

How real are adjective order constraints? Multiple prenominal adjectives at the grammatical interfaces

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Abstract

Adjective order restrictions on attributive adjectives (AORs) have been subject to debate in modern linguistic research for a long time (see already Behaghel 1909; Vendler 1968). Most generally, the question whether AORs can be located in grammar as such in rule-based fashion (e.g. Cinque 1994) is still unsettled. In the current paper, we largely argue against this view and claim that several of the core data to be explained are preferences based on norms rather than rules. A pragmatic explanation is offered to account for marked or apparently ungrammatical examples. First, we demarcate AORs in the narrow sense against data based on truth-conditional differences, show the sole hard constraint to be found in a distinction between object- and kind-modification, and introduce several of the factors argued to drive AORs in the literature. A large-scale corpus study on German AAN-phrases shows a hierarchy of relative adjectives preceding absolute ones (in the sense of Kennedy and McNally 2005) to reliably predict preferences, while temporariness and weight do not. We then illustrate that norm-based preferences can be overwritten via discourse linking and implement markedness in out-of-the-blue contexts pragmatically based on the M-principle (see Levinson 2000). Speculating that AORs in the narrow sense have their origins in more general cognitive principles, our findings support approaches that locate the better part of AORs outside the realm of core grammar.

Keywords: adjective order, temporariness, pragmatics, nominal syntax

1 Introduction

A classic topic in linguistics, order restrictions on attributive adjectives (henceforth AORs) have received considerable attention in recent years (see, for example, Bouchard 2002; Cinque 2010; Scott 2002). A large variety of factors driving AORs have been proposed in the literature, such as notional and grammatical adjective classes, morphophonological weight, temporariness of the encoded concepts, conceptual iconicity between adjective and noun, and frequency (see, for example, Eichinger 1992; Trost 2006; Wittenberg and Trotzke this volume). However, the nature of AORs as either core syntactic phenomena or merely preferential reflexes of more general cognitive ordering principles is very much still under debate. These two opposed sides of the argument can be exemplified by Scott's remark that "conjectures as to the psycholinguistic motivation for AOR need not be posed: AOR fall out as a direct consequence of UG" (Scott 2002: 97) and Bouchard's claim that while "the classification of properties may interact with language, it is not part of grammar, it does not fall under the object of study of linguistic theory" (Bouchard 2002: 121). The examples in (1) and (2) illustrate some of the data to be explained:

- (1) a. *mein kleiner grüner Kaktus*
 ‘my little green cactus’
 b. [?]/**mein grüner kleiner Kaktus*¹
 ‘my green little cactus’
- (2) a. *ein nettes französisches Mädchen*
 ‘a nice French girl’
 b. [?]/**ein französisches nettes Mädchen*
 ‘a French nice girl’

Focusing on modified German object nouns in this paper, we argue in favor of some middle ground that informs AORs.² Thus, we claim the only hard constraint to be found in the distinction between object- and kind-modification (see also Carlson 2003; Larson 1998), a bipartition that as a default, though not exclusively, coincides with the split between the classes of quality and relational adjectives. In opposition to a variety of approaches that draw on notional adjective classes in their AOR-accounts (see Cinque 1994; 2010; Scott 2002), we show orders among object-modifying quality adjectives to be preferences based on norms driven by frequency – this, in particular, holds for the strong order preference of relative preceding absolute quality adjectives, which turns out statistically significant in a corpus study. Moreover, the factors weight and temporariness, oftentimes claimed informative for AORs (see Cinque 2010; Eichinger 1992; Vendler 1968), are shown to either not be at play at all in our data (weight) or to follow more general order patterns (temporariness). Although norm-based preferences lead to at times strong grammaticality judgements, in particular in out-of-the-blue contexts, we illustrate that contextual enrichment and discourse-embedding oftentimes overwrite such preferences. The paper is structured as follows:

Section 2 provides an overview of the adjective classes relevant to our investigation and introduces several of the factors claimed to drive AORs. We demarcate AORs proper from more general order restrictions by means of truth-conditional consistency, i.e., in the narrow sense, AORs are claimed to only apply to cases in which reversing the two adjectives in an AAN-phrase does not alter the truth-conditional semantics of the DP in question. The section also disentangles hard constraints and norm-based preferences, both theoretically and empirically, and shows that cartographic approaches undergenerate. Moreover, we introduce temporariness as a potential predictor for AORs – thus, the chapter at hand also contributes to the ongoing individual-/stage-level debate (see, for example Kratzer 1995 for an overview). Section 3 offers an empirical

¹ Throughout this paper, asterisks (*) are used to denote ungrammaticality, question marks (?) to denote questionable grammaticality or markedness, and a combination of the two ([?]/*) markedness tending to ungrammaticality. Note that the examples in (1b) and (2b) pronouncedly gain in acceptability with focus stress on the respective first adjectives, i.e., *mein GRÜNER kleiner Kaktus* and *ein FRANZÖSISCHES nettes Mädchen*, respectively (see 2.2.1 below).

² Sections 2 and 3 of this chapter build on Kotowski (2016: Chs. 1/3). Section 2 fleshes out parts of the descriptive and theoretical background initiated there, while Section 3 recaps a corpus study reported on there. Section 4, in turn, picks up a variety of loose ends, offering explanations of preference-based phenomena and approaches to a pragmatic implementation.

reflection, reporting on a corpus study on German AAN-phrases including modifiers that encode temporary concepts, picking up several further factors established in the previous section and putting them to the test. In particular, the predictions regarding object- and kind-modification are corroborated, while weight and temporariness are not found to significantly inform adjective order. Finally, Section 4 introduces several case studies that illustrate the peculiar nature of evaluative adjectives and show discourse-linking phenomena to be informative regarding untypical orders. We offer an application of a pragmatic, manner-based principle to account for the markedness of non-preferred orders and conclude the study with considerations of more general cognitive orders as the source of norm-based preferences.

2 AORs as hard constraints and norm-based preferences

This section discusses the assumed theoretical background and several of the major factors argued to contribute to AORs in the literature. The overall goal is to i) establish the constructions and adjective classes relevant to the phenomenon (as well as those that elude AORs) and ii) carve out the differences between what may be called hard constraints and preferences based on norms, i.e., frequency-driven phenomena constituting a norm that allow for counterexamples and thus cannot easily be captured in rule-driven fashion. 2.1 introduces the core adjective classes relevant for AORs and the assumed adjective typology. 2.2 discusses the major factors argued to drive AORs as well as more fine-grained adjective classes often assumed to be at play in the literature and sheds some light on the often confusingly and inconsistently applied terminology in the field. 2.3, then, looks at the difference between two modification patterns (object- and kind-modification, respectively) driving several of the phenomena to be explained, showing that this distinction constitutes the sole hard constraints in the realm of AORs. Finally, 2.4 argues against the popular cartographic treatment of AORs in the realm of quality adjectives.

2.1 Relevant adjective classes

Depending on theoretical frameworks and authors, adjectives as a word class receive a fairly variable treatment in the literature (see, for example, the overviews in Eichinger 2007; Motsch 2002; Trost 2006). In order to set the stage, it is thus necessary to introduce the items relevant to the ensuing discussion and exclude several expressions sometimes categorized as adjectives but not relevant for our purposes.

AORs are a phenomenon restricted to the attributive use of adjectives (and, moreover, to prenominal modification in German and English as a default strategy).³ Thus, predicative-only

³ Thus, we will neglect postnominal modification, which is severely restricted in both English and German (unlike in, for example, Romance languages). For languages with postnominal adjective placement as well as (conjectures as

adjectives (see, for example, Coppock 2009; Engel 1991; Levi 1978) are by definition, and irrespective of their status as a part-of-speech, excluded from the analysis. Several further expressions that do feature in attributive use are also outside the scope of this paper: numerals (both cardinal and ordinal), demonstratives, discourse anaphoric/cataphoric expressions (e.g., *abovementioned*, *following* etc.), and modal or non-subjective adjectives (e.g., *former*, *future*, *alleged* etc.). While we remain agnostic as to the grammatical status of these expressions as well as their indisputable relevance to syntactic constraints, we thus avoid the risk of leaving the realm of AORs proper.

The two supra-classes among German adjectives that are at the heart of AORs are quality and relational adjectives (see, among many others, Levi 1978; Schlücker 2014; Trost 2006). A typical descriptive typology of these two classes for German adjectives is summarized below, followed by a brief introduction to set-theoretic and degree-based typologies of quality adjectives:

QUALITY ADJECTIVES

Quality adjectives, commonly understood as the *real* property words (see, for example, Trost 2006), do not make reference to a second nominal entity or a temporal/locational anchor (unlike relational adjectives; see below). They display the highest degree of prototypicality, i.e., they tend to occur in all canonical syntactic frames,⁴ and the better part of them is subject to grammatical comparison. Examples for relative and absolute quality adjectives⁵ – as well as some of the property concepts they denote – are provided in (3) and (4), respectively:

- (3) e.g., evaluatives (*schön* ‘beautiful’; *hässlich* ‘ugly’ etc.), dimension adjectives (*niedrig* ‘low’; *eng* ‘narrow’ etc.), speed adjectives (*schnell* ‘fast’; *flink* ‘brisk’ etc.), or physical state adjectives (*kalt* ‘cold’; *heiß* ‘hot’; *hell* ‘bright’ etc.)
- (4) e.g., basic color terms (*rot* ‘red’; *blau* ‘blue’ etc.), shape adjectives (*quadratisch* ‘square’; *rund* ‘round’ etc.), defectiveness adjectives (*blind* ‘blind’; *stumm* ‘mute’ etc.), or alternative state adjectives (*lebendig* ‘animate’; *tot* ‘dead’ etc.)

to) the relationship between pre- and postnominal placement, see, for example, Bouchard (2002); Cinque (2010); Guisti and Iovino (this volume); Panayidou (this volume).

⁴ That is, attributive and predicative uses, as well as oftentimes adverbial and adjective-modifying uses (see, for example, Motsch 2002 for the different uses).

