

XIII. Word-formation in language acquisition and aphasia

120. Word-formation in first language acquisition

1. Introduction
2. Why coin new words?
3. Principles
4. Patterns
5. Implications for theoretical approaches
6. References

Abstract

After first language acquisition is contrasted with other possibilities of acquiring a language, the specific problems related to word-formation are described. To recognize productive word-formations we need to find lexical innovations, as complex lexemes found in the target language might have been stored and imitated. Next, the reasons for creating new words are presented and after that the principles which guide children to coin new words and to choose among the word-formation techniques their mother language offers them. Different languages reveal different patterns of acquisition. The development for German, English and French acquisition is outlined, followed by the basics in languages from other language families. Finally, we discuss consequences of these considerations for theoretical approaches.

1. Introduction

The term *language acquisition* covers various aspects which cannot always be strictly separated, e.g., first, second or even third language acquisition, monolingual or bilingual language acquisition, untutored acquisition or acquisition at school.

Throughout the world, multilingual communities and accordingly bilingualism predominates. Bilingual (trilingual) acquisition has to be differentiated from second language acquisition, which is sometimes referred to as “consecutive” or “successive bilingual acquisition” when the second language is introduced after the age of 3. Differences in the age at which language is acquired will not only affect the rate and order of acquisition, but will have consequences for later language skills. Prototypical bilingualism with final equal competence in two languages differs gradually along a scale of various temporal and language-skill patterns of mixing and code-switching up to the other extreme: learning a foreign language during adulthood. In this article, first acquisition of a single language is the main issue.

Another consideration is that comprehension has to be differentiated from production. This is due to the fact that the understanding of complex structures is consistently ahead of word and sentence formation. This article focusses on production.

Whereas there are numerous studies on phonological, syntactic, lexical, even inflectional development, data on word-formation are scarce. Lexicalized complex words don't show children's active ability to use morphological units. If we want to study children's knowledge of word-formation we have to rely on their lexical innovations, as only coined complex lexemes reveal productivity, everything else might have been imitated and stored. Unfortunately these coinages are rare. Creative word-formation appears rather late and is rather seldom in the child's language development. Furthermore, we have to deal with various methodical difficulties. In elicitation tasks, the method involved and the instructors' wording in their instructions might influence the children (Becker 1994), whereas in longitudinal studies based on sporadic interview sessions innovations will hardly be documented. Accordingly, recordings have to be both long and detailed, which turns out to be very time consuming. Most data collections don't record all of the forms a child coins, usually only typical or occasional examples (e.g., Meringer 1908; Gipper 1985). Only thorough diary studies provide us with a sufficient number of examples, but this sampling method is out-of-date. Thus, the data base for word-formation in language acquisition is meagre.

Early studies were diary studies, e.g., Stern and Stern (1965 [1907]), Scupin and Scupin (1907, 1910), Grégoire (1947) or Leopold (1949). They observed acquisition as a whole and often took into account phonological and syntactic as well as lexical development. Later publications focussed on special issues (e.g., Berko 1958; Clark 1982; Bybee 1995). Today, more and more selected questions are tackled by eliciting specific data (e.g., Clark, Gelman and Lane 1985; Windsor 1993; Mellenius 1997; Helden-Lankhaar 1999; Nicoladis 2005). Often, these data collections are supported by guiding children towards certain patterns of word-formation with the help of specific questions (Helden-Lankhaar 1999: 62) or they work with existing concepts which are said to be unknown to the children. In sum, data like these have yet to be shown to be reliable and representative for actual language development. The following overview takes into account all kinds of sampling methods.

2. Why coin new words?

It's a matter of temperament whether a child chooses to be silent or to create an unknown word in case she experiences a lexical gap. Some extra-talkative children create words playfully without obvious communicative purpose, just for fun, e.g., German *Gertrudgei* with the name *Getrud* or *Volkergei* with the name *Volker* in analogy to *Papagei* 'parrot', which is reanalyzed as containing *Papa* 'daddy' (Gipper 1985: 146). Becker (1994) found that the purpose of highly contextualized, non-conventional expressions was not primarily to fill lexical gaps but to confuse parents or simply to make playful use of sounds to accompany actions (cf. Grégoire 1947: 68; Aimard 1975: 113). However, the role of language play differs among children, and data are rare.

But words are not always made up just for fun. As in the adult language, there seem to be sound symbolic aspects involved (cf. Elsen 2005, 2008). Word-creation is reported

by, e.g., Grégoire (1947), Aimard (1975), Augst, Bauer and Stein (1977), Scupin and Scupin (1907: 108), Stern and Stern (1965 [1907]: 386 f.), Gipper (1985), Taulelle (1984), Elsen (1991, 1999) and Becker (1994: 204).

The effort of children to assign some motivation to as yet unanalyzed coinages is found in many unintentional reanalyses of adult words, so called child etymology, e.g., *pretty coat* instead of *pettycoat* (Leopold 1949: 115), German *andernerer* instead of *Albanese*, *Albaner* ‘Albanian’, *andere/r/n* ‘other/s’, *kindernerer* instead of *Chineser/r* ‘Chinese’, cf. *Kinder* ‘children’ (both 2;2) as well as *lebertrank* instead of *Lebertran* ‘cod liver oil’, cf. *Trank* ‘potion’ (6;0) (Meringer 1908). *Eichhörnchen* ‘squirrel’ is replaced by *eihörnchen*, cf. *Ei* ‘egg’ (Stern and Stern 1965 [1907]: 419 f.), *mistgeburt* instead of *Missgeburt* ‘freak’, cf. *Mist* ‘manure’, *miss-* negative prefix (Augst, Bauer and Stein 1977: 71), French *sirap d’chien* lit. ‘syrup of dog’ instead of *chirurgien* ‘surgeon’ (Taulelle 1984: 63), Swedish *handburgere* ‘hamburgers’ “because you’re allowed to eat them with your hands” (Mellenius 1997: 62 f.).

Occasionally children coin new words to avoid difficult sound(cluster)s (Elsen 1994). In other cases, one part of a compound serves to elucidate the other, so called *verdeutlichende Komposita* (clarifying compounds) as in German *Käferauto* ‘beetle car’ (VW-beetle) (Elsen 1991), *Wasserpfütze* ‘water puddle’ (Augst, Bauer and Stein 1977: 68), *crow-bird* (Clark 1998: 387) or *co-op-store* (Windsor 1993).

French children sometimes have problems with identifying word boundaries because the masculine definite article *le* drops the vowel before a noun starting with a vowel and the indefinite counterpart *un* is pronounced with final *n* before a vowel. They create new words like *étoile d’araignée* lit. ‘spider star’ instead of [*les*] *toiles d’araignée* ‘cobweb’ (Taulelle 1984: 63), *bat jour* instead of *abat-jour* ‘lamp shade’ (3;11) (Grégoire 1947: 62).

But usually coinages fill a lexical gap in the individual or in the conventional lexicon. Especially N+N compounds serve to label subcategories, thus carry contrastive function, and help to organize categories (Clark, Gelman and Lane 1985), e.g., *bullet-gun*, *police-gun*, *marble-gun* (Windsor 1993: 123), Swedish *bräd-rött* lit. ‘board red’ (vs. *tegel-rött* ‘brickred’, a conventional word, both are colour terms) (Mellenius 1997: 78), German *Beppihundoma* (A 2;4) – *Beppi* (name of dog), *Hund* ‘dog’, *Oma* ‘granny’, i.e. ‘granny where the dog Beppy lives’, to differentiate between her grannies; *Stichbaum* lit. ‘pick tree’ (A 2;9) (*Stich* nominalization of *stechen*), i.e. *Tannenzapfenbaum* ‘fir tree; lit. fir-cone tree’ (A 2;9), vs. *Blätterbaum* ‘deciduous tree; lit. leaves tree’ (A 2;9), to differentiate between conifer tree and deciduous tree or to highlight differences between the trees (cf. Elsen 1991, 1999).

Thus, new words emerge because sometimes children don’t identify the correct word boundary, because they want to clarify a word part that is not yet well-known (clarifying compounds), because they use language playfully, as reanalyses (child etymology), to avoid difficult sounds or sound clusters, but mainly to fill lexical gaps, to label subcategories. This reinforces the need for longer compounds.

