Can relational adjectives really express any relation? An onomasiological perspective

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One commonplace about relational adjectives is that they are devoid of meaning and therefore able to express any conceivable relation between base noun and head noun. After an introductory first part, the second part comes to the conclusion that relational adjectives can indeed express any relation, except under three circumstances: a) for general cognitive reasons, the privative relation is never available; b) some relations can be absent due to the interference of a rival pattern; c) lexicalization. In the third and last part of the paper, an onomasiological approach is sketched that describes the decisions a speaker has to make on his way down from concept to utterance.

Keywords*: relational adjective, nisba, blocking, onomasiology, word family*

1. The notion of relational adjective

The notion of relational adjective has been around for quite some time now as an established term not only of theoretically-oriented or descriptive linguistics, but even at the level of grammars addressed to a larger public. In essence, the term is used to refer to denominal adjectives whose suffix is said to serve a purely transpositional function, converting a noun into an adjective. In *solar energy*, for example, the adjective *solar* is taken to mean only 'sun' (cf. German *Sonnenenergie*, lit. 'sun energy'), while the covert relational meaning that links 'sun' and 'energy' is attributed to an extragrammatical, purely conceptual sphere. The following quotation from a recent publication on relational adjectives (Bisetto 2010: 81-82) nicely illustrates the current *doxa*: "That relational adjectives are formed through suffixes with no meaning at all is a shared opinion; the affixes are considered transpositional, i.e. they introduce a category, but are deprived of additional meaning."

1.1 *The meaning contribution of the suffix*

It would be easy to assemble a long list of variations on this theme from other recent publications. May it suffice to refer to Murphy (2004: 455), for whom "in many cases, they are simply adjectival forms of noun concepts", or to Fradin (2008: 76), who similarly states that "[l]a sémantique d'un adjectif relationnel équivaut à celle de son Nb [i.e. nom base]". Most authors seem to think that the relation established by a relational adjective between its nominal base and the head noun it modifies is an automatic consequence of the adjective's occurrence in attributive position, though the mechanism explaining how all this comes about is not normally specified in detail.

Some dissenters, however, exist who believe that the adjective provides at least a minimal, though highly schematic characterization of the relational meaning. In Giegerich's opinion (cf. Giegerich 2005: 578-579), for example, " [t]he morphosyntax provides the basic relationship of 'associated with'", while "the specifics" are said to constitute "encyclopaedic knowledge". In a similar spirit, Lieber (2004: 39-40) claims that relational affixes "do make a semantic contribution, but only insofar as they place their nominal and verbal bases in the

broad semantic category of STATES." Their "semantic content" is said to be "a single semantic feature, in this case [−dynamic]." It is not immediately clear whether there is any substantial difference beyond the wording between the no-meaning-at-all and the minimal-semantics fraction. Since this question is not of vital importance to the central purpose of this paper, I will not further delve into this question here.

1.2. *Dornseiff, Bally and the modern notion of relational adjective*

This notion of a (near-to-)meaningless relational adjective seems to go back to Dornseiff (1921) who already stated that "[d]iese Art Adjektiva […] verrücken bloß den Substantivbegriff ins Attributive" (p. 193), i.e. that this kind of adjective only shifts a substantival notion to attributive position. Or in the same vein: "Diese Art Adjektiva dient bloß dazu, die syntaktische Beiordnung zu ermöglichen" (p. 198). As far as the meaning contribution of the suffix is concerned, he seemed to side with Giegerich by saying that it denotes "some relation that is not further specified": "Das Zugehörigkeitsadjektiv ist gekennzeichnet durch das Freisein von jeder Wertbetonung und von jeder andern logisch-intellektuellen Beziehung als der, daß eine nicht weiter umgrenzte Relation bezeichnet wird" (p. 198). This whole doctrine of relational adjectives being (almost) devoid of meaning and merely transposing a noun into an adjective was then adopted by Charles Bally, who may be credited to have popularized the idea among linguists: "L'adjectif dit 'de relation' transpose des substantifs […] sans rien changer à leur valeur de substantifs" (Bally 1950: 97).

Another common belief concerning relational adjectives also goes back at least to Dornseiff, viz. that relational adjectives do not denote qualities: "Diese Adjektiva bezeichnen nicht eine Eigenschaft" (Dornseiff 1921: 193). We also repeatedly find this idea in the later literature, e.g. in Kalik (1967: 270): "Ces adjectifs à l'état pur […] n'expriment guère la qualité proprement dite d'un objet. Ils en indiquent plutôt le caractère particulier par la relation avec un autre objet." Unfortunately, the authors who hold this view regularly forget to inform us about what a quality is, and how to distinguish a quality from a relation. The conceptual clarification of such fundamental notions has traditionally been deferred to philosophers, so let us turn to these quarters for help. The *Cambridge Dictionary of Philosophy* (Audi 1995) defines a relation as "a two-or-more-place property". If we adopted this philosophical terminology it would be pointless to make a distinction between qualities = properties and relations, since relations are themselves a kind of quality = property. For modern, logic-oriented philosophers the only difference between qualities and properties concerns the number of arguments (one-place vs. two-or-more place). This, however, is not the only definition which has been proposed by philosophers. Blasche (1989) and Steiner (1992) provide a relatively complete history of philosophical ideas concerning the nature of qualities and relations, from Aristotle up to the present day. Of the many attempts to define this elusive notion, the one by Christian Wolff (*Philosophia prima sive Ontologia*, 1730, §§ 452ff.) seems to come closest to the intuitions which probably lie behind the distinction between qualities and relations in Dornseiff (1921) and his followers. As Blasche (1989: 1773) reports, Wolff defined qualities as intrinsic features ("determinatio intrinseca") of things, i.e. features which could be conceptualized without referring to something else, as is the case with relations. Unfortunately, this criterion, which works reasonably well for prototypical cases like *red* and *Greek*, turns out to be of little operative value as soon as you try to apply it to many controversial denominal adjectives such as adjectives of material (E. *golden*, Lat. *aureus*, etc.), as the reader can easily find out for himself.

A last idea concerning relational adjectives which can already be found in Dornseiff and has then been popularized by Bally, is that the peculiar function of the relational adjectives has as a consequence a restricted syntactic behavior. Among these restrictions, the impossibility to use them in predicative position was (and sometimes still is) considered to be the most important one: "Prädikativ kommen sie nicht vor" (Dornseiff 1921:123); "enfin et surtout, il ne peut fonctionner comme prédicat: 'Cette chaleur est solaire' serait inintelligible" (Bally 1950: 102). Recent investigations of the syntactic behaviour of relational adjectives, however, have tended to conclude that syntactic restrictions such as non-predicability or non-gradability are not coextensive with the set of adjectives classified as relational by the semantic criteria mentioned before. Authors like Warren (1984: 86), Post (1986: 109-113), Bosredon (1988), Mezhevich (2002), Nowakowska (2004), Roché (2006b), Fradin (2008) or Bisetto (2010) have therefore concluded that it is preferable to abandon the strict dichotomy between qualifying and relational adjectives. The restricted syntactic behaviour essentially seems to be predictable from the semantic characteristics of individual adjectives.[1] If therefore we continue to use the term relational adjective at all, it should be taken in its literal sense of 'adjective expressing a relation', and therefore include adjective types such as adjectives expressing possession or resemblance which have normally been classified as qualifying adjectives (cf. *mountainous, childish*, etc.). This usage, by the way, as we will see in the next paragraph, in reality constitutes a return to the roots of the term *relational adjective*.