⁵ See Trost (2006) for a descriptive distinction between relative and absolute quality adjectives that is based on the criterion of grammatical comparison (and not to be confused with the relative-absolute distinction between gradable adjectives; see below). Lack of grammatical comparison for absolute adjectives is claimed to be down to their independence of a subjective or ascertainable comparison value.

RELATIONAL ADJECTIVES

Relational adjectives primarily differ from quality adjectives in that they do not modify a noun directly but always fall back on a second point of reference, encoded in the adjective itself. In most cases, this point of reference is a second nominal concept (this dual reference frame is reflected in morphological complexity),⁶ the primary syntactic criterion is their restriction to attributive use, and they elude grammatical comparison as well as other forms of gradability (see, for example, Motsch 2004; Schlücker 2014; Trost 2006). (5) itemizes some of the pertinent subclasses pertaining to general areas of life, which pick out subkinds of the kind denoted by the nominal head, with many authors assigning to them both functional and semantic equivalence with NN-compounds (see, for example, Arsenijević et al. 2014; Boleda and McNally 2004; Gunkel and Zifonun 2009).

- (5) e.g., ethnic adjectives (*belgisch* ‘Belgian’; *amerikanisch* ‘American’ etc.), material adjectives (*metallen* ‘metal(ic)’; *seiden* ‘silk(en)’ etc.), or religious and cultural terms (*jüdisch* ‘Jewish’; *islamisch* ‘Islamic’; *sprachlich* ‘linguistic’ etc.)

SET-THEORETIC AND SCALE-STRUCTURE SYSTEMS

In contrast, formal theories tend to subdivide the class of (quality) adjectives along the lines of set-theory and scale structure. The common set-theoretic division is one between intersective, subsective, and non-subsective modifiers (see Kamp 1975; Partee 1995). While oftentimes applied in theories on AORs, the set-theoretic typology is highly problematic and, in fact, ill-suited for modeling AORs.⁷ Instead, the corpus study discussed in Section 3 employs the degree-based classification system of gradable adjectives introduced in Kennedy and McNally (2005) and Kennedy (2007). In this system, degrees constitute abstract measurement representations, while scales are characterized as sets of ordered degrees of a given dimension (such as the dimensions length, beauty, or cleanliness). The general subdivision along these lines establishes relative gradable adjectives, which are vague in their positive form, and absolute gradable adjectives, which are not, by means of the compatibility of adjectives with degree and proportional modifiers (see also Rotstein and Winter 2004 for a similar typology). (6) illustrates the fully open scale for relative gradables and the fully or partially closed scales for different absolute gradables by dint of the endpoint-oriented modifiers *slightly*, *completely*, and *half*.⁸

⁶ Some authors also include other reference points into their typologies; for example, temporal, locative, or (text-) deictic ones (see, for example, Eichinger 1992; Trost 2006). These will be neglected in this chapter.

⁷ Discussing these problems is far outside this paper’s scope, though. In a nutshell, noun-independence is a dubious concept (cf. Bouchard 2002) and most formal semanticists working on adjective typologies in fact aim at modelling the better part of the subsective quality adjectives in intersective fashion; see Kotowski (2016: Chs. 1.2.2.2/3.2.2.3) for discussion.

⁸ The acceptability of several endpoint-oriented modifiers is complicated by different interpretations they allow. For example, besides the strict maximizing interpretation, *completely* (as well as *perfectly* and *absolutely*) also allows for a *very*-reading, which renders *completely bent* much more acceptable. Similarly, there are distinct readings for the minimum-standard modifier *slightly* – while the true endpoint-oriented reading is odd in *?*slightly expensive* (i.e.

- (6) a. open scale—contextual standard (relative)
 → *X is ?*slightly/*completely/*half tall/expensive/nice.*
- b. lower-closed / minimum standard (absolute)
 → *X is slightly/?*completely/*half dirty/wet/bent.*
- c. upper-closed / maximum standard (absolute)
 → *X is *slightly/completely/*half clean/dry/straight.*
- d. totally closed (absolute)
 → *X is ?slightly/completely/half full/empty/open/closed.*

In summary, this chapter focuses on the better part of items commonly classified as adjectives, but excludes peripheral subclasses such as predicative-only adjectives, modal adjectives, numerals, or discourse anaphoric/cataphoric expressions. The coarse classification contains quality adjectives – including absolute and relative gradable ones in the sense of Kennedy and McNally as well as nongradable quality adjectives – and those relational adjectives that pick out subkinds of the kinds denoted by the nouns they modify. The corpus study in Section 3 also includes German present and past participles in attributive use, while several more fine-grained typologies drawn upon in the literature on AORs are introduced in the following sections.

2.2 AOR-relevant factors among quality adjectives

2.2.1 Modification type, truth conditions, and focal stress

A primary caveat with respect to AORs lies in two distinct modification templates of multiple prenominal adjective constructions. This difference is usually captured by the two notions of ‘parallel’ and ‘hierarchical modification’ (see, for example, Cinque 2010; Scott 2002; Sproat and Shih 1988). Parallel modification as in (7) applies to structures in which the adjectives appear to modify the respective nominal head independently of each other and without recourse to local subsets established by adjective-noun-clusters.⁹ In turn, in hierarchical modification as in (8), an adjective modifies the complex set established by (multiple) adjective-noun-clusters. In this case, the modifier in farther distance from the head scopes over the ones in closer proximity to the head, specifying reference in recursive fashion.¹⁰

“having a degree of expensiveness”), the interpretation in which a contextual standard is exceeded by just a bit is perfectly fine (see Kennedy and McNally 2005 as well as Kennedy 2007 for discussion).

⁹ Parallel modification is accompanied by either comma intonation and/or overt conjunctions in between the modifiers.

¹⁰ ‘Recursivity’ is used as a semantic notion here. Depending on the respective syntactic model, hierarchical modification may well be represented via stacking of functional projections of different kinds, rendering it recursive only in a general syntactic but not a specific sense (see Kotowski and Härtl 2011; Van der Hulst 2010 for the difference between specific and general recursion).

(7) PARALLEL MODIFICATION

Schema: [A + A + A + N]

John loves Fury, his [cute, beautiful, tall riding horse].

(8) HIERARCHICAL MODIFICATION

Schema: [A + [A + [A + N]]]

*John went to a horse breeder looking for a [cute [beautiful [tall riding horse]]].*¹¹

Crucially, parallel modification circumvents many of the AORs oftentimes found in hierarchical modification. Thus, the differences in acceptability in (9) and (10) appear to be down to comma intonation, on the assumption that commas in written language can be equated with intonational pauses in spoken language, and thus to the distinction between the two modification types (the examples in 10 are adopted from Sproat and Shih 1988: 477-478):

- (9) a. ²/**a red beautiful car*
a.' *a red, beautiful car*
b. ²/**a round large table*
b.' *a round, large table*
- (10) a. ²*She loves all those Oriental, orange, wonderful ivories.*
[rated good by Sproat and Shih 1988]
b. *She loves all those wonderful, orange, Oriental ivories.*
[unmarked order; comma intonation]
c. **She loves all those Oriental orange wonderful ivories.*
[marked order; no comma intonation]

However, the issue appears more delicate. While Sproat and Shih rate the example in (10a) as fully acceptable, many of our informants consider it at least significantly marked in comparison to (10b). The most likely reason is to be found in the nature of the three adjectives: while *wonderful* and *orange* are quality adjectives, *Oriental* – at least in its salient reading – is relational. Empirically as well as theoretically, there is a well-established line of reasoning that regards modification via relational and quality adjectives, respectively, as two distinct phenomena (see 2.3. below). Working with written corpora below, these considerations lead to the exclusion of all structures with commas in between adjectives from the analysis.

Moreover, a further well-known effect that reliably overrides AORs concerns fronted constructions with focal stress (see, for example, Cinque 1994; Teodorescu 2006). Thus, the strongly marked examples in (9a/b) above, repeated here as (11a/b), are rendered acceptable upon putting focus stress on the adjective in farther distance from the head noun (indicated by means of capitalization):

¹¹ It is unclear in how far hierarchical modification presupposes restrictive modification (see Zifonun et al. 1997 in favor of this argument).

- (11) a. **a red beautiful car*
 a.' *a RED beautiful car*
 b. **a round large table*
 b.' *a ROUND large table*

A prerequisite for the appropriateness of such structures, however, appears to be discourse-presence of the inner AN-cluster (here, *beautiful car* and *large table*, respectively) as a pre-established class or ad-hoc kind. Thus, for example, (11a') appears odd outside of contexts in which beautiful cars have been introduced and can be drawn upon information-structurally as a topic or in comprehension questions. We will remain agnostic to the question whether one needs to assume a dedicated functional projection – for example, a Focus projection – to accommodate such presumably fronted structures (see, for example, Scott 2002).

Finally, AORs in the narrow sense only apply if the reversal of adjective orders is degraded in acceptability and at the same time does not alter the truth-conditions or interpretation of the entire DP if adjective senses are kept constant as in the examples in (9) above (see, for example, Svenonius 1994). In contrast, the examples in (12) show two possible orders that appear equally acceptable – in turn, however, different truth conditions apply to the reversed orders:

- (12) a. *der falsche neue Geldschein*
 'the counterfeit new banknote'
 a.' *der neue falsche Geldschein*
 'the new counterfeit banknote'
 b. *ein gefährliches totes Tier*
 'a dangerous dead animal'
 b.' *ein totes gefährliches Tier*
 'a dead dangerous animal'

Thus, we are either dealing with a counterfeit exemplar of a recently issued banknote in (12a) or some new version of a counterfeit bill in (12a'), while (12b) denotes an animal that is likely dangerous due to being dead – for example, a decaying corpse spreading germs – and (12b') some dangerous animal – for example, a beast of prey – that happens to be dead.¹²

2.2.2 Modificational layers and notional classes

Language-specifically as well as cross-linguistically, most authors agree that some form of pluricentric or multilayered configuration is best able to capture AORs (see, for example, Eichinger 1992; Rijkhoff 2002; Zifonun et al. 1997). Largely, these models are similar to the

¹² An explanation for these reading differences can be found in some form of a head primacy principle, stating that in modifier-head-structures, the head has interpretative primacy and is interpreted relative to context created by the whole constituent, while modifiers are interpreted relative to the local context created from the former context by the interpretation of the head (see Partee 1995: 334).

