed that adult language users rely primarily on phonotactic and prosodic features. The highest amount of segmental information can be found in stressed syllables whether regarding the acquisition data (Echols 1988) or the shortenings. These are obviously neither idiolectal nor language-specific peculiarities. The findings need to be treated within a framework that is able to deal with variation, transitions between correct and incorrect items, so-called exceptions, and the possibility of separate segmental and prosodic representations.

The data pose problems because, first of all, the role of prosodic features is clearly predominant. They are very often realized at the expense of individual sounds. Secondly, there is a smooth transition from correct productions to deviant forms of the target item.

These observations do not fit into general models working with abstract symbols and rules that neglect so-called exceptions in language production and use. Instead, an approach that considers the processing of language information in a network-like system seems preferable. Such a system imitates the neurocognitive facts – the architecture of nodes and connections and the mode of operation of the brain (e.g., Stemberger 1992, Elman et al. 1996, Lamb 1999). Information is processed in nodes and connections. On the one hand, each item such as a feature, a sound, and a word exhibits an individual pattern of activated connections. These items do not exist as entities or objects but must be understood to be a characteristic pattern at a characteristic position in the system. We can use names like /p/ or *dog* or *noun* to refer to items or categories. But that only facilitates communication and reasoning. It does not mean that they are sounds or categories per se. They are only generalizations. A member of such a group can show a more or less prototypical structure, i.e., more or less similarity to the activation pattern of the prototype. An early and repeatedly activated area or sound is stronger than a later one. Thus, frequent sounds from the babbling stage like /n/, /m/, /d/, /b/ often replace velars or fricatives in early words. Frequent word patterns of the target language are learned earlier. Infrequent patterns are more susceptible to change in younger children. When too much information is processed, the most prominent part will survive, usually syllable number and stress, followed (then) by the main syllable. On the other hand, all areas in the brain, in the computer network, or in the hypothetical model are interconnected. Accordingly, the part that deals with prosody can process independently or not and gradually integrate information from other domains. So, linguistic aspects grow together and complex structures emerge. The child data as well as the results on word creation indicate that prosodic information dominates over the segmental and that segmental information in stressed syllables dominates over information in neighbouring syllables. We might assume that the activation of connections that represent prosodic features are the strongest, followed by those which connect segmental information and main stress.

Several examples in this and other corpora show that segmental and prosodic features are articulated with varying degrees of precision. On the one hand, prosodic information is correctly processed, partly at the expense of

segmental information. Partly, correct sounds are only found in prominent syllables. On the other hand, the similarity between children's utterances and target words varies gradually from precise production to no similarity at all. We can find words exactly pronounced as the model, especially those with the prototypical German sound shape of two syllables with initial stress and a schwa in the last syllable. Especially in phonologically complex words, the child tackles the whole sound shape, the number of syllables, and the position of stress, thereby losing sight of individual sounds. Network-like processing assumes transitional areas between categories, learning by pattern association, and takes into account frequency factors (Elsen 1999, 2000). The same is true for Cognitive Grammar approaches. Here, the emergence of structure from "pre-packaged" formations is one fundamental aspect of cognition. Analyzability is a matter of degree (Langacker 2000: 133).

## 2.2. Morphology

To investigate the acquisition of past tense forms, computer simulations work with a single associative learning mechanism to answer the question whether a morphological rule is really needed to account for the formation of past tense (e.g., Rumelhart and McClelland 1986, Plunkett and Marchman 1991, 1993). In these studies models have been developed capable of memorizing patterns, of generalizing regularities, and of predicting overregularizations such as **singed* triggered by a sufficient number of regular verbs and irregularized verbs such as *to seal *sealt *sealt*, later in development. Astonishingly, the diary data on past participles show exactly these phenomena (for more, cf. Elsen 1997, 1998). The development from collecting pairs like *kleckern / ge-klecker-t* 'to slobber', *gucken / ge-guck-t* 'to look', *wickeln / ge-wickel-t* 'to swaddle' to actively using *ge-t* to mark the past can be understood as accumulating and analysing patterns and generalizing them to produce new verb forms. Similarly, the data on the acquisition of plurals (cf. Elsen 2002) point to the relevance of frequency, critical mass factors, and schemata. Both verb and noun inflection shows that holistic patterns or Gestalts develop into complex word forms during first language acquisition.