1.3 *The Arabic roots of the notion of relational adjective*

One popular but erroneous belief of the literature on relational adjectives is that the term and the doctrine that comes with it are essentially due to Charles Bally: "Das Relationsadjektiv wurde […] zum ersten Mal von Ch. Bally […] ausführlicher beschrieben" (Wandruszka 1972: 111).[2] In reality, the doctrine of relational adjectives as we know it today seems to be attributable essentially to Dornseiff, as we have already seen. But, as other central terms of word formation like *nomen agentis*, *instrumenti*, *loci*, etc., both the concept and the term eventually go back to Arabic grammar. Arabic has a denominal suffix *-i* which nowadays forms adjectives that can express almost any relation, as we will see, called *nisba* (lit. 'relation') in Arabic grammar (cf. Druel & du Grandlaunay 2008).[3] As far as I can tell, this term of Arabic grammar was first introduced into the Occidental tradition by the French Arabist Sylvestre de Sacy in his Arabic grammar from 1810. This grammar contains a chapter called "Adjectif relatif", which treats essentially the formal complexities of the *nisba* adjectives, but in paragraph 646 it also briefly refers to the origin of the term and the semantic functions of such adjectives: "L'adjectif nommé par les Arabes […] *nom relatif* ou […] *relation*, est celui qui indique des relations d'origine, de qualité, de pays, de famille, de secte, de clientelle, etc. Il dérive d'un nom ou d'un adjectif, et se forme en ajoutant [iyyun] à la fin du primitif […]." What is most noteworthy here, from the semantic perspective, is that the author also mentions 'quality' as a possible meaning of this suffix. What is meant by this term becomes clearer in paragraph 104 of Gorguos' Arabic grammar from 1849: "Nous désignons sous ce nom les adjectifs qui expriment une relation de l'objet qualifié avec son origine, une secte, une couleur, un pays, etc. Ainsi mahométan, africain, cendré, céleste, sont des adjectifs relatifs." The *nisba* adjectives, as we can see, can also express colours such as 'ash-coulored' or 'sky-blue', based on a relation of resemblance with a prototypical bearer of the colour in question.[4] Gorguos, by the way, used both *adjectif relatif* and *adjectif de relation*

for designating the *nisba* adjective. In the first Indo-European work to use the term *adjectif de relation*, Chansselle's description of Latin word formation from 1843, it is applied to adjectives of material ending in *-eus*: "2° Les Adjectifs formés de *ĕus* sont des adjectifs de relation qui signifient la *matière* dont une chose est faite: *aer-eus* d'airain, *aur-eus* d'or, *argenteus, ferreus, lapideus, igneus*" (p. 36).[5]

At least in modern Arabic as represented in the Langenscheidt Arabic-German dictionary (Kropfitsch 2005), the *nisba* suffix, apart from relations also considered as typical for relational adjectives in the prevalent linguistic tradition, can also express material, possession and resemblance, as can be seen in table 1, whose examples are representative of dozens of similar formations (*-a:ni:* is an "intensive" variant of the *nisba* suffix; cf. Druel & du Grandlaunay 2008: 379):

relation	adjective	meaning	base	meaning
'made of'	ʤibsi:	plaster, adj.	ʤibs	plaster, n.
	blasti:ki:	plastic, adj.	blasti:k	plastic, n.
	ħadi:di:	iron, adj.	ħadi:d	iron, n.
'(provided) with'	ʤabali:	mountainous	ʤabal	mountain
	ʃaˤra:ni:	hairy	ʃaˤr	hair
	duhni:	greasy	duhn	grease
'like'	tibni:	straw-coloured	tibn	straw
	muxmali:	velvety	muxmal	velvet
	ʔisfi:ni:	wedge-shaped	ʔisfi:n	wedge

Table 1 *Nisba adjectives expressing material, possession and resemblance*

1.4 *All-purpose vs. dedicated relational suffixes*

As we have already briefly mentioned at the beginning, linguists attribute no meaning at all to the suffixes of relational adjectives or at most some highly schematic meaning. The relational meaning that links the base noun of the adjective and the head noun of the noun phrase is considered as extra-linguistic in nature, intimately linked to the conceptual knowledge associated with the two nominal concepts in long-term memory and, occasionally, to the immediate context of utterance. During the Seventies and the Eighties of the last century several scholars have established catalogues of preferred relational meanings, of which those established by Downing, Levi and Warren are the most elaborated ones (Downing's and partly also Levy's lists are based on noun-noun compounds rather than relational adjectives, but these two types of word formation are considered to be equivalent with respect to the semantic problem at hand). As can be seen in table 2, Levi characterizes the relation directly, while Warren systematically prefers to use pairs of terms defining the semantic role of the head noun and the base noun respectively. Downing resorts to a mixed system.

Downing (1977)	Levi (1978)	Warren (1984)	Example
product	be, about, make	source-result	*financial problem*
	?be	result-source	*tragic death*
	in	norm-adherent	*orderly succession*
whole-part	have	whole-part	*federal budget*
part-whole	have	part-whole	*oily water*
place	in	place-object	*urban centers*
time	in	time-object	*colonial wars*
	in	object-place	*industrial city*
		object-time	*colonial times*
composition	from + ?make	origin-object	*central heating*
	cause	result-causer	*controversial issue*
	cause + use	causer-result	*electric shock*
occupation		affected obj.-actor	*naval architect*
purpose	for	goal-instrument	*polar equipment*
comparison		comparant-compared	*Roman nose*

Table 2 *Three classifications of covert relations*

The status of these relations has been the object of controversies. Levi considered the list to be closed. Downing, on the contrary, argued that these were merely preferred relations, while under special circumstances a great number of other relations could be observed. This is also the position defended in Warren (1984: 292, 294):

> In these and in all other empirical investigations of opaque semantic connections that I have come across, these same types of relations figure to a greater or lesser extent. In fact, it is possible to maintain that there is a set of favoured covert relations, which is not restricted to any particular type of modifier-head construction but in principle available when we wish to shorthand some connection. […] [P]rovided our head noun contains quite specific semantic clues and provided the meaning of the modifier can plausibly complement these, there is no need to keep to the set of favoured covert relations.

Not all languages have all-purpose relational suffixes, and even those that have such suffixes normally also have a set of more dedicated denominal adjectival suffixes, i.e. suffixes expressing only one specific relation or a small set of such relations. The German situation displayed in table 3 (based on Fleischer 1975: 254-277) can be considered as representative in two respects at least. On the one hand, German has dedicated suffixes for the five probably most widespread semantic categories among denominal adjectives from a cross-linguistic perspective, viz. resemblance, possession (in a wide sense), privation, material, and place (location, origin).[6] On the other hand, it shows patterns of polysemy which also seem to be widespread cross-linguistically. As one can see, all German all-purpose suffixes have a corresponding resemblance reading, and the same holds true for the material and possessive suffixes. It is tempting to surmise that these recurrent patterns of polysemy have a natural cognitive foundation, which, however, remains to be described.[7]

relation	*-e(r)n*	*-er*	*-haft*	*-ig*	*-isch*	*-lich*	*-los*	*-mäßig*
all-purpose					+	+		+
'like'	+		+	+	+	+		+
'made of'	+							
'having'			+	+		+		
'without'							+	
'in, from'		+			+			
'required by'								+

Table 3 *Semantic classification of German native adjectival suffixes*

The more dedicated suffixes generally express relations which are also covered in principle by the all-purpose suffix(es). In other words, there is, at least in principle, competition between the all-purpose suffix(es) and the dedicated suffixes. The only relation which seems to be absent systematically from otherwise all-purpose relational suffixes even without competitors is the privative relation (called 'caritive' in Uralic linguistics). Relational adjectives apparently never mean 'without N', which is probably why so many languages have dedicated privative suffixes such as English *-less*, German *-los*, etc. The systematic absence of the privative relation, at least from the set of preferred relations, is certainly attributable to some general cognitive reason. Apparently, relations can be of any kind, but they should be "positive" relations. In fact, it would greatly hinder communicative efficiency if adjectives could express at the same time the possessive relation and the privative relation: *emotional statement*, for example, could then mean at the same time 'statement that expresses emotions' and 'statement that does not express emotions'.

The nature of the competition between an all-purpose and a dedicated suffix can be of various types: a) in some cases, the dedicated suffix curtails the domain of the all-purpose suffix; b) alternatively, the dedicated suffix and the all-purpose suffix can be in a relationship of more or less free variation; c) and last but not least, the domains of the two can be disjunctive sets due to the restrictions attached to the suffixes, which means that the competition is only apparent. Unfortunately, most manuals and more generally descriptions of word formation are too vague to allow answering these questions satisfactorily. In the study of the semantics of all-purpose relational adjectives, the whole array of competing dedicated suffixes must be taken into account, since the absence of some relation from the all-purpose suffix(es) could well be attributable to the preference of the language for some more dedicated suffix. As we will see in the next section, this caveat not only concerns competing dedicated suffixes, but also all other rival patterns, irrespective of their internal structure.

2. Relational adjectives and their non-derivational competitors

2.1 *Production and interpretation*

As other linguistic phenomena, relational adjectives can also be approached either from the point of view of production or interpretation. Depending on which perspective you adopt, the

problems involved vary considerably. If as a speaker you look for a term to express the concept 'bicycle for cycling on Mars', the concept is given, though you still might have to adjust it somewhat by choosing the relevant concepts which you want to get formal expression. In a second step you will have to decide between a range of formal options such as *Mars bicycle*, *Martian bicycle* or, why not, *marsycle*. In the interpretative scenario, on the contrary, your interlocutor has already resolved the formal side for you, but you have the task of figuring out the concept which the speaker wants to convey. The linguistic disciplines corresponding to these two perspectives are, respectively, onomasiology and semasiology.