Duden's (2005: 348-349) model in (13) for German, which assumes the following ordering principle (from left to right preminally):

(13) THE DUDEN MODEL

- number adjectives (e.g., *zwei* 'two'; *viele* 'many' etc.)
- >> temporal/locational relational (e.g., *heutig* 'today's'; *linke* 'left' etc.)
- >> quality (e.g., *groß* 'big'; *schön* 'beautiful'; *schwarz* 'black' etc.)
- >> relational material (*metallen* 'metallic'; *silbern* 'silver' etc.)
- >> other relational adjectives (*französisch* 'French'; *ländlich* 'rural' etc.)

Coming back to example (10) above, parallel modification primarily occurs within the class of quality adjectives and does not spread across different classes. Moreover, the consensus is that the overarching orders are driven primarily semantically and/or pragmatically, in that referential, temporal, locational, or quantifying modification occurs in farther distance from the head noun than qualifying modification, which in turn occurs in farther distance than classifying modification (see Eichinger 1992; Rijkhoff 2002, 2010; Ten Wolde this volume). This is, for example, reflected in Eichinger's modification zones (1992: 327), adapted here as (14):

(14) EICHINGER'S MODEL OF 3 MODIFICATION ZONES

article	article classifiers		qualifiers		noun classifiers		noun
	quanti- fiers	referential adjectives	evalua- tives	qualita- tives	descrip- tives	classi- fiers	
	referential/situating		qualifying		classifying		

As can be derived from the differences in the models in (13) and (14), it is among the class of quality adjectives that capturing AORs is most contested. Eichinger splits in two the class of quality adjectives, with evaluatives preceding all other quality adjectives. In turn, he shifts his descriptives¹³ (color and shape adjectives) into the classifying layer, although these are by all accounts quality adjectives as defined in the preceding section. Commonly, however, AORs among quality adjectives are treated as hierarchies of notional property classes, either in terms of preferences or labile ordering constraints (see, for example, Bache and Davidsen-Nielsen 1997; Dixon 1982; Payne and Huddleston 2002) or as hardwired constraints directly written into the syntax and—given their cross-linguistic robustness – presumably a matter of UG (see, for example, Cinque 1994; Scott 2002; Sproat and Shih 1988). A particularly fine-grained example of such a cline is illustrated in Scott (2002: 114), adapted here as (15):¹⁴

¹³ The terminology employed here are translations from Eichinger's original (for example, *descriptiva* 'descriptives' or *qualitativa* 'qualitatives').

¹⁴ The brackets are our modification and only the non-parenthesized classes are quality adjectives. Question marks are Scott's, indicating his uncertainty of the necessity of the respective notional classes.

(15) SCOTT'S UNIVERSAL HIERARCHY NOTIONAL ADJECTIVE CLASSES

(Determiner > Ordinal Number > Cardinal Number >) Subjective Comment > ?Evidential
> Size > Length > Height > Speed > ?Depth > Width > Weight > Temperature >
?Wetness > Age > Shape > Color > (Nationality/Origin > Material > Compound Element)

Interestingly, returning to the issue of truth-conditional consistency mentioned above (see the examples in 12), evaluatives are a special case among quality adjectives. Unlike, for example, dimension, age, color, or shape adjectives, they consistently allow for interpretations in which they causally modify an inner AN-cluster, including the respective second adjectives. This is illustrated via the examples in (16) and one possible reading indicated by paraphrases.¹⁵

- (16) a. *ein hübsches eckiges Auto* 'a nice boxy car'
→ ein hübsches, weil eckiges Auto 'a nice, because boxy, car'
b. *ein schöner schwarzer Hund* 'a beautiful black dog'
→ ein schöner, weil schwarzer Hund 'a beautiful, because black, dog'

Importantly, outside further contextual clues, the indicated causal readings are always only one possible interpretation. However, it is unclear whether, in these readings, the examples constitute cases of AORs in the narrow sense, given that their semantics deviate from the respective second possible interpretations (i.e., for example, a nice car that happens to be boxy). The issue will be picked up anew and discussed in more depth by dint of a case study in 4.1. below.

More globally, hierarchies such as the one in (15) are claimed to reflect universal tendencies of language to realize modifiers along the lines of a variety of gradual ordering principles. With respect to languages with prenominal adjectival modifiers, the prominent principles among these are: first, the claim that (more) subjective modifiers precede more objective ones (see Hetzron 1978; Scontras et al. in press) – this tendency is commonly claimed to show a grammatical reflex in that notional hierarchies can be grouped into clines of relative adjectives preceding absolute ones (see, for example, Laenzlinger 2005; Truswell 2009; Wittenberg and Trotzke this volume).¹⁶ Second, modifiers applicable to a larger number of different nouns are hypothesized to precede less applicable ones (see Champollion 2006; Seiler 1987). Finally, third, modifiers encoding (more) temporary concepts are often assumed to precede modifiers encoding (more) permanent ones. While the former two principles will be picked up in passing at several points in the following, the temporariness criterion will be at the heart of the corpus study in 3 and therefore illustrated in some detail in the section below.

¹⁵ Note that we do not make any claims here on the preferred reading of the examples in (16) – possibly, the 'evaluation-qua-second-adjective-reading' is preferentially triggered by added focus on the second adjective.

¹⁶ Or into subsecutive and intersective adjectives – a distinction which has been argued to not be informative as regards AORs; see 2.1 above.

2.2.3 Temporariness

Across linguistic traditions and frameworks, temporariness is considered a further factor fueling AORs (see, for example, Cinque 2010; Eichinger 1992; Eroms 2000; Halliday 2014; Larson 1998; Posner 1980). The general claim in this regard can be summarized as follows: adjectives – and adnominal modifiers in general – that encode (more) temporary property concepts occur farther from the head noun they modify than adjectives encoding (more) enduring properties. In descriptive and functional frameworks, temporariness is usually not formalized, but merely stated as a continuum, and some examples the pertinent literature explicitly argues to be driven by the temporary >> permanent hierarchy are listed in (17).

- (17) a. *a new red ball*
(Halliday 2014: 381)
b. *einem betrunkenen jungen Mann*
'a drunk young man'
(Eichinger 1992: 322)
c. *die geöffneten umrankten Fenster*
'the opened entwined windows'
(Eroms 2000: 271)

The examples in (17) are all cases of two quality adjectives, i.e., the claim entails that it is among this class that temporariness predicts word order. In formal semantics, the temporariness of predicate classes has been modelled as the difference between individual- (IL) and stage-level-expressions (SL), which is argued to cut at least through the verb and adjective classes (for theoretical background and pertinent constructions, see Carlson 1980; Fernald 2000; Kratzer 1995).¹⁷ However, the notion of a grammatically encoded, fundamental split among word classes is far from uncontroversial and several authors doubt i) the uniformity of constructions subsumed under the label IL-vs-SL, ii) its force as a distinction in core grammar, and/or iii) the appropriateness of temporariness as its conceptual basis (see, for example, the discussions in Jäger 2001; Maienborn 2003). Nevertheless, the distinction is also applied to account for very specific AORs. Thus, for example, Cinque (2010) and Larson (1998) both argue for configurations in which SL-modifiers precede IL-modifiers on the basis of adjectival doublets, i.e., adjectives claimed to feature in both SL- and IL-readings as in (18), in which the only conceivable readings assign SL-status to the outer and IL-status to the inner modifier.

- (18) a. *The visible_{SL} visible_{IL} stars include Capella.*
(adapted from Larson 1998: 155)
b. *The navigable_{SL} navigable_{IL} rivers (include the Nile, the Amazon and the Ganges).*
(adapted from ibid.)

¹⁷ Nowadays, adherents of the notion usually formalize it as an argument structural distinction, making use of event arguments for SL-, but not IL-items (see Kratzer 1995).

As briefly outlined in 2.3 below, structures such as the ones in (18) – leaving aside their unnaturalness as language data – are argued to spread over two modificational layers and therefore do not relate to the phenomenon of AORs among quality modifiers. It is the claim that within the layer of quality modification temporariness predicts orders that is empirically put to the test in the corpus study in section 3. For the classification of adjectives in the corpus study, it is important to note that all SL-adjectives are absolute in the sense of Kennedy and McNally (2005) outlined above, i.e., they map to closed scales (see *ibid.*; Kennedy 2007).

2.2.4 Weight

A further, *ceteris-paribus* factor often used to explain AORs is morphophonological weight (see, for example, Behaghel's 1909¹⁸ and Pāṇini's laws; see Cooper and Ross 1975). Following the general linguistic tendency that – everything else being equal – morpho- and phonologically longer or weightier constituents or phrases tend to follow shorter ones in coordinated as well as stacked constructions, the claim essentially entails that if two adjectives are in principle interchangeable, the weightier adjective follows the less weighty ones. In German as well as English prenominal adjective sequences, then, weight is argued to function as a predictor for preferred sequences, in that weightier adjectives are encoded in closer proximity to the head noun than less weighty ones (see, among others, Eichinger 1992; Rijkhoff 2002; Vendler 1968). Weight will be another factor investigated into in the corpus study below.

2.2.5 Frequency and conceptual iconicity

Finally, frequency is an often-used AOR-related factor, both in terms of the frequency of particular AN-clusters and the frequency of notional adjective classes as such. First, a second of Behaghel's (1909) laws, stating a rule of thumb of semantic or conceptual iconicity,¹⁹ is acknowledged by authors who are critical of fixed AORs to explain variability in (quality) adjective order depending on a given head noun (cf. e.g. Bouchard 2002, Bouchard 2011; Eichinger 1992; Trost 2006). For example, Eichinger (1992: 322–323) argues for the example in (17b) (*einem betrunkenen jungen Mann* 'a drunk young man') that – in addition to the temporariness and contra the weight criterion – age is an important category for the classification of animate beings, making age adjectives occur close to, e.g., person nouns. Bouchard (2011) captures iconic conceptuality by a principle for adjectival serialization:

»The more the property expressed by an adjective makes it likely to form with the noun a relevant and usual Concept [*sic*], the more this adjective tends to be close to the noun, i.e., to modify the noun more directly than another adjective.« (Bouchard 2011: n.p.)