In the acquisition process, sound shapes and sounds have to be brought together and regular sound shapes develop into morphologically structured items. The diary data are not only compatible with computer simulations

but with ideas about the developmental relationship between holistic patterns and the origin of phonology. Vihman, for example, assumes that "phonological structure is the emergent product of the learning of (own and others') specific word exemplars over the course of repeated experiences with a common pattern" (Vihman 2001: 0). "Segments and prosody are induced from templates in the course of and as a consequence of use" (Vihman 2001: 1). Frequent and simple templates show more phonetic precision. Longer, infrequent ones are targeted with less success and with the help of *Ersatz*-strategies. Schemata are often a first step on the way to complex regularity (Elsen 2000, 2007b).

Data on phonology, noun and verb morphology, and the lexicon are consistent with predictions of network simulations. The computer system and very probably a child as well are capable of abstracting and producing hierarchical and 'rule'-dependent information from surface structures without the help of explicit, symbolic concepts and rules. This can explain the initially separate processing of prosodic and segmental information and the trial-and-error-like variation between tokens. Atypical examples and "exceptions" find a place in this psychologically oriented model, and it may well be that "the basic unit is the whole word pattern" (Vihman 2001:10). The overall sound shape of a term also appears to play a role in adult language processing.

## 3. Neologisms

The second research project was about German neologisms (for more, cf. Elsen 2004). Eight sub-corpora were compiled on the basis of, e.g., children's books, the special languages of technology and chemistry, and advertising. Each text type was represented by approximately 500 lexemes. Striking word formation patterns were found, like various kinds of blendings and word creations which defy standard morphology. These striking patterns are usually designed to trigger certain reactions from the recipients, such as attention, pleasure, or even change of opinion, as in the case of newspaper texts. Gestalts were found in several sub-corpora; the following section focuses on one of them.

In the special language of chemistry (cf. Elsen 2004), new chemical compounds are named according to international guidelines. The results are unpronounceable systematic names. Consequently, such substances receive additional trivial names. These should be easy to translate and involve in-

formation on contents or effects. Another group of neologisms are trade names, which are formed for commercial purposes. They should describe the product, be easily pronounceable, and arouse positive associations. Both groups should attract the interest of consumers. That is, they should sound non-German. Both types should also sound scientific and reliable. This aspect is satisfied with terms that resemble words of Latin/Greek origin.

The typical and most frequent German sound shape consists of two syllables with initial word stress and schwa in the second syllable. Thus, a non-German, scientific, word shape needs more than two syllables, full vowels only, many open syllables, a closed final syllable, and word final stress. Furthermore, typical German consonant clusters like /ʃtr-/, /pfl-/, /-mpf/ should be avoided. The avoidance of these typical sound structures are indeed characteristic of the selection of pharmaceutical names and designations in chemistry. The alien names are created in German with the help of different word formation processes such as manufactured words (13), blends (14), and shortenings (15), which show a phonotactically comparable pattern.

(13) *Acerbon,* medicine with Antihypertonicum Lisinopril-Dihydrat
*Agopton,* medicine with Lansoprazol against ulcers
*Bayboran,* for cleaning, by Bayer
*Agnucaston,* medicine with vitex.

(14) *Aflatrem,* tremorgene toxin with Aspergillus flavus
*Bastadin,* with Ianthella basta and Ryanodin-dependent calcium
*Calponin,* protein, binding Calmodulin and functioning like Troponin.

(15) *Aclonifen,* common name for 2-Chlor-6-nitro-3-phenoxyanilin
*Bambuterol,* common name for (+-)-1-[3,5-Bis(dimethylcarbamoyloxy)phenyl]-2-*tert*-butylamino)ethanol.

