Concept Types and Determination

SEBASTIAN LÖBNER
Heinrich-Heine-Universität Düsseldorf

Abstract

The article offers a systematic account of four basic types of nouns, of four basic types of nominal determination and of the interaction of noun type and determination type. The four basic noun types are sortal, individual, relational and functional; they correspond to the four logical types ⟨e,t⟩, e, ⟨e,⟨e,t⟩⟩ and ⟨e,e⟩ on the one hand, and to four types of concepts on the other. The four basic types of nominal determination are singular definite, indefinite (a variety of determinations including simple indefinite), absolute and relative, where possessive determination is a combination of relative reference and possessor specification. Only inherently unique concepts are available for singular definite reference, only nonunique ones for indefinite use, only nonrelational concepts for absolute reference and only relational ones for relative use. However, determiners of each type can be combined with nouns of each lexical type: if the type restrictions are not met, the noun is shifted to an appropriate type. On this basis, congruent and incongruent determinations are distinguished. Statistical, typological and historical evidence is presented that corroborates the hypothesis that incongruent determination is a marked option and involves type shifts of the noun.

1 INTRODUCTION

This article is an attempt to present the outlines of a semantic theory of determination, based on the distinction of four basic conceptual lexical types of nouns: sortal, individual, relational and functional. It will be argued that the function of determination essentially is to form a sortal, individual, relational or functional concept on the basis of the lexical meaning of the CNP[1]—with the possible addition of further conceptual content. The lexical type of the noun and its type under determination need not match. On the contrary, determination can yield any type of NP concept from any lexical type of noun. Therefore, the focus of the theory will be on the interaction of lexical noun meaning with determination.

The proposal is confined to NPs in referential use, be it nonquantificational or quantificational, but it excludes predicative

[1] Following the convention in Abbott (2010), the term CNP—common noun phrase—is used for operands of determination.

and generic NPs. This is in line with the basic idea that the function of determination is essentially to fix the type of reference for the NP.

Another range of phenomena not to be focused on is nominal quantification proper. As I argued elsewhere,[2] neither definites nor indefinites constitute instances of quantification proper. There remains a very small range of quantifying determiners proper: those that correspond to the standard quantifications of predicate logic, that is, expressions for 'every', 'all', 'both', 'some' or 'no'.[3]

Thus, the scope of the article is restricted to indefinite, definite, relative and absolute determination with sortal, individual, relational and functional nouns in referential use. It is claimed that the theory holds for both explicit and implicit determination. Based on general notions of the conceptual type of noun and NP meanings and the role they play in reference, it applies to all languages. Whether "concepts" are considered cognitive representations or mathematical constructs is a foundational issue that by and large can be neglected here. The distinctions and observations discussed here apply to both approaches.

2 LOGICAL TYPES OF NOUNS: BASIC DISTINCTIONS

2.1 *Sortal, individual, relational and functional nouns and concepts*

Nouns, including pronouns and proper names, have lexical meanings of different logical types. The four basic types are sortal, individual, relational and functional:

- **Sortal** nouns are unary predicate terms, of type $\langle e,t \rangle$. They characterize their potential referents in terms of properties. Their meanings are sortal concepts. In a given context of utterance, there may be zero, one or more entities the noun denotes.

Sortal nouns constitute the prototypical subtype of nouns. They occur with all modes[4] of determination; they naturally take adjectives and attributes; they are syntactically simpler in that they do not need

---

[2] See Löbner (1985: §2, 1987: §2, 2000: §2) for the nonquantificational character of "particular" definite NPs in general, including plural definites; Löbner (1987: §3, 1990: §3) for the nonquantificational analysis of "particular" indefinites; Löbner (2000: §4) for a nonquantificational account of simple "characterizing" (generic) indefinites such as singular indefinites with indefinite article or bare plurals and mass nouns. The terms *particular* v. *characterizing* are used in the sense of Krifka *et al.* (1995).

[3] I use italics for quoting linguistic expressions, and single quotes for meanings and concepts; double quotes are used in the sense of 'what is called . . .'.

[4] By "modes of determination" I mean varieties, or types, of determination such as definite, indefinite, quantificational and so on.

complements such as possessor specifications. Sortal nouns include terms for natural kinds as well as for kinds of artefacts, but these are by no means the only lexical subtypes.

- **Individual** nouns are individual terms, of type e. They include proper names and personal pronouns, along with nouns for unique institutions in a context of utterance: *pope*, *US president*, *Georgia, weather* and *temperature*. Their meanings are individual concepts that assign a unique referent to every appropriate context of utterance.

Due to their inherent uniqueness,[5] the default use of individual nouns in argument position is singular definite; plural, indefinite and quantificational use requires special contexts.

- **Relational** nouns are binary predicate terms, of type $\langle e,\langle e,t\rangle\rangle$.[6] Their meanings are binary relational concepts, involving a further argument in addition to the referential argument. Relational nouns characterize their referents in terms of a particular relation to some other object. Since this object is usually specified by means of a possessive construction, we will call it the "possessor".[7] In the case of relational nouns proper, the characterizing relation is not necessarily to-one.[8] In a given context of utterance, and for a given possessor, there may be any number of potential referents, including none.

Examples of relational nouns proper include most kinship terms, terms for nonunique parts and a broad variety of deverbal nouns. Due to their lack of uniqueness, relational nouns proper occur with indefinite as well as definite determination, in singular or in plural (if

---

[5] I am not happy with the term *unique(ness)*, but there does not seem to be a better choice. In German, I would use the term *eindeutig*, which means something similar to *unambiguous*. A description is "eindeutig" if it can apply to only one case. A description is "unique" if there is just a single case it applies to, but there may be more such cases possible. In a given context, *girl with a red hood* may amount to a unique description because it may happen that there is exactly one such case in that context; but the description would not be eindeutig. *Pope* is eindeutig because the concept 'pope' is such that there can be only one such person. (Even at the times when there were two popes, each one claimed to be "the" pope.) Thus, "Eindeutigkeit" entails uniqueness but not conversely. I hope that the discussion will leave no doubt that the term *unique* is used here in the stronger sense of *eindeutig*. In Löbner (1985), I made a point of using *nonambiguous* or *unambiguous* instead of *unique*. In this article, I will often need a term for the opposite case; obviously, *ambiguous* would be misleading, and *nonunambiguous* a terminological monster.

[6] Relational and functional nouns of higher arity will not be considered here.

[7] Talking of the second argument as a "possessor" actually constitutes overgeneralization. Obviously, there are alternative means, in particular for deverbal nouns, but also for others (cf. English examples such as *ticket to Rome* or *desire for apples*).

[8] That is, injective, or right–unique.

they are count nouns). For referential use, the possessor argument needs to be saturated.

- **Functional** nouns are unary function terms, of type ⟨e,e⟩. Their meanings are functional concepts, involving one argument: the possessor. Functional concepts are restricted to a domain of appropriate possessors and of appropriate contexts of utterance. The value for a given argument, in a given context of utterance, constitutes the uniquely determined referent of the noun.

Functional nouns include relational role terms such as *mother*, *author* and *president*; terms for unique parts such as *head*, *top* and *cover*; and terms for abstract aspects, or dimensions: *age*, *size*, *price*, *meaning*, *name* and *odour*. They combine the nonprototypical features of uniqueness and relationality; they require saturation of the possessor argument and are predisposed for singular definite use.

The type distinction is relativized by polysemy: a noun represents a certain type only with respect to a given lexical reading. For example, *child* has a relational reading 'direct descendant of' and a sortal reading 'nonadult'; *moon* has an individual reading 'moon of the earth' and a relational reading 'natural satellite of'; *subject* can be a grammatical term (functional), it can mean 'member of a state' (relational) or 'individual, person' (sortal).

It is convenient to relate the type distinction to two binary features, [U] for inherent uniqueness and [R] for inherent relationality: sortal nouns are [–U][–R], individual nouns [+U][–R], relational nouns [–U][+R] and functional nouns [+U][+R]. These features are not meaning components in the sense of feature semantics but just descriptive abbreviations.

2.2 *Types are specified in the lexicon*

It is often argued that nouns of whatever subtype can be used for relative and absolute reference, and for unique and nonunique descriptions, whence their lexical type should be considered unspecific. I argue that these lexical types of nouns are distinct since they are defined in terms of logical types of concepts that constitute their meanings. They are as distinct as unary v. binary predicates, or predicates v. individual concepts in predicate logic. It is not possible to assign a meaning to a noun while leaving open the logical type. Uses that seem to contradict the type assignment, it will be argued, are enabled by type shifts.

There are only two ways to technically evade fixing a lexical concept type. One could assign every noun each of the four types, an option that is clearly psychologically unrealistic because it violates laws of economy. Alternatively, one might try to arrive at a uniform type by assuming general underdetermination. If inherent uniqueness is left open, the resulting superclasses would be sortal and relational. If in addition the relationality distinction is left undetermined, the result is relational. Thus, an underdetermination account would end up with "relational noun" as the only type, which is certainly not the universal type of noun.[9]

2.3 *Uniqueness is a semantic property of individual and functional nouns*

To see the difference between sortal and individual nouns, let us consider a minimal pair in Japanese: *kare* ('he') v. *otoko* ('male human'). *Kare* is a third-person singular pronoun exclusively used for male persons. The use of pronominal *kare* is definite, either deictic or anaphoric. *Kare* carries a sortal specification 'male person', but it is primarily an individual concept: the expression is used as though this sortal description were uniquely specifying one referent in the given context of utterance. The noun *otoko* has the same sortal content, but it can be used indefinitely or definitely. Thus, the meanings of *kare* and *otoko* differ only in that the former constitutes an individual noun and the latter a sortal noun. This minimal pair illustrates that the difference between individual and sortal concepts is not a matter of descriptive content but a matter of concept type as such. The logical meaning representations would be:

(1) a. *kare* $\iota x\ (\mathrm{person}(x) \wedge \mathrm{male}(x))$
     b. *otoko* $\lambda x\ (\mathrm{person}(x) \wedge \mathrm{male}(x))$

Proper names, another group of individual nouns, carry the sortal specification that the name of the referent is that word; further sortal information can be part of the meaning, such as 'female person'. The crucial point about proper names, again, is that they are definite in referential use. Thus, a logical representation of the female proper name *Kim* would be:

(2)   *Kim* $\iota x\ (\mathrm{person}(x) \wedge \mathrm{female}(x) \wedge \mathrm{name}(x) = [\mathrm{kim}])$

---

[9] See also the remark on the asymmetry among the four types at the end of section 4.4.

Individual nouns other than proper names and pronouns can be classified into subtypes: role terms (*US president*, *pope*), terms for institutions (*catholic church*), terms for unique objects (*sun*, *moon*, *earth*) or singular events (*World War I*); also, abstract terms for certain aspects of the "world" such as "date", "temperature" (in the sense of 'temperature of the air'), "weather" and so on. The referent of an individual noun depends on the context of utterance, including a time index, a location index and a constellation of facts (i.e. a "world" in the sense of possible world semantics). The range of indices for which an individual noun refers to a particular entity may vary widely. Some have almost globally uniform reference (*US president*, *Ghana*), while others like *mosque*, *station*, *exit* and so on have a particular referent only in smaller domains. For such individual nouns, the index for fixing the unique referent has to be determined more precisely. Proper names, in particular given names, have a small range of uniform reference. This does not contradict the assumption of semantic uniqueness of proper names since uniqueness is relative to a given context of utterance. The crucial difference between [+U] and [−U] nouns is this—unique nouns "say": this is the description of the referent, in the given context of utterance there is exactly one that fits it. [−U] nouns say: this is the description of the referent (it need not be unique).

For certain subtypes of [+U] nouns, uniqueness is due to their descriptive content. For example, terms for concepts such as 'age', 'temperature' (in the general, functional sense) and 'shape' are semantically unique because for logical reasons an entity can have only one age, temperature or shape. Equally, role concepts such as *president*, *pope*, *dean* and *father* define their potential referents in terms of characteristics that entail that they can apply to only one individual.

A frequent objection to the approach taken here is that for any noun that is supposed to be semantically unique there are contexts of utterance where the uniqueness can be cancelled, whence uniqueness should be considered a mere implicature or explained otherwise when it comes about. Matushansky (2008) argues that the lexical type of proper names is essentially ⟨e,t⟩ because this type fits the predicative and nondefinite uses of proper names;[10] the default uses of proper names in argument position carry an implicit definite article. My argumentation will be converse (section 6.2.2): proper names express individual concepts; they are lexically of type e. If they are used predicatively or

---

[10] For the sake of simplicity, I am disregarding the naming relation that Matushansky postulates as a further meaning component. The question of uniqueness is independent of this assumption. See Matushansky (2008) also for reference to further approaches that analyse proper names as not inherently unique.

with indefinite or quantificational determination, they undergo a type shift from type e to ⟨e,t⟩; if used with a definite article, the article is semantically redundant.

Certain subtypes of sortal nouns are frequently shifted to unique concepts:

(3) a. Beware of the dog! (written on a board attached to a garden gate)
     b. He brought his toothbrush.

The sortal concept 'dog' can be shifted to an individual concept for a dog that plays a certain role (pet, watchdog, etc.) in a particular range of contexts of utterance.[11] Similarly, sortal furniture terms like *table* and *bed* can be used for established unique reference in certain surroundings. 'Toothbrush' is a concept for a certain type of artefact with a purpose specified. Toothbrushes are mostly used by one person exclusively; this results in a mapping from toothbrushes to persons, whence sortal 'toothbrush' can be shifted to the functional concept 'the object with the sortal characteristics of a toothbrush which possessor uses to clean his/her teeth'. These particular shifts occur frequently with large classes of nouns and without drawing on particular contextual information. They interfere in a principled way with the lexical meanings of nouns that undergo these shifts.

2.4 *Relationality is a semantic property of relational and functional nouns*

The fact that [+R] is a lexical property of relational and functional nouns is well established (cf. Barker forthcoming). The crucial criterion is the presence of an additional "possessor" argument. Depending on the grammar of the language, specification of the argument may or may not be syntactically obligatory. In English, it is not, but there is a number of Native American languages, where it is (see sections 6.2.3 and 6.2.4). Even if possessor specification is grammatically optional, it is mandatory for semantic and pragmatic reasons. Possessor arguments need to be taken care of in one way or other, if not by explicit specification, then by mechanisms such as existential saturation, abstraction or possessor retrieval from the context.[12]

---

[11] See Gerland & Horn (2010) on "permanently established individual concepts".
[12] Partee (1997) argues that there are "intransitive" relational nouns, such as *stranger*, which do not allow possessor specification. If this claim is correct, for such nouns the possessor determination would always be pragmatic.

If a noun meaning provides for an additional argument, this is not just an additional lambda operator. The meaning also specifies a relation to the referential argument: there is a "lexical" possessor relation for [+R] nouns. For example, in *tooth of a dog*, the relation between the referent and the possessor is that the former is a tooth of the latter. For [−R] nouns, no predefined possessor relation comes with the meaning of the noun: *my stone* can mean 'the stone I am holding in my hand', 'the stone I threw', 'the stone I am carving', 'the stone I am sitting on', 'the stone I have been talking about' and so on. In view of the optionality of the possessor argument, the presence or absence of a lexically specific relation to possessor is a useful diagnostics for [+R] nouns.