¹⁸ Cf. his '*Gesetz der wachsenden Glieder*', i.e. the 'law of increasing terms/constituents'.

¹⁹ Cf. his first law (*Erstes Behaghelsches Gesetz*), which roughly says that the conceptually closely related also occurs in close proximity.

Second, notional class frequency as such is possibly related to AORs (see Champollion 2006; Seiler 1978), in that high frequency adjective classes are applicable to more different nouns and tend to merge farther from the noun than less applicable classes. Thus, Champollion (2006: 13) argues the relative frequency ranks from the British National Corpus for the respective most frequent member from each of the five classes to coincide nearly exactly with the hierarchy for the reduced English cline ‘quality > size > shape > color > provenance’. The most frequent quality adjective (i.e., evaluative) is more frequent than the most frequent size adjective, which in turn occurs more often in the corpus than the most frequent shape adjective, etc.²⁰

2.3 Object-and kind-modification

Kotowski (2016) argues for a partitioned DP (see Abney 1989) that distinguishes between two distinct modification patterns: object- and kind-modification. The terminology²¹ goes back to the Carlsonian classes (see Carlson 1980), and a variety of (more or less) similar syntactic configurations have been proposed in recent years (see, for example, Cinque 2010; Larson 1998; Svenonius 2008; Carlson 2003). In general, the assumed partitioning relates to the two pragmatic functions of Eichinger’s model in (14) above, as kind-modification is classifying in nature and occurs in close proximity to the nominal head, while object-modification is qualifying and merges higher up the tree. Thus, NPs denote types or kinds, while DPs denote tokens or objects – in turn, every non-generic DP has been turned into an object at some point in the derivation (see, for example, Arsenijević et al. 2014; Vergnaud and Zubizarreta 1992). The following passages very briefly outline the typical modifiers found in each of these layers.

OBJECT MODIFICATION

By default, quality adjectives merge in between the D-head and NP and function as object-modifiers. Following Sternefeld (2008), they are located in functional projections, Agree-DP (AgrDP), not committed to any semantic or notional content.²² As such, they function as intersective²³ modifiers in the proper sense that denote properties of individuals and, speaking in terms of extensional semantics, combine with unsaturated items to produce an item of the same unsaturated type (see Heim and Kratzer 1998). AgrDP-projections can be stacked, allowing for the occurrence of multiple adnominal adjectives as in (19), adopted from Kotowski (2016: 118).

²⁰ PROVENANCE appears to be an outlier in this generalization, however; see Champollion (2006: 13).

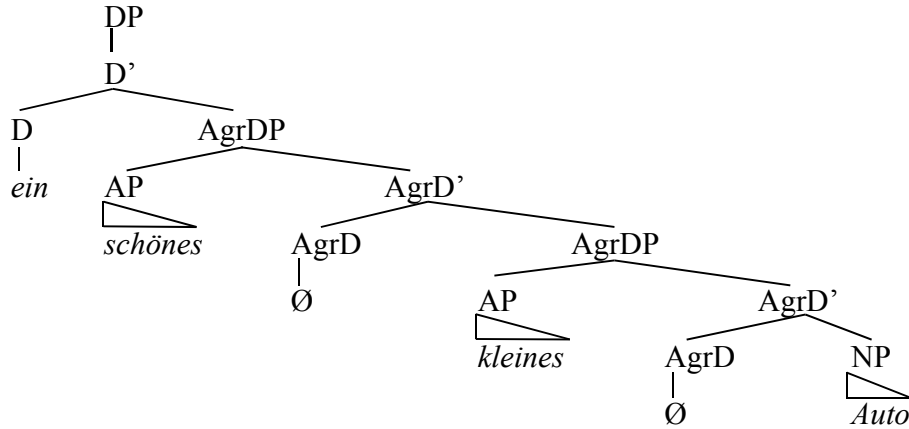
²¹ Other terminology for the essentially same partitioning is token- and type-modification (see, for example, Vergnaud and Zubizarreta 1992)

²² See *ibid.* for the theoretical arguments in this regard and the dismissal of other structural locations of quality adjectives.

²³ Irrespective of their categorization in set-theoretic typologies as subsective or intersective adjectives (see the comments above).

(19) a. *ein schönes kleines Auto* ‘a nice little car’

b.



Being non-committal with respect to notional content, the AgrDP-projections do not allow for reading off any of the hierarchies for AORs in the narrow sense in 2.2, but roughly equate to a modificational layer including Eichinger’s evaluatives, qualitatives, and descriptives in (14) above. As argued in 2.4 below, this flexible approach to quality adjectives as object modifiers does justice to the observed porousness of AOR-hierarchies.

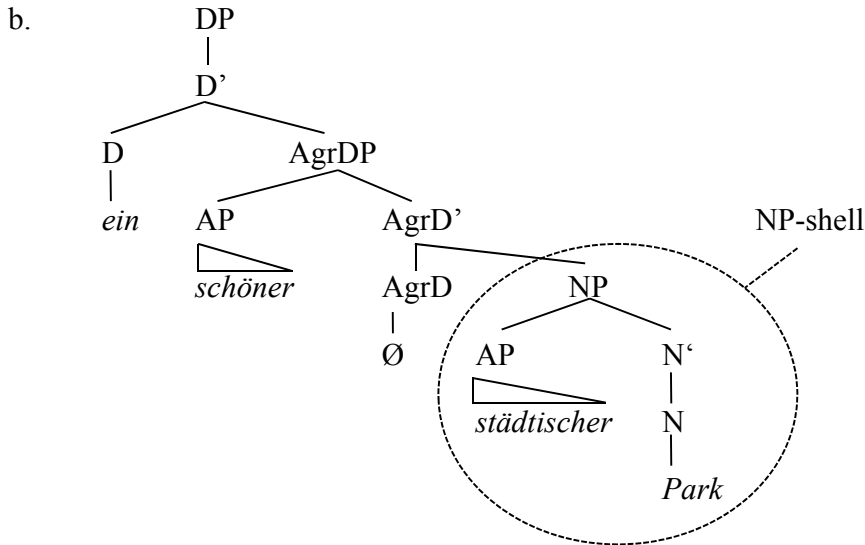
KIND MODIFICATION

Kind-modification, in turn, is always generic and establishes subkinds of the kinds denoted by the head-noun inside an NP-shell.²⁴ Following McNally and Boleda’s (2004) claim that they are properties of kinds (not individuals), denominal relational adjectives that pertain to general areas of life (see 2.1 above) are therefore the prototypical kind-modifiers. However, quality adjectives can also kind-modify if they feature in phrasal names or other lexicalized expressions (see Gunkel and Zifonun 2009; Schlücker 2014).²⁵ A DP-NP-partitioning neatly accounts for the fact that kind-modifiers always occur in close proximity to the noun, inside of object-modification. Combining the two modification types in question, we derive the structure in (20b) for the DP in (20a) (adapted from Kotowski 2016: 199), containing one object-modifier (the quality adjective *schön* ‘nice’) and one kind-modifier (the relational adjective *städtisch* ‘municipal’).

²⁴ We will remain agnostic regarding the need of *nP*. At least for relational adjectives with argument status, this has proven a viable solution (cf., for example, Adger 2003; Svenonius 2008). In general, and in particular given our focus on object nouns, nothing hinges on a possible extension of the shell up the tree.

²⁵ There is obviously the possibility of having more than one kind-modifier in one DP as well as ordering preferences that apply to these. For example, quality adjectives in phrasal names are always closer to the noun than relational adjectives (cf. Schlücker 2014; Svenonius 2008). We will remain agnostic here with respect to the structural representation of multiple kind-modifiers as well as their orders.

(20) a. *ein schöner städtischer Park* ‘a nice municipal park’



2.4 Contra a cartographic treatment of quality adjectives

The syntactic assumptions outlined above have commonalities with cartographic approaches to AORs, but crucially differ in other respects (for cartographic approaches to AORs, see Cinque 1994, Cinque 2010; Laenzlinger 2005; Ramaglia 2011; Scott 2002). Both treatments are similar in that they locate adnominal adjectives in dedicated functional projections and do not analyze them as, for example, N'-adjuncts or heads. However, the major difference lies in the nature or commitment of these projections. While AgrDPs primarily provide for the distribution of phi-features as well as the dichotomy of weak and strong declension in German in the framework just presented, based on Sternefeld (2008), they do not carry any lexical semantic content. In contrast, cartographic theories assume basic level lexical classes for these projections; for example, a SubjectiveCommentP, a SizeP, or a ColorP, depending on the assumed notional adjective classes.

With respect to AORs, the cartographic program entails writing adjective order directly into syntax, an approach claimed to do away with several problems of other theories. Scott, for example, states that “conjectures as to the psycholinguistic motivation for AOR need not be posed: AOR fall out as a direct consequence of UG” (2002: 97). However, upon closer inspection, the whole endeavor proves not sustainable. Reference to UG entails at least three assumptions: first, that the order of adjectives is cross-linguistically the same for every language (at least for those with prenominal modification patterns).²⁶ Second, the number of functional projections is necessarily fixed, cannot be exceeded in hierarchical modification, and all projections are present at all times, irrespective of whether they are filled or not. Finally, third, it entails that attested structures that run counter to a presumed order can either not be cases of

²⁶ See, for example, Bouchard (2002); Cinque (2010); Guisti and Iovino (this volume); Panayidou (this volume) for languages with other modification strategies.

hierarchical modification or are ungrammatical unless uttered with a peculiar intonation pattern, i.e., focal stress or comma intonation.

The major drawback of these assumptions is their empirical undergeneration (for similar objections, see Svenonius 2008; Truswell 2009). For example, Scott's (2002) cline in (15) above predicts UG-driven orders of subjective comment (i.e., evaluation) preceding size adjectives, shape preceding color, and size preceding speed adjectives. The following German examples in (21)–(23) are extracted from the DeReKo-corpus,²⁷ show the reversed orders, and are fully acceptable without applying focal stress or comma intonation.