First, names like that illustrate different degrees of motivation. Secondly, many of these words show endings which sound like morphemes, but which in fact are combinations of sounds without stable content, cf. *-on, -ol, -in* (e.g., *Acerbon, Bastadin, Bindol, Agopton;* so-called pseudomorphs, cf. Elsen 2006). Word formation techniques are word manufacturing, blending, and shortening. The sound shape of the resulting words is phonotactically comparable with derivations like *Adhäs-in* (protein),

*Calcineur-in* (protein), *Alendron-at* (salt), *Acampros-at* (salt), and *Afwill-it* (mineral). This stresses the third observation that various types of word formation lead to a *Gestalt*. The forms sound like Latin or Greek words and thus assume a scientific, efficient connotation. The phonological shape "steers" the line of association: substances with such names work properly and reliably. Taken together, we find phonotactic systematicity of sound shape and often hardly any morphological information. The goal is to coin a Latin/Greek sounding word and there are various ways to achieve this. The transition from word creation to word formation is a gradual one. Manufactured words complement regular morphology and operate as Gestalts to transport vague stylistic and expressive meanings. Interestingly, we find such Gestalts in yet another, completely different area of the lexicon.

## 4. Fantasy names

The following data are from the research project *Phantastische Namen*, Ludwigs-Maximilians-Universität München, Germany, funded by Bau + Plan GmbH, Munich, and by the Deutsche Forschungsgemeinschaft (EL 201/2-1, -2). Names from science fiction and fantasy stories were collected and examined according to morphological structure and in order to investtigate whether the relationship between a name and its fictitious referent is arbitrary. All 52 books were originally written in German. The texts range from classics such as Laßwitz (1897) to recent publications (cf. the appendix for a selection of titles). In the following, names for individuals, peoples, and species will be examined and discussed in contrast to names for substances and buildings (*Roter Palast, Schwarzes Portal, Schwarzer Turm, Tempel des Toten Gottes, Felsenburg, Emeritenturm*) as well as bodies of water (*Meer der Trauer, Scharlachrotes Meer, Kanal der Ausgestoßenen, Asphaltsee, Perlenmeer, Nevernever-Water-Fluß, Tausend-Bogen-Fluß, Jamachimfluß*). Both names for bodies of water and buildings show morphologically transparent examples. *Roter Palast* and *Schwarzes Portal*, e.g., are *Wortgruppenlexeme* (cf. Elsen 2007a). They equal *Red Palace* and *Black Portal* in English. These groups of referents are mainly based on morphologically regular forms while names for substances usually appear as in (16).

(16) *Terkonit, Ebulit, Molvedin* (metals), *Amnesin, Ansintan, Anthygrin, Corphorin, Energon, Erosan,Euphorit, Glysantin, Somnalin, Valoron* (drugs), *Sykanit* (for isolation of cables), *Howalgonium* (chemical element), *Oral-Deocal* (for deodorizing the mouth).

These words match with trade names from chemistry in using pseudo-morphs like *-in*, *-an*, *-on*, *-it*, which sound scientific but do not carry a consistent meaning. They function as stylistic markers and may develop into morphemes.

Likewise, we can find traces of sound symbolism, for example, the sound /i/ in names for small, good beings, see (17)

(17) *Brin* [HoHe], young, good-natured prince, *Elim* [AlFla], childlike prince, *Gwrgi* [Pesch], small, good-natured "Sumpfling" (living in swamps), *Krila* [WHAGar], small, good-natured gnome, *Kelwitt* [EschKel], Jombuuraner / Jombuuran (intelligent, innocent, dolphin-like creature), *Schti* [LaPla], very small winged horse.

Names for positive, magnificent, potent, and friendly characters preferably consist of more than two syllables, most of them open and many with the vowel /a/. The last syllable is predominantly closed (cf. 18).

(18) *Salamir* [WHGar], friendly magician, *Kalakaman* [HoHe], friendly magician, *Mandavar* [HoHe], friendly elf knight, *Katana Nipas* [[KneiAt], friendly patriarch, Springer (species), *Athanasios* [Pesch], friendly scholar, *Galdalyn* [FelMa], highest druid, friendly, *Racalla* [HoHe] female magician.

These superior, important characters carry names with a non-German but Latin/Greek-like sound shape with simple, often open syllables and full vowels.

Names for foreign or non-humanoid entities which are not marked as definitely vicious are striking as well. They also deviate from the typical German word pattern as they contain only full vowels. Some combinations on the phonological/graphemic level are highly unusual:

(19) *Gorx* [PR2], *Graan* [WHGar], *Te'el* [PR2], *Em'neta* [EschKel], *Mooffs* [KneiAt].