Work on relational adjectives often is not placed clearly in one of these two perspectives. Early investigations in the transformational-generative (cf. Wandruszka 1972) or semantic-generative (cf. Levi 1978) tradition could be assimilated to the onomasiological perspective up to a certain point, since they start out with a syntactic or semantic "deep structure" and then try to derive "surface forms" in a series of transformational steps. But generative models of course should not be interpreted as production models, though in the early stages of generative grammar there was quite some confusion on this point even among generative linguists themselves.

As far as the interpretive perspective is concerned, there is by now a substantial body of work focusing exclusively on the interpretation of relational adjectives or noun-noun compounds. One could mention Post (1986) as an early linguistically-oriented contribution, or Štekauer (2005) for a more recent one. However, over the last years it is mainly psycholinguists who have made of this question a focus of their work. On the basis of the syntheses contained in Gagné & Spalding (2010) and Spalding, Gagné, Mullaly & Ji (2010) the state of the art can be summarized in the following terms. As a first step head and modifier must be identified, since this distinction fundamentally influences further processing. The modifier has been found to be more important for the choice of the relation than the head noun in root compounds. The information concerning the preferred relation is stored at the conceptual level, not at the level of lexemes. The general frequency of a relation does not affect processing, while the strength of the relational association at the level of the concepts involved does, as well as the competing relations at that level. Relations are activated in parallel and compete for selection. Encyclopaedic information associated with the head noun plays an important role in evaluating the different competing relations. As far as the relations themselves are concerned, the researchers are not yet sure whether they are separately stored in long-term memory or only part of the concepts associated with lexical entries, but they tend to think of them as hierarchically organized ('to have as part' or 'to possess', for example, would constitute sub-relations of 'to have'). Once one relation is chosen, hearers often have to further elaborate the concept in order to get the full meaning.

2.2 *Relational adjectives and their competitors*

The following discussion will adopt an onomasiological perspective on relational adjectives from a general grammatical perspective. That is, we are not asking how a particular relation present in a particular concept is expressed by a particular speaker in a particular situation, but compare formal patterns for the expression of noun-noun relations from a comparative perspective.

The fact that it is recommendable in word formation to study patterns with the same function together in order to better identify common as well as differentiating features has been recognized since the end of the 19th century (for Romance, cf. Meyer-Lübke 1890).

Concerning relational adjectives, Wackernagel (1908) first brilliantly studied the competition between relational adjectives and the genitive in old Indoeuropean languages.[8] The genitive, though, is not the only possible competitor. In many languages, noun-noun compounds, prepositional phrases or attributivizers can do the same or a similar job. Last but not least, as we have already seen, other more dedicated derivational patterns also compete with relational adjectives in many languages. In the following subsections, we will address these competing patterns in turn.

2.2.1 *The genitive*

2.2.1.1. Latin. De Groot (1956-57) is an interesting study of the Latin genitive which is highly relevant to our purpose. He starts out (cf. pp. 10-12 of the article) reviewing the thirty types of Latin genitives that grammarians have distinguished, all with their separate names like *genitivus possessivus* (e.g. *hortus patris*), *genitivus coniunctivus* (e.g. *patria hominis*), down to *genitivus exclamativus* (e.g. *O mercis malae!*). He then asks himself whether it is really necessary to attach 30 different meanings to the genitive in Latin, opting for radical simplification: "I suspect that we may formulate the actual state of affairs by saying that the proper genitive may be actually used for any relation, *except for disturbing factors*, and define *disturbing factors* as the competition with another, more efficient, expression in the language." (p. 36). What he has in mind when talking of "disturbing factors" can be seen in his treatment of the *genitivus materiae*, which is so infrequent in Latin texts that some scholars have even doubted that it existed at all: "[T]he genitivus materiae [of the type *pocula auri*, F. R.] cannot compete with the more precise, consequently more effective, construction with a preposition, *pocula ex auro*, *pocula de auro*, or with an adjective, *pocula aurea*, or even *pocula ex auro facta*." (p. 37). De Groot apparently thought that of two competing patterns the semantically more "precise" one would win over the more generic one. If only things were that simple! In reality, we often find the genitive and other more precise patterns side by side, and in the case of all-purpose relational adjectives "precision" cannot make a difference anyway with respect to the genitive, since both can designate "any relation".

2.2.1.2. Slavic. Slavic languages present two highly interesting cases of competition between relational adjectives and the genitive.

The first case concerns the inability of some Slavic languages to express the direct-object relation between an action noun and its logical object (theme) by means of relational adjectives, which is all the more surprising since Slavic languages are renowned for their otherwise abundant use of relational adjectives. A concept such as 'silver production', for example, can only be realized as a sequence action noun + noun in the genitive in Slovak, as the examples (1a) and (1b), kindly provided by Pavol Štekauer, illustrate (REL = relational suffix):

(1) a. *výroba striebr-a*
production silver-GEN
b. **striebor-n-á výroba*
silver-REL-INFL production
c. *striebor-n-á lyžica*
silver-REL-INFL spoon

The wellformedness of example (1c) proves that this impossibility is not due to some restriction concerning the adjectival suffix involved, since the relevant relational adjective in fact exists and is used in other combinations which do not involve an action noun, such as 'silver spoon'.

The direct-object relation can equally be banned from noun phrases containing an agent noun. Mezhevich (2002: 96, 106) wonders why English synthetic compounds like *van driver* cannot be translated into Russian as a combination of agent noun + relational adjective (cf. 2b), but only as a genitive construction (cf. 2a):[9]

(2) a. voditel' furgon-a
driver van-GEN
b. *furgon-n-yj voditel'
van-REL-INFL driver

Her answer to this question is that the ungrammaticality of (2b) is due to an interaction between word formation and the syntax. The relational adjective is well-formed as such, but cannot go into the adjective position due to a general syntactic principle that does not allow deep-structure determiner phrases to move into adjective-phrase positions. This principle is attributed to Kayne (1981), who used it to explain the difference in grammaticality between *China's invasion by Russia* and **the Chinese invasion by Russia*. As a syntactic layman I will not try to assess the merits of this syntactic principle, but only adduce two observations that make me feel sceptic. The first is that a quick inspection of the World Wide Web with the Google search engine churns out dozens of examples of the type *the Russian invasion by Napoleon*, *the Afghan invasion by Russia*, *the Polish invasion by Germany*, *the Chinese invasion by Japan*, and the like, many of which apparently occur in authoritative documents. The second observation is that the combination action noun + relational adjective is among the most productive uses of relational adjectives in Romance languages (cf. Spanish *producción platera* 'silver production', lit. production silver-REL).

It therefore looks as if Mezhevich's explanatory edifice were built on shaky syntactic ground. However, if we do not accept her explanation, how are we then going to account for this surprising lacuna in the domain of relational adjectives in some Slavic languages?[10] In all humility appropriate in such matters for a non-Slavicist, I would like to argue here that the lacuna is paradigmatically determined. Slovak speakers have in their mental lexicon hundreds, probably even thousands of established terms of the structure action noun + genitive, corresponding to English synthetic compounds like *silver production*, *blood transfusion*, and the like. This endless memorized series of terms is best accounted for in the grammar by means of a lexical construction in the sense of Construction Grammar (cf. Booij 2010), whose peculiarity with respect to other lexical constructions only consists in the fact that its internal makeup is syntactic. In diachronic terms, it is the result of a reanalysis of a syntactic genitive construction as a lexical construction, which can now be used directly for the creation of novel terms of this type. If we are prepared to accept this analysis, we can explain the direct-object lacuna as a consequence of the curtailing of the domain of relational adjectives by the more specific lexical genitive construction. The whole problem has become a lexicon-internal affair.

Is this blocking effect deducible from general principles? Van Marle (1986) proposed what he dubbed the "Domain Hypothesis", according to which the domain of a default pattern is automatically curtailed by a more specific pattern which is a proper subset of the

general case (in fact, this kind of constellation corresponds to what is also known as Panini's principle or the Elsewhere Principle). If this principle where of universal validity, our Slavic examples would be readily explained by it. Unfortunately, however, Panini's principle does not apply across the board in word formation. As we will see later on, rival patterns with a subset relation can either show blocking, as in the Slavic case, or they can be used side by side. Which one of these two constellations obtains must be learned by the speaker from positive evidence in the linguistic input to which s/he is exposed. This learning is relatively straightforward if s/he encounters both patterns in the input: S/he will infer that both are possible and try to find out whether there are conditions which favour one pattern over the other in particular instances. But if s/he only encounters one of the two patterns in the input, how is s/he going to conclude that the other one is impossible, without negative evidence? I think Goldberg (2006: 96) has provided the correct answer to this problem of language acquisition. She surmises that learners resort to hypothetical reasoning of the following kind: I have encountered a lot of instances of pattern A, but no instance of the semantically equivalent pattern B. If pattern B were a legitimate part of the language, I should have heard instances of it a lot of times. Since this is not the case, it is safer to stick to pattern A. This reasoning presupposes that pattern B is effectively absent from the input, which seems to be true for our Slavic cases.[11]

The second interesting case from Slavic concerns the competition between the genitive and the possessive adjective, brilliantly described by Corbett (1987). This latter term in Slavic linguistics refers to relational adjectives derived from proper names, such as *Jan-ow* 'John's' in the following example from Upper Sorbian:

(3) *Jan-ow-a kniha* vs. *?kniha Jan-a*
Jan-REL-INFL book book Jan-GEN

Wackernagel (1908: 143, 145) had already shown that the relational adjective here corresponds to the older construction, which in fact goes back to Proto-Indo-European, while the genitive penetrated this domain only later. Corbett describes in great detail how far this penetration has gone in the different Slavic languages and shows that the "cut-off point" between the two patterns differs from one language to the next. Importantly, the exact location of this cut-off point is not deducible from other features of the grammar in question, and therefore has to be learned from the data, probably through the kind of hypothetical reasoning just described.