The lexical relation given for [+R] nouns can be overridden by a pragmatically given relation (Partee & Borschev 2002). For example, "my tooth" could be a dog's tooth that I wear on a string around my neck. In such cases, a shift applies that derelativizes the noun by taking care of the lexical possessor argument; for example, the possessor argument of *tooth* in *my tooth* may be saturated existentially. The resulting [−R] concept is then added some contingent relation to the possessor [see (59) in section 6.2.4].

It has been observed that there are privileged relations for possessive uses of certain classes of [−R] nouns, in particular terms for artefacts. Using qualia theory (Pustejovsky 1995), Vikner & Jensen (2002) derive the general availability of certain readings from the lexical qualia structure. For example, *my book* lends itself naturally to the readings *the book I am reading* and *the book I wrote* because the qualia component specifies reading and writing as typical actions performed with books. Shifting such nouns to [+R] concepts (cf. the case of *toothbrush* mentioned above) is quite common. Although these shifts are very frequent, one would not assume that a concept such as 'toothbrush' involves an additional argument: reference to a "toothbrush" is possible without taking care of any possessor argument.

2.5 *Meaning and context*

I consider the meaning of an expression, for example, a proposition, as that which results from the application of regular semantic composition to lexical meanings and grammatical information. No extralinguistic information enters composition. The proposition of the sentence *I am tired* is the same, independent of the context of utterance. When an expression is uttered in a given context of utterance, its reference gets

fixed and it takes on utterance meaning. The utterance meaning of *I am tired* depends on the context of utterance.

As to the notion of context: '[n]othing short of an extremely comprehensive theory of linguistic communication could provide a general solution to the problem of context dependence', state Stanley & Szabó (2000: 220). So far, such a theory does not exist. It was stated above that the reference of individual and functional nouns depends on a time–location–world index. This is a necessary assumption, but an index still does not make up a full context. What is needed is a dynamic theory of context, where the context changes with every utterance as well as with the course of time and the development of facts. It is obvious that, for example, anaphoric definites can only be fully analysed in a dynamic context framework. DRT (Kamp & Reyle 1993) and dynamic semantics (Groenendijk & Stokhof 1991) are theories that cover some aspects. In addition, a theory of context must cover general communicational aspects such as the indication and negotiation of the relevant context among interlocutors. Gumperz's (1982) theory of contextualization takes initial steps in this direction. An interactional theory of context would also cover aspects such as topicality and salience.

3 TYPES OF NOUNS AND TYPES OF DETERMINATION (1): DEFINITE AND INDEFINITE

3.1 *Basic correspondences (1): uniqueness and definiteness*

The properties that distinguish the types of nouns, that is, uniqueness and relationality, correspond to types of determination and reference. Clearly, uniqueness is linked to definiteness, and relationality to possessive determination. However, the correspondence between noun type and modes of determination is not straightforward.

For the theory to be developed here, we first have to settle the question: Which modes of determination are "natural" with which types of CNPs? The second question will be: Which type of reference results from the application of certain determinations? By a "natural" case of determination, I mean a determination that operates on the CNP in its original lexical meaning without coercion. Later, we will refer to the "natural" cases of determination as "congruent determination" (section 5). In this section, I will restrict the discussion to uniqueness.

For [+U] CNPs, singular definite determination is the only type that is natural, as it is in harmony with the feature of inherent uniqueness.

For [–U] CNPs, there is a wider range of determinations, that is, all those that require, or at least admit, a number of cases other than one. These include the following:

(4) modes of determination that are natural with inherently [–U] CNPs

determination	examples in English
simple indefinite	*a(n)* N_{sing}, bare plural, bare mass nouns
unspecific indefinite	*some* N_{sing}
free choice	*any* N
negative indefinite	*no* N
contrastive demonstrative	*this*, *that* N_{sing}
interrogative	*which* N
plural	(plural)
numerical	cardinal numerals
quantitative	*many, several, some* (plural, mass), etc.
quantificational	*every*, *each*, *all*, *both*

Simple indefinite NPs have one referent when they are interpreted at the utterance level, but there may be a choice among several single cases to which the bare description would apply. Free choice, interrogative and contrastive demonstrative determinations involve the possibility of more than one case; negative indefinite determination of less than one. Plural NPs have one complex referent that is composed of possibly more than one single case. For indefinite plural NPs, there may be a choice among several complex referents. For definite plural NPs, the complex referent is unique. Particular quantificational determination involves reference to a complex domain, out of which nonunique cases are referred to.

Common to all types of determination in (4) is the fact that in the given context the number of single cases may not equal 1; this is why nonunique input is required. Independently, the output may be an NP with unique or nonunique reference. I will therefore distinguish between I(nput)-uniqueness and O(utput)-uniqueness: I-uniqueness relates to the uniqueness of the CNP, O-uniqueness to the reference of the NP.

(5) Input-uniqueness and Output-uniqueness

determination	I-unique	O-unique
singular indefinite	no	no
plural indefinite	no	no

plural definite	no	yes
contrastive demonstrative	no	yes
singular definite	yes	yes

It follows from these observations that if the CNP is just a noun, the determinations in (4) are natural with [−U] nouns, while singular definite determination is natural with [+U] nouns. This difference in terms of natural determinations adds essentially to the characterization of noun types in section 2.1.

3.2 *The function of determination (1): definite and indefinite*

The next step reverses the perspective of nouns and determination. We will analyse types of determination as operations on nominal concepts. The approach taken is a natural extension of the theory of definiteness developed in Löbner (1985). There it was proposed that definite determination is not only natural with [+U] CNPs but in fact the definite article has the function to indicate that the CNP is to be construed as a unique concept: reference with definite NPs is reference in terms of an individual or functional concept. The approach explains why [+U] CNPs go naturally with singular definite determination: their regular meanings are congruent with the concept type indicated by the definite article. Therefore, definite NPs with [+U] CNPs were called "semantically definite" in Löbner (1985). If inherently [−U] CNPs are used for definite reference, for example, in anaphoric use, the CNP concepts are enriched with contextual information in order to render the individual or functional concept required. These cases were called "pragmatically definite". The approach is based on three assumptions:

(i)   The type of reference of an NP token is defined in terms of a conceptual type.
(ii) Definite articles indicate the conceptual type of reference (as [+U]).
(iii) The token interpretation of the NP builds upon the lexical meaning of the CNP; if the concept type indicated by the article differs, the CNP concept is shifted to fit.

The theory of definiteness will now be extended to determination in general. The essential function of determination is to map its input CNP onto a specific conceptual type for reference. O-unique determinations map the input onto a unique concept, O-nonunique determinations map the input onto a nonunique concept and so on.

Using the O-characteristics of modes of determinations, we can set up the following initial table, arrows representing the mappings.[13]

(6) **determination**   **output**
    simple definite   →   [+U]
    simple indefinite,
    unspecific indefinite,
    free choice   →   [−U]

The only function of simple definite or indefinite determination is to fix the output type. The other cases mentioned in (4) involve additional steps. Demonstrative determination requires [−U] input to be mapped on [+U] output. Plural and quantitative determination requires [−U] input and maps it onto [−U] output with additional quantity specification.

(7) **determination**   **input**   **output**
    demonstrative   [−U]   →   [+U]
    plural, quantitative
    numeral   [−U]   →   [−U]

Plural definites result from two steps: first plural on a [−U] input, then definite determination:

(8) **plural definites**   **input**   **output**
    1. plural   [−U]   →   [−U]
    2. definite   →   [+U]

Quantificational determination is achieved by means of genuine (logical) quantifiers such as 'all', 'every', 'each', 'both' or with numerals or quantity expressions as "weak" quantifiers. Particular quantification involves reference to the domain of quantification, a totality of single cases. This is explicit in partitive constructions, for example, *some of* NP, and implicit if the CNP is directly combined with the determiner. Reference to the domain of quantification with count CNPs is plural definite (Löbner 2000: 258 ff.). The partitive construction partitions the domain into a set of cases for selection. Adding a quantificational, quantitative or numeral element selects cases out of the set, for predication. *Every* selects arbitrary individual cases out of the set; *all* selects arbitrary members of a cover of the set;[14] *three* selects three

---

[13] If there is no entry to the left of the arrow, this means that the mapping carries no input restriction. Equivalently, '→ [+U]' can be replaced by '[±U] → [+U]'.

[14] See Löbner (2000: §§3.3, 3.4) for the difference between "every" and "all" quantification.

arbitrary individual cases and so on. The total series of mappings involves four steps:

(9) **quantification**   **input**   **output**
1. plural $[-\text{U}] \rightarrow [-\text{U}]$
2. definite $\rightarrow [+\text{U}]$
3. partition $[+\text{U}] \rightarrow [-\text{U}]$
4. quantitative/numeral $[-\text{U}] \rightarrow [-\text{U}]$

Steps 2 and 3 together constitute the partitive component of particular quantification; their characteristics are $[-\text{U}] \rightarrow [+\text{U}] \rightarrow [-\text{U}]$. The $[+\text{U}]$ output of the first step corresponds to the "partitive constraint". The output of the second step, that is, of the partitive as a whole, is $[-\text{U}]$, reflecting the "anti-uniqueness" of partitives (cf. Barker 1998 for both observations, Chierchia 1995: §2 for the latter).

In addition to the type mappings, determiners or equivalent functional elements may carry further semantic or functional information such as classification, quantity specification or deictic distinctions.

3.3 *Explicit and implicit (in)definiteness*

Many languages do not mark simple definiteness and/or indefiniteness. In Dryer's (2008a) sample of 566 languages, 281 have a definite article distinct from demonstrative words or a definite affix on the noun, 55 use a demonstrative word as marker of definiteness and 230 do not mark definiteness. For indefiniteness, Dryer (2008b) states that out of 473 languages, 269 do not mark indefiniteness, 91 have an indefinite article different from the numeral for 1, 90 use this numeral as a marker of indefiniteness and 23 languages mark indefiniteness with a noun affix. Apparently, there are sufficient other means for deciding on the uniqueness of reference. Such means include information structure, as referential topics tend to be definite.

If languages mark definiteness or indefiniteness, marking is usually incomplete. English does not mark definiteness of proper names, nor indefiniteness for mass nouns and plurals. We consider cases where (in)definiteness is not marked, but reference is (non)unique for other reasons, as carrying (in)definite determination implicitly.

Plural is not universally marked either. For a sample of 291 languages, Haspelmath (2008) states that in 133 languages marking plural is obligatory for all (count) nouns, 40 languages have obligatory plural marking for animate nouns, in other languages plural marking is

optional for all nouns or for animate nouns; 28 languages totally lack nominal plural.

Among the other modes of determination mentioned in (4), numerical, quantitative, interrogative and negative determinations cannot be implicit because they all involve a further function in need of explicit expression. The same holds for contrastive demonstratives, which, in addition to unique reference, indicate a deictic distinction such as proximity v. distality, or relation to speaker v. addressee (Diessel 2008). Free-choice indefiniteness emphasizes nonuniqueness; such emphasis, too, needs explicit expression. Whether there are implicit quantifiers is a complex problem, connected to fundamental assumptions about semantics. Many analyses of, for example, plurals, generic indefinites or donkey sentences, are based on the assumption of implicit quantification. I consider such analyses as a deviation from the principle of compositionality (Löbner 2000: 269 ff., 280 ff.). In my view, quantification is necessarily explicit; for the constructions with "hidden quantifiers", in fact a nonquantificational account is adequate. Simple definiteness and indefiniteness present a choice between elementary types of concepts (basically IC and SC, respectively; see section 5.5). Compared to these standard determinations, quantification proper, terms of universal or existential quantifiers, is a heavy instrument that not only affects the type of reference of the NP but also the predicational structure of the whole sentence by imposing a second-order predication on it. It is plausible that such functions are in need of explicit expression.

To sum up, among the modes of determination mentioned in (4), simple indefiniteness (including nonspecific), simple definiteness and plural may be implicit. The assumption of implicit determination does not constitute a commitment to null determiners. The only assumption made here is that determination, that is, the reference type assigned to a given NP token, is not left open in communication: in other words, a referential noun token will be assigned either unique or nonunique, either relational or absolute reference, and in this sense "carries" a specific type of determination on whatever basis it is determined.

3.4   A criterion for definite determination

The fact that definite determination may be implicit calls for an independent test. Such a test can also be used for deciding on the nature of determiner elements whose function is still to be assessed. Lyons (1999: 15 ff.) cites four tests for (in)definiteness in English:

(10) a. subject of existential *there* constructions
      There was *a bottle* / **the bottle* rolling on the floor.
   b. ⌜adj *as* NP (*be*)⌝ constructions
      Clever as **a girl* / *the girl* is, she'll notice.
   c. certain predicative possessive constructions
      *A house / *the house* is mine.
   d. partitive constructions
      Some of **houses* / *the houses* are damaged.

These tests are basically heuristic in nature. It is not clear how the traditional characterizations of definiteness in terms of familiarity, uniqueness or inclusiveness would predict the behaviour of (in)definite NPs in such constructions. In addition, as Lyons (1999: §1.2.1, §6.2) points out, these criteria do not distinguish accurately between definite and indefinite NPs. Existential *there* constructions also exclude quantificational NPs with "strong" quantification such as 'all', 'every', 'both' or 'most'. The adjectival construction in (10b) allows for generic indefinites; the predicative possessive construction in (10c) is good with quantificational subjects (cf. *some of the houses are mine*); partitive constructions admit certain indefinite NPs. Also, the tests are more or less language specific.

The test proposed here directly derives from the analysis put forward: since definite NPs are of type e, their logical behaviour must be that of individual terms. The criterion was first proposed in Löbner (1985); Löbner (2000: 215 ff.) provides a comprehensive discussion. Basically, a natural language NP behaves like an individual term in predicate logic iff it does not exhibit a difference between Boolean sentence negation and predicate negation, or between Boolean sentence conjunction and predicate conjunction.[15] For a formal definition, let ⌜n + p⌝ represent the syntactic combination of an NP n and a predicate expression p, for example, a VP; let ∧ represent predicate conjunction and ¬ predicate negation.

(11) a. **negation condition**
      For the NP n and arbitrary predicate term p:
      ⌜n + p⌝ is false iff ⌜n + (¬p)⌝ is true
   b. consistency
      If ⌜n + p⌝ is true, necessarily ⌜n + (¬p)⌝ is false.
      Or: ⌜n + p⌝ and ⌜n + (¬p)⌝ cannot both be true.

---

[15] Boolean sentence negation yields a sentence with opposite truth-values; it is presupposition preserving. Boolean predicate negation yields a predicate with the same domain of application, assigning opposite truth-values for every argument. Boolean conjunction of sentences and predicates is defined analogously.

  c. completeness
   If $\ulcorner n + p \urcorner$ is false, necessarily $\ulcorner n + (\neg p) \urcorner$ is true.
   Or: $\ulcorner n + p \urcorner$ and $\ulcorner n + (\neg p) \urcorner$ cannot both be false.

