1 Introduction

In English, the tiny word *all* performs an impressive range of grammatical duties, which despite their various differences all share the same core meaning: something we might call ‘maximality’, ‘completion’ or ‘totality’ (Dowty, 1987; Bobaljik, 1995; Brisson, 2003; Križ, 2015, and many others).

(1) a. All students passed the test / The students all passed the test.  
≈ Each of the students passed the test.
b. All students gathered / The students all gathered.  
≈ The totality of the students gathered.
c. All the town had turned out to see the game.  
≈ The totality of the town (i.e. all its inhabitants) had turned out to see the game.
d. All John’s lying has made him vulnerable to blackmail.  
≈ The totality of John’s lying has made him vulnerable to blackmail.
e. Where all have you been? (McCloskey, 2000)  
≈ Tell me each of the places you have been.
f. The soil was all dried out. (Bobaljik 1995, Buchstaller & Traugott 2006; Burnett 2011)  
≈ The soil has reached maximal dryness / the soil has every degree on the dryness scale.

These occurrences of *all* are all ‘strong’ or presuppositional in the sense that they operate on a predefined domain of reference, and express that a given property holds (collectively or distributively) for the maximal sum of individuals in that domain.

In Dutch, *all*'s cognate *al* appears in several distinct forms. *Al* (inflected form *alle*) is mainly used prenominally, while *allemaal* (originally *al temaal* ‘all together’) is used as a floating quantifier; these forms, together with the similarly alternating *heel/hele* and
helemaal (‘whole/wholly’), cover the same grammatical territory as English all. I will refer to this entire crosslinguistic class of expressions using the small-caps ALL.

(2) a. Alle studenten zijn voor hun tentamen geslaagd.  
   ‘All the students passed their exams.’

b. De studenten verzamelden zich allemaal in de collegezaal.  
   ‘The students all gathered in the lecture room.’

c. Al zijn geliegen gedraaid heeft hem alleen maar verder van huis gebracht.  
   ‘All his lying and prevaricating has only made things worse for him.’

d. Waar ben je allemaal geweest?  
   ‘Where all have you been?’

(3) a. Heel het team is op luizen gecontroleerd.  
   ‘All of the team were checked for lice.’

b. Het team is helemaal op luizen gecontroleerd.  
   ‘The team were all checked for lice.’

c. De aarde was helemaal uitgedroogd.  
   ‘The soil was all dried out.’

Yet, in both English and Dutch¹, ALL has a second type of use (occasionally remarked upon but, to my knowledge, never studied systematically), in which its contribution is both weak and non-maximal. That is, the NPs headed by these forms of ALL introduce a novel domain of reference and do not exhaust it; like other weak NPs, they may appear in existential there-constructions. In most cases, this use - which I will refer to as weak ALL² - can roughly be paraphrased as ‘many’, ‘various’ or in the case of degree modification, ‘very’:

(4) a. There were all these people trying to sell me stuff.

¹I will mostly limit my discussion to these two languages, but the observed patterns hold in other languages too. For instance, Burnett (2011) notes that adverbial ALL in Romance systematically alternates between an expression of totality and an intensifier, cf. our data in (1-f)/(6-a) and (3-c)/(6-b).

²Since the weak/strong distinction was first identified by Milsark (1974), there have been many attempts to formalise it in terms of independently identifiable semantic properties of either determiners or full NPs/DPs (e.g. Barwise & Cooper, 1981; McNally, 1992; de Hoop, 1995; Diesing, 1992; Ladusaw, 1994; van Geenhoven & McNally, 1998, and many others). In order to avoid committing to a particular position, I will use the more or less pretheoretical ‘weak/strong’ terminology even though it is not entirely appropriate for ALL (as ALL is not usually a determiner). I will also describe ‘strong’ ALL as presuppositional and partitive but this should not be taken as an endorsement of the position that the weak/strong distinction should be reduced to presupposition or partitivity - just as an observation that ALL has these particular properties in certain contexts.
≈ I encountered many people who tried to sell me stuff.

b. Ik hoorde allemaal meisjes zingen.
i heard all girls sing
‘I heard all these girls sing (≈ I heard many girls sing).’

(5) a. I saw all kinds of weirdly dressed people at the train station.
≈ I saw many people at the train station who were weirdly dressed in various ways.
b. Er stonden allerlei flessen drank op het aanrecht.
there stood all-kind bottles liquor on the counter
‘There was an assortment of bottles of liquor on the kitchen counter.’

(6) a. She got all angry at me.
≈ She got very angry at me.
b. Ze ging ineens heel/%helemaal raar doen.
She went suddenly wholly weird do
‘She started acting all weird all of a sudden.’

The persistence of this weak interpretation of ALL across different languages and different forms suggests that it is not coincidental that ALL gets repurposed in this way. Nor is it a peripheral phenomenon: while some of the forms in (6), or the this-indefinite in (4-a), may appear nonstandard or colloquial, sentences like (4-b) and the use of heel in (6-b) are fully acceptable in standard Dutch; the same applies to the all kinds/sorts/manner of construction in both English and Dutch, exemplified in (5). Thus, we are faced with a paradox: if there is a linguistic reason why meanings like those in (4-6) are expressed using some form of ALL, why do they lack the maximality that is commonly seen as the core meaning of ALL? And if the core meaning of ALL is not maximality, how else can we describe its contribution in the contexts in (1-2)?