In contrast, names of evil alien characters show a high number of back phonemes, especially velar and uvular fricatives and vowels like /u, o, a/ as opposed to the "nice and small-sounding" /i/. Furthermore, many syllables contain complex onsets and codas or non-German consonant clusters, as opposed to the magnificent sounding open syllables with /a/ (cf. 20).

(20) *Ch'tuon* [WHGar], demon, *Tairach* [HoHe], demon, *Ghuzdan* [EHScha], orc, *Gnoorat* [FelMa], bad, animal-like creature, *Azrathoth* [Pesch], dark elf, *Arjunoor* [HoHe], demon, *Chrekt-Orn* [PR2], vicious, reptilian-like creature, a Topsider from the planet Topsid, *Rrul'ghargop* [HoHe], orc, *An-Rukhbar* [FelElf], demon.

Hence, non-average characters get non-average names; that is, names which deviate from the prototypical German word pattern. This contains consonant clusters such as /ʃtr/, /pfl, /mpf/ and two syllables, the first of which is stressed while the second contains a schwa. The names of good, important, potent people sound like Latin words and are associated with education and science. In opposition to /i/ and /e/ which are associated with smallness, many *a*-sounds appear in these names thus emphasizing the magnificence of the referents. Foreigners receive names with striking, thus foreign sound or grapheme combinations and contain only full vowels. Additionally, names for bad characters show preferably dark vowels and back fricatives.

Jakobson explains the "ready associability of [i] with small things [...] by the high pitch of the vowel" (Jakobson and Waugh 1987: 187). Masuda (2007) suggests a physical basis and Ohala (1994) in his "frequency code" proposes biological grounds for some sound symbolic phenomena. One reason for the tendency to associate /i/ and /e/ with SMALL and thus HARMLESS and GOOD as opposed to dark vowels might be found in sexual and age related dimorphism of the vocal anatomy (cf. Ohala 1994). "Sounds made by a confident aggressor [...] are typically rough and have a low $F_0$" (Ohala 1994: 329). These sounds are connected with larger apparent size to give a dangerous impression. Back vowels and fricatives resemble threatening growls, roars, and snarls and will be more suitable to name dangerous and evil creatures. However, not only single sounds but also particular groups and sound patterns recur repeatedly to mark the identity of certain types of protagonists.

Interestingly, for the names denoting bad, foreign characters less frequent sounds and syllable shapes are used. The most frequent sounds in the

languages of the world are front nasals and stops and approximants like /l, j, w/ (cf. Maddieson 1984). The most frequent syllable structure is a consonant-vowel-combination. Complex clusters and velar and uvular fricatives are rare in the languages of the world. Most likely "rare" or "not known" is "threatening" – rare sounds, clusters, and syllable shapes might trigger preferably negative associations in addition to the fact that dark vowels and back fricatives resemble threatening growls, roars, and snarls. In combination with a non-German sound shape, they will indicate evil, foreign species more appropriately than a prototypical pattern such as *Lene* and *Suse*. By contrast, to denote magnificent, good characters a Latin-like sound shape with many *a*-sounds seems preferable because it creates associations to "reliability, efficiency, authority, importance", and to further positive traits.

Research on sound symbolism is not very extensive. For the time being it will suffice to say that in naming fictitious characters, certain sound patterns are repeatedly associated with certain information patterns and that this kind of systematicity is neither arbitrary nor morphologically regular.

## 5. How to model the bridge between phonology and morphology?

In sum, there is a continuum from sound shape to recurring groups of sounds to morphemes. Not only individual sounds, but also Gestalts seem to constitute a level in language processing. The traditionally grammatical view of morphology is obviously inadequate to capture these phenomena. Instead, we need an approach which takes into account frequency factors, holistic patterns, and the fact that there is no clear-cut borderline between categories and between linguistic levels (Elsen and Michel 2007).