In order to coin a new word when needing one, children have to rely on the possibilities their mother tongue offers, or, more precisely, the possibilities they already know. How do they choose among the various word-formation options?

3. Principles

In a number of publications (e.g., Clark 1993, 1995, 1998), Eve Clark has shown that the most important guiding principles for the acquisition of morphology in several languages are simplicity and transparency. Something which is easy is preferred over something more complicated. This means using a word for a different referent without changing its form is favoured, whereas changes are disfavoured. Therefore, compounds, for example, appear in German before affixations. Transparency is important for detecting, understanding and using the units of structure. Thus compounds with a one-to-one match of meaning and form like **bread-man* are more transparent than suffixations with *-er* like *baker* because this affix has several meanings and, moreover, is not used in isolation – so compounding is preferred over suffixation.

Formal simplicity and semantic transparency are not the only factors that help children to interpret and produce word forms. Two further principles affecting children's innovations are contrast (mutual exclusivity, Markman 1989) and conventionality (e.g., Clark 1993): two distinct forms carry two different meanings – a parrot cannot be a bird – and established items take precedence over novel ones. Accordingly, children give up their own word forms over time when they discover more about the adult lexicon. Thus children using the conversion to **piano/klavieren/*pianer* will have to replace them by *to play the piano/Klavier spielen/jouer du piano*.

Finally, according to Clark, children are sensitive to the productivity of patterns in the target language (e.g., Clark 2009: 266). However, productivity is not the same as frequency. Productive patterns vary across language varieties (Elsen 2011a) and unproductive patterns may be quite frequent depending on the situation of use. For example, most verbs in the everyday world around the child are irregular like *eat/essen, drink/trinken, stand/stehe, sleep/schlafen, sit/sitzen, go/gehen*. In the beginning, the verbal lexicon of a German child contains as many irregular as regular verbs, with the number of regular verbs increasing over time (Elsen 1998, 1999). While irregular inflection is not productive in German, children irregularize verbs all the same simply because they encounter sufficient examples in the input. Furthermore, simple and transparent forms are usually, but not always, more frequent in a language. Thus, frequency might be an enforcing or even basic factor. This has been demonstrated for the acquisition of verbal morphology in computer simulations (e.g., Plunkett and Marchman 1991, 1993) as well as in continuous longitudinal acquisition data (Elsen 1997, 1998).

Thus frequency factors might have been underestimated and the emergence of morphology might be related to lexical growth (e.g., Elsen 1999; Dressler, Kilani-Schoch and Klampfer 2003). As children hear their surrounding language without knowledge about new or occasional word-formations, they rely on frequency and not productivity of morphological patterns and units.

Languages vary in their word-formation devices. English offers a surprisingly high number of conversions (Schmid 2005: 188). German as well as other Germanic languages rely mostly on compounding while Romance and Slavic languages favour affixation. Therefore progress in the acquisition of word-formation patterns should vary among languages according to the patterns found in the adult lexicon.

German and English data collections illustrate that compounds are acquired earlier and in higher numbers than derivations, whereas Grégoire (1947) lists several French derivations for the age-group between five, six and later, but only one single compound,

des amies-fleurs ‘flowers which are friends to each other’ (Grégoire 1947: 234). Adult learners of French prefer derivation over compounding as well (Redouane 2007). English and German favour compounding over affixation, for French the opposite holds (for Swedish compounds cf. Mellenius 1997, for Dutch compounds Helden-Lankhaar 1999).

At least in the early stages, simplicity overrides frequency. In (Mandarin) Chinese, young children use words from various word classes as verbs although in the adult language nouns cannot be used as verbs (Erbaugh 1992: 382, 443). In Hebrew, the most frequent word-formation pattern is transfixation. This is the combination of a consonantal skeleton as a stem with vowel patterns as infixes, partly accompanied by prefixes and suffixes. Conversion, compounding and suffixation are less prevalent. But the youngest Israeli children favour conversions all the same, in addition to compounding, which, however, appears relatively late at around 5 (Berman 2009). They acquire suffixes before prefixes and infixes and avoid infixes, though highly frequent and productive, for a long time, except for inflecting the most common verbs (Clark and Berman 1984), whereas older children prefer affixation (Berman 2009). Late, from around 8 to 15 or even later, the acquisition of some types of transfixation is reported (Ravid and Avidor 1998).

In English conversion is quite frequent, in German it is notably less common than compounding, but much easier to produce. However, in all the languages children hardly ever use affixes before the age of 3, independently of frequency or productivity (Clark 1993: 176).

Sometimes frequency wins over simplicity. In Dutch, as well as in German, children have to decide whether to use a verb stem or the infinitive in compounds (cf. Germ. *Essenszeit* vs. *Esszimmer* ‘time to eat’ vs. ‘dining room’). As there are two forms to choose, composing words with the help of verbs is more difficult than with nouns. On the other hand, both N+N and V+N compounds are highly productive in Dutch. All the same, novel compounds consisting of verbs are quite frequent even at age 3 (40% of all compounds) (Helden-Lankhaar 1999: 80). However, the influence of general semantic categories should not be underestimated (Hamann 1997). Independently of the morphological structures of the language, children prefer agents or actions to instruments, in English as well as in Polish (Hamann 1997), German, Hebrew or Icelandic (Clark and Berman 1984: 557, 582). This means there is at least one further principle at work: the principle of relevance. Children prefer words for things which are more relevant for them to words for things which are less relevant. A human being is more important than an animal, an animal is more important than a thing, keys are more important than a plant, food is more important than decoration. So expressions for agents are understood and produced earlier than those for instruments or states. It is possible that children’s concepts and interests filter their perception of their surroundings and their focus on various contents – a necessity of survival. Interestingly, Hebrew speaking children use compounds relatively late, at around 5. Of course they are not so frequent, and in Hebrew not as easy as in English or German. Here, the principle of relevance interferes with transparency. Furthermore, Hebrew compounds are preferably used for instruments in adult language, so they are acquired later, according to Clark and Berman (Clark and Berman 1984: 570; Berman 2009). In English and German they are used for agents, and they are acquired very early. As the verbalization for agents is more relevant than for instruments, English and German children use compounds earlier than Hebrew children. This is not surprising as frequency, (relative) simplicity, transparency and relevance work together.

Thus, the guiding principles for the youngest learners when constructing their words are simplicity, frequency, relevance and transparency as well as contrast and conventionality and, to a certain degree, language play.

4. Patterns

In the developmental sequence of word-formation, children acquiring both German and English start with noun compounding for persons and things and conversion for actions. Noun derivation and other derived words appear later. Inflectional affixes are used before derivational ones (Clark 1998 and cf. the diary data in Clark 1993 and Elsen 1999). Generally, comprehension seems to be ahead of production in word-formation (Berman 2009). Both German and English are Germanic languages relying heavily on compounding.

4.1. German

There are a few diary studies and methodic observations offering data on the acquisition of word-formation in German. Most of them are published in German and are consequently not easily accessible to an international readership. We will focus on these data as they combine several exhaustive sources to give one detailed example of the developmental path towards adult proficiency. We present results from Scupin and Scupin (the boy B), Stern and Stern (H, a girl, G, a boy), the CHILDES (Child Language Data Exchange System) data collected by Szagun (F, a boy) and the study by Elsen (the girl A) (cf. Scupin and Scupin 1907, 1910; Stern and Stern 1965 [1907]; Elsen 1999; CHILDES: Szagun 2001, 2004). A recent study presents the development of the German-speaking girl C, living in Spain between 1;3 and 2;3 and acquiring Spanish as an additional, though secondary language (Rainer 2010, p. c.).

4.1.1. Compounding

Many children start to produce new nouns by compounding (for the difficulties in German verbal word-formation cf. Behrens 1998, Elsen 2011b). For A, the first instance of conversion appears before compounding.