Negation of a predication over a particular object is equivalent to stating the complementary predication. Negation of a predication with a nonunique argument term does not amount to a denial of a particular case. Let us assume that *leave* and *stay* are complementary predications:

(12) **negation test**
  a. Sue didn't stay. $\Leftrightarrow$ Sue left.
  b. neg (One man stayed.) = No man stayed. $\nLeftrightarrow$ One man left.

If Boolean sentence negation is available in the language considered, a sentence is false iff its negation is true; (11a) then means that sentence negation and predicate negation are equivalent, and conditions (11b) and (11c) break the equivalence down into the respective pair of entailments. Quantificational NPs of the type 'all', 'every', 'each', 'both', 'most', 'some' and 'no' all exhibit different truth–conditions for predicate ("internal") negation and sentence ("external") negation. "Strong" quantifiers, intuitively those that claim truth for more than half of the cases, fulfil the consistency condition but not completeness. Indefinites are inconsistent: in the same context of utterance both $\ulcorner n + p \urcorner$ and $\ulcorner n + (\neg p) \urcorner$ may be true. They are also incomplete: $\ulcorner n + p \urcorner$ and $\ulcorner n + (\neg p) \urcorner$ may both be false.

(13) a. **conjunction condition**
   For the NP n and arbitrary predicate terms p_1 and p_2:
   $\ulcorner n + (p_1 \wedge p_2) \urcorner$ is true iff $\ulcorner n + p_1 \urcorner$ and $\ulcorner n + p_2 \urcorner$ are both true.
  b. upward monotonicity
   If $\ulcorner n + (p_1 \wedge p_2) \urcorner$ is true, then necessarily $\ulcorner n + p_1 \urcorner$ and $\ulcorner n + p_2 \urcorner$ are both true.
  c. conjunctivity
   If $\ulcorner n + p_1 \urcorner$ and $\ulcorner n + p_2 \urcorner$ are both true, then necessarily $\ulcorner n + (p_1 \wedge p_2) \urcorner$ is true.

Intuitively, the conjunction condition holds for uniquely referring NPs because all tokens of such an NP in the same context refer to the same referent. If two predications are made in the same context using the same uniquely referring NP argument term twice, they amount to the conjoined predication over the argument. By contrast, tokens of a nonuniquely referring NP, even in the same context of utterance, may refer to different referents [cf. (14a) v. (14b)]:

(14) **conjunction test**

    a. Sue is blind and Sue is a spy.   ⇔ Sue is a blind spy.

    b. One man is blind and one man is a spy.   ⇎ One man is a blind spy.

Again, (13a) is the conjunction of (13b) and (13c). According to (13a), sentential conjunction is equivalent to predicate conjunction; (13b) holds if predicate conjunction entails sentence conjunction,[16] and vice versa for (13c). The condition of upward monotonicity is fulfilled by all NPs that are intuitively positive: simple indefinite, definite, demonstrative, lower bound quantitative and quantificational NPs, but not negative determiners or quantifiers of the 'no' or '(only) few' type. Consequently, this property does not distinguish indefinites from definites, unlike conjunctivity, which is fulfilled by definites, but not by indefinites.

Of all types of NPs, those expressing universal quantification ('all', 'every', 'each', 'both') come closest to fulfilling the logical criteria for uniqueness: they fulfil the two conjunction criteria and the criterion of consistency. The only condition they violate is completeness. Barwise and Cooper (1981: 183 f.) define definiteness by a criterion that is equivalent to the conjunction of the three criteria fulfilled by universal quantifiers.[17] Lyons (1999: 11 f.), too, considers the definite article essentially equivalent to *all*. This view is logically inadequate in that it disregards the fact that definite NPs, unlike universal quantifiers, fulfil the completeness criterion. Sentential and predicate negation coincides for definite NPs. It must be emphasized that this also applies to plural and mass definites. In these cases, Boolean negation yields an all-or-nothing contrast due to a presupposition of indivisibility (Löbner 2000: 239–51). The sentence in (15a) is true iff every single one of "the kids" is eating spinach, and it is false iff those kids are all not eating spinach, which is what the negation in (15b) expresses.

(15) a. The kids are eating spinach.

    b. The kids are not eating spinach.

---

[16] Upward monotonicity is usually defined as follows: if p entails p' then $\ulcorner n + p \urcorner$ entails $\ulcorner n + p' \urcorner$. This is equivalent to (13b): let n be upward monotone according to the usual definition; then, if $\ulcorner n + (p_1 \wedge p_2) \urcorner$ is true, $\ulcorner n + p_1 \urcorner$ and $\ulcorner n + p_2 \urcorner$ are both true since $\ulcorner p_1 \wedge p_2 \urcorner$ entails both p_1 and p_2. Conversely, let n fulfil the condition in (13b), and let p_1 entail p_2. Then, p_1 is equivalent to $\ulcorner p_1 \wedge p_2 \urcorner$. Therefore, if $\ulcorner n + p_1 \urcorner$ is true, $\ulcorner n + (p_1 \wedge p_2) \urcorner$ is also true, whence by (13b) $\ulcorner n + p_1 \urcorner$ and $\ulcorner n + p_2 \urcorner$ are true.

[17] According to Barwise and Cooper, an NP is "definite" if it denotes a principal filter.

It can be shown that for any referential NP that fulfils the four criteria, there is exactly one individual corresponding to it (Löbner 2000: 252), whence the NP refers uniquely.[18]

For a positive test of unique reference, all four criteria have to be positive; for a negative test, it is often convenient to just test consistency. The tests are most probably universally applicable. They are formulated in a way that does not presuppose grammatical means of Boolean sentence negation or Boolean sentence conjunction. Even Boolean predicate negation (which is probably universal) and Boolean predicate conjunction need not be available as general grammatical means. All one needs for the negation test is pairs of predicate expressions p and p' that are Boolean opposites. The conjunction test can be performed with triples of predicate expressions p, p_1 and p_2 such that p is the Boolean conjunction of p_1 and p_2, for example, for 'woman', 'person', 'female'.

There is a second class of NPs that fulfils the negation condition and the conjunction condition: characterizing NPs such as English generic bare plurals and mass nouns and simple singular indefinites (Löbner 2000: §4). The fact that the criterion is positive for both referential definites and characterizing NPs is of little harm since the distinction of these two types of NPs is easy enough. The common logical behaviour of characterizing NPs and definite NPs might be considered a motivation why in many languages, for example, French, characterizing NPs receive singular definiteness marking (Lyons 1999: 51).

Contrastive demonstratives, uncontroversially recognized as definite, seem to violate the consistency condition: for example, the sentence in (16) is not contradictory:

(16)   THIS man is dumb and THIS man isn't.

The sentence is not contradictory if one assumes that the two occurrences of *this man* refer to different men. If this is assumed, the context of utterance on which the reference depends changes in midsentence. After reference of the first occurrence is fixed, the context is changed to admit a new demonstration by which the reference for the second occurrence is fixed. The notions of logical entailment and logical equivalence are defined for one fixed context of utterance for the sentences involved: A entails B iff in every context of utterance, B is true if A is true. Thus, sentences like (16) do not show

---

[18] Therefore, definite NPs denote principal ultrafilters, rather than just principal filters (cf. Löbner 1987: 183 ff.)

that demonstrative NPs violate the consistency condition. Note that—if the reference of two or more occurrences of one demonstrative NP is fixed for the whole sentence—the criterion holds, along with the other definiteness criteria.

3.5 *Definite determination and unique reference*

Up to this point, it was assumed that a referential NP with definite determination refers uniquely. There are, however, apparent exceptions: indefinite NPs used for unique reference and NPs with definite article, but nonunique reference. One such case is German NPs with the superlatives *meist-* ('most') and *wenigst-* ('least'), which obligatorily contain a definite article, unlike their English equivalents.[19]

(17) Die meisten / die wenigsten Kinder sind infiziert. (German)
      the most   / the least   children are infected
      'Most / only very few children are infected.'

Another example is provided by German constructions denoting a half: ⌜*die Hälfte* + possessor NP⌝ or ⌜definite article + *halb*$_A$ + N⌝

(18) a. Die Hälfte der Besucher ist eingeschlafen.
         the half   of the visitors has fallen asleep
         'Half of the visitors have fallen asleep.'
      b. Das halbe Brot ist schon aufgegessen.
         the half   bread is already consumed
         'Half of the bread is already consumed.'

The half-constructions are inconsistent and hence do not refer uniquely: *die Hälfte der Besucher ist eingeschlafen und die Hälfte ist wach geblieben* 'half of the visitors fell asleep and half of the visitors stayed awake' is not a contradiction. NPs of the form ⌜*die meisten* N⌝ 'most N' are consistent, but violate the conjunctivity condition. ⌜*Die wenigsten* CNP⌝ 'only very few CNP' is not upward monotone: if there are only very few cases for which ⌜$p_1 \wedge p_2$⌝ is true, it does not follow that p_1 and p_2 each are true for only very few cases.

The discrepancy between what appears to be definite determination and actual logical properties can be explained away, if one observes that these constructions carry idiomatic meanings. German ⌜*die meisten* CNP⌝ constructions regularly receive the same interpretation as their English counterparts ⌜*most* CNP_{plur}/CNP_{mass}⌝. Likewise, the half-constructions in (18) receive the indefinite partitive interpretation of

---

[19] For a recent analysis, and a comparison with English, see Hackl (2009).

English ⌜*half of* NP⌝. Hence, these constructions simply are not definite. What these cases show is not that definite NPs may be used for nonunique reference; rather that idiomatic NP constructions containing a definite article need not carry definite determination.

As to the converse case, there is a way of using specific indefinites to the effect of unique reference. There is a special method of avoiding literal unique reference, but leaving it to a conversational implicature ('Oh, somebody has been indiscreet!' said in the presence of the one concerned, where everybody knows who is meant). Such uses of indefinites do not present mismatches between determination and reference, either. The indefinite NPs in these cases are used as for nonunique reference. Grice's maxim of quantity is violated, but overtly, for example, by looking at the person meant, and this triggers the conversational implicature that the speaker could as well have used a more precise, that is, unique description. Note that the special effect of insinuation only arises because the reference is literally nonunique.

In "configurational uses" (Löbner 1985: 304 ff.), definites are used although "objectively" there may be more than one single case:

(19) a. She put *her hand* on *his knee*.
      b. He was *the son* of a poor farmer.
      c. I do not want *my daughter* to marry *the lover* of *her sister*.

In such uses, relational, but not necessarily functional, nouns are used with unique determination—*hand*, *knee*, *son*, *daughter*, *lover*, *sister*—although in the situation given there may be, or even necessarily is (cf. the two daughters in c), more than one case to which the concept applies. In these uses an abstract type of situation, a configuration, is described, and reference by the relational nouns is unique relative to the abstract configuration.[20]

When we turn to possessive chains in section 4.3, we will encounter a different type of possible mismatch: possessive NPs with a definite article and an indefinite possessor specification, such as *the father of a girl*. Such NPs are indefinite although the Det element of the head NP is the definite article. As will be shown below, the compositional rules for such constructions regularly yield indefinite determination of the whole NP. Thus, again, there is no mismatch between determination and the type of reference.

As a result, we will assume that for referential NPs (in)definite determination does match with (non)unique reference.

---

[20] For alternative analyses of "weak definites" and "weak possessives", see Poesio (1994) and Barker (2004).

4 TYPES OF NOUNS AND TYPES OF DETERMINATION (2): RELATIONAL AND ABSOLUTE

4.1 *Basic correspondences (2): relational and possessive*

Relational determination links the referent of the noun to a possessor. For example, *my cousin* in argument use links the cousin to the speaker. Again, we distinguish between the I and the O characteristics of reference types. [+R] CNPs are natural with I-relational, [−R] CNPs with I-absolute determination. An NP with a possessor specification, such as *my cousin* in (20a), has O–absolute reference since the specification of the possessor by the possessive pronoun saturates the possessor argument.

(20) a. I met my cousin.
      b. I met a cousin.
      c. I met a logician.

Therefore, possessive pronouns are I–relational and O–absolute. By contrast, the determination of *a cousin* in (20b) is O–absolute and I–absolute. [+R] *cousin* is used absolutely; the lexical possessor argument of *cousin* must be saturated pragmatically; note that it need not be the speaker's cousin. Example (20c) is a case of I-absolute and O-absolute determination for a [−R] noun.

In the following, we need to distinguish between NPs and maximal NPs: a maximal NP is an NP that is not a proper part of another NP. In (21), *the father of a student* is a maximal NP, but neither *the father* nor *a student* is.

(21) The father of a student came to my office hours.

For maximal NPs in referential use, a basic constraint applies:

(22) **Absoluteness constraint on maximal NPs**
      Referential maximal NPs carry absolute determination.

The constraint derives from the simple fact that the utterance meaning of an NP cannot be determined as long as there is an open possessor argument. If the possessor is not explicitly specified, the possessor argument must be taken care of by some way of coercion.

In English there are three constructions that are I–relational and hence natural with [+R] CNPs: (i) possessive pronouns ⌜pronoun$_{poss}$ CNP⌝, (ii) the Saxon genitive ⌜NP$_{poss}$'s CNP⌝ and (iii) *of*–PP complements ⌜CNP *of* NP$_{poss}$⌝.[21] We will refer to the first two

---

[21] In addition, there is the "double genitive" construction (cf. *books of John's* or *books of mine*). I follow Barker (1998) in assuming that these are not possessive but partitive constructions.

constructions as left possessives, and the third as right possessive. While the pronominal construction is O-absolute, the two other constructions have an open NP$_{poss}$ position. Whether or not the result of filling this position is an absolute NP depends on the possessor NP: if it is relational, another possessor specification may be added to it, and so on.

(23) [R] characteristics of relational determinations in English

determination	input	output
possessive pronoun	[+R]	→ [−R]
Saxon genitive	[+R]	
of-PP	[+R]	

The subtypes of definite and indefinite determinations discussed in section 3 are indifferent to the [R] features. Maximal definite and indefinite NPs are absolute, but as nonfinal components[22] of possessive chains they are neutral. For example, *the father* as a maximal NP is [−R], while in *the father of a student* it is [+R].

4.2 *Explicit and implicit relationality*

Due to the absoluteness constraint, the matter of implicitness is different for the [R] feature. An NP carries relative determination if it denotes the possessum in an explicit possessor specification; else, its determination is absolute. Most languages do not mark absolute use by explicit functional elements (for exceptions, see section 6.2.4). But if we consider the lack of an embedding possessive construction as an overt, hence explicit, expression of absolute determination, it follows that along with relative and possessive determination, absolute determination is always explicit.

If a [+R] CNP is used referentially without a possessor specification, a shift to [−R] is coerced. This is not to be mistaken as implicit relationality because such NPs are used for absolute reference. [+R] NPs are systematically used without possessor specification in at least three cases. One is associative anaphora (see sections 5.2 and 5.3), the others are predicative possessive constructions (24) and external possessor constructions. The issue of implicitness is open for predicative possession:

(24) a. verbal: This word has a special meaning / has the
                        meaning 'rat'.
     b. prepositional: a word with a special meaning / a word with the
                        meaning 'rat'

---

[22] These "components" are not necessarily constituents (cf. the end of section 4.3).