2.2.2 *Nominal compounds*

The reason why relational adjectives and also the genitive are so frequently used for the expression of noun-noun relations in Slavic languages probably has to be sought in their dearth of compounding, which instead is the preferred lexical pattern for expressing classificatory concepts in German and, to a lesser degree, other Germanic languages. In what follows, I will only treat three cases of competition among relational adjectives and noun-noun compounding in German, one where relational and compound patterns are in complementary distribution, one where both patterns coexist pacifically and a third one where cases of blocking at the lexeme level can be observed.

The conclusions reached in 2.2.1.2 seem to be corroborated by Gunkel & Zifonun's (2008) contrastive study of relational adjectives in German, English and French. These authors point out (cf. p. 294) that, as in English and French, relational adjectives in German

may realize the subject argument, but contrary to English and French, they cannot realize the object argument: *städtische Reinigung* lit. 'urban cleaning', for example, can only mean 'cleaning by the city', not 'cleaning of the city'. More interestingly, they establish a complementary relationship between constructions with a relational adjective and noun-noun compounds:

> As a first generalization, one might say that in German relational adjectives and non-head constituents of compounds, in construction with nominalizations of transitive verbs, are in complementary distribution with respect to their thematic roles; in construction with nominalizations of intransitive verbs, relational adjectives may fill the gap left behind by the lacking agent slot in a compound.

German compounds, though seemingly of universal applicability, cannot realize an agent argument in first position, while relational adjectives can: 'the cleaning of the streets by the city', for example, can be realized as *die städtische Reinigung der Straßen* lit. 'the urban cleaning of the streets', but not as **die Stadtreinigung der Straßen* lit. 'the city cleaning of the streets'. Vice versa, 'the cleaning of the city by municipal workers' can be expressed by *die Stadtreinigung durch Gemeindebedienstete* lit. 'the city cleaning by municipal workers', but not by **die städtische Reinigung durch Gemeindebedienstete* lit. 'the urban cleaning by municipal workers'. It is tempting to establish a causal relationship between the high productivity of synthetic compounds in German and the absence of relational adjectives realizing an object, in much the same way we established a causal relationship between the genitive and relational adjectives in Slavic.

Let us now pass on to our second case. The 'made of' relation can be expressed in German either by nominal compounding or by means of the suffix *-en* (or its variant *-ern*): Wool socks, for example, may be called *Wollsocken* (a compound) or *wollene Socken* (composed of a material adjective and a noun). The same is true for all concepts of this kind for which an adjective in *-en* or *-ern* is available, though there is a sharp frequency bias in favour of the compounds, as table 4 shows (frequency according to Google):

base noun	RA + head	Google	compound	Google
Wolle 'wool'	*~ne Socken* 'socks'	4.360	*Wollsocken*	971.000
Holz 'wood'	*~erne Tisch* 'table'	7.480	*Holztisch*	1,700.000
Kupfer 'copper'	*~ne Kessel* 'kettle'	10.500	*Kupferkessel*	221.000
Eisen 'iron'	*~rne Ring* 'ring'	7.400	*Eisenring*	342.000
Leder 'leather'	*~ne Tasche* 'bag'	18.500	*Ledertasche*	4,850.000

Table 4 *Relational adjectives vs. noun-noun compounds in the material domain*

The reason for preferring one pattern over the other is difficult to pin down with precision. The most reasonable guess probably is that the adjective is resorted to when speakers want to be "descriptive", while the compounds are preferred for classificatory purposes. But the functional difference, if there is indeed one, is quite elusive.

In our third example from German the competition between the relational adjective and compounding presents itself in a completely different way. The reason possibly is that here both patterns clearly serve a classificatory function. They therefore give rise to stable terms, which apparently pretend to represent their concept exclusively, without competitor.

Benzing (1968) had already noted that the choice for one or the other pattern in single instances is more or less arbitrary from a synchronic perspective. For the concept 'paternal authority', for example, German prefers the relative adjective over nominal compounding: 6,780 occurrences of *väterliche Gewalt* in Google vs. 939 of *Vatergewalt*. The concept 'fatherland', on the contrary, is almost exclusively expressed by the compound *Vaterland* (4,660.000 occurrences, vs. 340 for *väterliches Land*, most of them spurious). In these cases, the competition has to be defined at the level of individual lexemes, not at the level of the patterns, and neologisms are probably formed by following the pattern of the nearest neighbour, very much like in the case of the adjective-noun constructions studied by Schlücker & Plag (2011).

2.2.3 *Prepositional phrases*

The syntactic category specializing in the expression of relations is prepositions (or postpositions, in some languages). In languages where prepositional phrases may be part of noun phrases of the type N + PP, one straightforward means of expressing concepts of the structure 'noun + relation + noun' is to add a prepositional phrase to a head noun. As is well-known, such structures are the most frequent strategy of term formation in Romance languages, which have no genitive (with the exception of Romanian), few noun-noun compounds and a limited set of relational adjectives, especially for expressing everyday concepts. The concept 'wind mill', for example, is expressed in French by *moulin à vent*. An early, insightful study of the particularly intricate competition between these structures in French is Wandruszka (1972), that would deserve a remake on the basis of modern theories of word formation and the spectacularly increased data at our disposal (corpora, World Wide Web). In the present context, I must limit my discussion of prepositional phrases in Romance to one interesting case from Spanish (essentially the same case could be made for French, by the way).

Let us begin with Latin. This language had a dedicated material suffix, *-eus*, but nouns denoting material could also be derived by means of another relational suffix, *-arius*. There seems to have been a relatively neat division of labour between these two suffixes: While *-eus* expressed the notion 'made of' and its metaphorical extension 'as if made of', *-arius* expressed other typically relational meanings. From *argentum* 'silver', for example, you could derive *argenteus* 'made of silver' (cf. *vasum argenteum* 'silver vase'), but also *argentarius* 'silver-', as in *creta argentaria* 'chalk for polishing silver'. Similarly, from *buxus* 'box wood', you had *sorticula buxea* 'slate made of box wood' and *auctio buxiaria* 'box wood auction'. Now, what would one expect to happen if the dedicated material suffix *-eus* dropped out of the language? If it were true that relational adjectives can express any relation, one might expect *-arius* to take over the relation previously covered by *-eus*. We have already seen, for example, that the Arabic *nisba* suffix routinely expresses the relation 'made of', and the same is true of Slavic relational suffixes (cf. Polish *drut stalowy* 'steel wire' vs. *przemysł stalowy* 'steel industry', Post 1986: 16). The material suffix *-eus* really disappeared on the way to Romance, but the successor of *-arius* did not take over its function. The relation 'made of', on the contrary, is everywhere productively expressed by a prepositional phrase, generally headed by the preposition corresponding to Latin *de* (in French, also by *en*). A wool sock in Spanish is a *calcetín de lana*, lit. sock of wool, not a **calcetín lanero* (*-ero* is the relational suffix corresponding to Latin *-arius*), a wooden desk a *mesa de madera*, not a **mesa maderera*, a silver cup a *vaso de plata*, not a **vaso platero*, and so on. (Note that these adjectives all occur in relational uses such as *producción lanera*, *maderera*, *platera* 'wool,

wood, silver production'.) How is this set of facts to be interpreted? One way of looking at it would be to say that the prepositional phrase *de N* curtails the domain of the relational suffix *-ero*. The prepositional phrase, of course, represents a lexical pattern with internal syntactic structure, that is, the competition would take place among lexical patterns very much like in the case of the Slavic genitive. There is, however, another possible interpretation. If Roché (2006a) is right in his claim that Latin *-arius* had a semantic restriction imposed on it to the effect that it could only be used if the resulting noun phrase referred to some activity, one could also say that this semantic restriction prevented *-arius* from extending its domain to the 'made of' relation, which can be viewed as static, at least as long as you focus on the resultant object and not on the process of elaboration. In that case, it would not be correct to say that the relationship in Spanish of *de N* and the relational adjective in *-ero* is one of blocking, since the 'made of' relation would not be part of *-ero*'s domain. It is not currently clear to me whether there is a principled way to decide this question.[12]

Competition between relational adjectives and prepositional phrases is also amply attested in Slavic languages. In Polish, for example, beside *szkłana butelka* 'glass-REL bottle' we also find *butelka ze szkła* 'bottle (made) of glass'. Post (1986: 15) reports that one Polish linguist surmised that "[t]he speaker uses a case form when he intends and is able to name a given relationship in a precise and unambiguous way; otherwise, when he does not intend, or is not able to say clearly what sort of a relationship obtains between two objects, he uses a denominal adjective". Whatever the merits of this characterization, we seem to have here another case of free variation where the choice is determined by communicative intention.