The aim of this paper is twofold. The first, descriptive, goal is to provide an overview of the syntactic, semantic, and discourse properties of weak ALL, all of which set it apart from the strong ALL exemplified in (1) and (2). The second is to address the above paradox by exploring some possibilities for a unified account of ALL that captures both its weak and strong interpretations. I will argue at length that the core function of ALL is enforcing semantic plurality, and will show how phenomena like maximality and degree intensification may arise as compositional side effects of this core function.

After the data-focused section 2, the paper is structured as follows. In section 3, I argue

3While the combination of helemaal ‘wholly’ and a relative adjective like raar ‘weird’ or leuk ‘good, nice, fun’ is seen as a low-register language innovation (the examples I have been able to find online were all either from very colloquial forum environments, or from denunciatory columns by language purists), the near-equivalent heel leuk/raar is an uncontroversial part of the standard language despite seemingly expressing the same odd combination of an endpoint modifier and a relative adjective. Perhaps relatedly, Buchstaller & Traugott (2006) observe that English constructions like (6-a) tend to be seen as innovative and colloquial despite having been around since Old English.
that a unified account of ALL should abandon the notion of maximality as its core property, and I introduce my analysis of ALL as a plurality enforcer based on familiar data involving adnominal strong ALL. I propose that economy principles active in linguistic computation drive the avoidance of higher-order predication, which includes favouring atomic over plural reference. I follow e.g. Link (1984); Landman (1989); Winter (2002), and de Vries (2015) in assuming that the grammar employs a family of economy-driven type-shifts that map (predicates over) sums to (predicates over) impure atoms, and propose that the function of ALL is to block the atomisation of sums of entities, ensuring that referents remain semantically plural. In section 4, I will extend this analysis to adnominal weak ALL. I will argue that strong ALL applies to entities in the individual domain, while weak ALL applies to kinds. Drawing inspiration from the aforementioned literature on impure atomicity, as well as Dayal (2004) on the differences between singular and plural kind reference, I show how the properties of weak ALL arise from the interaction of plurality enforcement with the process of episodic predication over kinds. In section 5, I show how the analysis of ALL as a plurality enforcer could be extended to adverbial (degree-modifying) ALL, borrowing key ideas from Dotlačil & Nouwen (2016). Section 6 ties up some loose ends and briefly addresses some unsolved issues. Section 7 concludes the paper.

2 Data

2.1 More on ‘weak’ and ‘strong’

There are various ways to show that weak ALL, in contrast to strong ALL, does not involve the exhaustion (through universal quantification over or maximisation of) a previously introduced set. For instance, transitive predicates whose object involves weak ALL are atelic, while predicates formed with a strong ALL object (or with every) are telic. (7) shows that prenominal allemaal, in contrast to floating allemaal and strong-only alle, is incompatible with adverbial modifiers like binnen een kwartier ‘within 15 minutes’. (8) shows a similar contrast between English all the (compatible with telic adverbials) and all these (incompatible with telic adverbials). Conversely, (9) shows that weak all kinds of behaves differently from strong all the/every kind of in a continuative construction: while (9-a) means that the event of discovering mistakes is ongoing, (9-b) only has an iterative ‘amnesia reading’ according to which the event of discovering a particular set of mistakes happened over and over again.

(7)  a. *Ik heb binnen een kwartier allemaal kopjes afgewassen
    I have within a quarter-hour ALL cups washed
    ‘I washed many cups within 15 minutes’

    b. Ik heb de kopjes binnen een kwartier allemaal afgewassen.
    I have the cups within a quarter-hour ALL washed
    ‘I washed all the cups within 15 minutes’
I washed all the cups within 15 minutes.

(8) a. *In an hour, I found all these clues.
    b. In an hour, I found all the clues.

(9) a. I kept discovering all kinds of mistakes in my draft.
    b. #I kept discovering all the mistakes / every kind of mistake in my draft.

The compatibility of strong \textit{all} with telic adverbials and other indicators of telicity is intuitive: if the theme of the event is a finite, pre-defined set, the event will reach a natural endpoint once that set is exhausted. In contrast, the grammatical behaviour of weak \textit{all} indicates that it does not provide such an endpoint, suggesting that the semantics of weak \textit{all} does not involve exhaustification of a pre-defined set.

Secondly, in contrast to its strong counterpart, weak \textit{all} cannot head a partitive:

(10) a. I thought I made several new friends yesterday, but it turned out that all (of) these people just wanted to sell me something.
    b. There were all (*of) these people trying to sell me stuff.

(11) a. Al twee weken voor aanvang van de Nationale Vogelweek waren vrijwel alle van de meer dan 400 vogelexcursies volgeboekt. ‘Two weeks before the start of the National Bird Week, virtually all of the more than 400 bird excursions were already fully booked.’
    b. *Ik ben op allemaal van de 400 vogelexcursies geweest. Intended: ‘I’ve been on many of the 400 bird excursions.’