If these constructions are used with [+R] CNPs, the verb *have* or the preposition *with* relate possessor and referent with the relation semantically defined. The underlying relational meaning is not suspended by coercion, although the NP comes with absolute determination.

In external possessor constructions, the possessor specification is not part of the NP referring to the possessum; hence, the possessum NP is absolute, but saturation of the possessor argument nevertheless makes use of an explicit possessor specification. In (25), the dative is construed as possessor specification.

(25) (German)
      Sie schüttelte   ihm   die Hand.
      she shook   him.DAT   the hand
      'she shook his hand'

4.3 *Possessive chains*

A possessor specification can be expressed by a determining element such as possessor affixes in Hungarian or possessive pronouns in English.

(26) Hungarian[23]
     a. a   könyv- em
        DEF book– POSS.1SG
        'my book'
     b. egy   könyv- em
        INDF book– POSS.1SG
        'a book of mine'

Alternatively, possessive constructions provide a possessor specification by a full NP. The two open possessive constructions available in English can be recursively iterated (cf. *my father's wife's mother's car* or *the car of the mother of the wife of my father*). They can also be mixed: *the car of my father's wife's mother* or *the car of the mother of my father's wife*. In all these variants, the logical order of the chain is: *car—mother—wife—father—(the speaker)*. Right possessives leave the determiner position of the head noun open; it is therefore available for definite or indefinite determination. This is not the case for left possessives in English.

---

[23] Glossing follows the Leipzig glossing rules, unless indicated otherwise (cf. http://www.eva.mpg.de/lingua/resources/glossing-rules.php)

A "possessive chain" consists of a head (denoting the possessum), a possessor specification and possibly recursively embedded further possessor specifications. We will investigate the question what the concept type is for a complete possessive chain, separately for the [U] feature and the [R] feature.

All nonfinal elements of the chain are [+R] because they carry a possessor specification. The last element in the chain must be [−R] in order for the maximal chain to fulfil the absoluteness constraint. If the [R] feature of any member of the chain is not semantically fulfilled, it is coerced. Obviously, all initial sections of a chain, except the maximal chain, are [+R], while the complete chain is [−R]. The compositional mechanism is this: when a possessor specification is added, its referential argument fills the possessor argument of the head (see the Appendix).

The [U] features of the NPs in a possessive chain can be chosen independently; there is no *a priori* value for any of the elements. Let us see what happens if a [±U] possessor NP is combined with a [±U] CNP. Of the possible four constellations, three yield the following picture:

(27) possessum   possessor   total
     the father [+U] of the girl [+U]   the father of the girl [+U]
     a friend   [−U] of the girl [+U]   a friend of the girl   [−U]
     a friend   [−U] of a girl   [−U]   a friend of a girl   [−U]

The father of the girl is definite, *a friend of the girl* is indefinite and so, of course, is *a friend of a girl*. These cases do not reveal, however, whether the determination of the total phrase results from forming the minimum of the two [U] values, or from applying the first determiner to the whole. Does the first determiner apply to the CNP with or without possessor specification? The critical case is a definite possessum CNP with indefinite possessor specification, like *the father of a girl*. The question can be decided by applying the consistency test: such NPs are inconsistent and hence indefinite. Consider, for example, (28) in the context of a teacher at a girls' school meeting parents during office hours; the sentence is not contradictory:

(28) The father of a girl left and the father of a girl came in.

As a consequence, the [+U] determination of a functional noun with possessor specification cannot be related to the whole NP, but only to the head noun itself. The definite article in '*the* CNP$_{functional}$ *of* NP' only indicates that the referent of the functional CNP is determined uniquely relative to the possessor. Consequently, the value of the [U] feature of an initial or complete possessive chain is the

minimum of all [U] values. Determination in the sense of (6) is strictly local: it applies only to the CNP immediately determined. It therefore makes sense to say that in a right possessive chain the first Det + CNP component is an NP that is combined with a possessor NP and so on, even if the first component is not a syntactic constituent of the whole.[24]

The considerations on the [U] and [R] features of possessive chains can be summarized as follows:

(29) **determination of possessive chains**
 For any possessive chain, initial or maximal,
 (i) the total [R] value is the minimum of the [R] values of the members of the chain, where initial chains are [+R] and maximal chains [–R] and
 (ii) the total [U] value is the minimum of the [U] values of the members of the chain.

The rules in (29) can be considered to hold also for [+R] nouns in absolute use, where a possessor specification is coerced. If such NPs carry definite reference, the implicit possessor must be [+U] in order to admit explicit [+U] determination for the NP. Thus, "the father" is always the father of somebody particular, given by an individual concept available in the context. By contrast, [–U] *a mother*, calls for possessor specification by a [–U] concept, for example, by existential saturation. With a [+U] possessor as in *a mother [of Liza]*, inherent uniqueness of 'mother' would have to be abandoned to yield [–U] for the whole; this would be a possible but pragmatically disfavoured option.

It follows from the rules in (29) that the combination of a [+U][+R], that is, functional, CNP with an [αU][βR] possessor NP is always [αU][βR]. In this sense, functional concepts are "transparent".

(30) **transparency of functional NPs**
 The type of a functional [+U][+R] NP with a possessor specification is the same as the type of the possessor specification.

We will see in the next subsection that (29) may interfere with a further constraint that applies to referential left possessives.

---

[24] Compare Barker (2004) for a proposal for a compositional treatment of this aspect of possessor constructions.

4.4 *Determiner possessives v. attributive possessives*

Lyons (1999: §3.3) distinguishes between "determiner genitives" and "adjectival genitives", for which I prefer to use the terms *d(eterminer)* and *a(ttributive) possessives*, respectively. As a cross-linguistic generalization, Lyons observes that d-possessives are in determiner position and impose definiteness on the possessum noun, while a-possessives are open to definite or indefinite determination (133 f.). Haspelmath (1999: 229 f.) shows that the crucial condition is in fact that the possessor specification be in complementary distribution with definiteness marking. An a–possessive construction is illustrated for Hungarian in (26). English left possessives are d-possessives; right possessives are a-possessives. For d-possessives, one has to distinguish between referential and predicative use.

The definiteness test proves that English referential left possessives are definite, if the possessor NP is definite. Possessive pronouns yield the same result.

(31) a. conjunction test:
 　　　The girl's brother is blind and the girl's brother is a spy.
 　　　⇔ The girl's brother is a blind spy.
 　　b. negation test
 　　　The girl's brother didn't stay. ⇔ The girl's brother left.

If the possessor NP is indefinite, the whole is indefinite. Replacing the right possessive in (28) by a Saxon genitive yields the same result: the sentence is not contradictory.

(32) A girl's father left and a girl's father came in.

These findings can be accounted for if we assume that, for some reason, referential left possessives impose [+U] on the possessum CNP and after this follow the rules in (29). This yields the following analyses for *the girl's brother*, *a girl's* father and *my book*, respectively:

(33) **possessum**　　　　**left possessive**　　　**possessor**
 　a. brother [−U][+R]　　's brother　[+U][+R]　　the girl [+U][−R]
 　b. father　[+U][+R]　　's father　[+U][+R]　　a girl　[−U][−R]
 　c. book　[−U][−R]　　poss.pron. [+U][+R]　　1SG　　[+U][−R]
 　　total
 　a. the girl's brother [+U][−R]
 　b. a girl's father　　[−U][−R]
 　c. my book　　　　[+U][−R]

The case is different for d-possessives in predicative use (see Holmberg 1993 for discussion and a syntactic analysis). Here, we can

apply a test similar to the consistency test. If the predicative NP is [+U], that is, of logical type e, a copula construction with a definite subject NP amounts to an equational statement. If the predicative NP is [−U], that is, of type ⟨e,t⟩, the same construction amounts to a simple predication. The same predication may be true for two different arguments, but not the same equational statement. Applying the test to [−U] *brother* and [+U] *father*, we obtain the following contrast:

(34) a. Art is my brother and Bart is my brother.
     b. Art is my father and Bart is my father.

If *father* in both occurrences is construed in the standard meaning, (34b) is contradictory, while (34a) is not. Obviously, in the predicative constructions left possessives do not impose [+U] on the possessum CNP; the [U] and [R] features of the whole chain derive immediately in accordance with (29). Note that the observation also applies to [−R] nouns:

(35) a. THIS is my book and THIS is my book.
     b. Béla is Hungary's greatest composer and György is Hungary's greatest composer.

The [−U][−R] noun *book* is coerced to [−U][+R], which according to (29) yields [−U][−R] with any possessor specification; (35a) is not contradictory. The superlative *greatest* shifts sortal *composer* to an individual concept [+U][−R]; the possessor specification imposes a shift to a functional [+U][+R] concept ('greatest composer of'); with the [+U][−R] possessor specification, the result is [+U][−R]; that is why (35b) is contradictory.

The data for predicative d–possessives suggest that d–possessives as such should not be considered as imposing [+U] on the possessum CNP. The definiteness effect of referential d–possessives must be due to the fact that the whole NP is referential and the possessor specification blocks definiteness marking. Haspelmath (1999: 227) argues that the phenomenon is 'ECONOMICALLY MOTIVATED [...]: the definite article can be omitted because possessed NPs have a very high chance of being definite, for semantic and pragmatic reasons'. The effect can be captured by the following constraint:

(36) **definiteness constraint on referential determiner possessives**
     In a referential possessive chain, a CNP element with a possessor specification in complementary distribution with definiteness marking obtains [+U] determination.

The constraint has the effect that the feature combination [+U] is imposed on the CNP together with [+R] by virtue of the possessive construction itself. Hence, the CNP is coerced to a functional concept.[25] The rules in (29) work out correctly, if the [+U] feature imposition according to the definiteness constraint applies first [cf. example (33)].

The findings in sections 3 and 4 show that there is an asymmetry among the four types of nouns and CNPs: there often are determiners for simple indefinite, definite and personal possessive determinations. Assuming the absoluteness constraint (22) and the definiteness constraint (36), these three elementary types of determination are in harmony with sortal [−U][−R], individual [+U][−R] and functional [+U][+R] nouns, respectively. There is, however, no simple type of determination in harmony with relational [−U][+R] nouns proper.[26]

5 CONGRUENT v. INCONGRUENT DETERMINATION

5.1 *(In)congruence of CNP type and determination type*

We have established in sections 3 and 4 that certain modes of determination require certain types of CNPs. We will now introduce the distinction between "congruent" and "incongruent" determination. One-step determination, for example, simple indefinite and simple definite determination, is congruent if the determination does not change the concept type of the CNP; multiple-step determination is congruent if the CNP satisfies the input type requirement without coercion.

Table 1 shows which modes of determination are congruent, or incongruent, with which types of nouns; the results carry over to CNPs. The table refers to nouns since the determinational properties add to the characterization of the four noun types. Congruent determinations are marked with ✔, incongruent ones with ↱. For the sake of brevity "Indef." is used for subsuming simple and unspecific indefinite, free choice, negative and interrogative; "Plural" is short for plural, numerical and quantitative [cf. (4) above].

Incongruent determination always involves coercion. Since the coercion operations always consist in a change of conceptual type, they will be referred to as "type shifts". Coercion causes higher semantic

---

[25] For an elaborate discussion of alternative compositional accounts for determiner possessives, see Dobrovie-Sorin (2004); also Jensen & Vikner (2004).

[26] The asymmetry parallels the system of three main cognitive-ontological classes discussed in Fraurud (1996), viz. individuals, functionals and instances (sortals).

	[−U]	Inherently unique [+U]
[−R]	**SORTAL NOUNS** *stone book adjective water* ✔ Indef., Plural, quantif., dem. ↱ singular definite ✔ absolute ↱ relational, possessive	**INDIVIDUAL NOUNS** *moon weather date Maria* ↱ Indef., Plural, quantif., dem. ✔ singular definite ✔ absolute ↱ relational, possessive
[+R] inherently relational	**RELATIONAL NOUNS** *sister leg part attribute* ✔ Indef., Plural, quantif., dem. ↱ singular definite ↱ absolute ✔ relational, possessive	**FUNCTIONAL NOUNS** *father head age subject* (gramm.) ↱ Indef., Plural, quantif., dem. ✔ singular definite ↱ absolute ✔ relational, possessive

Table 1   Four types of nouns and their respective congruence with modes of determination

complexity; consequently, the theory presented here predicts that incongruent determination will be distinguished in several ways.

(37) **general tendencies of incongruent determinations**
  a. Incongruent determinations are less frequent.
  b. Incongruent determinations receive more salient expression, such as strong v. weak marking, marking v. nonmarking, additional morphemes.
  c. Incongruent determinations require contextual support; they often draw on nonlexical information.

Evidence for (37a) is presented in section 6.1. For (37b), there are cross-linguistic data that will be discussed in section 6.2. Example (37c) has been touched on in sections 2.3 and 2.4, and will be concretely illustrated in the discussion of the example to follow.

In Löbner (1985), I introduced the terms 'semantic' and 'pragmatic definites' for the distinction between congruent and incongruent definites. In the present framework, I prefer to use the terms 'semantic' v. 'pragmatic uniqueness' for NPs that are [+U] for semantic reasons v. being coerced by determination.

5.2 *Example*

An example will illustrate the interaction of CNP type, determination and context. Referential NPs are in italics; incongruent determination is in addition marked by bold type.

(38) There she read about *a man* who had been discovered after
spending *two thousand years* in *a peat bog* in *the Netherlands*. ***A
photograph*** appeared on ***one page***. ***The man***'s brow was furrowed,
but there was ***a serene expression*** to *his face*.[27]

The interpretation of *she* cannot be reconstructed here because the
preceding text is not included. It is used anaphorically, referring to the
main character of the story, a woman named Sandy. Thus, the lexical
concept 'she', essentially 'ıx (person(x) ∧ female(x))', is substantially
enriched by the information compiled about the character in the
preceding part of the story. *There* in the first sentence refers to a certain
place in a book with the title *Mysteries of the Past*, which Sandy has
picked up and opened to this place.

The noun *man*, 'male adult human', is sortal, that is, [–U][–R]; the
indefinite article with the first occurrence indicates congruent
determination; the absolute use is congruent, too. Equally congruent
is the cardinal, absolute determination of sortal *year* in *two thousand
years*, and the singular indefinite, absolute determination of sortal *peat
bog*. *The Netherlands* is a proper name, [+U][–R], in harmony with
definite, absolute use.

By the end of the first sentence, an individual concept is established
of the content:

(39) 'man that Sandy read about there in that book with the title
Mysteries of the Past who had been discovered after spending two
thousand years in a peat bog in the Netherlands'

It uniquely determines a particular individual. Its inherent
uniqueness is due to the way in which the referent is linked to the
situation as it is described: in the given context, only one such man can
be meant.