Not all languages, by the way, allow a prepositional phrase to be combined directly with a noun in a noun phrase. Those languages, however, sometimes have so-called attributivizers, i.e. affixes or particles which serve as a link between the head noun and the prepositional phrase, thereby allowing its use in a noun phrase. One such language is Hungarian, which uses the suffix *-i* as an attributivizer (ATTR):

(4) *Hatástalan volt az ebéd után-i beszélgetés.*
ineffective was the lunch after-ATTR conversation
'Conversing/the conversation after lunch was ineffective.'

This sentence has been taken from Laczko (to appear), where it is discussed in another context. As the authors kindly wrote me, this attributivizing suffix can also "derive adjectives from noun stems in a very general relational sense: '(x) related to N'. The noun typically denotes an occupation, function, institution, location, abstract notion, a branch of art or science, period, personal name (but it cannot be attached to nouns denoting a material, animal or plant and to nouns which end in *-i* or *-ció*, and which are acronyms)." In Hungarian, therefore, the attributivizer would also have to be taken into account in an onomasiological study of relational adjectives an their competitors.[13]

2.2.4 *Derivation*

The most common case of competition in the realm of relational adjectives probably is that with more dedicated derivational patterns. We have already seen that such may have been the case in Latin, where the relational suffix *-arius* does not seem to have encroached on the domain of *-eus*. Though this case has been seen to be open to another interpretation, relevant cases could be adduced from many languages. Unfortunately the semasiological style prevailing in handbooks of word formation only rarely allows definitive statements on the

nature of the competition between suffixes. I will limit myself here to one interesting case from Arabic, a language which is particularly apt for this kind of study since the *nisba* suffix comes close to an all-purpose suffix.

In order to better understand the situation in Arabic, let us begin with a look at the corresponding English data in (5). In English some personal qualities such as 'stupid' and some psychic states such as 'sad' can be expressed by simple adjectives. In that case, the corresponding quality/state noun is expressed by suffixation. With another set of concepts such as 'courage' or 'anger', however, the abstract noun is a synchronically non-derived word. In order to get the corresponding concept in adjectival form, the language resorts to derivation. The semantic interpretation of the relations obtaining between the three columns in (5) has been a highly controversial issue since the medieval dispute about the nature of universals. While some think that the primary adjective and the corresponding quality noun have the same meaning, others attribute to quality/state nouns the function of presenting the quality/state as an abstract entity. Those who adhere to the pure-transposition view should consequently also defend the idea that the adjectives of the third column derived from primary abstract nouns have the same meaning as the base nouns and that suffixes like *-ous* or *-y* consequently are also purely transpositional. This latter position, however, is rarely defended in the literature. In most handbooks and dictionaries, suffixes like *-ous* and *-y* are classified as possessive suffixes, and the meaning of the adjectives is consequently glossed as 'having N', 'being characterized by N', 'being in a state of N', or the like. In Warren's classification presented in table 2 and footnote 1, for example, the meanings of these suffixes are classified as a subtype of the PART-WHOLE relation, viz. FEATURE-WHOLE for qualities and EXPERIENCE-EXPERIENCER for states. Such a classification, however, is not uncontroversial (cf. Winston, Chaffin & Herrmann 1987).

(5)	E. *stupid*	*stupid-ity*	—
	sad	*sad-ness*	—
	—	*courage*	*courage-ous*
	—	*anger*	*angr-y*

For our purpose, we need not side with one of the semantic theories presented. Furthermore, for simplicity's sake, we will limit the discussion to state nouns. The most interesting observation in our context concerning Arabic is that in this language very few cases of the *anger*/*angry* type are attested. In my perusal of the Langenscheid Arabic-German dictionary I could only find *xalwa* 'loneliness'/*xalawi:* 'lonely', *ħama:s* 'enthusiasm'/ *ħama:si:* 'enthusiastic', and *ʃadʒw* 'nostalgia'/*ʃadʒawi:* 'nostalgic'. A pair like *ħubb* 'love'/ *ħubbi*: 'love-' is not pertinent here, since the derivative is not of the EXPERIENCE-EXPERIENCER type, but denotes other relations (as in *love poem*). The immense majority of state nouns, on the contrary, have no corresponding *nisba* adjective, which is surprising at first sight, since the *nisba* suffix is an all-purpose relational suffix and should therefore also be able to express the EXPERIENCE-EXPERIENCER relation. I would like to argue that this lacuna is again paradigmatically determined. As can be seen in (6), Arabic has a special – now unproductive – pattern for deriving state adjectives, the *faʕil* pattern,[14] which apparently has precedence with respect to the *nisba* suffix. Note that the *faʕil* adjectives are not derived from the corresponding state nouns of the first column, rather both the state adjectives and the state nouns are derived from the same root (or the stative verbs of the third row, if you prefer).

(6)	*kamad* ‘distress’	*kamid* ‘distressed’	*kamida* ‘to be distressed’
	ʤaðal ‘happiness’	*ʤaðil* ‘happy’	*ʤaðila* ‘to be happy’
	nakad ‘unhappiness’	*nakid* ‘unhappy’	*nakida* ‘to be unhappy’
	qalaq ‘concern’	*qaliq* ‘concerned’	*qaliqa* ‘to be concerned’
	θamal ‘inebriation’	*θamil* ‘drunk(en)’	*θamila* ‘to be drunk(en)’
	ħanaq ‘anger’	*ħaniq* ‘angry’	*ħaniqa* ‘to be aangry’
	ʤaza ʿ‘concern’	*ʤazi ʿ*‘concerned’	*ʤazi ʿa* ‘to be concerned’

The *faʿil* pattern, by the way, is not the only pattern which can be used for deriving state adjectives, but it is sufficient here to illustrate the kind of blocking relation that I suppose to be operative in Arabic. This whole problem would certainly deserve one day closer scrutiny from specialists of Arabic morphology.[15]

2.2.5 *Conclusion*

Our inspection of a range of competitive constellations between relational adjectives and other attributive constructions has allowed us to identify four fundamental situations. In some cases, the relational adjective and some other construction live side by side. We found some evidence that the choice in cases such as German *Wollsocken* ‘wool socks’ vs. *wollene Socken* ‘woolen socks’ or Polish *szkłana butelka* ‘glass-REL bottle’ vs. *butelka ze szkła* ‘bottle (made) of glass’ could be dictated by communicative function. But this is not a necessity: Probably it will also be possible to find cases of authentic free variation, even though in general languages have a tendency to avoid total synonymy. The opposite constellation was constituted by cases where a more dedicated pattern curtailed the domain of a more general relational pattern, as is the case for the genitive after action or agent nouns in Slovak or Russian, the state adjectives in Arabic and possibly the *de N* construction for expressing the ‘made of’ relation in Spanish. In these cases a relationship of blocking obtains (on blocking, cf. Rainer 2012). I followed Goldberg in her explanation about the acquisition of such constellations via hypothetical reasoning. By the way, it is not necessarily the relational pattern which constitutes the general case: In modern Slavic languages, for example, it seems more appropriate to consider the genitive as the general case whose domain is curtailed to different degrees by the possessive adjective. While this second kind of constellation is situated at the level of patterns, the third constellation involves blocking by individual lexemes: Well entrenched terms of one type which express stable concepts tend to hinder or completely block terms formed according to a rival pattern. As we have seen, in German the concept ‘paternal autority’ is preferably expressed by *väterliche Gewalt*, which does not completely suppress the rival compound noun *Vatergewalt*, but confines it to a more marginal existence. Neologisms in such cases are formed by following the model of the nearest neighbour: For ‘maternal authority’, *mütterliche Gewalt* would also seem to be a more natural choice than *Muttergewalt*.