The contrast in (10)-(11) indicates that the difference between strong \textit{all} with telic adverbials and other indicators of telicity is not just a matter of ambiguous quantificational force, but that they impose different restrictions on their complement: since the embedded DP in a partitive is always definite (Jackendoff, 1977), we conclude that weak \textit{all} is incompatible with definite complements.

Just as weak \textit{all} cannot head a partitive, (12) shows that weak \textit{all}-NPs cannot be embedded inside one. Neither can they be modified by endpoint-oriented expressions like \textit{nearly}, as ((13)) and (14) show.

\footnote{Source: \url{https://www.vogelweek.nl/nieuws/bericht/?bericht=26}. It should be noted that similar examples with unmodified \textit{alle} are really hard to find. According to my own judgement, the sentence in (11-a) is a bit awkward, but it would be completely unacceptable without \textit{vrijwel} ‘nearly, virtually’. While the general unavailability of \textit{alle} in partitives might be accounted for by assuming that inflected \textit{alle}, unlike English \textit{all}, spells out a complex structure which includes a definite element (as proposed in e.g. Cirillo 2016), this does not explain why adding a modifier should improve it. In any case, the contrast between \textit{alle} and \textit{allemaal} remains: the latter is completely ungrammatical in partitives under all circumstances.}
a. The half of ALL respondents is it agreed with the proposal. Intended: ‘Half of many respondents agree with the proposal.’
b. The half of all respondents is it agreed with the proposal. ‘Half of all respondents agree with the proposal.’

a. Almost ALL surveyed are it agreed. Intended: ‘Almost many respondents agree.’
b. The surveyed are it almost ALL agreed ‘Almost all respondents agree.’

*There were nearly all these oddly dressed people at the party.

Finally, when an NP is modified by a PP restricting it to a finite set of particular individuals in the context (e.g. the locative PP on my plate in (15-a) and (16-a)), it ceases to be compatible with weak ALL (as well as other weak determiners). (In contrast, kind-level PP modification (e.g. without gluten, from Paris)) is fine with weak determiners including weak ALL, as (15-b) and (16-b) show.)

1. a. Ik heb alle allemaal *allemaal petitfours op mijn bord gegeten. ‘I ate all/both/SOME/many/no/sm petitfours on my plate.’
   b. Ik heb alle allemaal petitfours zonder gluten gegeten. ‘I ate all/both/SOME/many/no/sm petitfours without gluten.’

2. a. I ate all *all these petitfours on my plate.
   b. I ate all *all these petitfours from Paris.

The data above do not just show that the behaviour of weak ALL does not pattern with its much more famous strong counterpart, but also point - in various independent ways - at the nature of the difference. When the complement of ALL expresses a previously defined finite set of entities, ALL is strong and expresses maximality of that particular set. When the complement of ALL does not express such a previously established referent, ALL is weak: it simply picks out some plurality of entities that have the property expressed by its complement.
2.2 Weak and strong ALL in complementary distribution

Whether a particular member of the ALL-family is interpreted as strong or weak depends on several factors. Some forms are always strong (English adnominal *all*, Dutch adnominal *alle*), while some are always\(^5\) weak (English *all kinds/sorts/manner of*, Dutch *allerlei*).

(17) *Ik heb allerlei gerechten op mijn bord gegeten.
   I have all-kind dishes on my plate eaten
   ‘I ate all kinds of food on my plate.’

(18) a. *I ate all kinds of food on my plate.
   b. (compare) I ate every kind of food on my plate.

In other cases, the same form can be either strong or weak depending on syntactic position (Dutch *allemaal*; compare (19-a) and (19-b)), the predicate they occur with (English adverbial *all*; compare (20-a) and (20-b)), or discourse context (English *all these*; compare the sentences in (21)).

(19) a. Ik hoorde de meisjes allemaal zingen. (floating → strong)
   b. Ik hoorde allemaal meisjes zingen. (prenominal → weak)

(20) a. The room was all empty. (closed scale → strong)
   b. She got all angry. (open scale → weak)

(21) a. I passed 10 different people on my way here and all these people tried to sell me something. (demonstrative *these* → strong)
   b. There were all these people trying to sell me stuff. (indefinite *these* → weak)

When multiple factors coincide, syntactic position appears to have the final word. In (22-a), but not (22-b), the property of trying to sell me stuff holds of the maximal set of the oddly dressed people I am referring to - that is, *all* is strong - despite the fact that *these people* is itself weak (a plural *this*-indefinite).

(22) a. There were these oddly dressed people all trying to sell me stuff.
   ⇒ All of the oddly dressed people that were there tried to sell me stuff.
   b. There were all these oddly dressed people trying to sell me stuff.
   \(\nRightarrow\) All of the oddly dressed people that were there tried to sell me stuff.

Summarising these various observations in a handy table, we obtain the following:

\(^5\)Or at least almost always - see footnote 9.
Looking at the table, it is clear that interpretation is strongly correlated with syntactic position. One observation that immediately jumps out is that floating all is always strong. Secondly, if a particular form of all has both a strong and a weak use, they are in complementary distribution, with the weak version in prenominal position. The reverse pattern - if a form of all can occur in both positions, the prenominal position triggers a weak interpretation - holds with the exception of English all, which is strong-only.