As far as processing is concerned, network approaches provide explanations for transitions and exceptions. Frequent patterns are processed first. They are more stable and easy candidates for representatives. The ability of categorization results from physiological perception, from neural feature detectors, and from filtering mechanisms of the sense-organs. Neurobiological research reveals that organisms detect and react only to certain stimuli or sequences of stimuli to economize energy. In other words, certain features are selected, offering an explanation for categorization and prototypicality in cognition. Thus, from a biological standpoint, categories with representative members seem highly plausible (Müller and Weiss 2000: 59–60).

From a philosophical, linguistic, and psychological point of view Wittgenstein, Labov, Rosch, Langacker, and others worked on similar problems, which led to (and reinforced) prototype theory. This concept was originally developed for word meanings but might be extended to linguistic objects (cf., e.g., Taylor 1995, Brdar-Szabó and Brdar 2000). Recently, Cognitive Grammar offers an integration of prototypes, network ideas, and grammatical phenomena (cf. Dirven and Versporr 1998, Taylor 2002, Ungerer and Schmid 2006, Croft and Cruse 2007), even considering aspects of iconicity and the problem of holistic patterns or schemas (e.g., Taylor 2002: 45, Ungerer and Schmid 2006: 300). Cognitive Grammar approaches take into account frequency factors; they assume transitional areas between categories, learning by pattern association, and the grouping of entities on the basis of similarity (for a short overview, cf. Taylor 2002: 27).

When contemplating on various types of games, Wittgenstein concluded: "Wir sehen ein kompliziertes Netz von Ähnlichkeiten, die einander übergreifen und kreuzen. Ähnlichkeiten im Großen und Kleinen" (Wittgenstein 1984: 276) [We see a complicated network of similarities overlapping and criss-crossing, sometimes overall similarities, sometimes similarities of detail; translation by A.E.M. Anscombe]. Overall, similarity between words is nothing but the Gestalt, the impression of a shape, a complete whole, based on sounds and their combinations.

Wittgenstein further asks: "Wie ist denn der Begriff des Spiels abgeschlossen? Was ist noch ein Spiel und was keines mehr? Kannst du die Grenzen angeben? Nein. Du kannst welche ziehen" (Wittgenstein 1984: 279) [How is the concept of a game bounded? What still counts as a game and what no longer does? Can you give the boundary? No. You can draw one; translation by A.E.M. Anscombe]. Accordingly, we draw the line between phonology and morphology as follows.

Looking at the phantastic names we find e.g., *Gorx*, which is a manufactured word, *An-Rukhbar*, which is a bipartite manufactured word, *Ertruser*, a name with a manufactured stem and a regular affix, *Jamachimfluß*, a compound consisting of a manufactured word and the lexeme *Fluss* 'river', *Erosan* (Greek *eros*) and a pseudo-morph, and *Terkonit*, composed of a manufactured word and a pseudo-morph. Besides, there are morphologically regular names such as *Perlenmeer* 'sea of pearls' and *Venusier* 'humanoid living on the planet Venus'.

A morphologically complex word is composed of existing meaningful units (stems and [word formation] affixes). That is, it can be divided into morphemes and thus shows morphological structure. A manufactured word

is not morphologically structured; it does not consist of morphemes; it is a new stem; it operates on the level of sounds (cf. Elsen 2005). *Gorx* is a clear example of a manufactured word without any trace of morphological structure. It can only be described phonologically. *An-Rukhbar* shows the orthographic signs of a compound but without semantic support and, thus, can be called a manufactured word. *Terkonit* offers the interpretation of a derived manufactured word, but since a pseudo-morph does not carry consistent meaning, the name is manufactured. *Erosan* consists of a stem and a pseudo-morph. Its morphological structure is that of a lexeme and a manufactured part. *Ertruser*, on the other hand, consists of a regular affix and a manufactured part. Similarly, *Jamachimfluß* may count as a compound consisting of one manufactured stem and one lexeme.

