Core Principles of Morphological Exponence

It is one of the hallmarks of natural language that abstract morphosyntactic and semantic information is realized in an intricate way by phonological structure. This mapping of representations of radically different types closely related to Martinet's (1960) notion of 'double articulation' is traditionally called 'exponence' (Matthews, 1991). This network brings together researchers from theoretical morphology and phonology to evaluate the properties of what we see as an emerging standard model of morphological exponence, and to explore on the basis of extensive crosslinguistic evidence how its core mechanisms can be simplified, minimized and restricted to the range of empirically observable data. To this end, we focus on syntagmatic and paradigmatic aspects of four basic areas of exponence: identity of exponence, nonidentity of exponence, parasitic exponence and zero exponence. The central questions we want to investigate are, what theoretically significant types of exponence there are and how core mechanisms of exponence relate morphological and phonological aspects of these domains.

Es ist eines der grundlegenden Merkmale natürlicher Sprache, dass abstrakte morphosyntaktische und semantische Information in komplexer Weise durch phonologische Struktur realisiert wird. Diese Abbildungsbeziehung von fundamental unterschiedlicher Repräsentationen, die eng mit Martinets (1960) Konzept der "doppelten Artikulation" verknüpft ist, wird traditionellerweise "Exponenz" genannt (Matthews, 1991). Dieses Netzwerk bringt Wissenschaftler aus den Bereichen theoretische Morphologie und Phonologie zusammen, um die Eigenschaften eines, wie wir glauben, im Entstehen begriffenen Standardmodells der morphologischen Exponenz auszuloten, und dieses Modell auf der Grundlage umfangreicher Evidenz aus verschiedenen Sprachen und Sprachfamilien zu vereinfachen und an die empirische Datenlage anzupassen. Dabei konzentrieren wir auf syntagmatische und paradigmatische Aspekte in vier grundlegenden Bereichen der Exponenz: Identität von Exponenz, Nicht-Identität von Exponenz, parasitäre Exponenz, und Null-Exponenz. Die zentralen Fragen, die wir untersuchen möchten sind, welche theoretisch signifikanten Arten der Exponenz existieren, und wie Grundmechanismen der Exponenz morphologische und phonologische Aspekte dieser Bereiche zueinander in Beziehung setzen.

1   Stand der Forschung, eigene Vorarbeiten

1.1   Stand der Forschung

The current usage of the term 'exponence' in linguistic morphology goes back to Peter H. Matthews (Matthews, 1972, 1974, 1991) and denotes the realization of semantic and/or morphosyntactic features through phonological material (see Coates, 2000 for references to other uses of the term in the literature). Matthews also introduces several subtypes of exponence which identify types of exponence he regards as problematic for so-called 'Item-and- Arrangement' or 'Item-and-Process' models of morphology (Hockett, 1954), e.g. 'cumulative exponence', i.e. exponence where more than one morphosyntactic feature is realized by the same exponent. In this proposal we use a different subclassification of exponence which partially generalizes and systematizes, and partially crosscuts Matthews' terminology, and is closer to current topics in exponence we want to address in the network:

Identity of Exponence	Syntagmatic Identity of Exponence	Copies	(Reduplication, Affix Repetition)
	Paradigmatic Identity of Exponence	Syncretism	
Non-Identity of Exponence	Syntagmatic Non-Identity of Exponence	Morphological OCP-Effects	
	Paradigmatic Non-Identity of Exponence	Polarity and Constraints on Paradigmatic Distinctness	
Parasitic Exponence	Syntagmatic Parasitic Exponence	Allomorphy	
	Paradigmatic Parasitic Exponence	Directional Syncretism	
Zero Exponence	Syntagmatic Zero Exponence	Zero Affixes	
	Paradigmatic Zero Exponence	Paradigmatic Gaps	

1.1.1   Identity of Exponence

agraphSyntagmatic Identity: Copies

   Systematic syntagmatic identity of exponents is discussed in the literature under two headings: reduplication and affix repetition. In typical reduplication, a morphological category is expressed by partial or complete doubling of phonological material, for example in Sye, intensive is expressed by repetition of a stem (e.g. *isut*, 'far away'; *isutisut*, 'very far away'; Croft, 1998). In affix repetition, an inflectional affix is repeated, often without obvious semantic or morphosyntactic impact, as in the optional doubling of the 2nd person plural suffix in substandard varieties of Spanish reported in Halle and Harris (2005) (e.g. *venda-n-lo*, sell-2pl-it, 'you sell it', alternatively realized as *venda-n-lo-n*, sell-2pl-it-2pl).

   Although reduplication is at the center of much current work in phonological theory (McCarthy and Prince, 1994, 1995; de Lacy, 1999; Nelson, 2003), it is an open question to which degree it is governed by morphology. While McCarthy & Prince capture reduplication largely by phonological faithfulness constraints following the tradition of autosegmental phonology (Marantz, 1982), Nevins (2005) argues that this approach makes wrong typological predictions

for reduplication where copies are partially prespecified (as e.g. in English *metalinguistics - shmetalinguistics*). Downing (1999, 2000) shows that at least in a number of Bantu languages reduplication requires morphosyntactic in addition to (or instead of) phonological identity, evidenced for example by patterns where different phonologically unrelated allomorphs of an affix can occur in base and reduplicant. Inkelas and Zoll (2005) argue therefore for a model where reduplication is basically morphological copying.

While reduplication is in most cases straightforward exponence of morphosyntactic or semantic features, affix repetition has been taken as an exemplary case of an arbitrary (unmotivated) morphological operation (Stump, 1990). However, many cases of affix repetition have been shown to be motivated by independent factors. Thus Trommer (2003c) argues, building on insights of Ortmann (1999), that the two affix positions in the class marking of Chichewa adjective agreement (e.g. *pa-sukulu pa-pa-kulu* Class-school Class-Class-large 'at a large school'; Ortmann, 1999:82) correspond to one true agreement marker and a concord head adjoined to a derivational category deriving adjectives from underspecified roots.

Since affix repetition does not necessarily involve identical allomorphs, the problem of affix repetition generalizes to cases where the same morphosyntactic features have different exponents, as with German participles of the type *ge-káuf-t*, ge-buy-t, 'bought', where the participle is marked both by the suffix *-t* and the prefix *ge-*. As argued by Wiese (1996) and Wunderlich and Fabri (1994), *ge-* serves only as a last resort means to satisfy a morphophonological template requiring that participles start with an unstressed syllable (therefore *installíer-t*, 'installed', not **ge-installíer-t*), and would hence be analogous to affix repetition in Chintang (cf. Galani, 2004 for a similar case in Modern Greek). Similarly, Trommer (2006c) shows that in Menominee apparent prefixes realizing the same features as suffixal agreement markers are actually clitics, even though they form a morphological domain together with the suffixes (cf. also Halle and Marantz, 1993 for Potawatomi). At a diachronic level Fuss (2004) shows that the reanalysis of clitics as agreement markers in Germanic and Romance depends on paradigm slots where the clitic elements specify features not already expressed by the original agreement markers.

Paradigmatic Identity: Syncretism   Traditionally the term syncretism denotes the fact that paradigmatically related word forms are phonologically identical, such as in many German nouns where singular and plural forms are identical (e.g. *Redner*, 'speaker' (sg. or pl.)), while there are other nouns which have distinct forms for both numbers (e.g. *Löwe*, singular and *Löwen*, plural of 'lion'). Here we adopt following Stump (2001) a broader interpretation of "syncretism", where it also extends to identity of exponents among related word forms. Under this interpretation the German verb forms *fähr-t* ('he drives') and *fahr-t* ('you (pl.) drive') also exhibit (partial) syncretism since they exhibit phonologically identical suffixes even though the forms as a whole are distinct.