The relevant reading of *photograph* is [–U][+R] 'photographic
picture of'. Singular indefinite determination is congruent, while the
incongruent absolute use coerces saturation of the possessor argument.
According to the type rules for relational nouns in (29), the possessor
specification might be [–U] or [+U] because both would result in
indefinite determination for the NP. The obvious choice is a [+U]
possessor specification retrieved anaphorically from the given context:
the possessor is construed as the unique referent of the concept in (39).
Application of 'photograph of' to this possessor yields the concept:

---

[27] From Carver, Raymond (2003), 'Preservation'. In *Cathedral*. Vintage. London. 32.

(40) 'photograph of the man whom Sandy read about there in that book with the title *Mysteries of the Past* who had been discovered after spending two thousand years in a peat bog in the Netherlands'

Similarly, the relational noun *page* is related to the book, yielding the sortal concept:

(41) 'page of the book with the title *Mysteries of the Past* where Sandy read about the man who had been discovered after spending two thousand years in a peat bog in the Netherlands'

Numerical indefinite determination of *one page* is congruent with the lexical type [–U][+R], the [–R] feature of absolute determination is satisfied by retrieving the possessor argument from context. The two NP tokens, *a photograph* and *one page*, are instances of indefinite associative anaphora: relational nouns in absolute use where the possessor required is construed as something uniquely determined in the preceding discourse.

The man in the third sentence carries incongruent [+U] determination, while the absolute use is congruent. A classical case of anaphora, the [+U] requirement is met by enriching the sortal concept 'man' with all the information accumulated for the referent of *a man* two sentences back, yielding the individual concept:

(42) 'man whom Sandy read about there in that book with the title *Mysteries of the Past* who had been discovered after spending two thousand years in a peat bog in the Netherlands and a photograph of whom appeared on one page of that book'

Brow is a body-part term of type [+U][+R]; its determination here is congruent. The type of the total possessive chain is [+U][–R], in accordance with (29) and the transparency of functional concepts, since *the man* is [+U][–R]. The same holds for *his face*. *Expression*, too, in the sense relevant here, is a functional noun, [+U][+R]. Its determination is incongruent [–U][–R]. Crucial here is the modification with the adjective *serene*; the adjective implicitly contrasts the actual value of the functional concept 'expression' with possible alternative values. The concept 'expression' is thereby shifted to a concept for the possible values of the function. This concept is sortal. In general, functional nouns can be shifted to sortal concepts that denote the values that the functions may take. This was observed by Guarino (1992) who states that these terms can systematically be used for "attributes" (functional concepts) and the associated "concepts" (sortal concepts in our

terminology). I would therefore like to dub this shift from functional to sortal concepts "Guarino shift". The Guarino shift derelativizes the given functional concept.[28]

5.3 *Levels and types of shifts*

5.3.1 *Levels of shifts* Type shifts coerced by incongruent determination can be located at three levels of processing:

(43) **levels of type shifts**
   level 0   semantic interpretation
   level 1   adjustment at type level: application of general lexical
              meaning shifts
   level 2   adjustment at token level: application of shifts that draw
              on particular contextual information

Level 0 is trivial for nouns as such; many polysemous nouns have meaning variants of different concept types. Thus, the first option of meeting type requirements is choosing a lexical meaning of appropriate type. For example, for *my children* one would preferably choose the relational meaning of *child* rather than the sortal.

Forming CNPs from nouns, shifts at level 0 can be accomplished by explicit modification. These shifts will not be discussed here; they include modifiers such as adjectival superlatives, ordinal numerals, "last" and "next", individual noun appositions ([*the*] *year 2003*) and "establishing relative clauses" in the terminology of Hawkins (1978: 138 ff.) ([*the*] *woman he went out with last night*), which all shift to [+U]. Another level 0 shift is possessor specification.[29]

For many semantic classes of nouns, systematic meaning shifts are available, such as metonymy, metaphor, mass-to-count shifts and others. These belong to level 1; Bierwisch (1982) introduced them as "conceptual shifts". They are available for larger classes of semantically similar nouns; they produce meaning variation that is to a certain degree systematic, even across languages, since the shifts represent general cognitive patterns of concept modification. Some of these shifts change the conceptual type. The shifts with artefact terms mentioned in section 2 are level 1.

---

[28] Note that even though the NP *a serene expression* is used here for expressing a sortal concept, the embedding verbal locative-possessive construction ⌜NP *was to his face*⌝ exploits the lexical relation inherent to the functional noun *expression*.

[29] Some compositional level 0 shifts, in particular those triggered by *favourite*, *former* and *new* have been discussed in detail (Partee & Borschev 2002; Vikner & Jensen 2002).

Level 1 shifts are components of a dynamic lexicon. They enable a division of labour between storing lexical meanings and deriving further meanings by general procedures. If the same shift occurs repeatedly with a lexical item, storing its result may become more economic than repeated shifting. As a result, there is no clear borderline between polysemy and level 1 shifts. And this is what the literature on polysemy, as well as actual lexicography, reflects.[30]

Adjustment at level 2 is what we encountered with the anaphoric NPs in (38): the shifts are accomplished by enriching the semantic concept with information retrieved from the context. Level 2 shifts trigger the merge of level 1 output with extralinguistic information. If an utterance is interpreted, this merge inevitably takes place; one mechanism is the choice of referents and the consequent merge of the linguistic description with the knowledge independently available. The analysis of *the man* in (38) gives one example of the process. Shifts at level 2 thus serve another division of labour: the interaction of linguistic information with extralinguistic knowledge. As the information exploited for a level 2 shift is contingent on the given context of utterance, the results will not get stored in the lexicon.

5.3.2 *Types of shifts* Of the various level 1 and level 2 shifts applicable, I want to mention only the most frequent ones. Most of them concern the triangle of sortal, functional and individual concepts.

Sortal to individual: The most frequent shifts of this type are the level 2 shifts involved in direct anaphoric and deictic uses of definites.

Sortal to functional: When sortal CNPs are used with possessive determination (dubbed "extrinsic" possession by Partee 1997), a shift applies either at level 1 or level 2. Jensen and Vikner (Vikner & Jensen 2002; Jensen & Vikner 2004) discuss "lexical" (i.e. level 1) shifts based on the qualia information in the possessum concept; these apply frequently to CNPs that denote artefacts exclusively used by one user, such as *car, flat* and *toothbrush* (cf. section 2.4). Apart from these uses, possessive constructions with [–U] heads may receive "pragmatic" (Jensen & Vikner 2004) or "free" (Storto 2004) interpretations such as for *your book*, 'book you mentioned', 'book you stole' and 'book you'd like to borrow'. These are the result of level 2 shifts that exploit particular contextual information. One subclass is constituted by "control" interpretations of possessives, including cases of ordinary ownership (Storto 2004).

---

[30] Bierwisch (1982) would not count systematic meaning variation due to level 1 shifts as polysemy, while Tyler & Evans (2003) do; dictionaries usually list some products of level 1 shifts as meaning variants, but not generally so.

Sortal to relational: These shifts are triggered if a sortal CNP is used with relational indefinite determination, for example, in the plural with right possessor specification (*books of . . .*): the [−U][−R] sortal noun is shifted to [−U][+R]. There are obvious parallels to the previous type: level 1 shifts for artefact concepts that specify a certain type of use but such that more than one such artefact can be used by the same user. Analogously, there are level 2 shifts of this type for cases where the relationship between the objects and a possessor is to be retrieved from context.

Functional to individual: These shifts are most naturally achieved by combining a functional CNP with an individual concept possessor argument. As a level 2 shift, this occurs with definite associative anaphors: the functional concept with absolute determination is related to a possessor introduced before. *The door* in (44) is an example:

(44) (*in a hotel*) She walked into the foyer and sat in a chair near the door.[31]

The [−R] requirement for *the door* is met by choosing the foyer as the possessor of the door; the [+U] requirement is met by contextual restriction to the one door relevant here, the entrance door.

Functional to sortal: Functional CNPs can be shifted to sortal concepts by any [−U] type saturation of the possessor argument. One option is level 1 existential saturation of the possessor argument, as in *she is a late mother*. The Guarino shift is another level 1 instance of an FC to SC shift.

Relational to sortal: Saturation of the possessor argument of a relational noun leads to a sortal concept both with [−U] and [+U] possessor concepts. If the possessor is retrieved from the given context, the shift is level 2.

5.4 *The system of conceptual types and determinations*

Determinations constitute operations in a space of conceptual types. Figure 1 displays the system for the one-step modes of determination: (simple) indefinite, singular definite, rel(ational), poss(essor specification) with a [+U][−R] unique possessor, the combination rel(ational)-def(inite) for d–possessives and abs(olute).

More generally, Figure 1 supplies a scheme for type shifts among the four basic terms. The type shifting determination operations are just grammaticalized instances of type shifts.

---

[31] From Enright, Anne (2007) *The Gathering*. Black Cat. New York. 13. The quotation is shortened.
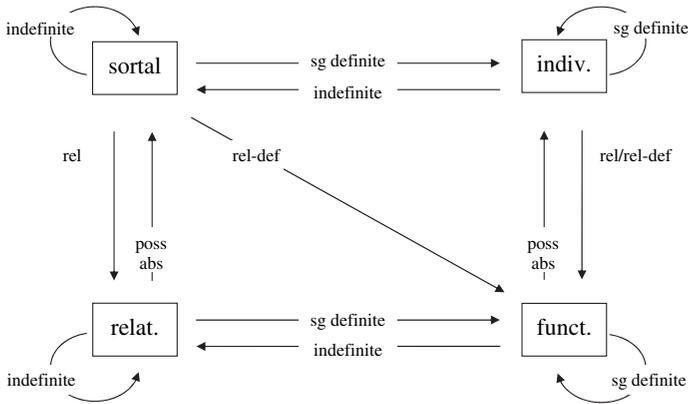
Figure 1 System of types of nominal concepts and types of determination.

5.5 *Determination and redundancy*

Despite the semantic redundancy of congruent determination, there are several motivations for marking it. First, explicit congruent determination may serve disambiguation of the CNP and its type. Second, determiners may carry functions beyond the mere specification of concept type: case marking, deictic differentiation, quantity specification and so on. Third, if there is explicit incongruent determination, the use of congruent determination leads to a uniform syntax: there is an analogical pressure towards the inclusion of congruent determination (see Lyons 1999: 322 ff.).

As to incongruent determination, its motivation is obvious. It serves as an explicit trigger for the type shifts to be applied. It might be asked, conversely, how languages can do without marking incongruent determination. The answer is twofold. First, there are those other means of indicating the type of reference, for example, information structure or nonnominal possessive constructions. Second, the basic concept types are not only types of noun and CNP meanings but more generally the basic types of concepts that our cognition works with anyway. Nonquantificational, referential full NPs are either construed as sortal concepts or as individual concepts. These are the two fundamental types of mental representations, for categories and individual objects, respectively. Thus, choosing a determination type means choosing between the two most general concept types available.

5.6   *Reflection on the analysis of determination*

The theory presented here—let us call it the concept type theory of determination (CTD)—is different from other approaches, in particular, from other approaches to definiteness, in two regards. It is a theory of determination in general, not only of definites or possessives, and it is claimed to apply to all languages. It predicts phenomena such as cross-linguistic splits in determination marking (see section 6.2). Apart from its wider scope, CTD offers an analysis not in terms of truth-conditions but in terms of the cognitive level of interpretation.

In its underlying understanding of linguistic communication and the role of context, CTD is close to relevance theory (Sperber & Wilson 1995). Wilson (1991) discusses cases of definites in a similar vein as in section 5.2. Rather than starting from the assumption of a common ground, CTD puts emphasis on the way in which utterances are formulated: choosing a referential NP with definite determination, the speaker declares the referent of the NP as being uniquely determined in the relevant context by the chosen description. By the respective contextualization cues (Gumperz 1982), the recipients receive an indication as to what the relevant context is like. The final interpretation of an NP token can then be modelled according to relevance theory. To give a simple example, Raymond Carver, in using *the man* in the third sentence in (38), conveys to the reader by the use of the definite article that the context is such that the referent is a "man" uniquely determined. Given that the context essentially is the actual interpretation of the story up to this point, the interpretation of the NP is predictable as the most relevant one.

For elaboration, CTD requires a theory of concepts that is able to model the level of lexical meanings and NP token interpretations. A promising candidate for a theory of concepts is currently being developed on the basis of Barsalou's (1992) theory of frames (cf. Petersen 2007). The theory of concepts-as-frames, that is, recursive attribute-value structures with constraints, is able to model the four types of concepts discussed here as frames of different architecture.

Concluding this section, I will briefly address the relation of CTD to other theoretical approaches to definiteness and possession.

Possession: The approach taken to relational and possessive uses is in accordance with Partee & Borschev (2002, and later work). The idea that the relational use of [−R] nouns is enabled by a variety of type shifts is widespread in formal semantics (see Barker forthcoming for an overview).

Definiteness: The [−U] account of indefinites appears to be uncontroversial. Except for [+R] nouns and proper names and pronouns, nouns are usually considered sortal, of type ⟨e,t⟩. For a recent treatment, see Landman (2004).

Some accounts of definiteness have raised the question as to whether there is a uniform notion of definiteness (Lyons 1999; Schwarz 2009; Abbott 2010). CTD provides a positive answer. The more recent discussion of definiteness focuses on the questions whether definiteness is essentially a matter of familiarity or of uniqueness, or neither; whether uniqueness, if it is actually given, is presupposed or conversationally implicated; and whether uniqueness is "semantic" (in the sense assumed by Russell) or the result of pragmatic "domain restriction".[32]

In CTD, uniqueness is not objective uniqueness in the given universe of discourse, as is expressed for "N" by Russell's formula:

(45) $\exists x((N(x) \land P(x)) \land \forall y(N(y) \rightarrow y{=}x))$

Roberts (2003) argues that this conception of uniqueness does not apply to uses of definite NPs such as in an example discussed in Heim (1982: 28), in a context, where more than one wine glass broke:

(46)   A wine glass broke last night. The glass was very expensive.

According to CTD, there are two sorts of unique NP concepts. First, there are those which are unique at level 0 or level 1: lexically unique CNPs, CNPs with level 0 shifting modifiers that turn them [+U] or CNPs that are unique due to a general context-independent level 1 type shift. These are the cases that I call "semantically unique". The second type of unique concepts is the utterance meanings of [−U] CNPs with incongruent definite determination, for example, anaphoric NPs such as *the glass* in (46). In these cases, a level 2 shift modifies the given [−U] concept to yield a [+U] concept in the relevant context. We have seen in (39)–(42) what these modifications are like. They capture the "pragmatic enrichment" that is made responsible in the literature for the uniqueness of "familiar" definites. CTD, however, rejects the idea suggested by Heim (forthcoming: §1.5) that the level 2 shift from [−U] to [+U] can be attributed to 'a covert predicate which in the semantic computation conjoins with the overt NP'. Conjunction

---

[32] See Birner & Ward (1994) and Roberts (2003) on uniqueness and familiarity and the nature of uniqueness, and Stanley & Szabó (2000) on domain restriction.

of a [–U] CNP meaning with another [–U] (type ⟨e,t⟩) predicate cannot yield a [+U] NP meaning however narrow the restriction be.[33]

According to CTD, uniqueness of an NP, more generally the concept type of an NP, has the status of a presupposition. The concept type is a nondetachable part of the token meaning of the NP. It is not part of the content of the predication that the NP specifies an argument of, and hence neutral with respect to the truth-value of the predication. Definite NPs presuppose unique reference; indefinite NPs presuppose the possibility that reference is not unique, a condition weaker than nonuniqueness; and relational NPs presuppose a relation of the referent to some possessor.