*Table 1.* Properties of compounds and manufactured words

| | Composed of units on the morphological level | Composed of existing, meaningful units |
|---|---|---|
| *Perlenmeer* | yes | yes + yes |
| *Jamachimfluß* | yes | no + yes |
| *An-Rukhbar* | yes ? | no + no |
| *Gorx* | no | no |

*Table 2.* Properties of derivations and manufactured words

| | Composed of units on the morphological level | Composed of existing, meaningful units |
|---|---|---|
| *Venusier* | yes | yes + yes |
| *Ertruser* | yes | no + yes |
| *Erosan* | yes | yes + no |
| *Terkonit* | yes ? | no + no |
| *Gorx* | no | no |

We might order the names according to the degree of their morphological structure (cf. Table 1 and Table 2): *Venusier*, *Perlenmeer*, *Jamachimfluß*, *Ertruser*, *Erosan*, *Terkonit*, *An-Rukhbar*, and *Gorx*, with a line drawn bet-

ween *Erosan* and *Terkonit*. The first examples are morphologically structured while the last three names only show phonological structure. However, the examples are more or less fitting. *Blackbird* and *learner* are very good examples of composition and derivation in the same way as *Perlenmeer* and *Venusier*. *Erosan* and *Jamachimfluß* are less clear examples, as they partly consist of non-existing sound sequences. On the other hand, *Gorx* is a very good example of a manufactured word. The prototypes *Perlenmeer*, *Venusier*, and *Gorx* may serve as the conceptual centre of the process of compounding, derivation, and manufacturing. They may be examples of these categories on the langue-level, to help scientists to structure the lexicon, to simplify communication, and to help the students to understand the concepts. On such a level of abstraction, marginal cases like *Erosan* only irritate. If we have to find a place in a morphological analysis, this is somewhere between morphology and phonology. If we have to decide, it is, *per definitionem*, on the side of the morphologically complex words. In fact, however, the peripheries of the categories compound and manufactured word as well as derivation and manufactured word gradually merge into one another to form degrees of membership. From a cognitive point of view, there is a continuum which is interrupted by linguists to meet Aristotelian and langue-oriented needs.

## Appendix: Selection of sources for *Phantastic Names*


AlFla Alpers, Hans Joachim. 2003. *Der Flammenbund*. München.

BemSt Bemmann, Hans. 2003. *Stein und Flöte*. München/Zürich.

EschKel Eschbach, Andreas. 2001. *Kelwitts Stern*. Bergisch Gladbach.

EW Ewers, H. G. 1979. *Die Para-Sklaven*. München.

FelElf Felten, Monika. 2003. *Elfenfeuer*. München/Zürich.

FelMa Felten, Monika. 2003. *Die Macht des Elfenfeuers*. München/Zürich.

FraSta Franke, Herbert W. 1962. *Die Stahlwüste*. München.

FraKy Franke, Herbert W. 1978. *Ein Kyborg namens Joe*. Berlin, 1964/1972.

FraKo Franke, Herbert W. 1964. *Der grüne Komet*. München.

GlaeSt Glaesener, Helga. 1999. *Der singende Stein*. München.

GlaeSk Glaesener, Helga. 2000. *Der schwarze Skarabäus*. München.

HoHe Hohlbein, Wolfgang, Hennen, Bernhard. 2001. *Das Jahr des Greifen*. Bergisch Gladbach.

KlPhai Klein, H. D. 2003. *Phainomenon*. München.

KneiLab Kneifel, Hanns. 1989. *Das brennende Labyrinth*. Zürich, 1967.

KneiRau Kneifel, Hanns. 1990. *Die Raumfalle. Raumpatrouille Orion* 6. Zürich, 1968.
KneiSe Kneifel, Hanns. 1995. *Serum des Gehorsams*. München.
KneiAt Kneifel, Hans[!]. 1995. *Atlans Todfeinde*. München.
LaPla Laßwitz, Kurd. 1984. *Auf zwei Planeten*. Berlin, 1897.
MiMin Mielke, Thomas R.P. 1991. *Mingo*. Bergisch Gladbach, 1981.
MiSer Mielke, Thomas R.P. 1992. *Die Entführung des Serails*. Bergisch Gladbach.
Pesch Pesch, Helmut W., Allwörden, Horst v. 1998. *Die Ringe der Macht*. Bergisch Gladbach.
PR1 *Perry Rhodan. Die dritte Macht*. 1978. W. Voltz. Gütersloh, 1961.
PR2 *Perry Rhodan. Das Mutantenkorps*. 1979. W. Voltz. Gütersloh, early sixties.
PR3 *Perry Rhodan. Der Unsterbliche*. 1979. W. Voltz. Gütersloh, early sixties.
WHScha Hohlbein, Wolfgang, Hohlbein, Heike. 1996. *Schattenjagd. Eine phantastische Geschichte*. Rheda-Wiedenbrück.
WHGrei Hohlbein, Wolfgang, Hohlbein, Heike. 2000. *Der Greif*. München, 1989.
WHGar Hohlbein, Wolfgang. 1995. *Die Saga von Garth und Torian*. München.