In the last two decades it has become increasingly clear that in many cases syncretism is much more general than a relation of two single forms (or exponents). Thus in German nominal categories (nouns, adjectives, pronouns, etc.), non-masculine forms never distinguish nominative and accusative (Trommer, 2002) even though the phonological exponents instantiating this syncretism are quite diverse (e.g. *die*, nominative/accusative feminine and *das*, nominative/accusative neuter article, cf. also Wiese, 1999, 2003). Williams (1994) takes cases like this, which he calls 'metaparadigmatic syncretism' as evidence for the assumption that syncretism is governed by an explicit formal representation of paradigms, but Bobaljik (2002) shows that metaparadigmatic syncretism can be captured equally well by postsyntactic operations deleting morphosyntactic features and hence morphological distinctions ("Impover-

ishment Rules"). Crucially, there is a growing consensus that many instances of syncretism follow from very general, abstract morphological rules or constraints (Müller, 2003b, 2005b; Baerman, 2005; Stump, 2001; Trommer, 2003c; Wunderlich, 2004b; Wiese, 2006b).

A major topic in current research on syncretism is whether syncretism is in principle arbitrary or corresponds generally to natural classes (Bierwisch, 1967). While the latter seems to be true for many cases of syncretism where "natural class" usually means "definable through a unique set of binary features", e.g. in German the syncretism of 1pl and 3pl forms corresponds to the natural class [-2 +pl] (see Bierwisch, 1961 and Plank, 1991b for approaches to capture natural syncretism by alternative 'geometric' representations), Stump (2001) and Baerman (2005) provide cases of systematic (metaparadigmatic) syncretism which apparently do not correspond to well-defined natural classes. Thus Baerman cites a syncretism pattern from the Cushitic language Dhasaanac where one type of forms (labeled "A") is used for 3sg masculine while a second type of forms (labeled "B") is used for 3sg feminine. In addition and among other cases, type A forms mark 1st person inclusive, while type B forms mark 1st person exclusive. Since in the first case the A/B contrast marks a gender distinction restricted to singular forms, but in the second case a person distinction restricted to plural forms, neither type A nor type B forms seem to correspond to a natural class.

1.1.2 Non-Identity of Exponence

Syntagmatic Non-Identity: Morphological OCP Effects   In phonology, constraints against cooccurring identical (or similar) elements, especially different varieties of the OCP (Obligatory Contour Principle; Leben, 1973; McCarthy, 1986) have played an important role at least since the early 1970. In morphology, phenomena of this type have only recently become a focus of research. Thus Grimshaw (1997) shows that many Romance languages share a constraint against identical (or similar) clitics in the same clitic cluster, which is resolved either by deleting or modifying one of the clitics. Gerlach (1998, 2001) provides a more detailed account extending also to other Romance languages such as Rumanian. For inflectional morphology, Trommer (2003c) and Wunderlich (1996, 2003) argue that specific syncretisms in languages with complex agreement are due to constraints against affixes which are identical or share certain features. Thus Quechua verbs allow only one plural marker even if both the subject and the object are plural (Wunderlich, 2003).

A central question in this area is to which degree syntagmatic identity avoidance in morphology is conditioned by morphology itself or by phonology (cf. also Plag, 1998). A relevant case is haplology in the genitive plural forms of English (Yip, 1998). The corresponding form for cat (/kæts/) has only one /s/ even though genitive and plural each are separately marked by homophonous *s*-affixes so that /kæts/ is actually three-way ambiguous (genitive singular, nominative plural, genitive plural). Crucially, the avoidance of having two *s*-affixes is not strictly phonological since the plural of the name Katz (phonologically also /kæts/) is /kætsəs/, not /kæts/, but, as Yip argues, also not strictly morphological since a plural marker and a genitive suffix can cooccur if they are not homophonous as is obvious in the genitive plural of *ox* /oksəns/ with the (irregular) plural suffix *-en* and the genitive marker. However, this argument crucially depends on the assumption that *oxen* is decomposed *ox-en* and not represented as a lexicalized single unit.

An even more difficult case in this regard are Romance clitic clusters. While Gerlach (1998, 2001) assumes that the ban against the clitic sequence **le-lo* ('to her-him'), which is replaced in Spanish by *se-lo* (*se* is used otherwise as a reflexive clitic) is due to a ban against the phonological identity of onset consonants, Nevins (2006) argues that it is actually

the cooccurrence of two third-person clitics which is avoided. Nevins cites data from the Arce dialect of Italian (Pescarini, 2005) where sequences of two 3rd-person clitics are also impossible even though they do not have identical onsets (e.g. *glie-ne, 'to him of it ') as support for a morphosyntactic constraint, but *glie* and *ne* are the only markers in Arce which are sonorant and coronal. Hence also assuming a phonological constraint against two coronal sonorant onsets would work here. Thus the evidence in these cases for a morphological or phonological trigger of identity avoidance is still inconclusive. However, the processes actually achieving identity avoidance in different varieties of Romance (replacing one clitic by another one, allomorphy, or deletion of a clitic) are clearly morphological in nature.

Paradigmatic Non-Identity:
Polarity and Constraints on Paradigmatic Distinctness In a number of unrelated languages, morphological contrast seems to be expressed by changing the values of a binary opposition into the respective opposite. For example in the Nilotic language Luo, plural, in addition to affixation is also indicated by the fact that stem-final voiced obstruents get voiceless (*kidi*, sg. ⇒ *kit-e*, pl., 'stone') and stem-final unvoiced obstruents get voiced (*bet*, sg. ⇒ *bed-e*, pl.; Tucker, 1994; Okoth-Okombo, 1982). In a number of Romance languages, the thematic vowels of *a*-class verbs change to *i* in the subjunctive (e.g. Italian *parla*, '(s)he speaks' (ind.) ⇒ *parli*, '(s)he speaks' (subj.)), while *i*- and *e*-class verbs change it to *a* (*vende*, '(s)he sells' (ind.) ⇒ *venda*, '(s)he sells' (subj.)). Data of this type have been taken as crucial evidence that morphology (or morphophonology) can involve an equivalent of alpha rules or alpha notation (Chomsky and Halle, 1968), i.e. rules which change the value of a given feature (e.g. [+/-plural] in the Luo case) into its opposite (Oltra-Massuet, 1999 for the subjunctive in Catalan; Fitzpatrick et al., 2004; cf. also the use of alpha notation for the lexical representation of affixes in Noyer, 1992 and Alexiadou and Müller, 2004) or constraints which require that morphologically distinct forms are also distinct phonologically for a specific phonological property (e.g. antifaithfulness constraints assumed by Alderete, 1999, 2001 for Luo) or generally, i.e. regardless of the specific phonological dimension of distinctness (e.g. the constraint Realize Morpheme; Kurizu, 2001).

These constraints have also been argued to play a crucial role in other types of non-additive morphology. Horwood (2001) analyzes cases of subtractive morphology by antifaithfulness constraints. General paradigmatic distinctness constraints such as Realize-Morpheme also extend to a second phenomenon, the fact that exponence sometimes alternates between different phonological realizations. For example in German, 3sg present tense forms normally bear the suffix *-(e)t* (e.g. *geh-t*, '(s)he walks', or *wat-et*, '(s)he wades'). A systematic exception are umlauting verbs with root-final *t* (cf. non-ablauting *jäte*, 'I weed'; *jät-et*, '(s)he weeds' and ablauting *rat-e*, 'I advice' *rät-Ø*, '(s)he advices'). In Neef (1996) this is captured as follows: 3rd person marking as in *watet* is determined by two constraints, one requiring that the form is different from the base *wat*, and one requiring that 3rd person forms end in a coronal stop. In an umlauting form with a final *t* such as 3rd person *rät*, the distinctness constraint is already satisfied by the umlaut (since *rät* is non-identical to the base *rat*) and the coronality constraint by the *t* already present in the base. Finally, paradigmatic distinctness is also a potential factor in the diachronic evolution of morphological exponence, where the development of new inflectional markers seems to be triggered by the goal to make syncretic forms distinct (e.g. in the development of 2nd person complementizer agreement in Bavarian; Fuss, 2004).