(21) SIZE >> EVALUATION

Alle Zahlen sind in den Geburtsdaten von ihr und ihrer Familie enthalten. Mit einem größeren Gewinn würde sie sich einen großen schönen Audi kaufen.

‘All numbers are included in her and her family's birthdays. With a larger payout she would buy a big beautiful Audi.’

(NON08/SEP.04230 Niederösterreichische Nachrichten, 08.09.2008, NÖN Großformat S. 44; LOTTO&p; JOKER-ZIEHUNGSERGEBNISSE VOM 7. SEPTEMBER)

(22) COLOR >> SHAPE

[...] eine kreisrunde Kupferplatte mit dem Durchmesser 5 cm, in die drei rote runde Glasscherben und drei weiße kreisrunde Perlmuttscheiben eingelassen sind [...]

‘[...] a circular copper plate, 5cm in diameter, into which three red round pieces of broken glass and three white circular nacre discs are set in [...].’

(WPD/HHH.07860 Christoph73; Topinambur; 1: Holle, In: Wikipedia - URL:<http://de.wikipedia.org>: Wikipedia, 2005)

(23) SPEED >> SIZE

Sprecher Cristophe Prazuck erklärte, die Piraten seien mit zwei schnellen kleinen Booten und einem sogenannten Mutterschiff unterwegs gewesen.

‘Spokesman Cristophe Prazuck explains that the pirates were using two fast little boats and a so-called mothership.’

(HAZ09/MAI.00466 Hannoversche Allgemeine, 04.05.2009; Griechischer Frachter gekapert)

Such counterexamples are not difficult to come by, with none of the random searches for two frequent adjectives of the respective classes returning negative results. A second, equally severe caveat concerns the available projections: it is unclear how any of the hierarchies could accommodate all possible quality adjectives. The Scott hierarchy is already very fine-grained in comparison to others argued for in the literature, yet seems unable to capture even highly frequent adjectives such as the ones in (24).

²⁷ “Deutsches Referenz Korpus”, accessible via the search software cosmas2-web of the Institut für deutsche Sprache (IDS); see <<http://www.ids-mannheim.de/cosmas2/web-app/>>. Corpus records are provided below the examples.

(24) *open; closed; married; empty; loud; sharp* etc.

The only possible, yet questionable merging sites for these items would be either the SubjectiveCommentP or the EvidentialP, i.e., two phrases to the very left of the hierarchy. In AAN-phrases, this would, for example, predict the orders in (25a/b), as subjective comment and evidential are both claimed to precede size and length. However, the examples are clearly rated as degraded in comparison to their reversals in (25a'/b') by our informants.

- (25) a. ? *a sharp long knife*
 a.' *a long sharp knife*
 b. ? *an empty big bucket*
 b.' *a big empty bucket*

While notional classes should not easily be dismissed as factors in predicting AORs, they have thus been shown to be outright untenable if conceived of as core syntactic phenomena that can only be circumvented via peculiar stress patterns. They neither capture the flexibility of attested orders nor can their number and lay-out be easily determined in a satisfactory way.

2.5 Summary

Restricting the scope of investigation to quality and relational adjectives, the only hard constraint the data appear to allow for is the distinction between object- and kind-modification. The latter modification pattern includes relational adjectives as defined above as well as quality adjectives functioning as kind-modifiers, as they, for example, materialize in lexicalized AN-expressions and phrasal names. With respect to quality adjectives as object-modifiers, we propose to regard all other factors introduced in this chapter – notional class, the relative-absolute distinction, temporariness, weight, frequency, and conceptual iconicity – as fueling norm-based preferences, not constituting core grammatical phenomena, on the basis of the discussed data. The corpus study reported on in the following section puts several of these predictions to the test, primarily with respect to the order of quality adjectives as object-modifiers and relational adjectives, the relative-absolute distinction, temporariness, and weight.

3 Corpus study – the placement of temporary quality adjectives

3.1 Rationale

Kotowski (2016) reports on a large-scale corpus study that makes use of a variety of the different assumptions and conjectures in the realm of AORs introduced in Section 2. The study hypothesizes that multiple prenominal adjectives in German are ordered at least preferentially and therefore puts several factors to the test: Searching the DeReKo for AAN-phrases in both of their two possible orders, it operationalizes seven different output classes, includes temporariness as a factor, and analyzes the output with respect to the weight criterion.

3.2 Procedure, items and hypotheses

One of the word-class tagged subcorpora (the TAGGED-T archive)²⁸ of the German Reference Corpus DeReKo was searched via the Cosmas II web interface for AAN-phrases. The ten predefined adjectives in (26) were used for a total of 20 searches.

(26) INPUT ADJECTIVES

betrunken ‘drunk’, *dreckig* ‘dirty’, *hungrig* ‘hungry’, *leer* ‘empty’, *leise* ‘quiet’, *müde* ‘tired’, *nackt* ‘naked’, *nass* ‘wet’, *wütend* ‘angry’, and *zufrieden* ‘content’

All of the input adjectives denote temporary properties, both intuitively and in the sense of the IL-SL-distinction. Passing several of the established tests for SL-hood (see Fernald 2000; Kratzer 1995), they were classified as both ‘SL’ and ‘absolute’ in the study (see 2.2.3 above). In order to test the preferred placement of temporary adjectives, 20 queries were run in total; two for each input adjective, once as the first of two prenominal adjectives ($A_x A_{att} CN$) and once as the second ($A_{att} A_x CN$), where ‘ A_x ’ stands for the predefined adjective, ‘ A_{att} ’ for an arbitrary attributive adjective, and ‘CN’ for an arbitrary common noun. The output adjectives – the respective second adjectives searched for via the part-of-speech tag ‘MORPH(ADJ at)’ – were assigned to the seven grammatical classes in (27) and (28).²⁹

(27) PERMANENT OUTPUT CLASSES

1. RELATIVE PERMANENT ADJECTIVES (REL_PERM)
e.g., evaluatives (*schön* ‘beautiful’), dimension adjectives (*groß* ‘big’)
2. ABSOLUTE PERMANENT ADJECTIVES (ABS_PERM)
e.g., color terms (*schwarz* ‘black’), shape adjectives (*rund* ‘round’)
3. NON-GRADABLE PERMANENT ADJECTIVES (NONGRAD_PERM)
mostly past participles (*verheiratet* ‘married’)
4. RELATIONAL ADJECTIVES (RELATION)
e.g. ethnic (*italienisch* ‘Italian’) and material adjectives (*hölzern* ‘wooden’)

(28) TEMPORARY OUTPUT CLASSES

5. TEMPORARY ADJECTIVES (TEMP)
the class of the input adjectives
6. NON-GRADABLE TEMPORARY ADJECTIVES (NONGRAD_TEMP)
mostly temporary past participles (*gefesselt* ‘chained’)

²⁸ TAGGED-T contains roughly 40% of DeReKo’s main archive with publication dates up to 2009, i.e., about 1.5 billion word tokens spread over 26 corpora, mostly from newspapers, press agencies, and internet sources. It allows searching for word-class annotated items in certain positions, e.g., ‘attributive adjective’ or ‘common noun’, and was thus crucial for the study at hand.

²⁹ The subdivision into permanent and temporary classes is in fact artificial from a grammatical standpoint, but was necessary for classifying the output according to the research objectives.

7. PRESENT PARTICIPLE (PRES_PART)
all present participles that allow for temporary readings and pass SL-hood tests
(*spielend* ‘playing’)

The following hypotheses were formulated: first, HYP0 (null hypothesis) – predicting no statistically significant difference between the seven output classes and the way they cluster with the input adjectives. Second, HYP1 (SL>>IL) – if assumptions regarding the SL >> IL claim are correct, we expect the permanent classes 1.–4. to be found robustly closer to the head noun than the input adjectives and to significantly differ in this respect from the temporary classes 5.–7. Third, HYP2 (RELATIVE>>ABSOLUTE) – if assumptions regarding the relative >> absolute hierarchy are correct, we expect class 1 (REL_PERM) to be more reliably found preceding the input adjectives than classes 2.–7.

3.3 Results

Searching the corpus via the 20 queries yielded an overall output of 6.622 hits. Manual cleansing led to a remaining sample size of $N=508$.³⁰ Tab.1 provides the overall occurrences of the seven subclasses of the respective output adjectives and their distribution given the respective input adjectives as either the first (A_1) or the second (A_2) of two prenominal adjectives, while Fig.1 illustrates the overall distributions by percentage for A_1 and A_2 , respectively.

Tab.1 Absolute occurrences of output adjective classes depending on the position of the input adjectives. Figures include the total 508 hits for all 20 search queries.

output class	input position	A₁	A₂
REL_PERM		56	102
ABS_PERM		42	11
NONGRAD_PERM		36	30
RELATION		147	0
TEMP		11	13
NONGRAD_TEMP		11	20
PRES_PART		11	18
	total	314	194

³⁰ Cleansing was necessary and occurred for a large variety of reasons, most prominently commas in between the two adjectives, idiomatic expressions, and wrong part-of-speech tags.

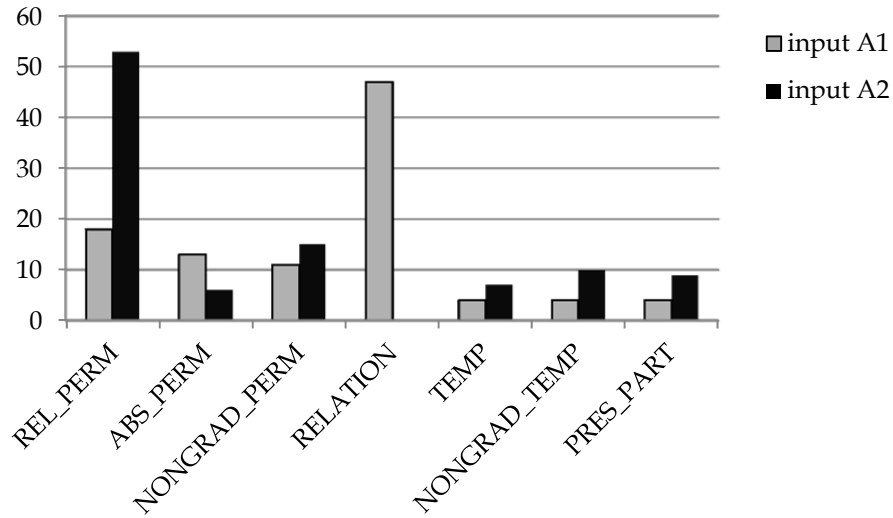


Fig.1 Distribution by percentage of output adjective classes given the input adjective as the first (gray bars) or the second adjective (black).