## References

Brdar-Szabó, Rita, and Mario Brdar
2000 Grammaticalization and the lexicon: Core-and-periphery model vs prototype approach. In *Prototypentheorie in der Linguistik*, Martina Mangasser-Wahl (ed.), 139–159. Tübingen: Stauffenburg.

Croft, William, and D. Alan Cruse
2007 *Cognitive Linguistics*. 4th Edition. Cambridge: Cambridge University Press.

Dirven, René, and Marjolijn Verspoor
1998 *Cognitive Exploration of Language and Lingustics*. Amsterdam/Philadelphia: John Benjamins.

Echols, C. H.
1988 The role of stress, position and intonation in the representation and identification of early words. In *Papers and Reports on Child Language Development* 27, E. Clark and Y. Matsumoto (eds.), 29–46. Stanford: Stanford University Press.

Elman, Jeffrey L., Elizabeth A. Bates, Mark H. Johnson, Annette Karmiloff-Smith, Domenico Parisi, and Kim Plunkett
1996 *Rethinking Innateness. A Connectionist Perspective on Development.* Cambridge, MA, London: MIT.

Elsen, Hilke
1991 *Erstspracherwerb. Der Erwerb des deutschen Lautsystems.* Wiesbaden: DUV.
1996 Two routes to language. Stylistic variation in one child. *First Language* 16: 141–158.
1997 Acquiring verb morphology: German past participles. In *Proceedings of the 21st Annual Boston University Conference on Language Development Vol. I*, E. Hughes, M. Hughes, and A. Greenhill (eds.), 160–169. Somerville: Cascadilla Press.
1998 The acquisition of past participles: One or two mechanisms? In *Models of Inflection*, R. Fabri, A. Ortmann, T. Parodi (eds.), 134–151. Tübingen: Niemeyer.
1999 *Ansätze zu einer funktionalistisch-kognitiven Grammatik. Konsequenzen aus Regularitäten des Erstspracherwerbs.* Tübingen: Niemeyer.
2000 Das Verhältnis zwischen segmentalen und suprasegmentalen Merkmalen in der Kindersprache. *Germanistyka* 15: 49–70.
2001 Formen, Konzepte und Faktoren der Sprachveränderung. *Zeitschrift für Germanistische Linguistik* 29.1: 1–22.
2002 The acquisition of German plurals. In *Morphology 2000*, W. Dressler, S. Benjaballah, O. E. Pfeiffer, and M. D. Voeikova (eds.), 117–127. Amsterdam/Philadelphia: Benjamins.
2004 *Neologismen. Formen und Funktionen neuer Wörter in verschiedenen Varietäten des Deutschen.* Tübingen: Narr
2005 Das Kunstwort. *Muttersprache* 115: 142–149.
2006 Pseudomorpheme – Fiktive Namen im Übergangsbereich von Phonologie und Morphologie. *Muttersprache* 3: 242–248.
2007a Wortgruppenlexeme – Beispiele aus Enzyklopädie, Zeitung, Baurecht und Wasserbau. *Fachsprache. International Journal of LSP.* 1-2/2007: 44–55.
2007b Gestaltverarbeitung. *Deutsch als Fremdsprache* 3/2007: 162–165.

Elsen, Hilke, and Sascha Michel
2007 Wortbildung und Sprachgebrauch. Desiderate und Perspektiven einer etablierten Forschungsrichtung. *Muttersprache* 1/2007: 1–16.

Grégoire, Antoine
1937 *L'Apprentissage du Langage.* Liège: Librairie Droz.

Jakobson, R., and Linda Waugh
1987 *The Sound Shape of Language.* Berlin/New York: De Gruyter.