An open question is whether polarity generally involves phonological polarity, The case of Catalan subjunctives is argued to be a change of abstract class features in Oltra-Massuet (1999) but obviously also correlates roughly to a phonological contrast between the low *a* and

the non-low vowels *e* and *i*. The most prominent example of strictly morphological polarity in the literature is found in Somali, where it is claimed that the definite suffix *-ta* is used after feminine singular and masculine plural nouns, while *-ka* is used after masculine singular and feminine plural forms (El-Solami-Mewis, 1987). Note that the Somali suffix paradigm under this analysis constitutes a syncretism not corresponding to a natural class (cf. sections 1.1.1, 1.1.3; see Bejar and Hall, 1999 for an analysis in terms of markedness). Baerman (2006) discusses some additional cases of polarity which do not seem to be strictly phonological. Thus in the Western Oceanic language Nehan in one noun class the suffix *a* is used for singular, and *o* for plural, in a second noun class the distribution is the opposite: *a* is used for plural and *o* for singular. In Amadiya Neoaramaic, so-called J-stems of verbs take type A suffixes to mark subject agreement, and type B suffixes for object agreement, but in so-called P-stems type B suffixes to mark suffix agreement, and type A suffixes for object agreement.

1.1.3   Parasitic Exponence

Syntagmatic Parasitic Exponence: Allomorphy   For an English past tense form such as *played* there is a broad consensus that *play* is the exponent of the verb (or the features of the verb) 'to play' while *-ed* is the exponent of past tense. More problematic is the Georgian imperfect affix which is generally realized as *-i*, but as *-n* in the context of the 3pl marker *-en*; Carmack, 1997; Trommer, 2003c:96) Assuming that *-n* is not a (direct) exponent of 3pl, but in addition to being an exponent of imperfect is triggered by the presence of *-en* (e.g. by a subcategorisation frame or context restriction of the affix), this is a case of syntagmatic parasitic exponence: by virtue of *-en* expressing 3pl, also *-n* signals the features 3 and plural. This type of parasitic exponence is traditionally called allomorphy.

A slightly different type of allomorphy is found in the English past tense form *hidd-en*, where the exponent of the verb is /hid/ instead of /haid/ used in the present tense. While *hide* and *hid* are different, they are also clearly phonologically related. This has led Halle and Marantz (1993) to assume for *hidd-en* the same root exponent as for the present tense form *hide*. However, the past tense marker *-en* (which shows exponence for [+past] and parasitic exponence for the class of verbs taking *-en* instead of *-ed*) triggers a morphophonological readjustment rule laxening /ai/ to /i/.

As shown in Anderson (1992) and Stump (2001), allomorphy can in principle be eliminated from morphological theory under the assumption that there can be arbitrarily many exponents for a given feature. Thus Georgian *-n* could be analyzed as a (non-parasitic) exponent of imperfect *and* 3pl).

Also readjustment type allomorphy has been argued to be dispensable. Thus while German umlaut – just as vowel allomorphy in English – might seem a perfect case for readjustment rules, a completely different treatment is possible in a theory which allows floating features, i.e. morphological material to consist completely or partially of features not associated with segments (Lieber, 1992; Zoll, 1996; Wolf, 2005). Thus Wiese (1994b) claims that umlaut consists of the vowel feature [-back] associated with specific affixes which attaches to stem vowels by a general phonological process. However Wiese also argues that ablaut which does not uniformly correspond to a single feature as [-back] (cf. German *finden*, 'find (inf.)' – *fand*, 'I/(s)he found'; *schlafen*, 'sleep (inf.)' – *schlief*, 'I/(s)he slept') and is much more irregular than umlaut is not amenable to a similar treatment.

A further area where allomorphy is linked intimately to phonology, but also to paradigmatic parasitic exponence (see below) are patterns where allomorphy involves phonological aspects which are not part of underlying phonological representations. Thus the derived verb *Jápan-*

ìse seems to get its stress position not from the noun *Japán*, but from the root in *Jápan-èse*. Steriade (1999) claims for similar cases that they involve 'split bases', i.e. *Japán* would be the morphosyntactic base of *Jápan-ìse*, and *Jápan-èse* its phonological base. However, Raffelsiefen (2004) argues that examples of this type involve a single base (here: *Jápan-èse*) and zero exponence of affixal material (here: *-ese*).

The involvement of phonology is also a central problem in cases where the selection of allomorphs is due to phonological, not morphological context. Thus in Estonian the allomorph *-tte* appears after bases with an odd number of syllables and *-te* after bases with an even number of syllables. Both allomorphs are not related by a productive phonological process. There are currently basically two approaches to this type of phenomenon, phonological subcategorization (Orgun, 1996; Fischer, 2002, 2006; Yu, 2003; Paster, 2005; Wunderlich and Stiebels, 1999) and the assumption that phonological constraints can select among different allomorphs (Mester, 1994; van Oostendorp, 1998; Mascaró, 1996; Wolf, 2005; Wunderlich and Stiebels, 1999). Thus Kager (1996) argues that the *-te/-tte* allomorphy in Estonian is governed by constraints optimizing foot structure. While the constraint-based approach is conceptually attractive, Paster (2005) disscusses a number of cases where phonologically conditioned allomorphy seems not to serve phonological optimization as evidence for a subcategorization approach: For example she cites Kimatuumbi, where "monosyllabic verbs mark perfective with *-ite* (e.g. *chól-a*, 'draw (inf.)' ⇒ *ni-chól-ite*, 'I have drawn'), while polysyllabic stems take an *-i*-infix (e.g. *belek-a*, 'bear (inf.)' ⇒ *ni-béliike*, 'I have born'). In Zuni, singular of monosyllabic nouns is marked by *-ʔleʔ* (e.g. *li-ʔleʔ*, 'sinew'), while the allomorph *-nne* is used after polysyllabic stems (e.g. *homa-nne*).

Paradigmatic Parasitic Exponence: Directional Syncretism Directional syncretism is a standard mechanism to derive syncretism in word-and-paradigm approaches to morphology, especially in the form of so-called Rules of Referral (Zwicky, 1985; Stump, 1993, 2001). The intuition behind Rules of Referral is that under specific circumstances one paradigm cell takes over exponence which "properly belongs" to another paradigm cell. Thus in German verb inflection, 1sg of regular main verbs is marked throughout paradigms by schwa (e.g. in *falt-e*, 'I fold'), while 3sg is marked by *-(e)t* (e.g. in *falt-et*, '(s)he folds') in the present indicative. That 3sg is also marked by schwa in past tense (*falt-et-e*, 'I/(s)he folded') and subjunctive forms (*falt-e*, 'I/(s)he fold(s) (subj.)') can now be interpreted in a way that in these contexts 3sg takes over exponence from the 1sg form, which can be captured by a Rule of Referral requiring that 3sg is marked the same way as the 1sg under appropriate conditions. This way of analyzing 1sg/3sg syncretism is directional (or asymmetric) since 3sg forms import 1sg exponence, not vice versa.

Many cases of directional syncretism can be straightforwardly captured by natural classes and zero exponence (cf. section 1.1.4). Thus schwa in German could be analyzed as a [-2] marker compatible with both 1sg and 3sg, and *-t* as specifying [-1-2] (see Plank, 1991a and Wiese, 1994a for different views on the naturalness of [-2]). Based on the Elsewhere Condition, *-t* is chosen in the present indicative for 3sg and schwa for 1sg. Assuming now a constraint or rule inducing zero exponence for [-1-2], in the subjunctive and past tense forms *-t* is blocked in this context, and schwa is used instead. (cf. Frampton, 2003; Nevins, 2003; Müller, 2005a; Trommer, 2005b, for similar analyses).