Putting the syntax together with the semantic observations from the previous section, I conclude that the data support an analysis in which strong all applies to definite expressions at the DP level, while weak all applies to indefinite expressions at the NP level - bare plurals, this-indefinites or explicitly kind-denoting constructions. The only exception to this pattern is English all, which is strong even in prenominal position:

(24) a. All the students came to the meeting.
    b. All students came to the meeting.
    c. *There were all (the) students present at the meeting.

It is sometimes claimed (e.g. Partee, 1995; Brisson, 2003) that the combination of all with a bare noun (as in (24-b)) is only grammatical in generic sentences (e.g. All cats are introverts), in which case it expresses maximality of instances of a kind. This would suggest that the complement of all always needs to be of type e (either a plural individual or a plural kind). However, many episodic examples like the one in (24-b) can be found online, and are judged grammatical by the native speakers I consulted. This suggests that all does not always require an entity complement, but can sometimes behaves like an ordinary quantifier (for example, as in Winter (2002), the plural counterpart of every). This idea is supported by the division of labour between allemaal and alle in Dutch (I will refrain from adding glosses after the first sentence, as they should be obvious):
We see that *alle can only be used pre-nominally, which suggests it is a quantifier. So, I will assume that English all is polysemous between a plural quantifier of type \( \langle et, (et, t) \rangle \) with the traditional strong interpretation, and an optional operator of type \( \langle \sigma, \sigma \rangle \) (with \( \sigma \) to be determined later) that systematically alternates between strong and weak interpretations depending on its syntactic position. This assumption means that we can disregard prenominal all and Dutch *alle under the assumption that they are quantifiers, and obtain a full correlation between syntactic position and interpretation for our remaining cases of ALL.

2.3  Miscellaneous observations

While my eventual analysis will be underpinned mostly by the data in the previous two sections, there are several other properties of weak ALL (and prenominal allemaal in particular) that deserve mention.

2.3.1  Discourse properties: novelty, specificity and lack of individuation

Whether or not weak ALL is an appropriate way of referring to a plurality of many individuals in a particular sentence strongly depends on the discourse context. In particular, NPs formed with weak ALL can only be used to introduce a novel referent ((26) and (27) are translation equivalents):

\[(26)\] Ik had tien vrienden uitgenodigd op mijn verjaardag. Er kwamen uiteindelijk...

a. \#...allemaal vrienden.

b. ...allemaal buren.

Judgements are a bit muddled here since the pronoun allen - which happens to be homophonous with alle in many dialects of Dutch including the author’s - is grammatical in this position, at least in formal language use. Insofar introspective judgements based purely on written sentences are valid, I believe (25-d) is marginal at best. Note that I will leave pronominal forms of ALL (e.g. All have sinned) aside for the purposes of this paper, but it seems to me that they can straightforwardly be accounted for by assuming they are derived from quantificational ALL with its first argument implicitly saturated by a contextually defined set (cf. everyone).

It has been suggested (e.g. Cirillo, 2016, see also footnote 3) that Dutch alle amounts to al de ‘all the’, but while this could account for some of its behaviour (for example, the ungrammaticality of *alle de), it leaves other data explained. For example, alle N but not al de N can be used in generic sentences, in parallel to English all N versus all the N. At the very least, this suggests that Dutch alle does not always incorporate a definite.
c. ...zes/veel/geen/meer dan tien/en handjevol vrienden.

(27) I’d invited ten friends to my party. In the end there came...
   a. #...all these friends.
   b. ...all these neighbours.
   c. ...six/many/no/more than ten/a handful of friends.

Often, the use of weak ALL additionally implies that the referent was new to the speaker in the described situation; many of my Dutch informants claim that 

allemaal conveys ‘an element of surprise’.

(28) a. De baas heeft allemaal personeel ontslagen.
    the boss has ALL staff fired
    ‘The boss fired all this staff (out of nowhere).’
   b. Ik kreeg allemaal water in mijn gezicht.
      I got ALL water in my face
      ‘All this water splashed into my face (all of a sudden).’

However, this ‘element of surprise’ is not obligatory, and allemaal may be used to introduce referents familiar to the speaker. In this case, the referents resist individuation: intuitively, their relevance to the discourse lies in some salient shared property, and their individual identities are unimportant. This is demonstrated by the contrast in (29). In (29), the speaker clearly has some familiar and specific people in mind, yet the continuation in (29-b) is infelicitous, showing that the individual cookery lovers themselves cannot be picked up as a discourse topic. As shown in (29-c), the problem is not that weak ALL-NPs fail to support discourse anaphora: they do so just fine, as long as the referents continue to be discussed as a non-individuated group, in the context of their salient shared property of being mad about cooking.

(29) a. Ik heb allemaal vrienden die dol zijn op koken.
    I have all friends who mad are about cooking
    ‘I have all these friends who are mad about cooking.’
   b. #...Ze heten Marie, Karel en Mohamed.
      they are-named Marie, Karel and Mohamed
      ‘They’re called Marie, Karel and Mohamed.’
   c. ...Ze zullen ongetwijfeld jaloers zijn op mijn nieuwe oven.
      they will undoubtedly jealous be of my new oven
      ‘No doubt they’ll be jealous of my new oven.’