Determinative compounds are coined by all of the children early and in large numbers during their word-formation development, e.g., *bodenlappen* ‘cloth for the floor; lit. floor cloth’ (A, 1;6), or *garfieldbuch* ‘book with pictures of comic Garfield in it; lit. Garfield book’ (F, 3;8). Few other kinds of compounding appear, such as coordinative compounds, cf. *topfpfanne* ‘pan; lit. jar pan’ (F, 2;3), *rattemaus* ‘mouse; lit. rat mouse’ (A, 2;4), *kakaotee*; lit. ‘cocoa tea’ (B, 2;0), *helmmütze* ‘special kind of cap; lit. helmet cap’ (G, 2;6), *mamapapa* ‘parents; lit. mummy daddy’ (G, 2;8). Additionally, we find clarifying compounds in which one of two components is redundant, cf. *trinktee* ‘tea; lit. drink tea’ (F, 2;1), *briekäse* ‘kind of cheese; lit. Brie cheese’ (A, 2;3), *boxerhund* ‘boxer; lit.

boxer dog' (A, 2;5), and possessive compounds, cf. *schiefkopf* 'boy with crooked cap; lit. askew head' (H, 5;4).

German children coin mainly noun-noun compounds, but also some innovative verb-noun combinations occur, cf. *wackelkatze* 'toy cat that wobbles; lit. wobble cat' (F, 2;1), *waschtruhe* 'commode on which the girl gets washed by her mother; lit. washing commode' (H, 2;9). Moreover, children combine adjectives and nouns, e.g., *dicksau* 'sow; lit. fat sow' (F, 3;2), and *schiefkopf* 'boy with crooked cap; lit. askew head' (H, 5;4). They combine prepositions and nouns, e.g., *hinterbäuchel* 'bottom; lit. back belly dim.' (B, 3;9), or *vorsoldat* 'soldier marching ahead; lit. ahead soldier' (H, 5;5), and interjections/onomatopoeic constituents and nouns, cf. *wua-(pa)pa* 'daddy of the lion; lit. roar daddy' (F, 2;0), *(p)füi-ordnung* 'confusion; lit. ugh order' (B, 4;7), *bähschaf* 'sheep; lit. baa sheep' (H, 1;9), or *klingling-puppe* 'doll making tinkling sound; lit. ting-a-ling doll' (H, 2;5). With time, recursive compounds appear, e.g., *Beppihundoma* lit. 'Beppi (i.e. first name) dog grandma' (A, 2;4,0), *Tannenzapfenbaum* 'fir tree; lit. fir-cone tree' (A, 2;9,15), *kahnschiffskutscher* 'captain; lit. barge boat coachman' (B, 4;7). At age 4;0 B coins *schere-rein-tu-ding* 'case for scissors; lit. scissors putting in thing' a compound consisting of a complex phrase and a noun.

Placing the constituents of a compound in the correct order seems to be difficult. Children go through a stage when the order of the elements in compounds is not stable, e.g., both *papamund* lit. 'daddy mouth' and *muspapa (mundpapa)* lit. 'mouth daddy', with the same meaning 'mouth of father lion' (F, 1;10), *hauspferd* lit. 'house horse', and *pferdhaus* lit. 'horse house', whose meanings are not clear (F, 2;4), *nägelfinger* 'finger nails; lit. nails finger' (A, 1;8), *nage(l)fuß* 'toe nail; lit. nail foot' (A, 1;9), *papierklo* 'toilet paper; lit. paper toilet' (A, 2;0). In Rainer's study this stage lasted from 3;1 to 4;5 (e.g., *Klavierkinder* 'a piano for children; lit. piano children', cf. Rainer 2010: 35). However, Dressler, Lettner and Korecky-Kröll (2010: 40) found reversal of order to be rare in their study.

Several German compounds need a linking element between the components. Children acquiring word-formation have to master this challenge. They do so with more or less success, F omits an *-n-* in *(s)binne(n)körper* 'spider's body; lit. spider body' (2;4), an *-e(n)-* in *pferd(e)räuber* 'someone who steals horses; lit. horse thief' (3;1), and in *bärenspiel* 'game with bears; lit. bear game' (3;2). A rarely omits a whole syllable, cf. *tann(en)zapfen* 'fir cone' (1;10), or *nas(en)tropfen* 'nose drops' (1;9). But in many cases she does not produce the final *-n* or *-l* of a first constituent consisting of two syllables as in *zappe(l)peter* 'fidget; lit. fidget Peter' (1;8), *stempe(l)automat* 'machine postmarking tickets; lit. postmark machine' (1;7). G does the same, cf. *stange(n)bett* 'crib; lit. stake bed' and *nase(n)kleid* 'handkerchief; lit. nose dress', both at 2;9. On the other hand, children also insert linking elements where the target language doesn't show them. F coins *gummisbärchen* 'jelly baby; lit. gum bear dim.' (3;0) and *fischebrieft* lit. 'fish letter' with unclear meaning, taken from a book he "reads" (3;8). Additional syllables including schwa also occur, cf. *leibespeise* 'favourite dish; lit. belly food' (A, 2;4), and *waschepulver* 'washing powder' (A, 1;9). Both B and G produce similar linking elements in compounds, e.g., *stoßeböckerle* 'small buck; lit. bounce buck dim.' (B, 2;1), *sandamaschine* 'digger; lit. sand machine' (B, 3;7), *decketisch* 'laid table; lit. lay table' (G, 2;6). In some cases, children string together nouns without linking elements, cf. *haseschere* 'pair of scissors in form of a bunny; lit. bunny scissors' (A, 2;4), *löwebaby* 'baby lion; lit. lion baby' (A, 1;9). Possible reasons besides dialect and analogy are rhythm or facilitating

demanding articulation (Elsen 1999: 72; Lettner, Korecky-Kröll and Dressler 2011: 198). Both phonological and morphological aspects interact.

Children not only create innovative nominal compounds. They also coin new adjectives, adverbs and verbs, although later in development than nouns and in smaller number, e.g., *schlechthörig* 'hard of hearing; lit. bad hearing', probably in analogy to the conventional synthetic compound *schwerhörig* (A, 5;10), the verbal compounds *glockenspielen* (noun *glocken*+verb *spielen*) 'to play carillon; lit. bell playing' (A, 6;9). B coins a number of adjectives and adverbs consisting of two adjectives or adverbs with oppositional meaning, e.g., *heutgestern* 'yesterday; lit. today yesterday' at 2;10, *großklein* 'medium-sized; lit. big small' at 3;6. They might be interpreted as a particular kind of determinative compound, *großklein* might mean a special kind of small, say a 'big kind of small'. H even creates an innovative preposition: *nebenvor*, unclear meaning, cf. the prepositions *neben* 'beside' and *vor* 'ahead' at age 3;8.

The main function of compounds seems to be the classification of objects. All observed children coin compounds which provide contrastive function and help to organize categories.

In some cases children coin new words to fill a gap in the conventional lexicon or in their own lexicon: A uses *gipspulli* lit. 'cast jumper' at 5;9 for a pullover she can wear despite her cast – there is no word for this kind of pullover in the target language. Instead of lexicalized *gänserich* 'gander' which is quite rare in the adult language, A creates *gansmann* lit. 'goose man' to fill the occasional gap in her lexicon at age 5;11.

In a considerable number of cases the observed children obviously just want to play with language when they coin innovative compounds – probably without serious communicative purpose and without meaning. F coins *aa-musik* lit. 'doo-doo music' (2;10) and *doofpaddel* 'blockhead; lit. dumb paddle' (3;4), to name just two.

Moreover, early reduplicative forms were found in the data with phonological motivation, as they are used for iterative or continuing actions, e.g., *druck druck* 'sound of the printer', cf. *Drucker* 'printer' (A, 1;11), *fetz fetz* 'to run quickly', cf. *fetzen* 'to run quickly', or *renn renn* 'run run' (said of a racing car), cf. *rennen* 'to run' (both A, 2;0). Meringer reports for his child *wa wa* 'soap', cf. *waschen* 'to wash' at age 1;9. B coins *mahle mahle* 'coffee grinder' and 'to mill' at 3;0, cf. *mahlen* 'to mill'.

4.1.2. Conversion (Zero derivation)

Subsequent to nominal compounding, children usually produce their first innovative words for actions by applying conversion. This is a very simple and quite productive device in German, accordingly, children make use of it early in development, cf. *(kl)avieren* 'to play the piano; lit. to piano' (G, 2;9), and *mühlen* 'to grind; lit. to mill' (G, 3;0), *enten* 'to work on a duck puzzle; lit. to duck' (F, 2;2), *scheren* 'to cut with a pair of scissors; lit. to scissor' (A, 1;10). A utters a reduplicative *piesel piesel* 'to pee; lit. pee pee' (1;5), which can be seen as an early action word, before her first noun compound. Further examples are *token* 'to hammer, knock', cf. *tock tock* 'the sound of hammering' (A, 2;1), *killen* 'to tickle', cf. *kille kille*, used for children when tickling them (A, 2;3). B, H and G do the same: B realises *stauben*, based on *Staub* 'dust', labelling 'to raise dust, to dust' (B, 3;1). H starts with *atzen* 'to tear to pieces', derived from her created

onomatopoetic word *atze*, *atze* (2;3), and *klavieren* ‘to play the piano’, cf. *Klavier* ‘piano’ (3;8). A creates the same verb at 7;8.