Generally, depending in detail on the assumed set of features, Rules of Referral allow to implement a superset of the syncretisms which can be captured by zero exponence. For example, assuming a paradigm with only two features, say [+/-Nom(inative)] and [+/-Pl(ural)] and two exponents A and B, there are 7 conceivable patterns of syncretism, 4 patterns where

1 cell is filled with A and the other cells with B, and 2 patterns where 2 cells are filled with A and two with B (we disregard mirror patterns which just differ by replacing A with B and B with A, i.e. a syncretism where [+Nom+Pl] is A and all the other cells are B is identical for our purposes to a syncretism where [+Nom+Pl] is B and the other cells are A). Taking for granted that one of the exponents can be a default exponent, all the paradigms where 1 cell is filled with A and 3 cells with B can be captured by assuming a full feature specification for A (e.g. [+Nom -Pl] and taking B as a default marker. Now, in a system without Rules of Referral (and without alpha representations of exponents as in Alexiadou and Müller, 2004), we get only 2 more possible paradigms with 2 A cells and 2 B cells if A corresponds to one of the natural classes [+Nom] or [+Pl] (again disregarding mirror patterns of syncretism).

What is excluded is a paradigm where [+Nom+Pl] and [-Nom-Pl] are marked by A and the other two cells contain B. On the other hand, in a system with Rules of Referral all syncretisms where 2 cells are filled by A and the other 2 cells by B can be derived by stipulating A for one cell, B as a default marker, and extending A to one of the other cells by a Rule of Referral. Thus the "unnatural" syncretism where only [+Nom+Pl] and [-Nom-Pl] are marked by A can be analyzed as linking [+Nom+Pl] to A and a Rule of Referral which requires that [-Nom-Pl] takes over the exponence of [+Nom+Pl].

1.1.4   Zero Exponence

Syntagmatic Zero Exponence: Zero Affixes   Syntagmatic zero exponence, especially under the heading of zero affixes is one of the ideologically most loaded subjects in theoretical morphology (cf. e.g. Anderson, 1992; Halle and Marantz, 1993; Wunderlich and Fabri, 1994), but discussions of the topic suffer from partial terminological confusion. In particular, it often remains unclear whether zero affixes are intended as empty elements at the morphological, the phonological or the phonetic level. Thus an affix might have phonological content, but be phonetically empty. Phonological entities of this type belong to the standard inventory of Government Phonology (e.g. word-final consonants are usually assumed to be phonologically licensed by following vowels which are phonetically empty, Kaye et al. 1990; Kaye 1990; Charette 1991) but are also assumed under more restricted conditions in other lines of research (Burzio, 1994; Kager, 1997). An affix might also be phonologically empty, but have morphological content. This is the structure of zero vocabulary items in Distributed Morphology which seem to be invisible phonetically and phonologically, but have the potential to trigger allomorphy in other phonologically non-empty elements, and hence must be morphologically visible (Halle and Marantz, 1993). Finally, exponents might be morphologically empty, but have phonological content. This seems to hold for the readjustment rules assumed in Halle and Marantz (1993) for Potawatomi to introduce phonological material in the context of specific morphosyntactic features without introducing a morphological object.

Zero exponence seems to be partially due to constraints on surface exponents - a case in point is zero exponence triggered by identity avoidance (see section 1.1.2) - and partially to "arbitrary" stipulation requiring that morphosyntactic features are not realized overtly ("taboos" in Wunderlich 2000a; impoverishment rules in Distributed Morphology; and impoverishment constraints in Trommer 2003c). A central question is whether these two types of zero exponence have a substantially different status in grammar. Thus Wunderlich (2000a) claims that arbitrary zero exponence is highly marked.

Besides purely morphological factors also phonological constraints seem to play an important role. For example Raffelsiefen (2004) argues that specific cases of derivational affixes exhibiting zero exponence are due to phonological constraints, e.g. *Jápan-ìse* is derived from

Jápan-èse under zero exponence of *-ise* to avoid stress clash as in **Jápan-èse-ìse*.

Paradigmatic Zero Exponence: Paradigmatic gaps   It is a well-known problem of optimality-theoretic approaches to grammar that there are no straightforward means to account for the fact that for specific inputs there is no well-formed output (cf. Prince and Smolensky, 1993). For example, English allows derivation of *randomise* from the adjective *random* and the suffix *-ise*, but not of **corruptise* based on *corrupt* (Raffelsiefen, 2004). Assuming that the input for derivational processes is the set of a base and an affix (e.g. {*random*, *ise*}), OT predicts that there should also be some output to the input {*corrupt*, *ise*} (if not necessarily *corruptise*) since according to the principles of OT candidates are not ungrammatical by virtue of violating specific wellformedness conditions, but only by being outranked by other candidates which exhibit less severe violations of such constraints.

While such cases of ineffability are typically seen as a problem specific to OT, they seem also to be characteristic for the input-output mapping in current theories of exponence more generally. Thus a basic claim of Paradigm Function Morphology (Stump, 2001) is that word forms are constituted by the input, not by their exponence, hence word forms are well-formed no matter how they are realized or even if they are not realized at all. In fact that underlying features do not have to be realized in this theory enables Paradigm Function Morphology to obviate stipulation for many cases of syntagmatic zero exponence ("zero affixes"). Also in Distributed Morphology, the basic mechanisms of exponence (vocabulary insertion, impoverishment, etc.) lead to a situation where paradigmatic gaps are unexpected. Thus paradigmatic gaps are a general problem of realizational theories of exponence. In contrast incremental approaches to exponence do not need any specific devices to account for ineffability: In a lexicalist system such as Lieber (1981) it is perfectly possible to have a grammar with a single 1sg agreement marker subcategorizing (hence restricted to) intransitive verbs. This grammar which is only based on the standard mechanism of lexicalist morphology, subcategorization, creates a massive paradigmatic gap, namely there won't be 1sg forms for transitive verbs.

In OT, there are currently four approaches to ineffability.

First, specific cases of ineffability turn out to have a realization once a wider array of possible outputs is considered. Thus, in Latin there are no synthetic perfect passive forms of verbs, but for each gap in the synthetic paradigm there is a periphrastic form consisting of an auxiliary and a participle taking over the role of the "missing" synthetic form (Haspelmath, 2000; Lieb, 2005). Interpreting analytic and synthetic forms as a single system for expressing morphosyntactic categories, cases like this do not show any paradigmatic gaps at all (Bresnan, 2001; Embick, 2000; Kiparsky, 2005; Stump, 2002; Stump and Ackerman, 2004). However, not all cases of paradigmatic gaps can be explained by alternative periphrastic forms. Thus the possibility of syntactic constructions such as *make corrupt* or *render corrupt* seems not to be linked in any way to the gaps in *-ise* formation, in contrast to the Latin case where periphrastic forms are impossible when there is a synthetic form.

Second, paradigmatic gaps have been taken as evidence that paradigms have to be evaluated (optimized) as a whole (Rice, 2005) as proposed in Optimal Paradigms Theory (OP, McCarthy, 2005). To avoid wellformedness violations in a specific part of a paradigm it is tolerated that constraints requiring filling of paradigm cells are violated. Unfortunately, this approach leads to enormous computational complexity since potentially large paradigms must be evaluated in a single evaluation process, and the OP model itself seems to make problematic empirical predictions (Bobaljik, 2004).

Third, it has been proposed that specific constraints are inviolable, i.e. their violation induces ungrammaticality by filtering out optimal candidates after the standard evaluation of

violable constraints (the 'Control Model'; Orgun and Sprouse 1999).

A fourth approach which can be interpreted as a more restrictive version of the Control Model and which is called the NullParse approach (cf. Prince and Smolensky, 1993; Wunderlich, 2000b; Heck and Müller, 2002). In this model paradigmatic gaps are due to outputs which are uninterpretable in a very specific way. In contrast to an OP approach, the NullParse model allows strictly local evaluation. Raffelsiefen (2004) shows that alleged empirical advantages of the Control Model do not hold under closer theoretical examination and that the Control model predicts unattested patterns in word formation which are avoided under a Null Parse account.