As for languages with no explicit marking of either simple definites or simple indefinites, CTD disagrees with the "competition" analysis of (in)definiteness (Heim forthcoming: §1.7). Heim locates definites and indefinites on a scale of competing alternatives where definites entail the corresponding indefinites (*the dog barked* would entail *a dog barked*). Heim concludes that, in languages without (in)definiteness marking, simple NPs are just indefinite. This view is rejected here since CTD considers indefinite and definite reference conceptually incompatible; definites do not entail the corresponding indefinites because they have contrary presuppositions. Other authors favour a type shift approach congenial with CTD for implicitly definite NPs with [–U] heads, for example, Bittner & Hale (1995), and Chierchia (1998) who elaborates on Partee's (1987) type shifting approach.

As a semantic theory, CTD is not the framework to provide an account of the conceptual mechanisms at work in the case of level 2 shifts. A theory of these mechanisms would have to answer questions such as follows: What qualifies an NP token in a discourse as an antecedent for subsequent anaphors? What are the requirements on nonlinguistic context for deictic and other nonanaphoric uses of definites? A further fundamental question is the role of salience in text interpretation, an issue that has received much attention in analyses of anaphora resolution and definite NPs in general (cf. e.g. Gundel *et al.* 2001).

6 EVIDENCE

In this section, evidence for CTD is provided from three perspectives: statistical investigations into the relative frequencies of congruent v. incongruent determination, typological data on (in)congruency and

---

[33] Compare note 5 above as to the crucial difference between the stronger notion of uniqueness relevant here, and accidental uniqueness, which might be achieved by additional predicative restriction on a sortal concept.

historical evidence showing that concept types are relevant for the development of definiteness marking.

6.1 *Statistical evidence*

Fraurud (1990) investigates a Swedish corpus of nonfictional written texts with 3877 NP tokens. Distinguishing determination modes of NPs, she counted which occurrences were first mention (referring to a discourse-new referent) and which ones subsequent-mention. One subclass of NPs is DefNP: definite NPs with a head noun with the definite suffix *–en/-et*. DefNP excludes all definite NPs without definite suffix: those with a definite article only, NPs with demonstrative determiners and determiner possessives, as well as proper names and personal pronouns. Fraurud counted a proportion of 60.9% of first-mention NPs within DefNP.[34] In nonfictional written texts, there will be no situational definites such as in 'Open the door, please!' Since incongruent definites are either situational or anaphoric (Hawkins 1978), first-mention definites must be due to CNPs that are inherently unique [+U]. Among the subsequent-mention uses of definite NPs were another 20.8% with a (first-mention) DefNP as antecedent; these, too, must be [+U], yielding a [+U] proportion within DefNP of more than 80%. Of determiner possessives, 85% are first mention. Since uniqueness of this subclass may be due to the definiteness constraint (36), the proportion of [+U] CNPs among them cannot be determined. The ratio of DefNP to determiner possessives is about 4.3. Two further classes of NPs can be added to definite uses of [+U] nouns: personal pronouns and proper names, which together out-number the DefNP tokens in the corpus. It follows that the proportion of congruent definites in the corpus is around 90%.

In a corpus study of *Wall Street Journal* articles, Vieira (1998) determines a similar result for English definite descriptions (i.e. NPs with definite article): a proportion of about 48% percent discourse-new uses. Again, these must be [+U]; adding definites that are coreferent with first-mention definites, cases of associative anaphora, proper names and personal pronouns will result in a clear majority of congruent definites.

The two studies may not be fully representative. Narrative texts would probably contain more anaphoric NPs; but then, most anaphoric NPs are [+U] third-person pronouns. I would expect that

---

[34] Fraurud defines "first-mention" definites not just as definites with a head noun used for the first time in the text but as definite NPs that are not coreferential with any NP occurring earlier in the text. Thus, first-mention definites are not anaphoric.

the proportion of incongruent anaphoric NPs will be somewhat higher but will not outweigh congruent uses. In oral texts or written texts containing dialogues, there will be a minor proportion of deictic definites.

Nissim (2004) investigates whether [+R] and [–R] nouns preferably occur with *its* or with *the* in the British National Corpus. According to her study, there are nouns that occur significantly more often with *its* than with *the*, and vice versa; among the former is a proportion of 90% [+R] nouns; among the latter, the proportion is 8%. The same tendency is observed by Jensen & Vikner (2004). They present a count of 2333 English prenominal possessives in fictional and nonfictional text; for more than 71%, the possessor relation is "inherent", that is, the head noun is [+R].

6.2 Typological evidence

The theory predicts tendencies of grammatical asymmetries between congruent and incongruent determination. What one would expect are phenomena such as

- implicit congruent determination v. explicit incongruent determination, with morphemes corresponding to the type shifts coerced by incongruent determination and
- strong marking for incongruent determination v. weak marking for congruent determination.

6.2.1 *Incongruent definites* Evidence for the difference between congruent and incongruent definites is very strong in Germanic languages. In many German dialects, a strong definite article marks incongruent definites, while a weak article is used for congruent definites, including proper names.[35] The strong and weak forms of definite articles in Ripuarian (Rhineland) dialects are as follows; the weak forms exhibit reduced vowels:

(47)	sg masc	sg fem	sg neuter	plural
strong	dä [dɛ]	die [di]	dat [dat]	die [di]
weak	dr [dɽ]	de [də]	et [ət]	de [də]

We would have (48a) as an announcement of the carnival parade in Düsseldorf, where the "zoch" (German *Zug*, 'parade') is an institution and therefore *zoch*, in this reading, an individual noun. In a railroad

---

[35] See Hartmann (1982) and Himmelmann (1997: 54 ff.) for Rhineland dialects; for Swiss German, see Studler (2004). Gerland & Horn (2010) present further discussion of these phenomena, in the framework of CTD.

station context, waiting for a train (German *Zug*, dialect 'zoch') to come, where 'zoch' would represent just a sortal notion, one would use the incongruent strong article *dä*.

(48) a. Dr   Zoch   kütt
           DEFARTWEAK   parade   comes
      b. Dä   Zoch   kütt.
           DEFARTSTRONG   train   comes

Dutch has a similar distinction between strong *die* (SG.M/F, P) and *dat* (SG.N) v. weak *de* and *het*, respectively. *Die* and *dat* are restricted to incongruent definiteness, while the weak forms can be used for all definites. The strong forms are demonstrative determiners, but stripped of specific deictic distinctions, unlike the proximal demonstrative *deze*. Albert Ortmann (p.c.) gives the following quote; *de warme hand* can be considered a functional NP,[36] as opposed to the anaphoric expression *die man* with a sortal head.

(49) En zo voelde Anton het ook: de [*weak*] warme hand van die [*strong*] man, twintig jaar ouder dan hij, die hem meenam.[37]
      'And so Anton felt it, too: the warm hand of the man, twenty years older than him, who took him with [him].'

In German, there are contractions of prepositions with definite articles that result in reductions of the articles to the final consonantal case morphemes. The contractions are used only when definite determination is congruent. Restricted by phonotactic rules, possible contractions are for example *im = in dem*, *am = an dem*, *vom = von dem*, *ans = an das*, *vors = vor das*, *zur = zu der*.[38]

Swedish marks congruent definiteness with the suffixes *-(e)t* or *-(e)n*; for example, *universitetet Stockholm* (*universitet* 'university') would be 'the university Stockholm', where 'university Stockholm' is an individual concept. Incongruent definites are marked with an article *den/det*, with or without additional suffixal marking on the noun. The White House (individual concept) is *vita huset* 'white house' (*hus* 'house'). *Det vita huset* with additional article is 'the white house' referring to some white house (sortal concept), and definiteness therefore incongruent.[39]

---

[36] Strictly speaking, 'hand' is relational; here, an RN to FN shift intervenes in a "configurational" use of *hand* (cf. section 3.5).

[37] From Mulisch, Harry (1982) *De anslaag*. De Bezige Bij. Amsterdam. 50.

[38] For recent in-depth work on this split in standard German, see Schwarz (2009).

[39] Quoted from Schroeder (2006: 564) who gives a more detailed account of definiteness marking in Scandinavian and other European languages.

In the case of Fering, a North Frisian dialect spoken in the German island of Föhr, Ebert (1970) reports a weak definite "A–article" (*a, at*) and a strong definite "D–article" (*di, det*); again, the strong article is used for incongruent definites, and the weak one for congruent definites.

The type of split with distinguished marking for incongruent definites is not restricted to Germanic languages. Lyons (1999: 53 f.) mentions languages that have a special definite article (different from demonstratives) for marking anaphoric reference: Ewe and Hidatsa (Lyons 1999: 158). Lakhota is discussed as a language with a special definite article *k'ú* for anaphoric use and a general definite article *kį* (Lyons 1999: 54).

The asymmetries of definiteness marking can be placed on a scale that reaches from pragmatic to semantic uniqueness, that is, from [−U] to [+U] CNPs/NPs, with a variety of subtypes (Figure 2). Deictic and anaphoric uses of definite NPs are at the [−U] end of the scale; they roughly coincide with the range of demonstrative determiners. The [+U] end of the scale forms an implicative scale with [+U] CNPs < proper names < personal pronouns. In the middle of the scale are [−U] CNPs with "establishing relative clause" (Hawkins 1978), such as *student who wanted to see you* and functional nouns with unique possessor, including definite associative anaphors. These middle types sometimes go with strong definiteness marking, probably owing to the contextual information contained within the complex CNP. In other cases, they receive weak marking, apparently due to the fact that the whole NP is [+U].

Explicit definiteness marking usually cuts off at some point on the scale. In standard written German and in English, proper names are used without a definite article. In colloquial German or Modern Greek, proper names do take definite articles. Very rarely, even personal pronouns receive definiteness marking. Maori personal pronouns in nontopical use and proper names receive a definite article *a* (Bauer
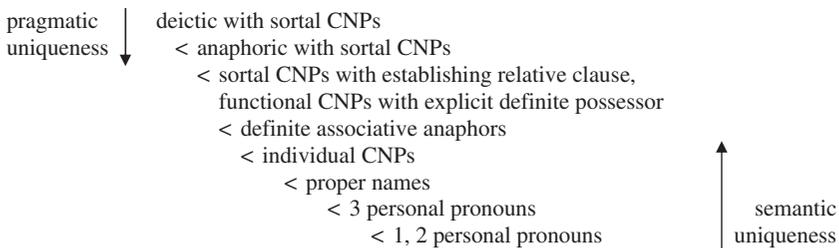

pragmatic
uniqueness   deictic with sortal CNPs
                 < anaphoric with sortal CNPs
                    < sortal CNPs with establishing relative clause,
                       functional CNPs with explicit definite possessor
                    < definite associative anaphors
                       < individual CNPs
                          < proper names
                             < 3 personal pronouns
                                < 1, 2 personal pronouns   semantic
                                                                   uniqueness

Figure 2 Scale of uniqueness.

1993: 108 ff.). One reason why personal pronouns are rarely used with definiteness marking might be that [−U] uses of them are very infrequent. Hungarian, in addition to marking definiteness with a definite article *a*, has "objective conjugation" for transitive verbs with definite objects (Havas 2004). It is used with all types of definite NPs except first- and second-person pronouns: this indication of definiteness cuts off after third-person pronouns.

Languages that develop definite articles from demonstratives start out with [−U] cases, the home base of demonstratives, passing through a stage where only incongruent definiteness is marked. When a language starts to use an originally demonstrative determiner for [+U] CNPs, a definite determiner is achieved.[40] This is presently to be observed with Upper Sorbian, a Slavic variety spoken in Eastern Germany with a long record of German language contact. *Dwórnišćo* 'station' in (50a) is an individual noun. It therefore has no article, although it carries definite reference. Breu quotes the example as an instance of what he calls "situative Unika"; these are individual nouns in CTD terminology, that is, terms for (local) institutions. The train referred to by *ća* 'train' in the second sentence in (50b) is not referred to as a local institution but as uniquely identified in the given context of discourse; *ća* here is anaphoric. In the first sentence of (50b), *ćaom*, the instrumental case of *ća*, can be taken either as an individual noun, similar to the use of *train* in the English translation, or as a sortal noun with indefinite determination.

(50)   Upper Sorbian (Western Slavic, Breu 2004: 30, 39)
    a. Tame jo dwórnišćo. [IN]
        there is   station
        'there's the station'
    b. Měrko jo s   ća-om šijoł.
        M.   is with train-INS come.PTCP.
        'Mirko came by train.
        Tón   ća [SN] jo dźewećich Kamencu bół.
        DEFART train   . . .
        'The train arrived in Kamenz at nine o'clock.'

The data show that there are many languages exhibiting splits in the marking of definites which can be located consistently on the scale in Figure 2. A critical point is the one between incongruent uses of definites, with [−U] CNPs, and congruent uses, with [+U] CNPs.

---

[40] For a comprehensive typological study of the grammaticalization of definite articles from demonstratives, see Himmelmann (1997).

Thus, the data confirm the significance of the distinction between inherently unique and inherently nonunique CNPs and nouns.

6.2.2 *Incongruent indefinites* Incongruent indefinites are [+U] CNPs with indefinite determination. One would expect them to exhibit a stronger marking of indefiniteness. One relevant observation is the fact that proper names in indefinite use are often accompanied by additional modal adjectives [cf. *a certain XY*, *ein gewisser XY* (German), *een zekere XY* (Dutch)].

A second observation is the behaviour of indefinite determiners in quantificational use. These take semantically [+U] CNPs that refer to the domain of quantification as a whole into NPs that refer to a nonunique part of the whole [cf. (9)]. Consider the contrast in (51):

(51) a. What's that noise?—Oh, there are some kids playing in the street.
   b. What are the kids doing?—SOME kids are playing in the street.

In (51a), the indefinite NP in the 'sm' reading is nonquantifica-tional, that is, not partitive. The plural *kids* is [−U] and the indefinite determiner *some* is congruent. *Some* is semantically almost redundant, not only for its congruency but also for the vague quantity predication; it is syntactically not obligatory; it does not carry stress and can be phonetically reduced to [sm]. By contrast, given the context in (51b), *some kids* will receive a partitive quantificational interpretation, equivalent to 'some of the kids'. In this interpretation, [−U] *kids* is shifted to [+U] [*the*] *kids*; *some* then shifts the [+U] concept for the whole set of kids to a [−U] concept for some part of it. In this case, *some* is incongruent; as such it is not redundant. It cannot be omitted. It carries stress and cannot be phonetically reduced.[41]

6.2.3 *Incongruent relatives* Many languages grammatically distinguish different types of possessive constructions.[42] The distinction is usually referred to as "(in)alienability splits".[43] As a general tendency, inalienable possession receives less salient expression than alienable possession. Inalienability essentially coincides with relationality: in-alienable possession constructions occur with [+R] CNPs and alienable

---

[41] See Löbner (1987: §3) for further discussion. Diesing (1992) offers a syntactic account of the two uses of indefinites.
[42] References and data in this section and the next are based on talks held by Albert Ortmann as well as on Ortmann (2002: 52 f.). For further discussion of incongruent relatives and absolutes in the framework of CTD, see Gerland & Horn (2010).
[43] For general information, see Nichols (1992: 116 ff.); Seiler (1983) speaks of 'inherent' v. 'established' possession, a terminology essentially in accordance with the approach taken here.

constructions with [−R] CNPs.[44] Languages differ, however, as to which [+R] CNPs enter the inalienable possessive construction (Chapell & McGregor 1996: 8 f.).