4.1.3. Affixation

Children not only create new words by compounding or conversion but also by using affixes. The acquisition of derivation in German starts with nominal derivation with *-er* for mostly denominal and deverbal agent nouns and instrument nouns, rarely result nouns, e.g., *schlafer* ‘someone who sleeps’, cf. *schlafen* ‘to sleep’ (A, 2;0), *piekser* ‘fork, rake’, cf. *pieksen* ‘to prick’ (F, 2;5), *beweger* ‘movement’, cf. *bewegen* ‘to move’ (A, 6;1), *zwickler* ‘drawing-pin’, cf. *zwicken* ‘to nip’ (B, 3;4).

The most favoured suffix is *-er*: nouns derived with *-er* are used for agents first, later for instruments; only few children show the reversed order or parallel appearance. The next important suffix is deverbal noun derivation with *-e*, mostly to label things, in particular instruments, e.g., *piepe* ‘chick’, cf. onomatopoetic *piep piep* ‘peep peep’ (A, 2;1), *schnaufe* ‘handkerchief’, cf. *schnaufen* ‘to snuffle’ (B, 2;5), *rauche* ‘pipe’, cf. *rauchen* ‘to smoke’ (B, 3;1), *schneide* ‘scissors’, cf. *schneiden* ‘to cut’ (H, 2;9).

Further suffixes are diminutives, e.g., *affi* ‘monkey’, cf. *Affe* ‘monkey’ + (in baby talk frequent) diminutive suffix *-i*, (F, 2;8), *armi* ‘arm’, cf. *Arm* ‘arm’ (F, 2;9) or *-erle* in *butterblumerle* ‘buttercup’ (B, 2;4).

Other suffixes to derive nouns follow, cf. *hassling* ‘something A hates’, based on the verb *hassen* ‘to hate’ (7;3) feminine forms *klauerin* ‘female thief’, cf. **klauer* ‘sb. who steals’ (not lexicalized) with *-in* feminine, *vergesserin* ‘someone who forgets about something’, cf. **vergesser* ‘sb. who forgets’ (not lexicalized), with *-in* feminine, both at 2;10, and *würschline*, female pet name, cf. *Würschtli* (2;4), or masculine forms such as *königan*, based on *Königin* ‘queen’, no suffix **-an* exists in the target language (3;2), and *würschler* ‘butcher’, based on German *Wurst* ‘sausage’ (6;1). The German prefix *miss(missmiss)-* is used by A to label the reversal of *Missverständnis* ‘misunderstanding’, cf. *missmissmissverständnis* at age 6;6. Derivation with *-ung* is observed, as well as *-heit* and *-erei*.

After noun derivation children add derived verbs and even adjectives or adverbs to their productive lexicon. As German verbs are mostly derived by prefixes (*be-zahlen* ‘to pay’) or particles (cf. *an-schauen* ‘to look at’), this strategy prevails in acquisition. New nouns, verbs and adjectives which strongly refer to already existing, lexicalized words in order to label a different or even opposite meaning show that the children have analyzed the constituents, they are able to replace them by others. B utters *abkleben* to name the opposite action of *ankleben* ‘to stick something’ at 5;11 and *auszünden* as opposite to *anzünden* ‘to light up (something)’ at 3;4. At age 2;3 F starts to derive verb roots like *abkrall’n* ‘to nick something’, cf. *krallen* ‘to claw’. Corpora show a large number of different prefixes and particles in verb derivations like, e.g.: *ab-*, *aus-*, *an-*, *be-*, *ent-*, *auf-*, *rein-*, *hin-*, *ein-*, etc.: *absägen* ‘to shave off one’s beard’, cf. *sägen* ‘to saw’ (A, 2;8), etc. Most of the examples are particle verbs, which were found to be early and frequent in other studies as well (cf. Behrens 1998).

Most observed new *-ig*-adjectives are based on nouns, verbs or adjectives, cf. *schampig* ‘smothered in shampoo’, cf. *Shamp(oo)* (A, 2;10), *kostig* ‘expensive’, cf. *kosten* ‘to

cost' (A, 6;9), or *kaffrig* 'stained with coffee', cf. *Kaff(ee)* 'coffee' (H, 4;1). Other suffixes are *-lich* and *-isch*, e.g., *butterlich* 'something smudged with butter fingers', cf. *Butter* 'butter' (H, 4;1).

Early prefixes are *ver-* and *un-*, e.g., *ungebacken* 'uncooked', from *gebacken* 'cooked, baked' (H, 4;6). Children also apply few rather rare word-formation devices to create innovative adjectives and adverbs. B makes use of *tagens* 'by day', based on *Tag* 'day', at age 3;3, cf. *nächtens* 'in the night'.

Most children start to derive a few innovative nouns at around 3, and later verbs or even adjectives and adverbs. The number of derived nouns seems to increase after a few months while compounds still occur very often in the data. Suffixes appear before prefixes.

Taken together the range and number of German suffixes grows steadily, but nominal compounding is favoured at all times.

4.1.4. Other word-formation techniques: rare techniques, new patterns, word-creation

Finally, the observed children also make use of rare word-formation devices like blending, *Zusammenrückung* (the nominalization of phrasal verbs, of other phrases or of whole sentences, cf. Marchand 1969: 124 ff.) or backformation. A coins blends like *hefeschlange*, cf. *Hefe(-Kuchen)* 'cake with yeast' and *(Luft-)Schlange* 'blow-out', at age 2;2 and *donnerplatz*, cf. the names of Munich tube stations *Donner(sberger Brücke)* and *(Marien-)Platz*, at 2;8, furthermore *oveck*, cf. *Ov(al)* 'oval' and *(Recht-)Eck* 'oblong'. Some of the forms might be inadvertent, others are used several times. H creates the adverb *nebensam* at age 3;8, cf. *neben(einander)* 'side by side' and *(gemein)sam* 'together'. In the data of B similar forms occur, e.g., *marmeschokolade*, cf. *Marme(lade)* 'jam' and *Schokolade* 'chocolate', *lampeterne*, cf. *Lampe* 'lamp' and *Laterne* 'hand lantern' and *trommelpete*, cf. *Trommel* 'drum' and *Trompete* 'trumpet', all three at age 2;5 and finally *gratufiere*, cf. *gratu(lieren)* 'to congratulate' and *(fotogra)fieren* 'to take a photo', at age 5;0.

B uses *ein tutweh* at age 3;4 to label a wound, cf. *etwas tut weh* 'something hurts' (*Zusammenrückung*).

Even examples of noun derivation without affixes or with omitted morphemes are reported, a kind of backformation (in general, the word-formation device of backformation is defined by change of part of speech) to create nouns with different gender, i.e. *der schraub*, m., cf. German *die Schraube* 'screw', f., at 2;7, *ein mück*, m., probably referring to German *eine Mücke* 'a midge', f., at age 2;8 or *ein putz*, to label a "unit" of the action *putzen* 'to clean', m., at 5;9 as well as Meringer's *der kalt*, m., referring to *die Kälte* 'cold', f., (without age). Obviously, these children treat *-e* in the German nouns *Mücke*, *Schraube*, *Kälte* as a suffix to mark a feminine noun (which is correct in deverbal suffixations, e.g., *Suche* 'the search') – and they omit this morpheme to label the masculine form. To form a masculine pendant to the feminine *Königin* 'queen', A used the non-existent suffix **-an* at 3;2. Furthermore, German speaking children use conversion, the most simple strategy to create new words, to transform pronouns into nouns, cf. *ich hab' ein selberes* 'I have one of my own' (A, 2;10). This is not possible in the target

language. They derive nouns from adverbs like *ein Genuger* ‘someone, something who, which is enough’, cf. German *genug* ‘enough’ (A, 2;11), again this is not possible in adult German. They even use acronyms as verbs. A takes the German noun *TÜV*, short for *Technischer Überwachungs-Verein* ‘Technical Inspection Authority’, as the base for the conversion *getüvt* at age 7;11. That is, children create new patterns, even new morphemes.