1.2 Eigene Vorarbeiten

Identity of Exponence   Trommer (2003c) analyzes affix repetition. Trommer (2006c) discusses mechanisms of identity avoidance in clitic-afffix combinations. Syncretism triggered by templatic constraints is analyzed in Trommer (2003c) and Trommer (2003a), and formalized in Trommer (1999a). Trommer (2003g) shows that there are cases of syncretism which cannot be captured by surface constraints. Trommer (2002) discusses consequences of meta-paradigmatic syncretism for the morphosyntax of free relative constructions.

Non-Identity of Exponence   Trommer (2003c) provides a detailed optimality-theoretic analysis of morphological OCP effects by means of so-called BLOCK constraints. Trommer (2003a, 2005e, 2006d) reduces the same effects to constraints on morpheme indexing independently motivated by affix ordering patterns ("Coherence" constraints). Trommer (2005d) (on tone polarity in Kanuri) and Trommer (2006a) (on voicing polarity in Luo) show that apparent cases of morphophonological polarity are actually due to general constraints on phonology and phonology-morphology mapping.

Parasitic Exponence   Trommer (2003c) develops a formal framework implementing different types of morphologically governed allomorphy in Optimality Theory. Trommer (1999b) and Trommer (2000) introduce basic locality constraints on allomorphy. Analyses of ablaut phenomena implicitly using class features are provided in Trommer (1997) and Trommer (1999c). Trommer (1997) and Trommer (1998) provide constraint-based analyses of phonologically conditioned allomorphy. Trommer (2003e,d) give detailed evidence against directional syncretism in the form of feature insertion as proposed in Noyer (1998) and Harbour (2000, 2003).

Zero Exponence   In Trommer (2003e,d) it is argued that different types of zero exponence introduced in Halle and Marantz (1993) can be reduced to insertion of zero affixes. In Trommer (2003c,g) it is shown that not all cases of zero exponence can be captured by surface constraints. Trommer (2002) develops a model of ineffability in OT-morphology.

2 Ziele und Arbeitsprogramm

2.1 Ziele

2.1.1 Background: A Convergence Model of Exponence

While current models of morphology diverge sharply in their assumptions on the position of morphology in the overall architecture of the grammar and the preference for derivational

rules or declarative constraints, the last years have seen the emergence of a core model for morphological exponence along the following lines:

- exponence is realizational, i.e. morphology provides (partial) phonological realization for bundles of of fully specified morphosyntactic features provided by paradigms (Wunderlich and Fabri, 1994; Stump, 2001) or syntax (Anderson, 1992; Halle and Marantz, 1993).

- exponence is governed in crucial respects by "blocks" (partially) determining position and cooccurrence of exponents. Blocks may be equated to syntactic heads (Halle and Marantz, 1993), rule blocks (Anderson, 1992; Stump, 2001) or derived from specific constraints (Trommer, 2003c; Wunderlich, 2003).

- exponence is governed by general rules or constraints inducing syncretism (e.g. Rules of Referral, Stump 2001; impoverishment rules, Halle and Marantz 1993; morphological constraints, Trommer 2003c;Wunderlich 2003).

- the core of phonological exponence are pieces of phonological structure or constraints inducing such structure (e.g. word design conditions; Neef 1996). In other words exponence is in a broad sense concatenative. (Stump, 2001; Wunderlich and Fabri, 1994; Halle and Marantz, 1993).

- Subsegmental exponence has morphologically the same status as segmental (affixal) exponence (Zoll, 1996; Stump, 2001; van Oostendorp, 2005b; Trommer, 2005a).

2.1.2 Theoretical Goals

In the network we want to find answers to the following questions:

- How can the convergence model of exponence be maximally restricted both with respect to the number of necessary theoretical mechanisms and its empirical coverage? Obviously, there is a tension between both aspects of restrictiveness. Thus replacing general rule formats such as impoverishment or Rules of Referral by very specific optimality-theoretic constraint types, e.g. constraints on antihomophony (Gerlach, 2001) and on subject-object expression linked to prominence hierarchies (Lakämper and Wunderlich, 1998) extends the inventory of formal mechanisms, but seems to lead to an empirically more constrained overall theory. Our goal is to find ways to resolve this tension on the basis of a better empirical understanding of morphological exponence crosslinguistically.

- How do morphological and phonological aspects of exponence interact? For example, in Hungarian allomorphy of 2sg agreement is partially determined by morphology and partially by phonology. The suffix *-l* is restricted in present indicative forms to verbs ending in a sibilant (e.g. *föz- ö-l*, 'you cook'), while for other verbs *-sz* is used (e.g. *lát-sz*, 'you see'). In past tense forms, *-l* is used throughout (e.g. *föz-t-é-l*, 'you cooked'). While there are elaborate models of allomorphy for both morphological (Halle and Marantz, 1993; Wunderlich and Fabri, 1994; Trommer, 2003c) and phonologically conditioned allomorphy (Mester, 1994; Mascaró, 1996; van Oostendorp, 1998), it is unclear how these can be integrated.

- What is the formal relation and division of labour among different areas of exponence? For example, reduplication (i.e. syntagmatic identity of exponence) is often claimed to result from a kind of zero exponent (a morpheme with "no segmentism in the input"; McCarthy and Prince, 1995:26). Paradigmatic identity of exponence, syntagmatic zero exponence, and paradigmatic parasitic exponence all seem to play a role in the proper understanding of syncretism. In particular, we want to address the question which aspects of exponence function as triggers of other phenomena. Thus identity avoidance might trigger syncretism or paradigmatic gaps, and it is an open question whether paradigmatic distinctness triggers allomorphy or is itself an epiphenomenon of allomorphy and other more basic mechanisms.

2.1.3 Empirical Goals

- Current research on morphological exponence suffers crucially from the fact that morphological systems of many languages are analyzed only superficially. Thus Trommer (2006b) and Stump (2001) (cf. also Wunderlich, 2003) show that syntactic analyses of Algonquian morphology are empirically (and hence also theoretically) problematic because they are restricted to main paradigms ("Independent Order") and neglect the so-called Conjunct Order paradigms which convey important evidence for the analysis of these systems (see also Steins, 2000 and Wunderlich, 1996 for reanalyses of 'inverse' patterns in Georgian and Kiowa based on additional empirical data). In the network we want to focus on thorough analyses of broader, representative fragments of morphological systems, especially in a wide variety of Non-Indoeuropean languages. A further empirical focus is to extend analyses to language (or dialect) groups which exhibit microvariation in morphological exponence along the lines of Lakämper and Wunderlich (1998) because this promises important evidence on the fine structure of morphological exponence. A second important source of microvariation in exponence are different historical stages of languages (Fischer, 2002, 2006; Fuss, 2004; Raffelsiefen, 1999). Finally, we want to focus on the consequences of different possible segmentations. Thus Trommer (2003c) argues following Harris (1994) that a proper understanding of Spanish clitic clusters depends on segmenting sequences such as *lo*, traditionally taken as a single 3sg masc clitic into a clitic stem *l* and a gender marker *o*. Müller (2006) shows that 2sg *-st* in German actually consists of the number marker *-s* and the general [-1] marker *-t* with crucial consequences for the status of person syncretism in the language.

2.1.4 Practical Goals

- We plan to document the results of the network in two edited volumes, one summarizing the current state-of-the-art in research on exponence, and one presenting new perspectives on exponence developed in the course of the network.

- Together with the state-of-the-art volume we want to create an online encyclopedia documenting the crucial concepts and research results in this area. This project is especially important since currently such resources are only available in a rudimentary and theory-dependent manner (cf. e.g. http://ling.kgw.tu-berlin.de/call/webofdic/morph.html and http://www.ling.upenn.edu/~rnoyer/dm/).

2.1.5 Identity of Exponence

Syntagmatic Identity: Copies   We want to pursue two hypotheses substantially restricting possible copy processes.