A final note about novelty: one property of allemaal in particular is that it strongly resists canonical subject position, instead occurring predominately in existential there-constructions.
(30) a. Er kwamen allemaal meisjes aan de deur met kinderpostzegels.
   ‘There came all these girls to the door with charity stamps.’

b. Allemaal meisjes kwamen aan de deur met kinderpostzegels.
   ‘All these girls came to the door with charity stamps.’

Other Dutch indefinites happily occur in both canonical and non-canonical subject position. Some basic Google results are telling: *een paar meisjes kwamen* ‘a few girls came’ and *er kwamen een paar meisjes* ‘there came a few girls’ both have around 225 hits; *een meisje kwam* ‘a girl came’ and *er kwam een meisje* ‘there came a girl’ both have around 45,000 hits; but for *allemaal* there is a large difference between the two constructions: 14 hits for *allemaal meisjes kwamen* (upon closer inspection, only 7 of those involve weak *allemaal*-NPs in canonical subject position) against 107 for *er kwamen allemaal meisjes*.

I hypothesise that this pattern is related to the strong novelty requirement imposed by weak *allemaal*, as the sentence-initial position occupied by canonical subjects is associated with old information (Ward & Birner, 2004). In contrast, existential *there*-constructions obligatorily introduce new referents, making them the perfect syntactic host to weak *allemaal*.

2.3.2 Spatiotemporal aspects of *allemaal*

An important distinction between weak and strong *allemaal* in Dutch is sensitivity to the mass/count distinction: while strong *allemaal* is only grammatical with plural count nouns, its weak counterpart is compatible with mass and count alike.

(31) Ik kreeg allemaal modderwater in mijn gezicht.
   ‘I got all this muddy water in my face.’

(32) Het water is allemaal weggelopen.
   ‘All the water has drained away.’

When weak *allemaal* appears with a mass NP, it expresses either spatiotemporal scatteredness of the referent or, somewhat less prominently, the presence of multiple subkinds of the kind expressed by the NP. The *Algemene Nederlandse Spraakkunst*, the standard descriptive grammar of modern Dutch, notes that weak *allemaal* “indicates a relatively large quantity of something, usually spread over a relatively large area” (Haeseryn et al., 1997, p.353, my translation). Spread or scatteredness also figures prominently in the comments on weak

Although it should be noted that judgements vary here; in my own dialect, this sentence is strongly unacceptable, but not all speakers agree with me. For example, for Johan Rooryck (p.c.), the use of strong *allemaal* with mass nouns forces an individuated ‘multiple portions’ interpretation, so sentences like (32) are acceptable in a context that involves multiple streams or puddles of water.
allemaal I sourced from native speakers. For instance, people generally agreed that (33-a)
is good while (33-b) is bad, although one speaker remarked that (33-b) would be acceptable
in the context of a bread-tasting event in which many different kinds of bread were sampled:

(33) a. Ik kreeg allemaal water over me heen.
     I got ALL water over me towards
     ‘I got a lot of water on me’ / ‘I got water all over me’

b. *Ik heb allemaal brood gegeten.
     I have ALL bread eaten
     Intended: ‘I have eaten a lot of bread’

The same appears to hold for English all this N. Googling There was all this milk, for
example, yields only a handful of results, but they all involve milk dripping, leaking, or
covering a large surface - all rather atypical situations for milk, but expected if we assume
that weak all imposes a plurality requirement on its complement that can be met by the
involvement of multiple spatiotemporal locations. Similarly, most of the Google results for
There was all this glass describe situations involving scattered bits of broken glass (the few
exceptions relate to buildings with many large windows).

The observations in this section are all compatible with our earlier conclusion, reached
in section 2.2, that weak and strong all apply at different levels of the extended nominal
projection (NP and DP, respectively). Whatever the type of argument that weak all applies to, the above data suggest that it incorporates spatiotemporal and/or taxonomical
information that is lost at the DP level. Hence, the plurality requirement of weak allemaal
can be met by plurality in the individual, kind or spatiotemporal domains, while at DP
level, a plurality of individuals is required in order to license strong allemaal.

3 A new semantics for ALL

3.1 Can we preserve maximality?

As mentioned in the introduction, the semantic contribution of all is usually taken to be
the expression of maximality: it expresses that a particular plural predicate applies to a
plurality without exceptions. Thus, while (34-a) is compatible with the existence of a few
girls who did not jump into the lake, adding all cancels this tolerance for exceptions: no
matter how many girls there are in the context, every single one of them needs to have
jumped into the lake for (34-b) to be true.

(34) a. The girls jumped into the lake.
     b. All the girls jumped into the lake.

On the face of it, the contribution of weak all does not involve maximality of any kind,
suggesting either that maximality is not the core meaning of all, or that weak and strong
all are distinct lexical items. The second option is clearly dispreferred in the light of our earlier observation that weak and strong all are in complementary distribution. But before we jump to the first conclusion, we should rule out the possibility that weak all does express maximality, but that this contribution is somehow obscured by other properties of weak all-NPs.