The rich data reported in the literature support the type shift approach. For example, [+R] nouns in Lakhota are immediately prefixed with a possessor marking, while [−R] nouns require an extra REL (relativizer) morpheme that enables the noun to take a possessor prefix:

(52)   Lakhota (Siouan, Robert D. Van Valin p.c.)
    a. ni–nági   ki
       2SG-spirit DEF
       'your spirit'
    b. ni-thá-wowapi ki
       2SG-REL-book DEF
       'your book'

The [+R] noun *nági* 'spirit' takes the congruent prefixal possessor specification *ni-* that shifts it to [−R]. [−R] *wowapi* 'book' is shifted to [+R] by the relativizing prefix REL *thà-*, in order to take the possessor specification *ni-* that shifts it back to [−R]. The relativizer *thá* is used iff there is a type shift from [−R] to [+R]. Analogous data are reported by Lehmann (1988: 52, 56) on Yucatec, and by Thompson (1996: 654 ff.) for Koyukon.

(53)   Yucatec (Mayan, Mexico, Lehmann 1998: 52; 56)
    a. in   la'ak
       1SG.POSS   friend
       'my friend'
    b. le   h–o'
       DEF   house-DISTAL
       'the house'
    c. in   nah–il
       1SG.POSS   house-REL
       'my house'

In Koyukon, inalienably possessed nouns, that is, [+R] nouns in our theory, can only occur with a possessor affix, unlike [−R] nouns (Thompson 1996: 651). If the latter are used with a possessor specification, they require a relativizing REL suffix *−e'* (with certain morphophonological effects on the noun), or the prefix *k'e*, here glossed as K'E because it also serves as a derelativizer [cf. (58) below]:

---

[44] Barker (1995: 67) arrives at the same conclusion.

(54) Koyukon (Athabaskan, Thompson 1996: 655, 667, 659)
    a. hʉtl (sortal)   be-ghʉdl-e'
        sled   3SG-sled-REL
                            'his/her sled'
    b. gguh (sortal)   se-k'e-gguh
        rabbit   1SG-K'E-rabbit
                            'my rabbit'
    c. *to' (functional) be-to'
        father   3SG-father
                            'his/her father'

In other languages, alienable possession receives a syntactic treatment, whereas inalienable possession is expressed by morphological means:

(55) Georgian (South Caucasian, Khizanishvili 2006: 12 f.)
    a. deda-čem-i
        mother-1SG.POSS.-NOM
        'my mother'
    b. čem-i   ċign-i
        1SG-POSS book-NOM
        'my book'

Ewe combines [+R] CNPs immediately with a possessor specification, unlike [−R] CNPs:

(56) Ewe (Niger-Congo, Ameka 1996: 790 ff.)
    a. inalienable
        ɖeví-á-wó   tɔbé
        child-DEF-PL grandfather
        'the children's grandfather'
    b. alienable
        kofi Φé awu
        Kofi REL GARMENT
        'Kofi's garment'

The data show that, in these languages, either incongruent possession is marked with a corresponding relativizing morpheme (Lakhota, Yucatec, Koyukon, Ewe) or the connection between the noun and the possessor expression is less close (Georgian) and therefore more salient.

6.2.4 *Incongruent absolutes* Incongruent absolute use should tend to be more saliently marked than congruent use. This kind of distinction

is to be expected only with languages that distinguish [+R] CNPs grammatically. In Mam, according to England (1983), [+R] nouns in absolute use carry an extra derelativizing morpheme.

(57) Mam (Mayan, Guatemala, England 1983: 69)
    a. relative
        n-yaa'=ya
        1.SG.ERG-grandmother=NON3
        'my grandmother'
    b. absolute
        yaa-b'aj
        grandmother-DEREL
        'grandmother'

Parallel data are attested by Lehmann (1998: 70 ff.) for the Mayan language Yucatec. Koyukon is another such case. The prefix *k'e-* occurring as relativizer in (54b) can also function as a derelativizer in incongruent absolutes with nonhuman possessors. In (58a), the prefix serves existential saturation of the possessor argument; (58c) shows that it also serves both functions in the same expression.

(58) Koyukon (Thompson 1996: 666 f.)
    a. *kkaa' [+R]   k'e-kkaa'
        foot   K'E-foot
                                  'a/the foot [of some animal]'
    b. gguh kkaa'   ne-kkaa'
        rabbit foot   2SG-foot
        'rabbit's foot'   'your foot'
    c. ne-k'e-gguh kkaa'   ne-k'e-k'e-kkaa
        2SG-K'E-rabbit foot   2SG-K'E-K'E-foot
        'your rabbit foot'   'your [animal's] foot'

The expressions in (58a and b) involve a single switch from [+R] to [−R]. The expressions in (58c) involve a series of three switches [+R] to [−R] to [+R] to [−R]: in *ne-k'e-gguh kkaa'*, [+R] *kkaa'* is switched to [−R] by the inalienable possessor specification *gguh*; *k'e* switches back to [+R] to make alienable possession possible, which is then achieved by adding *ne-* to yield [−R]. The three steps are analogous with *ne-k'e-k'e-kkaa*: first derelativizer *k'e* expressing existential saturation switches to [−R]; next, the result is taken to [+R] by relativizing *k'e*; the ultimate possessor specification (*ne-* 2SG) reduces [+R] to [−R].

Obviously, the prefix *k'e* indicates just a [±R] switch. The double use of *k'e* is not redundant; direct affixation with *ne-* would have yielded 'your [own] foot'. English *your foot* is ambiguous between the

reading 'your [own] foot' and the reading 'your foot [of someone or some animal]'. The latter reading would be the result of the same shifts as are involved with *ne-k'e-k'e-kkaa'*, the only difference being that Koyukon makes these shifts explicit, while English does not. Other languages with a strict distinction of relational and nonrelational nouns use just a relativizer on a relational noun in these cases. According to Haude (2006), in Movima, an isolate language in Bolivia, *as* [ART] *bo:sa* is 'my arm' (the absence of a possessor affix on *bo:sa* is understood as first-person singular possession, p. 233). The noun *bo:sa* also means 'sleeve'; it can take the affix *-eɬ* which '[i]n nouns seem[s] to indicate that an entity is possessed which is either normally unpossessed or possessed by a different possessor than usual' (p. 239). Hence, this suffix serves as a relativizer on [−R] nouns or as a re-relativizer on [+R] nouns, that is, the combined effect of first derelativizing and then relativizing. It can be analysed as a shifter from [−R] to [+R], which, applied to [+R] nouns, coerces derelativization before shifting to [+R]. With this affix we get *as* [ART] *bosa:-neɬ* 'my sleeve' (p. 242). In (59), the shifts are depicted from right to left in order to preserve the word order of the examples:

(59)

		shift 3		**shift 2**		**shift 1**	
		poss.1		rel.		derel.	
	[−R]	←	[+R]	←	[−R]	←	[+R]
Koyukon		ne		k'e		k'e	kkaa'
Movima		impl. 'my'		neɬ		impl.	bo:sa
English		my		impl.		impl.	foot

6.3 *Evidence from the evolution of definiteness marking*

The theory predicts the well-known fact that demonstrative determiners are a possible source of definite articles. Demonstratives shift [−U] CNPs to [+U] NPs, that is, unique reference. In the course of the development into definiteness marking, they undergo two extensions of usage: first, detachment from their specific deictic function, for example, the neutralization of a proximal/distal distinction—this step extends their use along the uniqueness scale from deictic to anaphoric use. Then, the deictic distinction and contrastivity is dropped; this in turn makes the [−U] input requirement void; it is dropped, and thereby the application of the determiner is extended to [+U] nouns. Typically, there are remnants of semantic definiteness with no explicit definiteness marking, for example, personal pronouns, proper names and institution terms. After extension to [+U] nouns, we may eventually observe

a third stage, the reduction to weak forms of definiteness marking with [+U] nouns.[45]

The approach predicts a second possible source of definiteness marking, namely possessive pronouns. These take nouns of whatever type to [+U][−R] reference [cf. (4.3)]. Such cases do, in fact, exist. According to Schroeder (2006: 587), in Uralic languages such as Komi, Nganasan and Selkup, third- and second-person possessive suffixes in nonrelational use mark [+U][−R] nouns ("nouns with unique referents") and sortal nouns as definite.

(60)   Nganasan (Uralic, Tereščenko 1979: 95):
       nonrelational possessive marking with individual nouns
       məu- δu
       earth- POSS3SG
       'the earth'

(61)   Selkup (Uralic): nonrelational possessive marking with anaphoric
       sortal nouns (Nikolaeva 2003)
       tyt qanyqqyn anty totta, anty-ty   apykə:l   e:ŋa.
       river bank.on   boat stands boat–POSS3SG oar.without is
       'A boat stands on the riverbank, the boat has no oar.'

Himmelmann (1997: §5.3.2) mentions Indonesian and Amharic as further languages exhibiting this phenomenon. Fraurud (2001) discusses the phenomenon extensively, including also Turkish, Yucatec and other languages. She posits several stages of the development of possessive marking into definiteness marking. The development starts from congruent use with [+R][+U] nouns, for example, in associative anaphoric use. Since the possessor specified by possessive affixes is definite, the result is definite. The use of possessive suffixes is eventually extended to individual nouns, and to those sortal nouns for which unique reference is grounded in contextual givenness. The semantic steps are similar to the ones of demonstratives developing into definite articles: first, the specific content, that is, the specification of a first-, second- or third-person possessor, is neutralized; with it, the function of relating the operand to a 'possessor' extinguishes. What remains is a general indexical quality and [+U] determination. Once the suffixes are stripped of their possessive quality (in certain uses), they can be applied regularly to [−R] nouns for the indication of definite reference.

---

[45] See Gelderen (2007) for more on the historical cycle of definiteness marking in Germanic languages.

6.4 *Conclusions*

The statistical, typological and historical data corroborate the concept theory of determination types and related type shifts. The clearest evidence is provided by cases where certain suffixes serve the direct and exclusive indication of the type shifts postulated, such as relativizing or derelativizing affixes. Other evidence lies in the fact that definiteness splits and (in)alienability splits align with the distinction between [−U] and [+U], and [−R] and [+R]. I know of no splits that contradict this alignment. This article offers only a few illustrative examples, but the evidence in the literature appears to be robust. More comprehensive studies are currently in progress.

APPENDIX: POSSESSIVE COMPOSITION

Table A1 gives the composition rules for the combination of [+R] nouns with a possessor NP of each of the four types. *S*, *R*, *i* and *f* represent constants corresponding to sortal, relational, individual and functional nouns, of logical type $\langle e,t \rangle$, $\langle e,\langle e,t \rangle \rangle$, e and $\langle e,e \rangle$, respectively. Due to the syntactic design of predicate logic, individual and functional constants do not exhibit a referential argument. Thus, the natural language feature [+U] corresponds with the fact that these constants are not of a predicate type. For predicate constants, the first argument r/r' is the referential one; the second p/p' the possessor. The compositional mechanism is basically functional application and relational or functional composition. Indefinite NPs are analysed in terms of an η operator, as it offers the possibility of direct argument insertion for indefinite possessor arguments.

Table A2 gives the types of head-with-possessor constructions for natural language. Note that functional heads with possessor inherit the type from the possessor ("transparency").

Head	Type	Possessor	Type	Head with possessor	Type
λrλp R(r, p)	$\langle e,\langle e,t \rangle \rangle$	λr' S(r')	$\langle e,t \rangle$	λr R(r, ηr' S(r'))	$\langle e,t \rangle$
λrλp R(r, p)	$\langle e,\langle e,t \rangle \rangle$	λr'λp' R'(r',p')	$\langle e,\langle e,t \rangle \rangle$	λrλp' R(r, ηr' R'(r', p'))	$\langle e,\langle e,t \rangle \rangle$
λrλp R(r, p)	$\langle e,\langle e,t \rangle \rangle$	i	e	λr R(r, i)	$\langle e,t \rangle$
λrλp R(r, p)	$\langle e,\langle e,t \rangle \rangle$	λp' f'(p')	$\langle e,e \rangle$	λrλp' R(r, f'(p'))	$\langle e,\langle e,t \rangle \rangle$
λp f(p)	$\langle e,e \rangle$	λr' S(r')	$\langle e,t \rangle$	λr r=f(ηr' S(r'))	$\langle e,t \rangle$
λp f(p))	$\langle e,e \rangle$	λr'λp' S(r',p')	$\langle e,\langle e,t \rangle \rangle$	λrλp' r=f(ηr' S(r', p'))	$\langle e,\langle e,t \rangle \rangle$
λp f(p)	$\langle e,e \rangle$	i	e	f(i)	e
λp f(p)	$\langle e,e \rangle$	λp' f'(p')	$\langle e,e \rangle$	λp' f(f'(p'))	$\langle e,e \rangle$

Table A1 Logical composition for combinations of head and possessor specification

Head	Type	Possessor	Type	Head with possessor	Type
RC	[−U][+R]	SC	[−U][−R]	SC	[−U][−R]
RC	[−U][+R]	RC	[−U][+R]	RC	[−U][+R]
RC	[−U][+R]	IC	[+U][−R]	SC	[−U][−R]
RC	[−U][+R]	FC	[+U][+R]	RC	[−U][+R]
FC	[+U][+R]	SC	[−U][−R]	SC	[−U][−R]
FC	[+U][+R]	RC	[−U][+R]	RC	[−U][+R]
FC	[+U][+R]	IC	[+U][−R]	IC	[+U][−R]
FC	[+U][+R]	FC	[+U][+R]	FC	[+U][+R]

Table A2   Type composition of for combinations of head and possessor specification

Acknowledgements

SEBASTIAN LÖBNER
Institut für Sprache und Information
Heinrich-Heine-Universität Düsseldorf
Universitätsstr. 1
40225 Düsseldorf
Germany
e-mail: loebner@phil.uni-duesseldorf.de

REFERENCES

Abbott, Barbara. (2010), *Reference*. Oxford University Press. Oxford.

Ameka, Felix. (1996), Body parts in Ewe grammar. In H. Chappell and W. McGregor (eds.), *The Grammar of Inalienability: a typological perspective on body part terms and the part whole relation*. Mouton de Gruyter. Berlin. 783–840.

Barker, Chris. (1995), *Possessive Descriptions*. CSLI. Stanford, CA.