Lamb, Sidney
1999 *Pathways of the Brain: The Neurocognitive Basis of Language.* Amsterdam/Philadelphia: Benjamins.
Langacker, Ronald W.
2000 *Grammar and Conceptualization.* Berlin/New York: De Gruyter.
Locke, John L.
1983 *Phonological Acquisition and Change.* New York: Academic Press.
Maddieson, Ian
1984 *Patterns of Sounds.* Cambridge: Cambridge University Press.
Masuda, Keiko
2007 The physical basis for phonological iconicity. In *Insistent Images,* Elzbieta Tabakowska and Christina Ljungberg (eds.), 57–71. Amsterdam/Philadelphia: Benjamins.
McMahon, April M. S.
1994 *Understanding Language Change.* Cambridge: Cambridge University Press.
Menn, Lise
1978 *Pattern, Control, and Contrast in Beginning Speech. A Case Study in the Development of Word Form and Word Function.* Bloomington: Indiana University Linguistics Club.
Müller, Horst M., and Sabine Weiss
2000 Prototypen und Kategorisierung aus neurobiologischer Sicht. In *Prototypentheorie in der Linguistik. Anwendungsbeispiele – Methodenreflexion – Perspektiven*, Martina Mangasser-Wahl, (ed.), 55–71. Tübingen: Stauffenburg.
Mühlhäusler, Peter
1986 *Pidgin & Creole Linguistics.* Oxford: Basil Blackwell.
Ohala, John J.
1994 The frequency code underlies the sound-symbolic use of voice pitch. In *Sound Symbolism*, L. Hinton, J. Nichols, and J. J. Ohala (eds.), 325–347. Cambridge: Cambridge University Press.
Plunkett, Kim, and Virginia Marchman
1991 U-shaped learning and frequency effects in a multi-layered perceptron: Implications for child language acquisition. *Cognition* 38: 43–102.
1993 From rote learning to system building: acquiring verb morphology in children and connectionist nets. *Cognition* 48: 21–69.
Ronneberger-Sibold, Elke
1996 Preferred sound shapes of new roots: On some phonotactic and prosodic properties of shortenings in German and French. In *Natural Phonology: The State of the Art*, B. Hurch and R. A. Rhodes (eds.), 263–293. Berlin/New York: De Gruyter.

2005 Zur Definition und Typologie von Wortkreuzungen. Ein Vorschlag auf der Grundlage ihrer relativen Transparenz. In *Sprache und Natürlichkeit*. G. Fenk-Oczlon and C. Winkler (eds.), 205–224. Tübingen: Narr.

Rumelhart, David, and James L. McClelland

1986 On learning the past tenses of English verbs. In *Parallel Distributed Processing Vol. II. Psychological and Biological Models*, J. L. McClelland, D. Rumelhart, and the PDP Research Group (eds.), 216–270. Cambridge, MA: Bradford Books, MIT.

Smith, Neilson V.

1973 *The Acquisition of Phonology. A Case Study*. Cambridge: Cambridge University Press.

Stemberger, Joseph P.

1992 A connectionist view of child phonology. In *Phonological Development*, C. A. Ferguson, L. Menn, and L. Stoel-Gammon (eds.), 165–189. York: Timonium.

Taylor, John R.

1995 *Linguistic Categorization. Prototypes in Linguistic Theory*. 2nd Edition. Oxford: Clarendon Press.

2002 *Cognitive Grammar*. Oxford: Oxford University Press.

Ungerer, Friedrich, and Hans-Jörg Schmid

2006 *An Introduction to Cognitive Linguistics*. 2nd Edition. London: Pearson Longman.

Vihman, Marilyn M.

2001 Word templates and the origins of phonology. Paper presented at the 7th International Cognitive Linguistics Conference, July 26, 2001. [MS]

Wittgenstein, Ludwig

1984 Philosophische Untersuchungen. In *Tractatus logico-philosophicus*, Anscombe, G. E. M., G. H. von Wright, Rush Rhees. 225–621. Frankfurt am Main: Suhrkamp. English translation by G. E. M. Anscombe. 1978. *Philosophical Investigations*. Oxford: Basil Blackwell.