3.1.1 Hyperbolic maximality

One obvious suggestion is that weak all simply involves a hyperbolic use of all, similarly to the way a teenager might whine “I hate everything” when they mean ‘I hate a lot of things’. However, there are at least two reasons why such an approach is not feasible. First, hyperbolic language use is not a lexical property, so an approach based on hyperbole could not explain why a weak interpretation is available for all but not in equivalent sentences involving e.g. each or every. The truth conditions of (35-a) and (35-b) are clearly distinct ((35-b) entails (35-a) but not vice versa):

(35) a. I tasted all kinds of yummy food at the festival. 9
b. I tasted every kind of yummy food at the festival.

Furthermore, while hyperbolic use of every in a non-maximal context can be ‘admitted’ (as in (36-a)), such admissions are infelicitous in the case of weak all, suggesting that weak all is inherently and obligatorily non-maximal.

(36) a. I tasted every kind of yummy food! Well, OK, I passed on the fugu sashimi.
b. I tasted all kinds of yummy food! # Well, OK, I gave the pickled durian a wide berth.

The second reason to reject a hyperbole approach is that it fails to account for all the syntactic, semantic and discourse-related differences between weak and strong all as identified in section 2. For instance, why would prenominal allemaal accept mass noun complements on its ‘hyperbolic’, but not on its ‘literal’ use? Why would ‘literal’ and ‘hyperbolic’ all be in complementary distribution? Why would partitives resist ‘hyperbolic’ all? In short, an approach that treats weak all in terms of hyperbolic or imprecise usage of (maximal) strong all appears to be untenable.

9 In all kinds of-constructions, when the kind in question is associated with a readily accessible taxonomic hierarchy, a strong interpretation becomes available in addition to the weak one; on this interpretation, which I find very hard but not completely impossible to get with (35-a), it is equivalent to (35-b). I will assume this interpretation involves quantificational all (section 2.2), applied to a set of subkinds. For the present purpose, I am focusing only on the weak interpretation of all kinds of, which (according to my judgement) is the most salient even in sentences like (35-a) (and can be brought out decisively by giving either kinds or music somewhat more prosodic prominence than all itself).
3.1.2 A covert possessive structure

In the introduction, I included *allerlei* ‘all kinds of’ as one of the members of the Dutch all-family. Examining the morphological structure of *allerlei* somewhat more closely, we find a genitive -er (now no longer productive in Dutch):

(37) all.er.lei flessen
    all.GEN.kind bottles
    ‘of all sorts of bottles’ (i.e., an assortment of bottles)

This construction is reminiscent of a similar construction that exists in many languages (Dutch included):

(38) a. Ik heb van alles gezien.
    I have of everything seen
    ‘I have seen all kinds of things.’ (i.e., many/various/a wide range of things)

b. Ho mangiato di tutto.
    have-1SG eaten of all
    ‘I have eaten all kinds of things.’ (Italian; Nino Grillo p.c.)

c. Jeo sam od svega.
    eaten AUX-1SG from all-GEN
    ‘I have eaten all kinds of things.’ (Serbo-Croatian; Boban Arsenijevic p.c.)

In all these examples, the equivalent of ‘of all’ is used to convey something like ‘a sample of all things’, resulting in a ‘many’-like interpretation reminiscent of the one triggered by weak *all*. However, this ‘sample reading’ is likely the result of the use of a possessive construction, not an instance of weak *all*, as it is also attested in Dutch in the absence of *all*:

(39) De trein zat vol met [van die gestreste zakenmannen].
    the train sat full with of those stressed-out businessmen
    ‘The train was full of those stressed-out businessmen (you know the kind I mean)’.

Here too, we find an instance of an NP of the form ‘of X’ interpreted as ‘various instances of the kind X’, an interpretation that clearly cannot be due to some unusual contribution of *all* given that *all* is absent here. If the sample reading is introduced by the possessive, *all* in the examples above can simply be analysed as ordinary, maximality-conveying instances of *all*, with ‘of’ (or a genitive) picking out some subset of this maximal set, resulting in the appearance of non-maximality.

Generalising this pattern to other cases of weak *all*, then, we might assume that they all involve an overt or covert *of*, and that ‘weak *all*’ constructions as a whole are interpreted as something like ‘a selection out of all X’ or ‘a representative sample of X’. However, there are two problems with such an approach. First, there is no syntactic or morphological evidence of the presence of a possessive construction in cases other than the two above (for
example, there is no genitive in *allemaal* or its earlier forms). Second, while some instances of weak ALL may be described in terms of a representative sample (in particular, when its complement is kind-denoting, as in (5)), this does not hold for all of them; there is no sense in which the combination of *allemaal* with a mass noun like *water* describes a sample or a selection of all possible water, or *all angry* describes a selection of degrees of anger. I will therefore not pursue this option for weak ALL in general. I will, however, assume that it is an accurate approximation of what is going on in (37)-(38), which is why I will disregard *allerlei* and *van alles* in the remainder of this paper. Of course, why and how possessive constructions like (38) end up with this ‘representative sample’ interpretation is still an interesting question, but one that does not seem to involve any unusual contribution of ALL and is therefore beyond the scope of this paper.

### 3.1.3 Maximalisation of spatiotemporal occurrences

In section 2.3.2, we have seen that (at least some forms of) weak ALL are sensitive to spatiotemporal and/or taxonomic structure of the referent, meaning that an NP like *allemaal* \(X\) requires either the presence of multiple subkinds of \(X\) or the presence of \(X\) scattered across multiple portions of spacetime. We therefore might want to entertain the possibility that weak ALL expresses maximality, but in the kind or spatiotemporal domains rather than the individual domain.