Another very rare way of coining new words is word-creation, when a new root is invented. *Huhu* is a created word F uses in many situations, it refers to a monster. B used *säsä* several times without his parents getting the meaning. He utilizes words with created elements, so that the meaning remains unknown, e.g., *baben*, 2;5, or *kreibonkel*, 2;5. A used *gecko* (1;11–1;15) for a small wooden woodpecker moving along a rod and making a sound similar to a real woodpecker. German has no word for this toy. Other examples are *butti* and *doiker*. All these words were used several times (Elsen 1991, 1999). In Augst, Bauer and Stein (1977), only one example of word-creation is reported, *muck* (Augst, Bauer and Stein 1977: 97).

To sum up, German children mostly use determinative compounding and conversion to create innovative nouns, two word-formation devices which are very productive in the target language. Children have to master order problems in compounds. They do not always use the correct linking element between the constituents. Less often and later they use coordinative, clarifying and possessive nominal compounds. They also coin verbs, adverbs and adjectives and even a few prepositions – to fill lexical gaps in their own lexicon or in the target lexicon, to organise subcategories or even to play with words. They use nominal, but also verbal and adjectival derivation. We find a broad range of affixes, both suffixes and prefixes for each child, preferably the suffixes *-er* and *-e*. Whereas child etymology is reported for almost every child, devices that are rare in the target language like blending, *Zusammenrückung*, backformation or even word-creation also remain rare in the data.

Noun compounding is favoured by the observed children at all times. At the age of 8, children use all patterns with about the same frequency as adults (Symann 1995: 177). However, they make use of word-formation patterns and morphemes which are not allowed in the target language, especially when they are simple like conversion. Finally, children create words.

4.2. English

In Clark’s (1993) report on English speaking children, compounds consistently outnumber other word-formation techniques when coining new nouns, whereas verbs are mainly converted from nouns (Clark 1993: 201). Clark shows that children first rely on known roots in coining words, early coinages consist of one root form or a combination of roots, only later coinages combine roots and affixes. The boy D acquiring English as his first language initially favours compounding to create innovative nouns, *crow-bird* ‘crow’ (1;7), *bubble-hair* ‘curly hair’ (1;10), *baby-bottle* ‘bottle used when speaker was a baby’ (1;11). The initial function of compounds seems to be the identification of subcategories: *I read a babar-book, not a duck-book* (1;11).

Early compounds consist of two nouns, the second one being the head. Clark’s data show that at around age 2 children start to master the distinction between head and

modifier in root compounds. Synthetic compounds appear only after this. D only produces synthetic compounds with *-er* for agents and instruments and *-ing* for instruments and affected objects. Conversion is the simplest possibility for creating novel English words. Accordingly, children produce some new verbs before the age of 2, e.g., *tall* (name unknown, 1;9) or *noise* (name unknown, 1;10). They create innovative instrument verbs like *scale* 'to weigh', *button* 'to push the button' (D, 2;4) or *key the door* 'open the door with a key' (D, 3;0). After novel instrument verbs, locatum verbs and characteristic activity verbs appear, i.e. *mummy trousers me* 'mummy gets me the trousers on', *the buzzer is buzzing* 'the buzzer is making a noise' at 2;3 or *make it bell* 'speaker wants the bell to be rung' at age 3;0. Locatum, goal and agent verbs are rare in the diary data of D, cf. *I'm going to basket those apples*, when the speaker wants to put apples in a basket at 5;0 (Clark 1982).

Following noun compounds and first denominal verbs, children derive some nouns, then the number of derived nouns increases with age. At the same time affix types and their frequency increase. Two-year-olds mainly use *-er* (agentive use of *-er* appears before instrumental uses), cf. *climber* 'someone who is climbing' (D, 2;3), *clapper* 'someone who is clapping his hands' (D, 2;5), *-ie* for diminutives (*cattie*, *forky*) and *-ing* for activities. Once D has analyzed *-y* in established adjectives, he overgeneralizes the suffix to create numerous novel adjectives, e.g., *windy* 'blown by the wind' (2;5), *soaky* 'very wet, soaked' (2;6).

The prefix *un-* for undoing actions appears later, cf. *it's unflowing* 'the water is emptying out' (D, 2;9). At the age of 4 children add *-ness* to their repertoire, *-ist* as well as *-ment* for specialised agents and events (Clark 1993, 2009).

To sum up, the acquisition of English word-formation starts with nominal compounding, whereby simple root compounds appear before synthetic compounds. Shortly afterwards, first denominal verbs appear by conversion before derived nouns and later verbs and adjectives. Suffixes appear before prefixes. Nouns dominate. Compounds are favoured all along but the number of derived nouns increases with age. Like German children, English children switch from simple (compounds, conversions) to complex strategies (affixation) during development (cf. Swan 2000). Apart from conventional word-formation techniques and in addition to Clark, Becker reports substitution of parts of words as well as word-creation for one boy such as *thumble* as well as clarifying compounds, cf. *coop-store* (Becker 1994: 208).

4.3. French

French children prefer derivation over compounding, as their language offers them numerous derivations but only a few compounds. They start with conversion (Clark 1993: 161), e.g., *bulldozé* (2;0) 'bulldozered' (Aimard 1975: 118), *bimer* (*bimm!* sound of a blow against a basin) (around 2) (Grégoire 1947: 241). They continue using this process also in later years, *choser* (*chose* 'thing') (about 4;6), *piper* 'to smoke a pipe' (*pipe* 'pipe') (4;8) (Grégoire 1947: 72 f.).

Conversion of nouns from verbs is not productive in French and at best found in literature or in technical language, but children use it all the same, cf. *le jardiner* (*jardiner* 'to work in the garden'), *le courir* (*courir* 'to run'), *le promener* (*promener* 'to take

a walk') (end of 3rd year) (Grégoire 1947: 37 f.). Later they produce more and more suffixations as well as prefixations, for agents and instruments mainly in *-eur*, *-euse*, for objects in *-eau*, *-age*, *-ure*, for activities in *-ment*, for diminution in *-ette*, roughly according to the French frequency patterns (Clark 1993). They use *dé-* for opposites or reversals, when the target language doesn't, even when French offers an expression and caregivers are sure their children know this, e.g., *désendormir* ('to wake up', lexicalized *réveiller*, *s'endormir* 'to fall asleep') (3;3), *déchauffer* ('to cool down' lexicalized *rafraîchir*, *chauffer* 'to warm') (3;5) (Aimard 1975: 119, 121). For other examples, there are no lexicalized pendants, so the children fill lexical gaps, cf. *décoincer* 'to un-clamp', (3;6), *rouge désalèvre* 'a lipstick that removes the colour', *rouge à lèvres* 'lipstick' (4.2) (Aimard 1975: 119 f.). In some cases, even non-existing derivational patterns were found in deriving the masculine form *pimbeau* from *pimbêche* 'flippant, stuck-up woman' (3;7) (Aimard 1975: 114) or deriving the noun *montrel* from *montrer* 'to show' (Aimard 1975: 117).

Compounds are extremely rare, but they are used to verbalize contrasts all the same, cf. *croque-jeune-fille* (in a restaurant, when ordering a sandwich for herself, *croque-monsieur* and *croque-madame* are special kinds of sandwiches, at age 2;10), *garçon-chien* 'dog boy; lit. boy dog', *fille-chien* 'dog girl; lit. girl dog' (3,6) (Aimard 1975: 116), *médecins-guêpes* lit. 'physician wasps', *médecins-abeilles* lit. 'physician bees', when talking about specialized bees (4;2) (Aimard 1975: 117).

As with German children, order problems are found, cf. *longue chaise* (*chaise-longue* 'deck chair') (3;9), *ville-chat* (cf. *Chatons-ville*, name for a town for cats in a book), town+cat (4,2) (Aimard 1975: 115).