First, we assume that affix repetition and reduplication are basically the same type of operation: morphological copying. Evidence for this hypothesis comes from the fact that appearance of different allomorphs found in several reduplication cases discussed by Inkelas and Zoll (2005) is also a typical property of affix repetition (cf. Breton *bag-ou-ig-ou*, boat-PL-DIM-PL, 'small boats' with *paotr-ed-ig-ou*, boy-PL-DIM-PL, 'small boys' where repetition of the plural marker is achieved by two different allomorphs, *-ed*, which occurs only adjacent to an animate noun root, and the default allomorph *-ou*; Stump 1990). Interestingly there are also cases where reduplication seems to be triggered by purely phonological constraints (e.g. in Cantonese loanword adaption illicit onsets as in English *blood* are broken up by reduplication: *pat.lat*, Yu 2005), and at least one analogous case of affix repetition: Bickel et al. (2005) argue that in the Khiranti language Chintang, affix repetition is triggered by a prosodic minimality requirement.

Second, we hypothesize that copying, especially affix repetition and redundant exponence are generally triggered by external factors, either by (morpho-)phonological wellformedness constraints or the requirement to realize the same features in different relevant morphosyntactic domains (e.g. derivation, inflection, clitics). We expect that the formal nature of external triggers and the semantics of the morphological categories involved (affix copying often involves plural marking, reduplication often marks intensive action, and similar notions) explains important differences between different types of copying.

To test these hypotheses we want to look at a much broader survey of affix repetition, and similar phenomena. Together with a further investigation of morphological constraints on reduplication which often targets specifically roots (Nelson, 2003), this promises also a deeper understanding of how far roots and affixes exhibit substantial differences with respect to copy processes. A better understanding of copy phenomena has also important consequences for zero exponence, since copying is often assumed to be triggered by a specific type of zero affix (section 2.1.8), and allomorphy phenomena which have recently be reanalyzed as (arbitrary) copying processes (Müller 2006, cf. section 2.1.7).

Paradigmatic Identity: Syncretism

We want to address two crucial questions regarding syncretism:

First, we want to investigate whether metaparadigmatic syncretism has significantly different properties from other cases of syncretism, e.g. whether metaparadigmatic syncretism is more restricted in the range of categories it can relate than more spurious syncretism. An important empirical aspect is the problem to distinguish metaparadigmatic syncretism from simple syncretism which is obscured by morphophonology. Thus Baerman (2005) cites the contrasts *-mpi/Ø* and *-nti/Ø* in Tiwi as a case of metaparadigmatic syncretism. However *mpi* and *nti* differ phonologically only by the fact that the consonants are labial in *mpi* and coronal in *nti*. Thus an analysis where syncretism is due to the same morphological exponent in both cases and in which the difference follows from a floating labial morpheme also seems to be plausible. Crucially, the status of syncretism here is connected to the treatment of allomorphy in this language and more generally. The null hypothesis here is that (apart from phonological syncretism) *all* syncretism is systematic (Müller, 2002).

Second, we want to explore the hypothesis that data like the orthogonal syncretism in Dhaasanac (cf. section 1.1.1) do not provide genuine counterevidence to the claim that syn-

cretism is always due to natural classes, but are due to a phenomenon familiar from direct-inverse marking in Algonquian languages (Bickel, 1995; Zúñiga, 2002; Alexiadou and Anag-nostopoulou, 2006). For example in the Central Algonquian language Menominee (Bloom-field, 1962), transitive forms with specific subject - object combinations (1st/2nd person - 3rd person proximate, 3rd person proximate - 3rd person obviative, 3rd person obviative - inani-mate) are marked by the direct marker *-a:*. Transitive forms with the converse types of subject and object bear the inverse marker *-eko*. Technically, the inverse marker (as well as the direct marker) cannot be captured by a natural class of simple features since the object can have any person value and be proximate or obviative as long as it is animate and the subject can be of any type as long as it is not 1st or 2nd person. A structure such as [+Subj +3][+Obj +animate] would not exclude forms with proximate subjects and obviative object. However, there is a widespread agreement that inverse marking is not arbitrary syncretism, but signals a marked constellation of the subject-object relation. This is implemented in Wunderlich (1996) by re-lational features which refer to a prominence hierarchy (1st/2nd person $\succ$ 3rd proximate $\succ$ 3rd obviative $\succ$ inanimate), in Trommer (2003b, 2006b) by preference constraints linked by a constraint schema to this type of hierarchy, and in Stump (2001) by introducing the feature MR for specific combinations of subject and object which is then spelled out by morphological rules. Thus in all these analyses, inverse marking is linked to an abstract characterization of markedness not directly corresponding to standard features of person, gender, etc. In Wiese (1999) and Trommer (2005b) it is shown that an explicit representation of markedness also governs central aspects of syncretism in German, e.g. the falling together of 1st and 3rd per-son forms and the neutralization of nominative and accusative (cf. Plank, 1991a and Noyer, 1992 for discussion of additional correlations of markedness and syncretism).

Problematic cases as in Dhaasanac seem to follow a similar pattern. Thus type B forms correspond roughly to marked feature combinations. Plural is the marked value for 1st person exclusive forms (type B), but unmarked for inclusive forms (type A, in fact there is no inclusive singular in the language). Similarly feminine gender is marked in the language (type B) while masculine is unmarked (type A). Other cases of syncretisms which apparently do not follow natural classes might be due to additional factors. Thus in Hua (Stump, 2001) problematic syncretism of 2sg/1pl forms goes hand in hand with a complex system of verbal ablaut showing a very different paradigmatic distribution and allowing for example to differentiate 1st, 2nd and 3rd person singular. Hence the suffix syncretism can only be properly understood in relation to this morphological subsystem which might ultimately account for the patterning of 2sg and 1pl.

Many other problematic cases of syncretism seem to be due to inflectional classes (Alex-iadou, 2004) and open to an analysis which decomposes class membership into more atomic features, an approach motivated in Müller (2003a,b) and Alexiadou and Müller (2004) for Rus-sian nouns, and in Trommer (2005c) for Amharic verbs. An additional factor are phonological restrictions on affix inventories. Thus German inflection seems to be restricted to maximally monosyllabic combinations of schwa, coronal and nasal consonants substantially restricting possible morphological distinctions. Phonological factors might also have played a crucial role in the development of the unusually complex system in Dhaasanac (Baerman, 2005).

The role of natural classes in syncretism is tightly linked to the question, whether syn-cretism which does not follow from the underspecification of visible exponence can generally be captured by mechanisms inducing zero exponence (e.g. by OT-constraints blocking specific exponents or by impoverishment rules in Distributed Morphology), or whether (additionally or alternatively) mechanisms of parasitic exponence (especially Rules of Referral) are necessary. These topics are further discussed below (sections 2.1.7 and 2.1.8).

2.1.6 Non-Identity of Exponence

Syntagmatic Non-Identity: Morphological OCP Effects   The central question we want to investigate in this area is whether there are specific morphological mechanisms enforcing non-identity. Our working hypothesis is that there are no such mechanisms and that apparent morphological OCP-effects follow either from phonological constraints or are due to more general morphological factors, especially to constraints on linear order.

Thus Grimshaw (1997) and Gerlach (1998, 2001) argue that cooccurrence restrictions on clitic combinations where both clitics would specify non-third person arguments follow from alignment constraints also governing the positioning of clitics. Trommer (2006d) proposes that suppression of cooccurring number suffixes in Dumi is triggered by a constraint on coindexation sequencing also crucial for affix order in the language. Other cases such as the ban on *le-lo in Romance (cf. section 1.1.2) might be directly triggered by the phonological OCP or similar phonological mechanisms. Crucially, we need much more empirically data from different languages to test the viability of this approach.

Romance clitic clusters also exemplify a second problem we want to address: the question what are possible strategies to avoid illicit syntagmatic identity. The processes actually achieving identity avoidance of *le-lo in different varieties of Romance (replacing one clitic by another one, or allomorphy, or deletion of a clitic) also relate identity avoidance tightly to other areas of exponence, especially syncretism (section 2.1.5) and allomorphy (section 2.1.7). Raffelsiefen (1999) shows that identity avoidance can also lead to paradigmatic gaps (section 2.1.8): Nominalizing -al cannot be attached to stems already containing l because this would violate a general phonological constraint against multiple identical liquids in a prosodic word (cf. deny ⇒ deni-al vs. appeal ⇒ *appeal-al).