However, this possibility is not supported by the actual interpretation of weak ALL. While the use of an NP like *allemaal meisjes* or *allemaal water* may only be appropriate if the girls or water-quantities in question are scattered over multiple portions of spacetime (or represent multiple subkinds), there is no sense in which they require their referents to occur in all portions of spacetime (or represent all subkinds, respectively). Weak ALL remains weak, even if we relocate the domain on which it operates from individual entities to spatiotemporal or taxonomic ones.

### 3.1.4 Conclusion

I have considered three possible ways to maintain maximality as the core semantic contribution of ALL and have shown that none of them are feasible. Accordingly, I conclude that maximality is not the core meaning of ALL. If we want to preserve the unified analysis of strong and weak ALL as suggested by their complementary distribution, we will have to approach ALL’s meaning in a different way. I will outline my proposal in the next section, drawing on familiar data involving strong ALL, and show how it can be extended to weak ALL in section 4.

### 3.2 All as a plurality enforcer

I propose to analyse ALL as a modifier that operates on plural (i.e., nonatomic) entity arguments and ensures that this argument remains semantically plural in the subsequent
derivation. Of course, such a proposal only makes sense under the assumption that the plural status of plural individuals is somehow unstable or under threat. In the present section, I will argue that this is indeed the case. More specifically, I will argue that languages have a tendency to simplify plural predication by resorting to systematic atomisation of plural arguments, unless this move is blocked by cognitive or compositional factors which include the presence of ALL.

### 3.2.1 Impure atomicity: some background

A recurring debate in the literature on plurals and group nouns involves data like the following, which show that there needs to be some formal connection between the denotations of singular collective nouns/DPs like the committee, my family, and couple, and plural ones like the committee members and my guests.

(40)  
- a. The committee laughed   ⇔  The members of the committee laughed.
- b. The committee gathered  ⇔  The members of the committee gathered.
- c. My family is intelligent ⇔  The members of my family are intelligent.

(41)  
- a. [Mary and Sue / the women] are a happy couple.  
- b. My guests are couples from Hungary.  (Schwarzschild, 1996)

(42)  
I met a committee of women.  (Barker, 1992)

First, (40) shows that there are systematic entailment relations between plural and collective DPs. Second, the fact that it is possible to use collective nouns as plural predicates (as in (41)) shows that there must be a formal relation between the two: since a sentence of the form ‘X is P’ is standardly analysed as true iff the denotation of X is a member of the denotation of P, a predicate like happy couple must include the denotations of referential DPs like the women or Mary and Sue. A similar argument applies to (42), where the predicate women applies to the individual members of the committee, suggesting that the semantics has access to the latter.

At the same time, there are many good reasons to assume that the denotations of plurals and collective DPs are not identical (Barker, 1992; Schwarzschild, 1996; de Vries, 2017); rather, most of the evidence suggests that plural DPs refer to sum entities while collective DPs refer to atomic ones. That means that, in order to derive the sentences and entailment patterns in (41)-(42), we minimally need to equip our semantics with either a way to map singular entities to plural ones, or the reverse. The first approach is taken by Barker and Schwarzschild, who both constrain their proposed mappings from atoms to the sum of that atom’s members in such a way that they only apply to mixed predications involving collectives like the ones in (41) and (42); a less constrained version of this approach is adopted by Landman (1989). The second approach, exemplified by Winter (2001), assumes

10 See section xxx for a concrete implementation of this idea that also serves to highlight the semantic similarity between this operator and quantificational all.
that the denotation of a referential plural can be mapped to a corresponding group or impure atom (Link, 1984; Landman, 1989). This approach treats sentences like (41-a) as a form of singular predication: the sum consisting of Mary and Sue is ‘fused’ into a conceptually complex but semantically singular individual, and the sentence is true iff that individual is a member of the set of happy couple-entities.

\[(43)\] Impure atomisation:
If \(x\) is a sum of entities denoted by a referential DP, \(\uparrow_e(x)\) is the (singular) impure atom corresponding to \(x\).

A major difference between the two approaches is that the latter, but not the former, makes predictions beyond the realm of collective noun interpretation. If impure atomisation is available to the grammar, we expect to see atomic interpretations of morphosyntactic plurals in other cases as well, not just when they appear in mixed predications with collective nouns. That this prediction is correct is argued at length by de Vries (2015), who develops a series of grammatical tests for both semantic plurality and atomicity and uses them to show that morphosyntactically plural DPs tend to receive semantically singular (atomised) interpretations when they are inanimate, but not when they are animate. For instance, in a questionnaire study with speakers of Dutch, De Vries shows that a lack of animacy facilitates the availability of a ‘half-of-each’ interpretation for sentences like (44). It has been argued (Pearson 2011, based on the analysis of partitives in Barker 1998) that this interpretation is only available when the embedded DP is atomic; for semantically plural DPs, the only available interpretation is a ‘half-of-total’ one. Thus, while (44-b) is true in a situation in which spilled coffee on a list of names, obliterating half of each name, (44-a) is false in a parallel situation in which each girl is covered with mud up to her waist. Instead, (44-a) can only be verified by a situation in which half of the total number of girls is completely mud-covered.