The relationship between the position of the input adjective and the output class was significant; $\chi^2 (6, N=508) = 164.36, p < .001$. The classes RELATION and ABS_PERM reached significance, while REL_PERM ($A_2 = 64.6\%$) showed at least a clear trend. Being a constant, RELATION was excluded from further analysis, reducing the sample size to $N=361$.³¹

A multinomial logistic regression was performed to compare data from the dependent variable's different categories (output adjectives) and their behavior as regards the independent variable (adjective position) against the reference category TEMP.³² Fig.2 visualizes the results.

³¹ The relation between input adjective position and output class remained significant; $\chi^2 (5, N=361) = 34.71, p < .001$.

³² TEMP was chosen as the reference category because the input adjectives are classified as TEMP themselves and, consequently, the found distribution of A_1 s and A_2 s is arbitrary for combinations of input adjectives and TEMP adjectives (see Tab.1 and Fig.1).

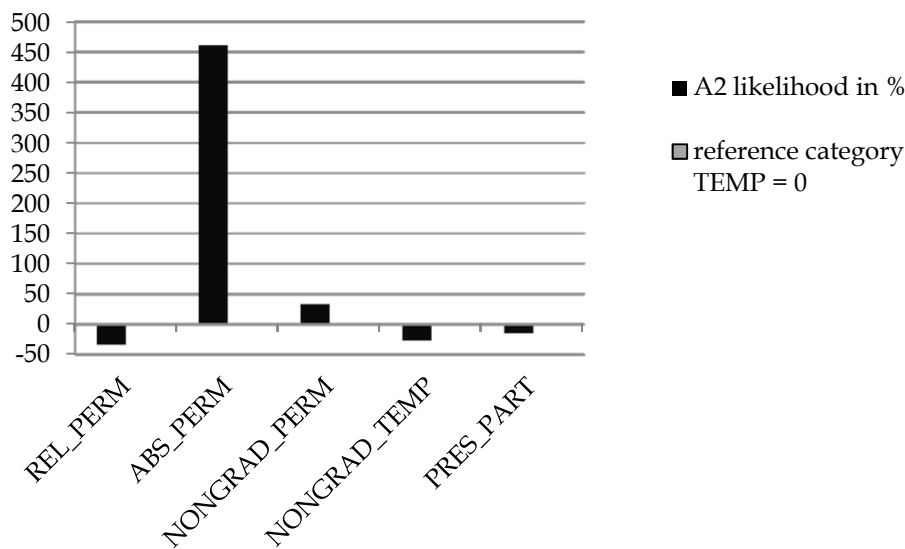


Fig.2 Odds ratios (likelihood) of output adjectives from the different classes to feature as the second of two adjectives in comparison to the reference class TEMP. The reference category is consequently set to '0'.

Only ABS_PERM reached statistical significance ($p = .002$) – if the input adjective is in position A₁, it is roughly 460% more likely, compared to the reference category TEMP, that the output adjective in position A₂ is of category ABS_PERM ($\text{Exp}(B)=5.604$). In contrast, $\text{Exp}(B)$ s cluster around the reference value 1 for the other four categories (REL_PERM, NONGRAD_PERM, NONGRAD_TEMP, PRES_PART) and none of them reached significance (but see the discussion below for relative adjectives).

Finally, an ANOVA calculated on the influence of output class in combination with input position on the independent variable WEIGHT³³ was significant; $F(11, 298) = 36.68, p < .001$. Somewhat counterintuitive, these results show weight to not predict orders; see the discussion section below. Tab.2 itemizes the post-hoc tests (Tukey HSD), while Fig.3 illustrates the weight measure distribution across output classes and input position.

³³ In fact, the ANOVA was conducted for only 5 out of the 10 input adjectives (*betrunken, hungrig, leer, nackt, and nass*), as the other 5 adjectives did not yield significant results in isolation. This led to a final minor adjustment in sample size ($N=310$ as opposed to $N=361$). Items were coded for three different values of weight: “-1” = the 1st of two adjectives has a higher weight (i.e., more syllables) than the 2nd; “0” = the two adjectives are equal in weight; “1” = the 2nd adjective has a higher weight.

Tab.2 Post-hoc results (Tukey HSD) of the ANOVA for the intra-output-category distribution of adjectives depending on adjective weight.

input position output class	A ₁	A ₂	A ₁ vs A ₂ mean diff. / significance
REL_PERM	M = -.50, SD = .51	M = .00, SD = .65	diff = .50, $p < .001$
ABS_PERM	M = .03, SD = .28	M = -.70, SD = .48	diff = .73, $p = .002$
NONGRAD_PERM	M = .83, SD = .38	M = -.90, SD = .31	diff = 1.72, $p < .001$
TEMP	M = .17, SD = .41	M = -.15, SD = .56	diff = .32, $p = .974$
NONGRAD_TEMP	M = .91, SD = .30	M = -.94, SD = .24	diff = 1.85, $p < .001$
PRES_PART	M = .75, SD = .71	M = -.94, SD = .24	diff = 1.69, $p < .001$

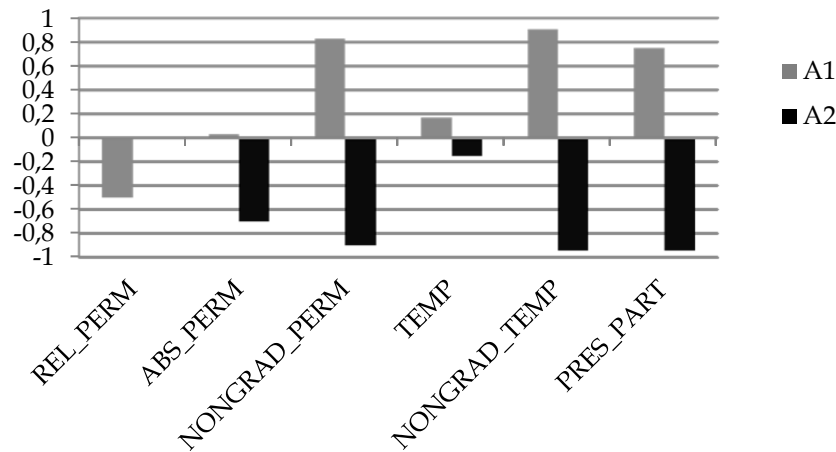


Fig.3 Measures of morphophonological weight for the respective two adjectives across output classes with the input adjective either as the first (gray bars) or the second adjective (black).

3.4 Discussion

The null hypothesis (viz., no correlation between input adjective position and output class) is rejected, given the trends for the output classes REL_PERM, ABS_PERM, and RELATION (the latter two significant). The theoretical assumptions outlined in Section 2 are supported, as relational adjectives as kind-modifiers are the only class that introduces a hard constraint: As a statistical constant, they are always realized closer to the noun than the input adjectives. All other classes allow for exceptions to statistical patterns (for example, input adjectives >> REL_PERM or ABS_PERM >> input adjectives). HYP1 (SL>>IL) is also rejected: REL_PERM and ABS_PERM, the two major permanent classes besides the eliminated class RELATION, show inverse behaviors with respect to input adjective positions, the former predominantly featuring as the first, the latter as the second of two prenominal adjectives. Thus, temporary adjectives by no means generally precede permanent ones, but, on the contrary, tend to follow relative ones (being absolute themselves).

Logically following from the reasons for rejecting HYP1, HYP2 (relative >> absolute) is corroborated: Relative adjectives can be said to precede absolute ones with statistical normality (see Schurz 2001 for the notion of statistical normality). Thus, they precede the absolute input adjectives and, by transitive reasoning, can be argued to also precede absolute ones in general. Post-hoc analysis allows for identifying several patterns. Upon exclusion of age adjectives modifying nouns that denote animate beings, the class REL_PERM ($p = .036$) also becomes statistically significant, supporting claims that age adjectives form clusters of conceptual iconicity with certain nouns introduced above (see 2.2.5). Moreover, no shape adjectives feature in the ABS_PERM output, with color terms by far the largest group of items in this class (42 out of 53 adjectives) – while this appears accidental, it speaks in favor of a distinct behavior of the notional class color that preferentially merges very low close to the head noun.³⁴

Finally, the factor weight does not predict adjective order in the study at hand. With input adjectives being short themselves, weightier expressions tend to follow A₁-input-adjectives and to precede A₂-input-adjectives. While this holds true for all output classes (with the obvious exception of RELATION), it is tellingly most pronounced for the non-significant classes (NONGRAD_PERM, TEMP, NONGRAD_TEMP, and PRES_PART), while the effect is weakened for the significant classes REL_PERM and ABS_PERM. This observation corroborates the nature of these two latter classes as significant predictors for preferred adjective orders among quality adjectives. To sum up, the corpus study corroborates the reasoning that the distinction between object- and kind-modification is the sole hard constraint, shows the relative >> absolute hierarchy to significantly predict adjective order among object-modifying quality adjectives, and rejects both temporariness and weight as significant factors.