Interestingly, French children use shortening, something quite frequent in French, although some examples might be interpreted as backformations, cf. *Sirée* (*Desirée*, name) (2;1) (Grégoire 1947: 62), *pistole* (*pistolet* 'pistol') (4,1), *thermo* (*thermomètre* 'thermometer' (4;1), *mail* (*maillot* 'swim suit') (4;2), *chausse* (*chaussures* 'shoes'), *coc* (*coca-cola*) (4;2) (Aimard 1975: 123 and cf. Grégoire 1947: 55 ff.), as well as blending, cf. *tatitu*, a blend of *tartine* 'little cake' and *confiture* 'marmalade' (2;0) (Grégoire 1947: 376), *encoquineuse*, a blend of *enquiquineuse* 'nuisance' and *coquine* 'rogue' (3;1), *friponner*, a blend of *fripon* 'roguish' and *friponner* 'to rub (in)' (3;4), *bédouna* 'plant', a blend of the plant names *bégonia* and *pétunia* (3;11) (Aimard 1975: 167), *s'entourner*, a blend of *se tourner* 'to turn' and *entourer* 'to surround' (3;0) (Grégoire 1947: 77), *conchon*, a blend of *con* 'stupid' and *cochon* 'pig' (4;4) (Aimard 1975: 168). The last example at least was meant to be especially expressive (Aimard 1975: 168). Another clearly intentional form is *moutle*, for corn flakes with much milk which don't crackle (one of the characters on the box is called *Crackle*), but became soft, *mou* 'soft' and *Crackle* (Taulelle 1984: 56 f.).

Grégoire reports backformations, e.g., *électeur* 'voter' giving rise to *électer* 'to vote' (about 8), *populeux* 'populated' leads to the verb *populer* 'to populate' (10;7) (Grégoire 1947: 76 and cf. Aimard 1975).

There are even several examples of word-creation, e.g., *pampam* when throwing an object (1;8) (Grégoire 1947: 379), *wapapa* 'ill', *pépette* 'parade' (3,1) (Grégoire 1947: 68), *tchiak-tchiak* 'yo-yo' (3;8) (Aimard 1975: 94), *gapi* 'house' (3;0) (Aimard 1975: 169), *sicor* 'big, malicious animal' (3;6) (Aimard 1975: 168), *mitouner* 'special evening rite including choosing a book to be read aloud' (4;5) (Aimard 1975: 166), *marimarsito*

'kind of interjection' (3;7) (Taulelle 1984: 58), *wèti* 'sound of scissors' (around 6) (Grégoire 1947: 242) (and cf. Grégoire 1947: 442, fn. 3).

Reduplication is not used as a derivational device, but is phonologically or playfully motivated (cf. Grégoire 1947: 65 ff.; Aimard 1975: 169).

French children produce by far more derivations than compounds, in addition to conversions and shortenings. They do not always stick to the possibilities their language offers them, but create new patterns or morphemes. Although some patterns are rare or even non-productive in the adult lexicon, they can be found in the data of small children, especially, when they are simple, such as conversion. Additionally, blending and word-creation are found – in some cases to fill lexical gaps, sometimes as an expression of play.

In sum, depending on the density of the data, created words are shown to be used to fill lexical gaps. Sometimes they remain in the lexicon over a period of time. Blending and word-creation were reported for several children, but shortening appears to be rare among children. All three techniques are rarely reported in studies on language acquisition of English, German and French, in part because many experimental or elicitation tasks focus on other word-formation patterns.

4.4. Other language families

Polish prefers derivation over conversion, compounding is rare. Accordingly, young children use a few conversions and hardly any compounds, but mostly derivations, e.g., *plakać* 'to cry' – *plakacz* 'someone who cries', *stłuc* 'to break' – *stlukacz* 'someone who breaks things' (Clark 1993: 166 f.). Between 2;0 and 2;5, they start with innovative deverbal nominal derivations for agents, objects and instruments and denominal instrument verbs, followed by action and place nouns and object verbs. Derivations are not too frequent before the age 3;5 (Hamann 1997). For Hamann the main factor responsible for the development is semantics. But on the whole children respect the frequency patterns of the input (Clark 1993: 168).

In Chinese, compounding is very productive (Erbaugh 1992), especially verb compounding, cf. *ku-xing* 'to cry and cause someone to be awake; lit. cry be awake', or *si-kai* 'to tear something so that it opens; lit. tear be open' (Chen 2006: 114). It is used to express changes of state or location. Children do not use N+N compounds except for those who live in the States (Erbaugh 1992: 412 f.). Instead, they form compounds with two verbs from 1;9 on, with three verbs from 2;0 on, but only lexicalized ones. From the age of 2;6 they create innovative forms such as *la-guan* 'to close the window by pulling on it; lit. pull close', *peng-ting* 'to stop the toy car by touching it; lit. touch stop', *tui-ting* 'to stop the toy car by pushing on it; lit. push stop' (2;6), but even 6 year olds still overgeneralize verb compounding patterns, missing subtle constraints of the adult language (Chen 2006).

In the African language of Luo (Kenya), compounding again is very productive. Children start with a lot of conversions and compounds, then add prefixations and suffixations. Though the adult language has no denominal verbs, children still create them. And in contrast to adults, children derive some adjectives from nouns with the help of reduplication, cf. *pi* 'water', *pii-pii* 'watery' (Orwenjo 2009: 194). However, tone and

reduplication play a minor role in Luo and, consequently, these processes are found in children's lexical innovations (Orwenjo 2009).

Except for Luo and Turkish (Sofu 2005; Orwenjo 2009) reduplication is never used as a derivational device, but reflects failed attempts at imitation or serves as a strategy to produce the correct number of syllables when articulation is not yet fully developed (Elsen 1991, 1994). That is, reduplication very often serves as a phonological simplification strategy. In some cases it is an expression of word play (Grégoire 1947: 65 ff.; Aimard 1975: 169).

5. Implications for theoretical approaches

Whereas in the past the basics of language, especially rules or parameters, were said to be given at birth, we today believe that regularity as well as units are acquired during language acquisition. Emergentist and usage-based accounts assume general learning mechanisms and gradual acquisition of language and other cognitive aspects. Learning and general categorization processes both help in acquiring a language. Children are sensitive to statistical properties of their mother tongue, so language input is an important factor in language development. Children extract statistical regularities from the language they hear, they form generalizations over exemplars. Highly frequent items and forms are processed faster and acquired earlier, so frequent use of a pattern facilitates acquisition. Children discover correspondences between formal patterns and meaning. A form-function pairing may be a word, an amalgam, a group of words, a sentence, but initially these patterns are on the same level of complexity and might be called chunk, gestalt, formula, holophrase or construction. These prefabricated units are learned from the input and used as shortcuts to save processing energy.

In principle, the basics of the acquisition of word-formation are comparable to those of phonological and syntactic acquisition. Children start with simple units. Early words consist of simple sounds and sound combinations ([m, b, d, n, a, ə], CV-sequences), early sentences consist of two words, the first one is the more important one. In Germanic languages early word-formations are conversions and compounds. Then, the influence of the mother tongue becomes gradually prevalent, over time the frequency patterns in child language come to mirror the frequency patterns of the adult language. Children produce more and more difficult sounds and sound sequences, according to the target patterns they hear. This is paralleled by compounding when needed or instead, but later, affixation. Additionally they use simplification strategies and overgeneralize patterns they have already mastered. For word-formation, this means amalgams (Berman 2009; Dressler, Lettner and Korecky-Kröll 2010) and compounds instead of affixations in languages where compounding is prevalent. In languages where compounding is rarer children even make use of shortenings, such as in French, or word internal processing in Hebrew (Berman 2009: 319). However, in word-formation more processing strategies are at work than merely simplicity and frequency, especially transparency, relevance, contrast and conventionality, in some cases even play.

Language emerges gradually over time. Data show that children attend to gestalts, complex yet unanalyzed constituents (e.g., Elsen 1999; Schlipphak 2008; Berman 2009), and make use of analytical forms at the same time. They use (frequent) rote forms taken

from the input, then combine parts analogically and end up with rule-governed speech. Compounds which are not completely analyzed yet like *hahnmutter* ‘hen; lit. cock mother’ (H 3;9), and schemas with slots filled with conversions like *I’ll hockey over there* ‘I’ll run over there with my hockey stick’ and *it noises* ‘it makes (a) noise’ (Goldberg 2006: 59–60) suggest that this is also the case in word-formation. When children employ word-formation techniques which are not given in the adult language they either misinterpret or overinterpret a model and end up with the wrong analogy or they create a rule of their own. Constructions are the starting point for which individual units have to be discovered. Children analyse these building blocks gradually. A holophrase turns into a schema, a rough outline with slots. But at the same time, children produce analytical forms. The parallel use of analytical and holophrastic constructions was shown for syntactic (Elsen 1999) and phonological acquisition (Elsen 1996), with fillers forming a bridge between chunks and analytical forms (Peters 2001).