A final question is in what domains identity avoidance holds. While it is often implicitly assumed that the relevant domains are relatively local (i.e. under adjacency, in the morphological word or the clitic group), Trommer (2005e) shows that the restriction against multiple items specifying the feature [+/-3] in Menominee holds across the morphological word and a (possibly non-adjacent) clitic group. Assuming that the relation of clitics and agreement is copying, this type of identity avoidance also has important repercussions for the understanding of syntagmatic identity (section 2.1.5).

Paradigmatic Non-Identity:
Polarity and Constraints on Paradigmatic Distinctness   An important goal of the network is to develop a better empirical and theoretical understanding of processes which have been categorized as polarity. We think that it is currently unclear whether morphological and morphophonological polarity really exist and want to investigate the hypothesis that apparent polarity can generally be reduced to standard exponence and independently motivated phonological processes.

Thus Lecarme (2002) shows that Somali plural formation is actually a derivational process, where specific plural affixes overwrite the gender of their base. However, every plural suffix consistently derives either feminine or masculine forms resulting in different allomorphs of the definite suffix. Cases of length polarity in Dinka and Nuer plural formation, where long vowels of singular forms get long in the plural and vice versa are restricted to apparently unpredictable lexical classes (Frank, 1999), but if the items undergoing length polarity have to be lexically marked, it is equally plausible that there are two classes, one marked for lengthening and one for shortening. Trommer (2006a) shows that almost all instances of tone polarity in Luo can be derived from independently motivated processes of final devoicing, intervocalic voicing

and a restriction against voicing domains crossing morpheme boundaries. Baerman (2006) also concludes, based on a different analysis of the data that apparent polarity in Luo is due to different independent morphophonological processes (cf. also de Lacy, 2002; Wolf, 2005). van Oostendorp (2005b) shows that a concatenative account of tone patterns in Limburg Dutch which are taken by Alderete (1999) as evidence for paradigmatic polarity is empirically and conceptually preferable. Finally, also for truncation processes the motivation for paradigmatic distinctness processes is questionable: Most truncation processes seem to be triggered by the requirement to adjust word forms to a prosodic template, where distinctness does not play any role (Benua, 1995; Lappe, 2003), and even the most convincing cases of non-templatic truncation in Tohono O'Odham (Papago) and imperative truncation in Hebrew seem to be in principle amenable to a purely phonological treatment. (Hill and Zepeda, 1998;Steins, 2000;Bat-El, 2002; cf. also section 2.1.8).

Also other processes which do not not strictly show polarity, but seem to involve non-distinctness conditions are not decisive. Fuss (2004) shows that distinctness in the evolution of agreement markers actually derives from a learning strategy maximizing specificity of affixal exponence. It is also unclear whether alternations of phonological exponence as in German ablaut haplology really require a morphological distinctness constraint, since an analysis representing umlaut as a floating feature also allows an analysis without reference to paradigmatic distinctions (see section 2.1.7).

2.1.7 Parasitic Exponence

Syntagmatic Parasitic Exponence: Allomorphy   While syntagmatic parasitic exponence is empirically dispensable we think that together with a restricted theory of possible morphological copy mechanisms, a model endorsing allomorphy and the claim that every feature can have at most one exponent predicts desirable substantial restrictions on the upper bound of possible redundancy in exponence (cf. section 2.1.5).

More generally, we think that assuming allomorphy is justified if this leads to valid empirical generalizations which cannot be captured otherwise. Thus Bobaljik (1999) observes that context restrictions in Itelmen allomorphy obey specific locality and directionality conditions not expected in a theory without different types of exponence (see also Trommer, 1999b; Carstairs-McCarthy, 2001; Harbour et al., 2001; Carstairs-McCarthy, 2001; Harbour et al., 2003). Similarly, in most current models of morphology which assume allomorphy, there seems to be an implicit assumption that for morphological rules or constraints only non-parasitic exponence is "visible". Thus context restrictions of affixes would be irrelevant for constraints on affix order or cooccurrence such as constraints requiring identity avoidance (Trommer, 2003c,f, 2006d, 2003a), and it is predicted that for a given exponent exactly the same features should be (ir-)relevant for locality conditions, linear ordering and cooccurrence. Hence, we want to pursue the working hypothesis that allomorphy is a real phenomenon and want to come to a better understanding of how far these general correlations hold.

Further we want to explore to which degree readjustment and similar phenomena can be eliminated. Wiese (1994b) explicitly argues that ablaut is not amenable to an analysis in terms of floating features. However this is not obvious given that ablaut seems actually to be highly regular (Wiese, 2004, 2006a). Assuming that roots can be lexically listed with class features (Müller, 2003a,b; Trommer, 2004), the vowel in *finden/fand* can be analyzed as two floating allomorphs realizing a set S of class features where *a* is restricted to the context [+past] and *i* is the default realization of S. Phonologically, vowel quality is then associated with the final vowel slot in the same way as [-back] umlaut. Crucially, under this analysis readjustment is

reduced to allomorphy and feature floating. In principle the floating vowel qualities of ablaut could also be uninterpretable features associated with the functional projection, in this case the [+past] tense head which is realized by different vowels in the context of different roots. This would also allow to capture haplology as in the *rat/rät* case by a constraint which requires that each morpheme be expressed by at least some material specific to this morpheme (cf. MORPHDISF in de Lacy, 2002). In *rät*, the [-back] feature of the ablauting vowel quality would satisfy this constraint and allow (phonologically preferred) fusion of suffixal and root-final *t*, while *in jätet* fusion is avoided since the vowel quality is part of the phonological correlate of the root. Although vowel alternations can be amended to a treatment where phonological adjustment is actually primary exponence and standard allomorphy exponence, there are other cases which seem to be much harder, e.g. morphologically conditioned shortening of vowels as in Hungarian, where final long vowels of certain nouns are shortened in specific affixed forms (e.g. *madaar*, 'bird' ⇒ *madar-ak*, 'birds' vs. *tanaar*, 'teacher' ⇒ *tanaar-ok*, 'teachers'). Siptár and Törkenczy (2000) discuss two possible analyses, one where shortening is triggered by morphological context, and one where it is triggered by vowel-initial suffixes. The first analysis is a a variant of readjustment, but the second one has empirical problems. Wunderlich and Stiebels (1999) suggest a solution based on the idea that the types of stems and affixes undergoing vowel shortening have underlyingly complementary deficient phonological structure which however requires the assumption of lexically listed stem allomorphs differing only minimally by mora association (e.g. *madaar* has one allomorph, where 2 moras are linked to the second vowel, and one where one mora is linked to the vowel and there is an additional floating mora).

Many cases of apparent readjustment might also be captured by cophonologies (Inkelas et al., 2004). For example, Raffelsiefen (1999) shows that the alternation between adjectival *-al/ar* (*tradition* ⇒ *tradition-al* vs. *pole* ⇒ *pol-ar*) which is not a general phonological process of English (cf. the discussion of nominal *-al* in section 2.1.6) follows from a ranking of phonological constraints specific to derivations with this affix. Hence a crucial point is to determine the borderline between exponence and morphologically restricted phonology.