4 AORs and the pragmatics interface

Building on the findings from the above sections, we have arrived at the conclusion that a cartographic implementation of fine-grained AORs for quality adjectives is untenable. AORs of this type are not hardwired in the grammar of a language. Instead, they appear to be rooted in preferences for orders in specific adjectives combinations and to regularities grounded on norms. This view entails that linguistically acceptable reversals of typical adjective orders occur on a regular basis, albeit with lower frequency. In the following, we report on data from a case study in support of this view, under the assumption that an analysis of AORs as norm-based preferences applies to semantically identical order variations alone. In particular, we will show discourse configurations to be a factor which can influence adjective orders. The markedness perceived with reversed orders in out-of-the-blue contexts will then be attributed to a manner-based implicature that cannot be resolved in contexts of this sort.

³⁴ The lack of shape adjectives is certainly down to the chosen input adjectives, which preferably modify person nouns. Also, not all color terms follow the input adjectives, again speaking in favor of preferences rather than rule-like behavior.

4.1 Case study on untypical adjective orders

The linguistic acceptability of certain reversals of typical adjective orders is confirmed by the results of an explorative corpus study, in which we examined the numerical nature of adjective order preferences for a selection of individual quality adjective combinations. For example, for the combination of the dimension adjective *klein* ‘small’ and the color adjective *schwarz* ‘black’, our search³⁵ in DeReKo reveals a strong preference for *klein* >> *schwarz* (N=316) over the reversed order *schwarz* >> *klein* (N=5). An order preference can also be observed for the combination of the shape adjective *rund* ‘round’ and the color adjective *weiß* ‘white’, for which the query returned 16 hits for the order *rund* >> *weiß* and only 5 hits for the reversed order. Closer inspection reveals that, with these two combinations, no systematic difference in meaning can be detected for the two orders. Consider the following two examples for an illustration.

- (29) Typical order: *klein* >> *schwarz* (N=316)
Ideen und kleine Geschichten sammelt Garm, der sich momentan in der Freistellungsphase der Altersteilzeit befindet, das ganze Jahr über. Sein Markenzeichen ist ein kleiner schwarzer Hut.
‘Ideas and short stories are collected by Garm, who is currently in the release period of partial retirement, throughout the year. His trademark is a little black hat.’
(RHZ08/JAN.23351 Rhein-Zeitung, 28.01.2008; Garm: Seit 41 Jahren in der Bütt)
- (30) Untypical order: *schwarz* >> *klein* (N=5)
Alle drei Monate kommt die Familie mit ihrer Ernte zum legalen Kokamarkt von La Paz; vier Säcke sind es pro Fahrt, schätzt die Frau mit dem schwarzen kleinen Hut.
‘Every three months, the family comes to the legal coca market in La Paz; four bags per trip, as estimated by the woman with the black small hat.’
(RHZ06/APR.20647 Rhein-Zeitung, 24.04.2006; Morales im Konflikt mit Kokabauern)

In the above examples, both orders are unmarked and a reversal of the adjective order does not entail a semantic difference, thus fueling the view that, here, the ratio of the two adjective orders is based on a norm. Once more, note that a norm-based reasoning on order ratios cannot be used for combinations in which ordering has a specific semantic rationale. One example is the combination of the evaluative *schön* ‘beautiful’ and the dimension adjective *groß* ‘big’, for which our corpus search returned 127 hits for *schön* >> *groß* and 13 hits for the reversed order. Here, however, instances of the order *schön* >> *groß* include cases in which a causal connection between the two modifiers can be assumed to hold, as illustrated in the following examples.

³⁵ Invalid hits (i.e., combinations with commas in between adjectives, comparatives, and adjective-modifying etc.) uses were excluded from the analysis. Also, adjective combinations were balanced with respect to weight (same number of syllables) and general frequency (at maximum, they were two frequency classes apart in the *Leipzig Wortschatz*-corpus; see << <http://wortschatz.uni-leipzig.de/> >>).

(31) *schön* >> *groß* (N=127)

- a. *Die meisten Möbel wurden pünktlich geliefert, nur das schöne große Bett nicht. Ich liege also immer noch auf der Matratze, die ich in der Mansarde entdeckt hatte.*

‘Most of the furniture were delivered on time, but not the beautiful large bed. So, I still lie on the mattress, which I had discovered in the attic.’

(RHZ09/FEB.15301 Rhein-Zeitung, 18.02.2009; Schließlich trennen wir uns ...)

- b. *Jetzt haben wir schöne grosse Fenster; dort, wo wir früher wohnten, war es immer so düster.*

‘Now we have beautiful large windows; where we lived before it was always so gloomy.’

(A98/SEP.54881 St. Galler Tagblatt, 05.09.1998, Ressort: TB-SG (Abk.); getroffen)

In these examples, the interpretation of the DPs in question supports the implication that the respective referents, i.e., the bed and the windows, are evaluated as beautiful as a consequence of their being large. As mentioned above, this reading is not the only one available and we do not claim that the two possible interpretations can easily be disentangled.³⁶ Crucially, however, an analogous interpretation is not manifest in the reversed order. Consider the following example:

(32) *groß* >> *schön* (N=13)

Die Mitglieder dieser neuen Bewegungen hingegen gehen von Haus zu Haus und fragen, wie es den Leuten geht. Und dann stellen sie eine große schöne Kirche hin und laden zum Singen und zum Beten ein, versprechen eine bessere Zukunft.

‘The members of this new movement, by contrast, go from house to house and ask how the people are doing. And then they erect a big beautiful church and invite to sing and pray, promise a better future.’

(RHZ07/MAI.10322 Rhein-Zeitung, 11.05.2007; In Brasilien ist die Religion ein Markt)

The scope dependency of evaluatives is a specific feature of this class, which none of the other notional categories exhibit. In the above example, an interpretation where the church is evaluated as beautiful as a consequence of its being large is not promoted, if at all conceivable.³⁷ Under the assumption that *groß* ‘big’ denotes a property which tends to be evaluated positively and with said semantic difference between the two orders in mind, their ratio must be concluded to also be based on scopal configurations rather than on a norm alone. Consider the examples in (33), picking up the discussion of evaluatives in 2.2.2:

³⁶ Probing the actual interpretations of speakers regarding AAN-phrases including evaluatives seems a worthwhile endeavor beyond this chapter’s scope. There, possible prosodic differences, such as stress on the second adjective, might prove insightful with respect to the availability of the ‘evaluation-qua-second-adjective-reading’.

³⁷ Notice, also, that the example in (32) does not promote a kind or subsective reading.

- (33) a. *ein hübsches eckiges Auto* ‘a nice boxy car’
 b. *ein schöner schwarzer Hund* ‘a beautiful black dog’
 c. *ein schnelles eckiges Auto* ‘a fast boxy car’
 d. *ein großer schwarzer Hund* ‘a big black dog’
 e. *?/*ein eckiges hübsches/schnelles Auto*
 f. *?/*ein schwarzer großer/schöner Hund*

In (33a/b), *little car* and *black dog* are preceded by the evaluative modifiers *nice* and *beautiful*, respectively. In one of the readings for both examples, the speaker describes the car as *nice* qua its shape (*boxy*) and the dog as *beautiful* qua its color (see also the paraphrase tests in example 16 above). This qua-second-property reading is not accessible for the examples in (33c/d). The speed of a car is not conventionally thought of in terms of the vehicle’s shape and the size of a dog not in terms of its color. However, reversing the order of the two adjectives is again clearly degraded as shown in (33e/f) for all four examples. Thus, we are faced with the situation that evaluatives in their canonical or typical position in AAN-phrases allow for two interpretations, causal modification qua second quality adjective and non-causal modification, while only the latter one constitutes an AOR phenomenon in the narrow sense.

To sum up, an analysis of AORs as preferences based on norms has an empirical foundation but can be reasonably applied only to semantically identical orders. The question remains of how the occurrence of varying, semantically identical orders of adjective combinations can be accounted for and, furthermore, how to explain the noticeable markedness perceived with reversed orders in out-of-the-blue contexts, given their linguistic acceptability. These issues will be addressed in the following.

4.2 Reversed adjective orders and discourse linking

Under the assumption that order variations among quality adjectives that do not have a semantic rationale are rooted in norm-based preferences, how can we account for the occurrence of reversed orders? Are they accidental? A factor known to have an impact on adjective orders concerns the domain of information structure. As elaborated in 2.2, focal stress produces adjective orders that are otherwise highly marked. Thus, with focal stress on the first adjective used to indicate a contrastive reading, an otherwise non-preferred order like color preceding dimension adjectives, as in *the YELLOW small flower*, is rendered acceptable.

An information-structural factor that is not reflected in stress but order alone is related to discourse linking. Consider the following examples for the untypical orders *weiß* ‘white’ >> *rund* ‘round’ as well as *schwarz* ‘black’ >> *klein* ‘small’ from our corpus search.

(34) *weiß >> rund*

Statt scharfer Augen aus dem All genügt Forschern aber seit dem 19. Jahrhundert auch eine weiße runde Platte von etwa 10 Zentimetern Durchmesser, die an Schnüren ins Wasser gelassen wird.

‘Instead of sharp eyes from space, a white round plate of about 10 centimeters in diameter, which is placed into the water on cords, is sufficient for the researchers.’

(SPK/J10.00551 spektrumdirekt, 28.07.2010; Dem Grün nicht grün)

(35) *schwarz >> klein*

Nun bekam ich eine hellgrüne Schlafcouch, einen kleinen dreieckigen Tisch mit einer hellgrünen Platte, zwei mittelgrüne Cocktailsessel mit Holzlehnen und schwarzen Ornamenten im Bezug, eine dreiarmlige Stehlampe mit drei verschiedenen Farben (grün, orange, gelb), einen schwarzen kleinen Teppich (in den Ecken mit gelb-, grün- und orange-farbigem Ornamenten in den Farben der Lampe), [...]

‘Now I got a light green sofa bed, a small triangular table with a light green plate, two medium green lounge chair with wooden arms and black ornaments on the cover, a three-arm floor lamp with three different colors (green, orange, yellow), a black small rug (with yellow, green and orange-colored ornaments in the colors of the lamp in the corners), [...]