A schema offers a comfortable frame in which to place a new and complicated item such as a phonologically difficult one or a morphologically complex word. Schemas save processing energy as they are represented as stable patterns of nodes in the neural network and as their activation requires less processing energy – this allows for more complexity in the slots. For example, the boy F (cf. CHILDES, Szagun 2001, 2004) seems to prefer uttering difficult compounds within specific syntactic formations acting like frames. His data show several fixed schematic phrases, cf. noun phrase + *is/sin das/die*, noun phrase + ‘is/are this/those’ or *das (is) + noun phrase*, ‘this (is)’ + noun phrase. Especially new words with difficult phonology occur in such fixed frames as well as complex innovative compounds. They show mostly adult articulation, which indicates the facilitating role of frames (Elsen 1999; Schlipphak 2008), cf. *das papalöwe* ‘this (is) daddy lion’ (2;1), *igelkinder sin die* ‘little hedgehogs are those’ (2;1), *das is binnekörper* ‘this is spider body’ (2;4) or *da sind viele papaenten* ‘there are many daddy ducks’ (3;5). These principles lead from phonological gestalts to morphological and syntactic structures. The development from formulas to schemas to further generalisations could even imply a bootstrapping of syntactic and morphological knowledge. There is no strict layering of language. That at least some phonological units gradually evolve into morphological units was shown by Peters (2001) and Dressler, Kilani-Schoch and Klampfer (2003). Another precursor to word-formation are two juxtaposed words which are a first step towards compounding.

Morphological schemas come to be understood in a similar fashion to other schemas. At first they are not analyzed, e.g., compounds like *ein mutterkuh* ‘a cow’ and *ein mamahahn* ‘a hen’ (F, 2;4). F uses the schema “mother+name of an animal”. It seems that he does not know that German *hahn* ‘cock’ labels a male bird: A cock cannot be a feminine animal but nevertheless he combines it with the female *Mama* ‘mummy’. For H some innovative words are reported which show that she – comparable to F – is not able to analyse the meanings of the parts yet: she utters *hahnvater* ‘cock; lit. cock father’ and *hahnmutter* ‘hen; lit. cock mother’, both at age 3;9. Again, the German noun *hahn* ‘cock’ clearly labels a male bird. These analogical formations as well as larger groups of similar formations and subcategories illustrate how children use them as frames which save processing energy. At the same time they work freely with constituents. Child etymology shows that children process complex words in relation to their knowledge of their language and end up with compromise solutions.

New words are formed on the basis of analogy with other words. Thus, the role of frequency, i.e. the number of models, is highly important. Holophrases taken from the input may become schemas, which are split up, and complex units can be formed analytically in the end, whereas at the same time some complex units will be used as rote forms. The transition from rote forms to schemas and finally abstract rules is gradual. Various theoretical approaches point in this direction (e.g., connectionist networks, cognitive and construction grammar, cf. Taylor 2003; Tomasello 2003, 2007; Tuggy 2005; Goldberg 2006; Clark and Kelly 2006).

On the one hand, children make use of building blocks. The second relevant factor which has to be covered by a theoretical approach is compromise solutions. As their linguistic abilities are developing, children do not have all the processes at their command as adults and can, therefore, only produce simple forms and have to compensate for the difficult ones. The third factor is the crucial role of input – children will come up with word-formation patterns they hear in their language, even if they play around with different ones in an interim phase, they will prefer the more frequent ones in the end. The concept of schemas and constructions offers a serious option for understanding the mechanisms of language acquisition.

6. References

- Aimard, Paule
1975 *Les jeux de mots de l'enfant*. Villeurbanne: Simep-Éditions.
- Augst, Gerhard, Andrea Bauer and Anette Stein
1977 *Grundwortschatz und Ideolekt. Empirische Untersuchungen zur semantischen und lexikalischen Struktur des kindlichen Wortschatzes*. Tübingen: Niemeyer.
- Becker, Judith A.
1994 'Sneak-shoes', 'swords' and 'nose-beards': A case study of lexical innovation. *First Language* 14: 195–211.
- Behrens, Heike
1998 How difficult are complex verbs? Evidence from German, Dutch and English. *Linguistics* 36: 679–712.
- Berko, Jean
1958 The child's learning of English morphology. *Word* 14: 150–177.
- Berman, Ruth
2009 Children's acquisition of compound constructions. In: Rochelle Lieber and Pavol Štekauer (eds.), *The Handbook of Compounding*, 298–322. Oxford: Oxford University Press.
- Bybee, Joan
1995 Regular morphology and the lexicon. *Language and Cognitive Processes* 10: 425–455.
- Chen, Jidong
2006 The acquisition of verb compounding in Mandarin. In: Eve V. Clark and Barbara F. Kelly (eds.), *Constructions in Acquisition*, 111–135. Stanford: CSLI.
- Clark, Eve V.
1982 The young word maker: A case study of innovation in the child's lexicon. In: Eric Wanner and Lila R. Gleitman (eds.), *Language Acquisition, the State of the Art*, 390–425. Cambridge: Cambridge University Press.
- Clark, Eve V.
1993 *The Lexicon in Acquisition*. Cambridge: Cambridge University Press.

- Clark, Eve V.
1995 Later lexical development and word formation. In: Paul Fletcher and Brian MacWhinney (eds.), *The Handbook of Child Language*, 392–412. Oxford: Blackwell.
- Clark, Eve V.
1998 Morphology in language acquisition. In: Andrew Spencer and Arnold M. Zwicky (eds.), *The Handbook of Morphology*, 374–389. Oxford: Blackwell.
- Clark, Eve V.
2009 *First Language Acquisition*. 2nd ed. Cambridge: Cambridge University Press.
- Clark, Eve V. and Ruth A. Berman
1984 Structure and use in the acquisition of word formation. *Language* 60(3): 542–290.
- Clark, Eve V., Susan A. Gelman and Nancy M. Lane
1985 Compound nouns and category structure in young children. *Child Development* 56: 84–94.
- Clark, Eve V. and Barbara F. Kelly
2006 *Constructions in Acquisition*. Stanford: CSLI.
- Dressler, Wolfgang U., Marianne Kilani-Schoch and Sabine Klampfer
2003 How does a child detect morphology? Evidence from production. In: R. Harald Baayen and Robert Schreuder (eds.), *Morphological Structure in Language Processing*, 391–425. Berlin/New York: Mouton de Gruyter.
- Dressler, Wolfgang U., Laura E. Lettner and Katharina Korecky-Kröll
2010 First language acquisition of compounds: With special emphasis on early German child language. In: Sergio Scalise and Irene Vogel (eds.), *Cross-disciplinary Issues in Compounding*, 323–344. Amsterdam/Philadelphia: Benjamins.
- Elsen, Hilke
1991 *Erstspracherwerb. Der Erwerb des deutschen Lautsystems*. Wiesbaden: Deutscher Universitäts-Verlag.
- Elsen, Hilke
1994 Phonological constraints and overextensions. *First Language* 14: 305–315.
- Elsen, Hilke
1996 Two routes to language: Stylistic variation in one child. *First Language* 16: 141–158.
- Elsen, Hilke
1997 Acquiring verb-morphology: German past participles. In: Elizabeth Hughes, Mary Hughes and Annabel Greenhill (eds.), *Proceedings of the 21st Annual Boston University Conference on Language Development*. Vol. 1, 160–169. Somerville: Cascadilla.
- Elsen, Hilke
1998 The acquisition of past participles: One or two mechanisms? In: Ray Fabri, Albert Ortman and Teresa Parodi (eds.), *Models of Inflection*, 134–151. Tübingen: Niemeyer.
- Elsen, Hilke
1999 *Ansätze zu einer funktionalistisch-kognitiven Grammatik. Konsequenzen aus Regularitäten des Erstspracherwerbs*. Tübingen: Niemeyer.
- Elsen, Hilke
2005 Das Kunstwort. *Muttersprache* 115: 142–149.
- Elsen, Hilke
2008 *Phantastische Namen. Die Namen in Science Fiction und Fantasy zwischen Arbitrarität und Kunstwortbildung*. Tübingen: Narr.
- Elsen, Hilke
2011a *Neologismen. Formen und Funktionen neuer Wörter in verschiedenen Varietäten des Deutschen*. 2nd ed. Tübingen: Narr.
- Elsen, Hilke
2011b *Grundzüge der Morphologie des Deutschen*. Berlin/Boston: de Gruyter.