At a more general level, we may conclude that relational adjectives indeed seem to be able to express any relation, in accordance with the prevalent opinion, except for the privative relation and for cases where some specific relation is blocked due to the interference of a rival pattern.[16] Since blocking presupposes the mental lexicon (cf. Rainer 1988: 164), this also means that only theories of morphology which are based on the mental lexicon are in a position to adequately deal with the paradigmatic interactions described in this section.

3. From concept to utterance

In the second part of this paper, I have compared patterns which in some way compete with each other for the expression of some relation between two nominal concepts. This can be classified as an onomasiological approach, since it compares patterns apt to express one and the same function. While this kind of pattern-comparing onomasiological approach goes back to the end of the 19th century, in more recent times some scholars (cf. Štekauer 1996, Grzega to appear) have advocated for a different kind of onomasiological approach which comes close to a production model, though without psycho- or neurolinguistic pretensions. In the spirit of such models, one starts out with the concept to be expressed and then describes the different choices a speaker has to make in order to arrive at an adequate expression for that concept. In this third part of my paper I will take such a perspective with respect to the expression of complex concepts consisting of two nominal concepts linked by some relational concept, which is the core competence of relational adjectives.

3.1 *The role of communicative function*

In our discussion of cases of free variation such as German *Wollsocken* 'wool socks' vs. *wollene Socken* 'woolen socks' or Polish *szkłana butelka* 'glass-REL bottle' vs. *butelka ze szkła* 'bottle (made) of glass' we have already noted that communicative intention might make a difference. Warren (1984: 86) distinguishes three fundamental functions of attributive constructions: (a) identification/specification (ex.: *the citizen's rights*); (b) characterization/ description (ex.: *healthy food*); (c) classification/categorization (ex.: *civil rights*). If one had to construct an artificial language, one would probably establish one-to-one correspondences between these three functions and formal patterns. Natural languages, as is well-known, hardly ever show such simple correspondences, and a closer analysis of attributive constructions shows that they deserve their reputation of having a preference for what seems to be unnecessary complexity. In fact, it turns out that most attributive constructions can fulfil all three functions at the same time, under conditions that are hard to pin down exactly. In English, the main function of the genitive seems to be that of identification (see above), but the language also has what are called "descriptive genitives" (e.g. *women's magazine*; cf. Rosenbach 2006). The primary function of relational adjectives seems to be that of classification (see above), but the Slavic possessive adjectives serve the function of identification and adjectives expressing the 'made of' relation are fundamentally descriptive. For Latin, on the contrary, Maurel (1993: 25-26) describes the relational adjective (in the broad conception of denominal adjective) as primarily descriptive, while he attributes a fundamentally classifying function to the genitive:

> L'AR présente un N (son nom source) sous l'aspect de ses diverses qualités : il peut donc s'appliquer à des entités très diversifiées, pourvu qu'elles s'accommodent d'au moins une des qualités suggérées par l'AR. C'est ainsi que *caninus* par exemple (« l'A correspondant au N *canis* ») pourra s'appliquer à *prandium* (un repas de chien, où on ne boit que de l'eau), à *eloquentia* (éloquence agressive), à *littera* (la lettre R, comme un grognement), etc. Le génitif au contraire, dès lors qu'il est la forme d'un N, propose un sens global. Il servira donc plus à classer qu'à décrire. Parler ainsi de *nugae theatri* (P, PSE, 1081) (des plaisanteries de théâtre), ce n'est pas seulement qualifier les *nugae* comme le ferait *festiuae* ou même *caninae*, c'est supposer qu'il existe une typologie conventionnelle des *nugae* et que *theatrum* permet de distinguer un type reconnu […].

However, he has to admit that in many contexts these primary functions are, as he puts it, "neutralized". I haven't found many intents of this kind to pin down the functions of attributive constructions of particular languages from a comparative perspective. A recommendable starting point is Gunkel & Zifonun (2009), which analyses how "common names", i.e. complex nouns referring to subkinds of the head-noun, are formed in Germanic, French and Polish. This apparently remains a vast field for future research.

3.2 *The role of style*

In the Western European languages, most relational adjectives have entered the language as loans from Latin, at all its phases, from Classical Latin up the Neo-Latin of the Renaissance and later centuries (cf. Lüdtke 1995, Rainer 2009b). As a consequence, many such adjectives have retained a learned flavor that makes them inappropriate in many contexts of utterance.

The often heavily restricted distribution of relational adjectives in Western European languages as far as potential head nouns are concerned (cf. table 5, frequencies according to Google, example inspired by Giegerich 2005: 576), can probably in part be predicted from this stylistic restriction. Warren (1984: 144) surmised that "[t]here appears to be a tendency for concrete nominal heads to prefer nominal modifiers, matched by a tendency for abstract nominal heads to prefer adjectival modifiers." But a brief look at the data of table 5 shows that the match is far from perfect. (Here and elsewhere, only the combinations of the word form of the head nouns indicated in the table has been searched for.) Leaving aside the metaphysical question of whether the tooth fairy is concrete or abstract, there are other clear counterexamples to Warren's guess: *ache* is an abstract word, yet prefers *tooth*, while *floss* is concrete and prefers *dental*. The distribution could probably be captured more adequately by saying that *dental* is used whenever a more technical or scientific perspective is adopted by speakers.

head noun	*tooth-*	*dental*
fairy	248.000	23
ache	255.000	1.640
brush	1,560.000	3.840
paste	1,310.000	2.080
decay	145.000	39.400
floss	9.140	174.000
care	232.000	3,750.000
hygiene	9.970	262.000
surgeon	500	88.300

Table 5 *English tooth- vs. dental*

Nevertheless, a general stylistic explanation probably will not be sufficient to explain all the distributional restrictions observable with relational adjectives. Let us have a look, for examples, at Spanish relational adjectives derived from family names. These indeed also obey some kind of stylistic restriction, but of a different kind than that of the *tooth/dental* case just seen. The use of such adjectives in Spanish is essentially limited to the written language, and furthermore requires that the person whose family name serves as a base have

acquired some notoriety. But even with famous people you cannot apply the adjective to just any head noun. The examples of Table 6 suggest that the head noun must have something to do with the source of the person's fame (music in the case of Mozart).

head noun	*de Mozart*	*mozartiano*
padre 'father'	35.200	0
perro 'dog'	7.360	0
calavera 'skull'	19.700	0
viajes 'journeys'	7.340	0
muerte 'death'	188.000	0
biografía 'biography'	31.300	56
intérprete 'interpreter'	6.660	113
año 'year'	173.000	556
festival 'id.'	8.340	2.460
música 'music'	223.000	21.800

Table 6 *Spanish de Mozart vs. mozartiano*

The third case which I would like to mention definitely proves that a simple stylistic explanation will not be sufficient to explain distributional restrictions with respect to head nouns. Wandruszka (1972: 47, 175-177) made an interesting observation concerning the use of relational adjectives in French. He observed that they are frequent after action nouns, realizing the theme role, but rare in this same function after agent nouns. The French say *acquisition immobilière* 'acquisition of real estate', but much less *acquéreur immobilier* 'buyer of real estate', though this kind of expression is on the rise, as Bernard Fradin reminds me. Since Wandruszka's study was based on a relatively small corpus, I have checked his examples on Google. As one can see in table 7, his generalization is essentially sound, though there are exceptions (cf. *producteur céréalier*, *constructeur naval*). The picture is puzzling, and I have no convincing explanation to offer for the asymmetry observed by Wandruszka.[17] This whole area of restrictions related to the head noun obviously is in urgent need of in-depth studies.

action noun + RAdj	Google	agent noun + RAdj	Google
production céréalière 'wheat production'	249.000	*producteur céréalier*	6.760
exposition florale 'flower exposition'	37.800	*exposant floral*	0
construction navale 'ship building'	2,430.000	*constructeur naval*	31.900
exploration océanique 'exploration of the Ocean'	16.000	*explorateur océanique*	655
réforme universitaire 'reform of the university'	29.700	*réformateur universitaire*	78
libéralisation économique 'economic liberalization'	60.900	*libéralisateur économique*	0
analyse stylistique 'stylistic analysis'	28.700	*analyseur stylistique*	6
châtiment corporel 'corporal punishment'	69.400	*châtieur corporel*	1

Table 7 *Action and agent nouns as head nouns of French relational adjectives*

3.3 *Retrieval or neologism?*

The first step in our lexical search is to look whether there is a ready-made expression in the language for the conceptual combination to be expressed. In that case, the first choice will obviously be the ready-made expression, unless there is some special reason not to proceed in this way. If I want to express the concept 'violence that takes place in the family', I can choose either *violence in the family* or *family violence* in English – *familial violence* would be stylistically marked −, while in German *Gewalt in der Familie* would clearly be the first choice, *Familiengewalt* and *familiäre Gewalt* being much rarer (13.200/19.400 vs. 207.000). As we have already seen in section 2.2.2 discussing the 'paternal authority' case, it is often synchronically unpredictable which one of several morphologically well-formed options has the preference of the speech community for a specific concept. Once the speech community has made a decision, however, the speaker is well-advised to follow the tyrannical usage. Another aspect of the problem which becomes apparent in this example is that the choice is hardly ever either/or, but rather one of higher or lower probability.