Apart from eliminating readjustment we also propose to restrict allomorphy to morphosyntactic features. This means that apparently phonologically conditioned allomorphy must be derived phonologically along the lines of Kager (1996). In fact one of the cases cited by Paster (2005) as problematic for this approach, Kimatuumbi is probably better analyzed as a case of prosodic morphology: All perfective stems are minimally trisyllabic and involve a penultimate syllable containing *i* and a final syllable containing *e* which is achieved either by merging affixal *i* with the stem-final vowel and suffixing *e* or by suffixing both vowels and inserting an unmarked stop (*t*) to avoid hiatus. For Zuni, the word initial syllable also bears main stress. Assuming that inserting a glottal stop (*li-ʔ* in *li-ʔ.leʔ*) maintains the sonority contour of an open syllable in the base (*li*) more faithfully, appearance of *-ʔleʔ* can be interpreted as higher-ranked faithfulness for syllable contours (Steriade, 2006) in a more prominent position (an instance of 'positional faithfulness'; Beckman, 1998) outranking preference for *-nne* elsewhere which might be motivated by avoidance of codas (*-ʔleʔ* induces two codas, *-nne* only one). Moreover there are cases where allomorphy is clearly related to specific phonological constraints in a language. Thus the alternation between *-al* and *-ar* in adjective formation (e.g. *tradition* ⇒ *tradition-al* vs. *mole* ⇒ *mol-ar*) is clearly related to the general ban against multiple identical liquids in English, a correlation which is lost under a subcategorization analysis (Raffelsiefen, 1999) .

Especially interesting for the project are cases where allomorphy is partially determined by morphology and partially by phonology, as for Hungarian 2sg agreement allomorphy: The

suffix *-(V)l* is restricted in present indicative forms to verbs ending in a sibilant (e.g. *föz-ö-l*, 'you cook'), while for other verbs *-sz* is used (e.g. *lát-sz*, 'you see'). In past tense forms, *-(V)l* is used throughout (e.g. *föz-t-é-l*, 'you cooked').

Paradigmatic Parasitic Exponence: Directional Syncretism   Since there seems to be no type of syncretism which cannot be captured by Rules of Referral, the implicit claim of a framework incorporating this device is that a theory of syncretism must be able to capture any conceivable syncretism. Empirically, this would be justified by cases of syncretism which apparently cannot be captured by natural classes and/or zero exponence (Stump 2001;Baerman 2005;). However, Wunderlich (2004a) shows that a number of patterns which seem to require directional syncretism can be captured by an analysis based on natural classes, and many other cases seem to involve natural classes involving markedness (see section 2.1.5). Thus the question whether directional syncretism is necessary is open and a central topic of the project.

2.1.8   Zero Exponence

Syntagmatic Zero Exponence: Zero Affixes   We want to explore the hypothesis that zero exponents exist but are highly restricted. As a working hypothesis, we assume that exponents which are filled at a lower level cannot be empty at a higher level, i.e. phonetically contentful affixes must also have content phonologically and morphologically, and phonologically non-empty affixes must also have morphological content even when they are phonetically empty. Additionally, we take it for granted that exponents with morphological content must also have some phonological content. These assumptions basically allow only two types of empty affixal exponents: exponents which are phonetically empty, but have phonological and morphological content, and exponents which are empty phonetically, phonologically, and morphologically.

There is good evidence for both of these types of zero exponence. With regard to phonetically empty affixes, van Oostendorp (2005a) shows that in certain Dutch dialects 1sg agreement is marked by a suffix which is phonetically empty, but acts in every respect as a vowel for phonological factors such as final devoicing and conditions of syllable structure. Exponence which is empty at all relevant levels (phonetics, phonology and morphology) corresponds to rules and constraints widely used in different frameworks, such as impoverishment rules in Distributed Morphology, and constraints requiring non-realization of specific features in constraint-based approaches to morphology, e.g. the constraint blocking expression of objects in specific contexts in Lakämper and Wunderlich (1998) or impoverishment constraints in Distributed Optimality (Trommer, 2003c). Also Word-and-Paradigm approaches allow mechanisms which seem to be equivalent to zero exponence at all levels: word formation rules which do not involve phonological modification of the base (Spencer, 1991:218), and different modes of rule application in Stump (2001). Finally, also underspecification of rules or vocabulary items (Halle and Marantz, 1994) can lead to zero exponence of this type.

On the other hand, other types of zero exponence seem to be theoretically questionable. Especially, zero affixes with the capability to trigger vowel change processes are susceptible to an analysis where 'vowel change' corresponds to primary exponence involving floating features (cf. section 2.1.7). Eliminating this type of zero exponence and readjustment-type allomorphy is a promising convergence point for apparently different areas of exponence.

Further restrictions on zero exponence might be due to the content of specific morphological categories. For example Greenberg (1963) observes that there is a crosslinguistic asymmetry in zero exponence between nominal singular and plural marking (cf. also Haspelmath, 2006), and as noted in Trommer (2002), zero exponence for agreement is common, but hardly

attested for lexical roots and other semantically contentful categories such as negation.

We also want to investigate other important connections of zero exponence to different areas of exponence. To which degree zero exponence blocks non-zero exponence depends essentially on the status of primary and secondary exponence. Since zero exponence is also context-dependent in many cases, zero exponence often functions as a type of allomorphy (cf. section 2.1.7). Exponents which are phonologically visible but phonetically empty might well account for many aspects of non-concatenative morphology. Thus in McCarthy and Prince (1995) reduplicants are interpreted as phonologically empty morphemes. de Lacy (1999) argues that in Maori fusion of zero morphemes with phonological material of a base while phonetically invisible leads to morphological realignment of phonological material resulting in a prosodic lengthening effect. A further domain which is potentially connected to zero exponent is subtractive morphology. For example, for Tohono O'odham (cf. section 2.1.6), where specific participle forms of verbs are derived by dropping a final vowel, we might assume that there is an affix consisting of a phonetically empty segment which obligatorily fuses with the base. If the phonological and phonetic specifications of the affix segment prevail, subtraction emerges. Zero exponence thus can potentially replace paradigmatic identity avoidance as a source of non-concatenative morphology.

Paradigmatic Zero Exponence: Paradigmatic gaps We want to approach ineffability in the most restrictive way currently available, the Null Parse approach. A crucial question we want to address is what exactly constitutes uninterpretability relevant for the Null Parse. The simplest approach is to identify uninterpretable forms with zero structure or forms which are not phonologically parsed into prosodic structure (Prince and Smolensky 1993; therefore the name "Null Parse"). While this solution works well to describe certain Morpheme Structure Constraints for short words, it does not work in more complex cases, where it is not so clear why we could not parse at least a part of the relevant structure. Thus the English comparative suffix *-er* can only be attached to Minimal Words of the size of one foot. For an input such as {*violet, er*}, the output $[(vio)_F (let)_F]$ should be in principle possible, since this is a well-formed structure elsewhere in the language, viz. in the simple form of the adjective; so it is not clear why the Null Parse would ever win (van Oostendorp, 2006). Prince & Smolensky also consider a second conception of uninterpretable forms namely forms which are not assigned morphological structure. However, given our understanding of exponence, morphological structure is prior to phonological structure (i.e. the output of morphology provides the input to phonological computation). Therefore phonological factors shouldn't be able to "destroy" morphological interpretation. Moreover, this approach seems to fit only cases where ineffability is due to phonological factors, but not instances where morphosyntax is involved. We want to pursue a third alternative, where uninterpretability is equated with defective feature structure. This can either be structure containing features without a value (van Oostendorp, 2006) or a feature structure with different conflicting feature values (Trommer, 2002).

A second important question is to which degree ineffability is due to arbitrary details of a given language, i.e. the lexical inventory or lexeme- or morpheme-specific constraints. Fanselow and Féry (2002) argue that these factors play an important role in paradigmatic gaps, but Raffelsiefen (2004) shows that at least some of the data they cite for word formation are not triggered by morpheme-specific constraints, but by morpheme-specific ranking of general phonological constraints, independently motivated for derivational patterns not involving gaps. Trommer (2002) shows that the distribution of ineffability in German Free Relative constructions is caused by general mechanisms of syncretism (namely the general syncretism of nominative/accusative in non-masculine DPs), not by the lexical inventory of morphemes.

More generally, we expect that the study of paradigmatic gaps leads to a better understanding of mechanisms also at work in other areas of exponence and requires only a minimal amount of devices specific to ineffability.

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