- Erbaugh, Mary S.
1992 The acquisition of Mandarin. In: Dan Isaac Slobin (ed.), *The Crosslinguistic Study of Language Acquisition* 3, 373–455. Hillsdale, NJ: Erlbaum.
- Gipper, Helmut
1985 Der aktive Anteil des Kindes am Sprachlernungsprozeß. In: Helmut Gipper (ed.), *Kinder unterwegs zur Sprache. Zum Prozeß der Spracherlernung in den ersten drei Lebensjahren*, 143–147. Düsseldorf: Schwann.
- Goldberg, Adele
2006 *Constructions at Work. The Nature of Generalization in Language*. Oxford: Oxford University Press.
- Grégoire, Antoine
1947 *L'apprentissage du langage*. Vol. 2: *La troisième année et les années suivantes*. Paris: Librairie E. Droz.
- Hamann, Ewa
1997 Can nouns and verbs grow up? Case study of word-formation rules for denominal verbs and deverbal nouns. *Psychology of Language and Communication* 1(1): 75–81.
- Helden-Lankhaar, Marja van
1999 *Words in Progress. Taxonomic Relations and Novel Compounds in Lexical Development*. Utrecht: Universiteit Utrecht.
- Leopold, Werner F.
1949 *Speech Development of a Bilingual Child. A Linguistic Record*. Vol. 3: *Grammar and General Problems in the First Two Years*. New York: AMS Press.
- Lettner, Laura E., Katharina Korecky-Kröll and Wolfgang U. Dressler
2011 Charakteristika von deutschen Nominalkomposita in der protomorphologischen Phase des Erstspracherwerbs. In: Hilke Elsen and Sascha Michel (eds.), *Wortbildung im Deutschen zwischen Sprachsystem und Sprachgebrauch. Perspektiven – Analysen – Anwendungen*, 191–208. Stuttgart: ibidem.
- Marchand, Hans
1969 *The Categories and Types of Present-Day English Word-Formation. A Synchronic-Diachronic Approach*. 2nd ed. München: Beck.
- Markman, Ellen M.
1989 *Categorization and Naming in Children. Problems of Induction*. Cambridge, MA: MIT Press.
- Mellenius, Ingmarie
1997 *The Acquisition of Nominal Compounding in Swedish*. Lund: Lund University Press.
- Meringer, Rudolf
1908 *Aus dem Leben der Sprache: Versprechen. Kindersprache. Nachahmungstrieb*. Berlin: Behr.
- Nicoladis, Elena
2005 When level-ordering is not used in the formation of English compounds. *First Language* 25(3): 331–346.
- Orwenjo, Daniel Oching
2009 *Lexical Innovation in Child Language Acquisition*. Frankfurt/M.: Lang.
- Peters, Ann M.
2001 Filler syllables: What is their status in emerging grammar? *Journal of Child Language* 28: 229–242.
- 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.
- Plunkett, Kim and Virginia Marchman
1993 From rote learning to system building: Acquiring verb morphology in children and connectionist nets. *Cognition* 48: 21–69.

- Rainer, Franz
2010 *Carmens Erwerb der deutschen Wortbildung*. Wien: Verlag der Österreichischen Akademie der Wissenschaften.
- Ravid, Dorit and Avraham Avidor
1998 Acquisition of derived nominals in Hebrew: Development and linguistic principles. *Journal of Child Language* 25: 229–266.
- Redouane, Rabia
2007 Acquisition of derivational lexical rules: A case study of the acquisition of French agent noun forms by L2 learners. *Indian Journal of Applied Linguistics* 33(1): 107–120.
- Schlipphak, Karin
2008 *Erwerbsprinzipien der deutschen Nominalphrase. Erwerbsreihenfolgen und Schemata – die Interaktion sprachlicher Aufgabenbereiche*. Stuttgart: ibidem.
- Schmid, Hans-Jörg
2005 *Englische Morphologie und Wortbildung. Eine Einführung*. Berlin: Schmidt.
- Scupin, Ernst and Gertrud Scupin
1907 *Bubi's erste Kindheit. Ein Tagebuch über die geistige Entwicklung eines Knaben während der ersten drei Lebensjahre*. Leipzig: Grieben.
- Scupin, Ernst and Gertrud Scupin
1910 *Bubi im vierten bis sechsten Lebensjahre. Ein Tagebuch über die geistige Entwicklung eines Knaben während der ersten sechs Lebensjahre. Zweiter Teil: Das vierte bis sechste Lebensjahr umfassend*. Leipzig: Grieben.
- Sofu, Hatice
2005 Acquisition of reduplication in Turkish. In: Bernhard Hurch (ed.), *Studies on Reduplication*, 493–509. Berlin/New York: de Gruyter.
- Stern, Clara and William Stern
1965 [1907] *Die Kindersprache. Eine psychologische und sprachtheoretische Untersuchung*. Reprint of 4th ed. Darmstadt: Wissenschaftliche Buchgesellschaft.
- Swan, Deanne W.
2000 How to build a lexicon: A case study of lexical errors and innovations. *First Language* 20: 187–204.
- Symann, Beate
1995 *Stiefkind Grammatik. Untersuchungen zur kindlichen Wortbildung*. Essen: Hem.
- Szagun, Gisela
2001 Learning different regularities: The acquisition of noun plurals by German-speaking children. *First Language* 21: 109–141.
- Szagun, Gisela
2004 Learning by ear: On the acquisition of case and gender marking by German-speaking children with cochlear implants and with normal hearing. *Journal of Child Language* 31: 1–30.
- Taulelle, Dominique
1984 *L'enfant à la rencontre du langage. Comment l'enfant découvre et crée sa langue maternelle*. Bruxelles: Mardaga.
- Taylor, John R.
2003 *Cognitive Grammar*. Oxford: Oxford University Press.
- Tomasello, Michael
2003 *Constructing a Language. A Usage-Based Theory of Language Acquisition*. Cambridge, MA: Harvard University Press.
- Tomasello, Michael
2007 Cognitive linguistics and first language acquisition. In: Dirk Geeraerts and Hubert Cuyckens (eds.), *The Oxford Handbook of Cognitive Linguistics*, 1092–1112. Oxford: Oxford University Press.

Tuggy, David

2005 Cognitive approach to word-formation. In: Pavol Štekauer and Rochelle Lieber (eds.), *Handbook of Word-Formation*, 233–265. Dordrecht: Springer.

Windsor, Jennifer

1993 The functions of novel word compounds. *Journal of Child Language* 20: 119–138.

Hilke Elsen and Karin Schlipphak, Munich (Germany)

121. Word-formation in second language acquisition

1. Introduction
2. The study of second language acquisition
3. Learning word-formation
4. Types of word-formation processes
5. Conclusion
6. References

Abstract

This article explores the role of word-formation processes in the acquisition of a second-language lexicon and the relevant concepts from second language acquisition theory, among them the “word family”. The acquisition of word-formation knowledge influences the structure of a speaker’s mental lexicon, but teaching word-formation explicitly is sometimes seen as an optional extension for advanced learners. Dictionaries can help learners develop their knowledge of word-formation, but only electronic versions can make full use of the relevant information.

1. Introduction

The interface of word-formation and second language acquisition is not a regular topic in either field. In the study of word-formation, the absence of attention to second language acquisition can be explained as a reflection of the focus on word-formation rules as such and their implementation in the (native) speaker’s competence. Whereas data from first language acquisition can be seen as giving information about the origin and form of word-formation rules in the mental lexicon, it is not immediately clear how data from second language acquisition can add to this in any substantive way. Conversely, the field of second language acquisition does not pay much attention to word-formation studies. A recent handbook, Gass and Mackey (2012), does not have index entries for *word-formation*, *derivation* or *compounding*. Also in standard textbooks of second language