3.4 *Exploiting family ties: the word family of the modifier*

If the speaker finds no ready-made expression in his or her mental lexicon, the most recommendable strategy is to look into the word family of the modifier concept.[18] As we have already seen in section 2.1, psycholinguists have found out that in the interpretation of noun-noun compounds the modifier is much more important for determining the relevant relation than the head noun. This privileged role of the modifier has also been demonstrated in studies on the correct choice of the linking element in noun-noun compounds (cf. Krott, Baayen & Schreuder 2001). Whatever the deeper cause for this head-modifier asymmetry may be, its importance is also obvious from the production perspective that we adopt in this section.

If a speaker of German wanted to express the concept 'damage caused by advertising', s/he must first identify the modifier in this conceptual combination (which is also the first step in interpretation, by the way, as we have seen in 2.1). This is important for several reasons, for example in order to know which word to put into the first position (in German, the modifier comes first). At this point, s/he might choose the words corresponding to 'advertising', i.e. *Werbung*, and 'damage', i.e. *Schaden*, and put them together according to the very productive noun-noun compounding pattern: *Werbung-s-schaden* (the linking element *-s* is automatic after words ending in *-ung*). This outcome is an acceptable word, but it will not be the preferred option for most native speakers. Apparently the strategy speakers use is to inspect the word family of the modifier concept and follow the model which is prevalent there. Simplifying somewhat, the word family of the modifier concept 'advertising' can be imagined to look like table 8. The speaker will find a huge number of compounds with a first element *Werbe-*, much less compounds with a first element *Werbungs-*, and only a marginal number of combinations of the relational adjective *werblich* with a head noun. This is *a priori* quite unexpected, since *Werbe-* is formally a verb, though semantically it serves to realize the nominal concept 'advertising'.[19] German speakers will therefore tend to opt for *Werbeschaden*, while *Werbungsschaden* and *werblicher Schaden* are not excluded, but more remote options. What this example nicely illustrates is that speakers give precedence to analogy based on the word family over more generic default rules such as noun-noun compounding.

head noun	*Werbe-*	*Werbungs-*	*werbliche(r)*
Agentur 'agency'	17,500.000	20.500	0
Aktion 'campaign'	634.000	1.260	19
Botschaft 'message'	582.000	78	226
Etat 'budget'	99.500	289	0
Fachmann 'man'	172.000	307	0
Slogan 'slogan'	479.000	883	6
Träger 'medium'	2,260.000	10.200	4

Table 8 *The word family of the modifier concept 'advertising' in German*

3.5 *Exploiting family ties: the word family of relatives of the modifier*

The strategy of looking into the word family of the modifier does not guarantee success, for example if the modifier is an orphan. In that case the speaker will, as a second best solution, look into the language family of related concepts. Here we can distinguish two scenarios, depending on whether the related concept(s) belong(s) to the speaker's own language or to another language.

This second case represents what is known in linguistics as a *calque*. Recourse to a corresponding foreign concept is particularly frequent in translation, where the corresponding foreign model is immediately under the eyes of the translator. When one anonymous Spanish doctor coined the relational adjective *pelviano* 'pelvic' in the 19th century, he solved the problem of finding a relational adjective corresponding to *pelvis* by looking how the French made their adjective from this word. The French adjective is *pelvien*, and since French *-ien* corresponds to *-iano* in Spanish, our doctor created *pelviano* by simple proportional analogy. It is through this channel that *-iano* eventually became established in the anatomical terminology of Spanish, while Italian for example did not imitate in its anatomical terminology the suffix *-ien*, which was a French innovation unknown to Latin (cf. Rainer 2009a).

More often, however, the speaker will turn to a related concept or related concepts of the language s/he is using and then proceed by proportional analogy. One example will also do to illustrate this familiar case. When Lorenzo Valla (15th c.) and Pierre Gassendi (17th c.) felt the need to have a material adjective corresponding to Latin *aurichalcum* 'brass', the first one came up with *aurichalceus*, the latter one with *aurichalcicus* (cf. Rammingers *Neulateinische Wortliste*). Both are legitimate formations and have been arrived at in the same manner, viz. by consulting the word family of related concepts. Wherein they differ, is in the choice of the related concept(s). Valla apparently consulted nouns like *aurum* 'gold', *ferrum* 'iron', *plumbum* 'lead', etc., whose word families contain the material adjectives *aureus*, *ferreus*, *plumbeus*, etc. Gassendi, on the contrary, first bumped into the word *metallum* 'metal', in whose word family he found the material adjective *metallicus* (the only Latin material adjective with the suffix *-icus*, the unexpected suffix being due to its Greek origin).

It is at this level that restrictions on patterns come into play.[20] Let us suppose that a speaker of Friesian wanted to form a material adjective for some noun which does not yet have one in the language. Looking into the word families of related concepts, i.e. other nouns denoting material, s/he would find that some form the material adjective in *-s*, others in *-en*.

But while in the Latin case above the distribution of one of the suffixes, viz. *-icus*, was lexically governed, there is a phonological rationale behind the distribution in Friesian (Hoekstra, to appear): "The suffix *-s* appears after nouns ending in *-en*, *-el* and *-je*, e.g. *linnens* 'linen' ← *linnen* 'linen', *duffels* 'duffel' ← *duffel* 'duffel', *flenjes* 'flannel' ← *flenje* 'flannel'. […] The suffix *-en* is used elsewhere: *sulveren* 'silver' ← *sulver* 'silver', *houten* 'wooden' ← *hout* 'wood', *papierren* 'paper' ← *papier* 'paper'." A competent speaker will simply take as a model the series of words most similar phonologically to the base to be derived. Any reasonable algorithm for the selection of a nearest neighbour (cf. Skousen, Lonsdale & Parkinson 2002) should be able to formalize such situations.

Human beings, however, are not algorithm-driven machines. Though they generally follow linguistic mechanisms blindly, unconsciously, they can also occasionally take some license, which need not necessarily be of the poetic type. Consider the examples of table 9. The first two rows of examples show that in Spanish family names choose different relational suffixes than place names. According to this regularity, we should expect the last four names in the family-name column to behave like the first two ones and choose *-iano*; and indeed, *riveriano*, *rojiano*, *bergaminiano* and *aleixandriano* are not only well-formed, but also in current use. In some sources, though, I found used the derivatives of the second column (cf. Rainer 2002). The explanation for these anomalous forms is straightforward: Their coiners consciously exploited the (near-)homonymy with place names, borrowing an adjective from the locative series in column four in order to achieve a stylistic effect.

family name	relational adjective	place name	relational adjective
Alejandro Toledo	*toledíano*	*Toledo*	*toledano*
Miguel de la Madrid	*delamadridiano*	*Madrid*	*madrileño*
...	...	...	...
Rivera	*rivereño*	*ribera*[21]	*rivereño*
Rojas	*rojano*	*La Rioja*	*riojano*
Bergamín	*bergamasco*	*Bergamo*	*bergamasco*
Aleixandre	*aleixandrino*	*Alexandria*	*alexandrino*

Table 9 *Family names with place-name suffixes in Spanish*

3.6 *Skirting stumbling blocks on the last meters*

The morphological strategies described in the preceding sections often yield neat results. Sometimes, however, unexpected problems arise on the last meters. The speaker may have identified a morphologically convenient set of models in the word family of the modifier or of relatives of the modifier, when s/he becomes aware that the base word does not fit very well into the chosen pattern for phonological reasons. Such a stumbling block may be skirted in several ways: Speakers may phonologically adapt the base or the suffix, choose another, morphologically more remote pattern where the phonological problem does not arise, or avoid word formation altogether. Such strategies have been investigated with much insight over the last two decades by a research group in Toulouse (cf. Roché, Boyé, Hatout, Lignon & Plénat 2011, Plénat, to appear).

This kind of problem and the strategies used to solve them apply to word formation in general. I'll therefore give just one simple example from the realm of Spanish relational adjectives. We have seen in the last section that family names and place names choose

different suffixes. At closer inspection, one discovers that not even family names form a homogeneous set, because at least politicians' names behave slightly differently. While other categories of people take *-iano*, with names of politicians *-ista* is the most frequent choice.[22] The adjective corresponding to Fidel Castro, for example, is *castrista*, so one might expect this same suffix to convene to his predecessor, Fulgencio Batista. However, there is a small euphonic problem here if we try to attach *-ista* to *Batista*, because of the cacophonous repetition of sounds (**batistista*). The way out was to resort to the general *-iano* pattern, which does not exclude politicians' names, and form *batistiano*.