Barker, Chris. (1998), 'Partitives, double genitives and anti-uniqueness'. *Natural Language & Linguistic Theory* **16:**679–717.

Barker, Chris. (2004), 'Possessive weak definites'. In J.Y. Kim, Y.A. Lander, and B.H. Partee (eds.), *Possessives and beyond: semantics and syntax. University of Massachusetts Occasional Papers in Linguistics 29*. GLSA Publ. Amherst. 89–113.

Barker, Chris (to appear, 2011), Possessives and relational nouns. In Claudia Maienborn, Klaus von Heusinger, and Paul Portner (eds.), *Semantics: An International Handbook of Natural Language Meaning. Volume II*. De Gruyter. Berlin, New York. Ch. 45.

Barsalou, Lawrence W. (1992), 'Frames, concepts, and conceptual fields'. In A. Lehrer and E.F. Kittay (eds.), *Frames, Fields, and Contrasts: New Essays in Semantic and Lexical Organization*.

Lawrence Erlbaum. Hillsdale, NJ. 21–74.

Barwise, Jon & Robin Cooper. (1981), 'Generalized quantifiers and natural language'. *Linguistics and Philosophy* **4:**159–219.

Bauer, Winifred. (1993), *Maori*. Routledge. London.

Bierwisch, Manfred. (1982), 'Formal and lexical semantics'. *Linguistische Berichte* **80:**3–17.

Birner, Betty & Gregory Ward. (1994), 'Uniqueness, familiarity, and the definite article in English'. *Proceedings of the Annual Meeting of the Berkeley Linguistic Society* 93–102.

Bittner, Maria & Kenneth Hale. (1995), 'Remarks on definiteness in Warlpiri'. In E. Bach, E. Jelinek, A. Kratzer, and B.H. Partee (eds.), *Quantification in Natural Languages*. Kluwer. Dordrecht. 81–105.

Breu, Walter. (2004), 'Der definite Artikel in der obersorbischen Umgangssprache'. In M. Krause and C. Sappok (eds.), *Slavistische Linguistik 2002*. Sagner. München. 9–57.

Chapell, Hilary & William McGregor. (1996), 'Prolegomena to a theory of inalienability'. In H. Chappell and W. McGregor (eds.), *The Grammar of Inalienability: a typological perspective on body part terms and the part whole relation*. Mouton de Gruyter. Berlin. 3–30.

Chierchia, Gennaro. (1995), *Dynamics of Meaning*. University of Chicago Press. Chicago.

Chierchia, Gennaro. (1998), 'Reference to kinds across languages'. *Natural Language Semantics* **6:**339–405.

Diesing, Molly. (1992), *Indefinites*. MIT Press. Cambridge, MA.

Diessel, Holger. (2008), 'Distance Contrasts in Demonstratives'. In M. Haspelmath, M. Dryer, D. Gil, and B. Comrie (eds.), *The World Atlas of Language Structures Online*. Max Planck Digital Library. München. Chapter 41. Available online at http://wals.info/feature/41. Accessed on 2010-07-29.

Dobrovie-Sorin, Carmen. (2004), 'Genitives and determiners' In J.Y. Kim, Y.A. Lander, and B.H. Partee (eds.), *Possessives and beyond: semantics and syntax*. University of Massachusetts Occasional Papers in Linguistics 29. GLSA Publ. Amherst. 115–132.

Dryer, Matthew S. (2008a), 'Definite articles'. In M. Haspelmath, M. Dryer, D. Gil, and B. Comrie (eds.), *The World Atlas of Language Structures Online*. Max Planck Digital Library. München. Chapter 37. Available online at http://wals.info/feature/37. Accessed on 2010-07-29.

Dryer, Matthew S. (2008b), 'Indefinite articles'. In M. Haspelmath, M. Dryer, D. Gil, and B. Comrie (eds.), *The World Atlas of Language Structures Online*. Max Planck Digital Library. München. Chapter 38. Available online at http://wals.info/feature/38. Accessed on 2010-07-29.

Ebert, Karen H. (1970), *Referenz, Sprechsituation und die bestimmten Artikel in einem nordfriesischen Dialekt [Fering]*. Ph.d. thesis, University of Kiel, Nordfriisk Institut, Bredstedt.

England, Nora C. (1983), *A Grammar of Mam, a Mayan Language*. University of Texas Press. Austin.

Fraurud, Kari. (1990), 'Definiteness and the processing of noun phrases in natural discourse'. *Journal of Semantics* **7:**395–433.

Fraurud, Kari. (1996), 'Cognitive ontology and NP form'. In T. Fretheim and J. K. Gundel (eds.), *Reference and Referent Accessibility*. Benjamins. Amsterdam. 65–87.

Fraurud, Kari. (2001), 'Possessives with extensive use. A source of definite articles?' In I. Baron, M. Herslund, and F. Sørensen (eds.), *Dimensions of*

Possession. Benjamins. Amsterdam. 243–67.

Gelderen, & Elly van. (2007), 'The definiteness cycle in Germanic'. *Journal of Germanic Linguistics* **19:**275–308.

Gerland, Doris & Christian Horn. (2010), 'Referential properties of nouns across languages'. In D.-H. Choi, J.-S. Hong, H.-K. Kang, Y.-S. Kang, K.-H. Kim, K.-A. Kim, J.-Y. Yoon, S.-H. Rhee, and J.-S. Wu (eds.), *Universal Grammar and Individual Languages. Proceedings of SICoL 2010*. Korea University Press. Seoul.

Groenendijk, Jeroen & Martin Stokhof. (1991), 'Dynamic predicate logic'. *Linguistics and Philosophy* **14:**39–100.

Guarino, Nicola. (1992), 'Concepts, attributes, and arbitrary relations: some linguistic and ontological criteria for structuring knowledge bases'. *Data & Knowledge Engineering* **8:**249–61.

Gumperz, J. J. (1982), *Discourse Strategies*. Cambridge University Press. Cambridge.

Gundel, Jeanette K., Nancy Hedberg & Ron Zacharsky. (2001), 'Definite descriptions and cognitive status in English: why accommodation is unnecessary'. *English Language and Linguistics* **5:**273–95.

Hackl, Martin. (2009), 'On the grammar and processing of proportional quantifiers: *most* versus more than half'. *Natural Language Semantics* **17:**63–98.

Hartmann, Dietrich. (1982), 'Deixis and anaphora in German dialects: the semantics and pragmatics of two definite articles in dialectal varieties'. In J. Weissenborn and W. Klein (eds.), *Here and There. Cross-linguistic Studies on Deixis and Demonstration*. Benjamins. Amsterdam. 187–207.

Haspelmath, Martin. (1999), 'Article-possessor complementarity: economic motivation in noun phrase syntax'. *Language* **75:**227–43.

Haspelmath, Martin. (2008), 'Occurrence of Nominal Plurality'. In M. Haspelmath, M. Dryer, D. Gil, and B. Comrie (eds.), *The World Atlas of Language Structures Online*. Max Planck Digital Library. München. Chapter 34. Available online at http://wals.info/feature/34. Accessed on 2010-07-29.

Haude, Katarina. (2006), *A Grammar of Movima*. Ph.D. thesis, University of Nijmegen. (http://webdoc.ubn.ru.nl/mono/h/haude_k/gramofmo.pdf).

Havas, Ferenc. (2004), 'Objective conjugation and medialisation'. *Acta Linguistica Hungarica* **51:**95–141.

Hawkins, John A. (1978), *Definiteness and Indefiniteness*. Croom Helm. London.

Heim, Irene. (1982), *The Semantics of Definite and Indefinite Noun Phrases*. Ph.D. thesis, University of Massachusetts, Amherst, MA.

Heim, Irene. (to appear, 2011), 'Definiteness'. In C. Maienborn, K. von Heusinger, and P. Portner (eds.), *Semantics: An International Handbook of Natural Language Meaning. Volume II*. De Gruyter. Berlin, New York. Ch. 41.

Himmelmann, Nikolaus P. (1997), *Deiktikon, Artikel, Nominalphrase. Zur Emergenz syntaktischer Struktur*. Niemeyer. Tübingen.

Holmberg, Anders. (1993), 'On the structure of predicative NP'. *Studia Linguistica* **47:**126–38.

Jensen, Per Anker & Carl Vikner. (2004), 'The English pre-nominal genitive and lexical semantics'. In J.Y. Kim, Y.A. Lander, and B.H. Partee (eds.), *Possessives and beyond: semantics and syntax*. University of Massachusetts.

Kamp, Hans & Uwe Reyle. (1993), *From Discourse to Logic*. Kluwer. Dordrecht.

Khizanishvili, Tamar. (2006), 'Possession im Georgischen'. In T. Stolz and C. Stroh (eds.), *Possession, Quantitative Typologie und Semiotik*. Brockmeyer. Bochum. 1–76.

Krifka, Manfred, Francis Jeffry Pelletier, Gregory N. Carlson, Alice ter Meulen, Godehard Link & Gennaro Chierchia. (1995), 'Genericity: an introduction'. In G. N. Carlson and F. J. Pelletier (eds.), *The Generic Book*. University of Chicago Press. Chicago. 1–124.

Landman, Fred. (2004), *Indefinites and the Type of Sets*. Blackwell. Oxford.

Lehmann, Christian. (1998), *Possession in Yucatec Maya*. Lincom Europa. München.

Löbner, Sebastian. (1985), 'Definites'. *Journal of Semantics* **4:**279–326.

Löbner, Sebastian. (1987), 'Natural language and generalized quantifier theory'. In P. Gärdenfors (ed.), *Generalized Quantifiers: Linguistic and Logical Approaches*. Reidel. Dordrecht. 181–201.

Löbner, Sebastian. (1990), *Wahr neben Falsch. Duale Operatoren als die Quantoren natürlicher Sprache*. Niemeyer. Tübingen.

Löbner, Sebastian. (2000), 'Polarity in natural language: predication, quantification and negation in particular and characterizing sentences'. *Linguistics and Philosophy* **23:**213–308.

Lyons, Christopher. (1999), *Definiteness*. Cambridge University Press. Cambridge.

Matushansky, Ora. (2008), 'On the linguistic complexity of proper names'. *Linguistic and Philosophy* **31:**573–627.

Nichols, Johanna. (1992), *Linguistic Diversity in Space and Time*. University of Chicago Press. Chicago.

Nikolaeva, Irina. (2003), 'Possessive affixes as markers of information structuring: Evidence from Uralic'. In P. Suihkonen and B. Comrie (eds.), *International Symposium on Deictic Systems and Quantification in Languages spoken in Europe and North and Central Asia. Collection of papers*. Udmurt State University. Izhevsk. Max Planck Institute of Evolutionary Anthropology. Leipzig. 130–145.

Nissim, Malvina. (2004), 'Lexical information and choice of determiners'. In J.Y. Kim, Y.A. Lander, and B.H. Partee (eds.), *Possessives and beyond: semantics and syntax*. University of Massachusetts Occasional Papers in Linguistics 29. GLSA Publ. Amherst. 133–52.

Ortmann, Albert. (2002), *Kategorien des Nomens: Schnittstellen und Ökonomie*. Niemeyer. Tübingen.

Partee, Barbara H. (1987), 'Noun phrase interpretation and type-shifting principles'. In J. Groenendijk, M. Stokhof, and D. de Jongh (eds.), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*. Foris. Dordrecht. 115–43.

Partee, Barbara H. (1997), 'Genitives. A case study. Appendix to Theo M. V. Janssen, Compositionality'. In J. F. A. K. van Benthem and A. ter Meulen (eds.), *Handbook of Logic and Linguistics*. Elsevier. Amsterdam. 464–70.

Partee, Barbara H & Vladimir Borschev. (2002), 'Integrating lexical and formal semantics: genitives, relational nouns, and type-shifting'. In R. Cooper and T. Gamkrelidze (eds.), *Proceedings of the 2nd Tbilisi Symposium on Language, Logic and Computation*. Tbilisi State University. Tbilisi. 229–41.

Petersen, Wiebke. (2007), 'Representation of concepts as frames'. In J. Skilters, F. Toccafondi, and G. Stemberger (eds.), *Complex Cognition and Qualitative Science. The*

Baltic International Yearbook of Cognition, Logic and Communication, vol. 2. University of Latvia. Riga 151–70.

Poesio, Massimo. (1994), 'Weak definites'. In *Proceedings of the 4th Conference on Semantics and Linguistic Theory*. Cornell University Press. Ithaca, NY.

Pustejovsky, James. (1995), *The Generative Lexicon*. MIT Press. Cambridge, MA.

Roberts, Craige. (2003), 'Uniqueness in definite noun phrases'. *Linguistics and Philosophy* **26:**287–350.

Schroeder, Christoph. (2006), 'Articles and article systems in some areas of Europe'. In G. Bernini and M.L. Schwartz (eds.), *Pragmatic Organization of Discourse in the Languages of Europe*. Mouton de Gruyter. Berlin. 545–611.

Schwarz, Florian. (2009), *Two Types of Definites in Natural Language*. Department of Linguistics, University of Massachusetts. Amherst, MA.

Seiler, Hansjakob. (1983), *Possession as an Operational Dimension of Language*. Narr. Tübingen.

Sperber, Dan & Deirdre Wilson. (1995), *Relevance. Communication and Cognition*, 2nd edition. Blackwell. Oxford.

Stanley, Jason & Zoltán Gendler Szabó. (2000), 'On quantifier domain restriction'. *Mind & Language* **15:**219–61.

Storto, Gianluca. (2004), 'Possessives in Context'. In J.Y. Kim, Y.A. Lander, and B.H. Partee (eds.), *Possessives and beyond: semantics and syntax*. University of Massachusetts Occasional Papers in Linguistics 29. GLSA Publ. Amherst. 59–86.

Studler, Rebekka. (2004), 'Voller und reduzierter Artikel in der schweizerdeutschen DP'. In S. Bračič, D. Čuden, S. Podgoršek, and V. Pogačnik (eds.), *Linguistische Studien im Europäischen Jahr der Sprachen. Akten des 36. Linguistischen Kolloquiums in Ljubljana*. Lang. Frankfurt. 625–35.

Tereščenko, Natalja. (1979), *Nganasanskij jazyk* [The Nganasan Language]. Nauka. St. Petersburg.

Thompson, Chad. (1996), 'On the grammar of body parts in Koyukon Athabaskan'. In H. Chappell and W. McGregor (eds.), *The Grammar of Inalienability: a typological perspective on body part terms and the part whole relation*. Mouton de Gruyter. Berlin. 651–78.

Tyler, Andrea & Vyvyan Evans. (2003), *The Semantics of English Prepositions*. Cambridge University Press. Cambridge.

Vieira, Renata. (1998), *Definite Description Processing in Unrestricted Text*. Ph.D. thesis, University of Edinburgh, Edinburgh.

Vikner, Carl & Per Anker Jensen. (2002), 'A semantic analysis of the English genitive. Interaction of lexical and formal semantics'. *Studia Linguistica* **56:**191–226.

Wilson, Deirdre. (1991), 'Reference and relevance'. *University College London Working Papers in Linguistics* **4:**167–91.