(BRZ07/JUL.15454 Braunschweiger Zeitung, 16.07.2007)

The example in (34) centers around the visibility of an object – a plate used in water to estimate plankton density. The notion of visibility is referred to in the discourse preceding the DP in question through the prepositional phrase *statt scharfer Augen* ‘instead of sharp eyes’. The example in (35) contains a list of furniture items, enumerating their color attributes. Considered from a discourse-theoretical perspective, the notions of visibility and color in the above examples correspond to so-called discourse topics (see, for example, Asher 2004; Reinhart 1980), i.e., to the subject matter a text is about. Coherence in discourse is achieved through the successful establishment of discourse relations such as *Elaboration*(α, β) or *Narration*(α, β), which progress the content of a text in specific ways. A common definition for *Elaboration* holds that two discourse units α and β describe the same state of affairs but the latter does so in a more specific way (see, among others, Hobbs 1979) and the second argument β is a mereological part of the first (see Asher and Lascarides 2003: 161). We assume this to be instantiated in the example in (34): Visibility (α) is defined as a function of contrast and the measure of the distance at which an object can be discriminated. Thus, it is determined by factors like size, sharpness as well as contrast with the background, and whiteness (β) represents a part of this notional set as it coincides with high contrast.³⁸ Arguably, the color adjective is thus fronted in order to link the corresponding DP *weiße runde Platte* ‘white round plate’ to the discourse and produce an increase in coherence. An analogous reasoning can be applied to the example in (35), in which

³⁸ Note that while the shape of an object (as encoded in the adjective *rund* ‘round’ here) certainly has to do with visual perception, it is not a matter of visibility—the contrast needed for estimating plankton density is provided by the plate’s color, not its shape.

the respective DP *schwarzer kleiner Teppich* ‘black little rug’ is part of a listing of items stating object properties from the taxonomic field of color. Note that in the DP *einen kleinen dreieckigen Tisch* ‘a small triangular table’ in the example, the object’s color is not denoted and the two adjectives follow the expected order dimension >> shape.

We conclude that effects rooted in discourse linking can account for deviations from a preferred adjective order in systematic ways. Crucially, in the cases in question, conformity to discourse conditions goes hand in hand with linguistic unmarkedness as otherwise non-preferred orders are rendered unproblematic in matching contexts. The question remains of how to explain the markedness perceived with reversed orders in out-of-the-blue contexts. We will address this issue in the following section.

4.3 A pragmatic account of the markedness of reversed orders

The following examples again illustrate the noticeable markedness of reversed orders in out-of-the-blue and wide focus contexts, respectively, that form the basis of many of the primary introspective entries to the field (see also the examples 1 and 9 above).

- (36) a. [?]/_{*}*Es war einmal ein blauer kleiner Elefant.*
 ‘Once upon a time there was a blue small elephant.’
 b. *Was ist passiert?*
[?]*Max hat einen gelben runden Tisch gekauft.*
 ‘What happened today?’
 ‘Max bought a yellow round table.’

Observe that the two examples appear to differ in their degree of acceptability, with the example in (36b) less marked than the one in (36a). The contrast may be due to the fact that dimension adjectives like *small* and color adjectives (*blue*), as used in (36a), represent more distant classes on the hierarchy of notional classes (as formulated, for example, by Scott 2002, see 2.2) than the neighboring classes shape (*round*) and color (*yellow*), as in (36b). Such an approach has been adopted by Adam and Schecker (2011), who show on the basis of an ERP-study that adjectives from adjacent classes can be reversed more easily than adjectives from more distant classes. Based on their interpretation of the elicited event-related potential (a LAN), the authors opt for an implementation of the observed effects in the realm of syntax. This, however, is not a necessary conclusion as the LAN is an ERP component that has been reported to be sensitive also to working memory load (see, for example, King and Kutas 1995) and, recently, also to infringements rooted in the domain of pragmatics (see Kulakova et al. 2014).

We believe that a pragmatic account of the markedness perceived with reversed orders like those in (36) offers a theoretically coherent way of implementing AORs as preferences, that is, regularities based on norms. Knowledge about what is the norm (and what is normal) derives from generalizations across typical instances of the entities in the world (see d’Avis 2013), that

is, in our case, across occurrences of multiple prenominal adjectives. It represents our understanding about defaults (see Leslie 2008). An important property of this kind of knowledge is, as stressed by d’Avis (2013), that it has to allow exceptions. Depending on the strength of the norm, exceptions can be unmarked or marked. For example, a deviation from the norm that ducks lay eggs is unmarked as more than half of the population of ducks does not lay eggs (cf., among others, Khemlani et al. 2007). A marked exception would be a duck that cannot swim as an instance of a deviation from the default that ducks can swim. In the linguistic realm, the markedness of an expression has been linked to its deviation from a more conventionalized form. For example, according to Levinson (2000), an expression is marked if it is less lexicalized. Importantly, the use of a marked expression implicates a non-stereotypical meaning.

This is the gist of Levinson’s Manner-principle, which states that a non-stereotypical situation is indicated “by using marked expressions that contrast with those you would use to describe the corresponding normal [...] situation” (Levinson 2000: 136). The M-principle can be used to explain, for example, interpretational differences between NN-compounds, such as *matchbox*, embodying the default interpretation as a specific kind of box, and corresponding phrasal expressions, like *box for matches*, which denotes some non-prototypical box used for matches (see Levinson 2000: 147). In a similar way, we can use the M-principle to account for occurrences of non-standard adjective orders that, as discussed above, are rooted in information-structural domains. In these cases, the choice of a non-stereotypical order creates the implicature of a specific contextual condition to be considered on the hearer’s side. Crucially, a manner-based implicature of this sort fails to emerge in out-of-the-blue contexts, cf. the examples in (36) above. In these cases, an untypical expression, that is, a non-preferred adjective order is used in a situation that does not require a special marking, thus producing the relatively strong markedness effect we perceive in these cases.

4.4 Where do order defaults come from?

Our explanation for the markedness of untypical adjective orders is a pragmatic one. It holds that a deviation from the default order produces an implicature that cannot be resolved in out-of-the-blue contexts. The notion of norm as used above implies that default adjective orders are the result of generalizations over occurrences. It could be tempting, then, to ground the derivational mechanism that produces an order for multiple prenominal adjectives on exemplar-based analogy. Such an approach builds on patterns stored in the mental lexicon based on input frequency, with the choice between two alternatives dependent on the frequency value of a pattern (see, for example, Baayen et al. 2010, Schlücker and Plag 2011). The degree of conventionalization of a pattern is essentially a statistical matter in such an approach, in which rule-based, categorial factors are regarded as irrelevant. An alternative approach, which we favor, is to implement categorial (semantic-conceptual) properties of adjectives as an informational source which is exploited in parsing multiple adjective occurrences. A parsing strategy of this

kind predicts conceptually more specific adjectives to appear after less specific ones. Thus, the semantic range of options for the positions to follow in a sequence of adjectives is limited.

In this vein, Eichinger (1991) associates adjective order preferences with memory capacities and a strategy of the cognitive system to reduce complexity. Accordingly, a parsing strategy in this domain can be reasoned to routinely rely on a heuristics which places adjectives describing predictable properties in closer proximity to the head noun than adjectives describing less predictable properties (see *ibid.*: 216, cf. also Seiler 1978 for a functional implementation of such a view). In such an approach, the general tendency of, e.g., evaluatives like *schön* ‘beautiful’ to be placed before shape and color adjectives is attributed to the broader sortal restrictions evaluatives impose on the head noun in comparison to the latter. An approach of this type, where adjective order preferences are linked to a parsing strategy, can also be used to explain the LAN effect observed by Adam and Schecker (2011), see 4.2 above, under the assumption that the effect reflects working memory related processing difficulties produced by unexpected adjective orders.

An open question is if the order preferences we observe correlate to conceptual scales as part of our non-linguistic knowledge. Are order preferences a reflection of an ordering on a higher cognitive level? Such an assumption could imply cognitive orders to be hardwired into our conceptual system to a significant extent. An alternative hypothesis could be to reverse causality and view cognitive orders as mirroring configurations found in a language and, thus, as largely dependent on the linguistic input and its frequency. Supposed cognitive scales would then be language-specific in nature. This is a chicken-or-the-egg dilemma: While analogy-based accounts see input frequency as the origin of cognitive scales, the opposite view recognizes a categorial rule system as the force behind the formation of linguistic units – and their frequencies as an effect. Note that what is essentially at stake here is the question if our non-linguistic knowledge is dependent on (a specific) language, i.e., the linguistic relativity hypothesis. While this subject is beyond the current paper’s focus, the numerous ordering regularities to be found cross-linguistically let us opt for a non-relativistic standpoint, where order preferences are a reflection of conceptual configurations hardwired into the cognitive system, though certainly not as part of universal grammar in the narrow sense.

5 Conclusions

In this chapter, we have investigated the nature of adjective order restrictions. The analysis has shown that – restricting the object of investigation to AORs in the narrow sense based on truth-conditional consistency – only the distinction between object- and kind-modification can be described as a hard constraint, which presumably is located in syntax proper. By default, this bipartition accounts for the order quality >> relational adjective. With respect to object-modifying quality adjectives, we have argued on both a theoretical and empirical basis that

the myriad of seemingly (un)grammatical examples derive from norm-based preferences rather than grammatical rules. The corpus study has provided clear-cut evidence that the relative >> absolute hierarchy in German (with its prenominal modifying template) is a statistically significant predictor for said preferences, while neither the temporariness of adjectival concepts nor morphophonological weight are determining factors. In particular, temporariness has been shown to be completely absorbed in more general hierarchy preferences. Although dismissed as core syntactic phenomena, pace the cartographic program, notional classes most likely do play a role in the establishment of norm-based preferences.

Finally, we have argued that several cases of untypical adjective orders can be explained by discourse-linking phenomena and that the markedness of AAN-phrases in out-of-the-blue and wide focus contexts is based on knowledge of norms and the non-applicability of pragmatic repair principles. The ubiquity of cross-linguistically reliable order preferences lets us opt for some form of universal and hardwired cognitive configuration that finds a reflex in language. Future work will, in particular, have to show to what extent the capacity of discourse enrichment to overwrite typical orders can be captured descriptively in more rigorous fashion and be formalized appropriately.

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