3.7 *Conclusion*

The exercise in this third part of the paper could rightly be criticized as representing a kind of introspective psycholinguistics. My aim here was only to sketch a framework that seems to be apt in principle to accommodate many of the facts that I have described concerning the use of relational adjectives and related patterns. I am fully aware that this is just a beginning and that many aspects remain to be fleshed out. Nevertheless, it seems to me that the model makes some predictions that might be of interest to psycholinguists. For example, the three stages I have postulated – retrieval < inspection of the word family of the modifier concept < inspection of the word family of relatives of the modifier concept < fall-back pattern – should correlate with measurable differences in the time needed for finding a suitable expression for an input concept. Hopefully further research will contribute to sharpen aspects of the model which have remained all too sketchy.

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Notes

[1] As far as predicative usage is concerned, Warren (1986: 86-88) comes to the following conclusion: "Adjectives that classify or identify – i.e. that are restrictive – are also nonpredicating. Adjectives that describe are predicating. [...] [A]djectives with descriptive function may adhere to the following two main types of patterns:

I	RESULT-SOURCE	(*problematic law*)	II	PART-WHOLE	Subpatterns
	RESULT-CAUSER	(*healthy air*)		*big house*	Feature-Whole
	NORM-ADHERENT	(*normal behaviour*)		*angry man*	Experience-Experiencer
				sad eyes	Manifested Experience / Feature Medium
				musical boy	Aptitude/Inclination-Possessor
				stony garden	Object-Place (containing)
				dangerous time	Object-Time (containing)
				COMPARANT-COMPARED	
				childish man	'having qualities like…'".

[2] Cf. also McNally & Boleda (2004: 181), Gunkel & Zifonun (2008: 283, fn. 2), among others.

[3] According to Druel & du Grandlaunay (2008: 377) the term *nisba* more broadly "refers to an adjective which is derived from a noun."

[4] Gorguos' wording is somewhat confused. The *nisba* in fact does not express "a relation with a colour", as he puts it, but denotes a colour by establishing a relation with an object, designated by the base noun, which is a prototypical bearer of the colour in question.

[5] Incidentally, Dornseiff will later classify adjectives of material as qualifying adjectives.

[6] A cross-linguistic study of the semantic categories most commonly expressed by means of word formation remains a desideratum; cf. the short sketch in Aikhenvald (2011: 274-275).

[7] Warren's intent to analyze English adjectival *-en* and *-y* as all-purpose suffixes seems ill-advised. For example, she tries to explain the fact that *-en* only occurs with some frequency in adjectives of material (*wooden table*) and resemblance (*wooden behaviour*) as the result of a "stem preference", i.e. a restriction tying the suffix to base nouns denoting concrete matter (Warren 1984: 111). But this is an illusion. As we will see below, nouns denoting concrete matter are compatible with all kinds of relations, not only the material and the resemblance reading. The resemblance reading is better viewed as the result of a metaphorical extension of the adjectives of material: a golden cup is of gold, but golden sand is AS IF of gold.

[8] The close connection between relational adjectives and the genitive can also be deduced from the fact that the former may have their diachronic origin in the latter. Bickel & Nichols (to appear) report that in Chechen material adjectives such as *dechkan* 'wooden' or *deshin* 'golden' historically derive from nouns inflected with the *genitivus materiae*.

[9] Ingeborg Ohnheiser tells me that she could not find any example of **furgonnyj voditel'* on Yandex, but 688 examples of *avtobusnyj voditel'*. For more on this issue, as well as on synthetic compounds of the type *furgonovoditel', avtobusovoditel'*, cf. Ohnheiser (to appear).

[10] Ingeborg Ohnheiser points out to me that the extent to which Slavic languages shun the relational adjective in object position varies considerably. While for the concept 'blood analysis' she found 5 million occurrences of Russian *analiz krovi* (genitive) vs. 56 of *krovjanoj analiz* (relational adjective) on Yandex, the situation in Czech is the opposite, with 3117 occurrences of the relational adjective (*krevní zkouška*) vs. 46 of the genitive (*zkouška krve*). Even closely related languages seem to differ considerably on this point. For the concept 'blood transfusion', for example, she found 17.000 occurrences of the relational adjective (*krevní transfuze*) vs. 4.500 of the genitive (*transfuze krve*) in Czech, while in Slovak the genitive (*transfúzia krvi*, 10.400) by far outnumbers the relational adjective (*krvná transfúzia*, 215). Apparently, a lot of empirical work is waiting here for Slavicists.

[11] Goldberg reports a clever experiment by Gergely, Bekkering & Király (2002) which proved that this kind of hypothetical reasoning is already applied by infants at a preverbal age.

[12] The fact that the material reading of *metálico* 'metallic' is not blocked by *de metal* 'of metal' could be interpreted as evidence in favour of the latter hypothesis (for 'metal bar' there are 405.000 occurrences on Google of *barra de metal* vs. 91.000 of *barra metálica*).

[13] Cf. also on this suffix Kiefer (to appear), sections 4.2 (a) and (g). Another language which possesses a similar attributivizing suffix, viz. *-ko*, is Basque (cf. de Rijk 1993).

[14] A note for those who are not familiar with Arabic morphology: the consonants *f*, ʿ and *l* are variables for the three root consonants. The *faʿil* pattern therefore consists in inserting an *a* between the first and the second, and an *i* between the second and the third root consonant.

[15] More in general, the competition between the *nisba* adjectives and the genitive would also deserve closer scrutiny. Fischer (2006: 17) notes that in pre-Classical Arabic the *nisba* suffix was "normally suffixed to names of tribes and places", though the resemblance meaning is also already attested. In Classical Arabic, "the number of adjectives of relationship increased, because every noun could become the derivational base." In Modern Standard Arabic "the nisba ending is extremely productive and may even replace the genitive, e.g. *aṯ-ṯawb-u n-nawm-iyy-u* or *ṯawb-u n-nawm-i* 'the night-dress'." Ryding & Versteegh (2007: 297) characterize the semantics of the genitive in Arabic as "wide-ranging" and occasionally "hard to delimit". It appears that the competition between relational adjectives and genitives remains to be studied in detail in Arabic too.

[16] At least in productive use. As Wandruszka (1976: 74) has already pointed out, in lexicalized relational adjectives the number of available relations can be arbitrarily limited. One such case, according to him, is French *manuel* 'manual', which cannot be combined with *dos* 'back': **dos manuel* 'back of one's hand', in fact, is unacceptable, even though the semantically parallel combination *surface murale* 'surface of the wall' is well-formed. This interesting phenomenon has never been studied extensively, as far as I know. It should be treated together with other restrictions

related to the head noun which are mentioned in 3.2, as well as blocking effects (note that the established word in French is *dos de la main*).

[17] It is not certain, in the first place, whether the restricted distribution is peculiar to relational adjectives. Note that the asymmetry between *exposition florale* and *exposant floral* is mirrored by that between *flower exposition* (12.800) and *flower exposer* (2), where no relational adjective is involved.

[18] I here present things as if the speaker tried one strategy after the other, bottom-up. This seems to be empirically wrong, however. The Morphological Race Model (Frauenfelder & Schreuder 1992), for example, claims that all strategies are tried at the same time and that the fastest one wins. Cf. also Libben's (2006) principle of "maximization of opportunity".

[19] This mismatch between form and meaning must have arisen as a consequence of the reanalysis of ambiguous compounds. *Werbeagentur*, for example, can plausibly be paraphrased both by 'Agentur, die wirbt/agency that advertises' and by 'Agentur für Werbung/agency for advertising'. *Werbeetat*, on the contrary, can only be paraphrased as 'Etat für Werbung/budget for advertising', while 'budget that advertises' is semantically aberrant.

[20] On restrictions on Polish relational adjectives, cf. Szymanek (1985). Restrictions like the one described in section 2.2.1.2 with respect to the theme relation after action and agent nouns in Slavic can probably be thought of as located at the level of the word family of either the modifier concept or the relatives of the modifier concept. For example, if a speaker of Slavic were to coin a new term for the concept 'blood extraction', s/he could either find in the word family of the 'blood' concept a suiting model like *blood transfusion* (in the respective Slavic language) or, in the absence of such a word, continue to search in the word families of related medical terms or other terms of similar semantic structure.

[21] This is a common noun meaning 'bank (of a river)'.

[22] Note that *-ista* here does not mean 'follower of' or 'adhering to', but really functions as a relational suffix: *el gobierno gonzalista* 'the government of Felipe González', *la revolución castrista* 'the revolution by Fidel Castro', etc.

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