\[(44)\]

\[\begin{align*}
a. & \quad \text{De helft van de meisjes is met modder bedekt.} \\
& \quad \text{the half of the girls is with mud covered} \\
& \quad \text{‘Half of the girls is/are covered in mud.’} \quad (√\text{half-of-total, } ×\text{half-of-each}) \\

b. & \quad \text{De helft van de namen is onleesbaar geworden.} \\
& \quad \text{the half of the names is unreadable become} \\
& \quad \text{‘Half of the names has/have become unreadable.’} \quad (√\text{half-of-total, } √\text{half-of-each})
\end{align*}\]

\[\text{11Impure atomicity is also invoked by McNally (1993) in order to deal with ‘comitative’ NPs (a special kind of coordinated NP) in Russian and Polish, and by Kwak (2003); Joh (2008) in order to account for certain semantic differences between two types of plural NPs in Korean.}
\[\text{12The } \uparrow \text{ notation is from Landman 1989, although I do not adopt his formalisation of impure atoms as singleton sets of sets. The } e \text{ subscript, for ‘entity’, indicates that this version of } \uparrow \text{ applies to pluralities of individuals, and is intended to distinguish it from } \uparrow_k \text{ (for kind pluralities) and } \uparrow_d \text{ (for degree pluralities) which I will propose later on.}\]
De Vries shows that the degree of animacy of the referent is a much more reliable predictor for the availability of the atom-based half-of-each interpretation than the DP’s morphosyntactic number, suggesting that atomised denotations are systematically available for inanimate plural DPs. This observation also has the potential to account for a major empirical problem with Winter’s impure atom shift. Because this shift, under Winter’s definition, is essentially unrestricted, it predicts that we should always be able to substitute a plural DP for a collective one (since the former always has the option to shift into a denotation that makes it semantically equivalent to the latter). However, this is not the case (see also Barker, 1992; Schwarzschild, 1996; Magri, 2012):

(45)  
(a) The committee [has 2 members/consists of Mary and Sue/was founded in 2012].
(b) *The women [have 4 members/consist of Mary and Sue/were founded in 2012].

In line with her other observations, de Vries (2015) argues that the pattern in (45) does not represent the full picture. She shows that sentences like (45-b) are not always unacceptable: while speakers of Dutch uniformly reject sentences like (45-b) when the subject is human, they accept them much more often when the subject is inanimate, as in (46).

(46)  
De [buit bestaat/²buitgemaakte voorwerpen bestaan] uit vijf parelkettingen en zes horloges.
‘The [loot consists/stolen objects consist] of five pearl necklaces and six watches’

Taken together, these results indicate that plural DPs are sometimes interpreted atomically, indicating that something like Winter’s impure atom mapping must be available. Furthermore, this mapping is not freely available, but constrained by animacy. De Vries speculates that the relevant factor is individuation in general: the less individuated a plural DP is, the more people tend to treat it as if it were atomic. In this way, the semantic treatment of plural DPs parallels their morphosyntax: as Corbett (2000) points out at length, nominals are crosslinguistically much more likely to be marked plural and take plural agreement when they are highly individuated. Animacy is an important exponent of individuation; cardinality is another one (Corbett notes that numerical DPs are crosslinguistically more likely to lack number marking and agree in the singular when they involve high numbers). Other likely facets of individuation are spatial configuration (things that appear and move independently from each other are more individuated than things that usually appear or move in groups; see e.g. Grimm (2012) on the number systems of languages like Welsh and Maltese) and the degree to which a particular collection of individuals has a collective purpose or function (see de Vries (2015, p.129), who discusses an earlier observation by Mador-Haim & Winter (2015); cf. also Geurts’s (2002) discussion of the influence of ‘case versus character’ on the way we count things).
3.2.2 Atomisation as an economy strategy

Why, though, would people routinely take an additional compositional step (impure atomisation) in order to undo the semantic plurality of non-individuated DPs?

First, note that singular predication is a first-order process, while plural predication is higher-order. Compare for instance (47-a) and (47-b):

(47) Let the set of rabbits be \( \{m, n, a\} \). Let pluralisation of a set of atomic entities \( X \) (written \( X \)) be defined as the closure under sum of \( X \) (Link, 1983). Then

a. \([\text{Miffy is a rabbit}] = m \in \{m, n, a\}\)

b. \([\text{Miffy and Nina are rabbits}] = m \oplus n \in \{m, n, a, m \oplus n, m \oplus a, n \oplus a, m \oplus n \oplus a\}\)

Where singular predication involves checking membership of a single entity in a set of atomic entities with cardinality \( n \), plural predication involves checking membership of a sum of entities in a set of sum entities with cardinality \( 2^n - 1 \) - an order of magnitude more complex. In addition, its verification process requires the semantic representation of every individual member of the subject sum, which seems unrealistic in many real-life situations.

A point often made in the literature on collective nouns like family or committee is that we often talk about collections of things without really knowing or caring which individual entities make up said collection, but this observation applies to ‘ordinary’ plurals just the same. Intuitively, when a school teacher utters the sentence in (48-a), she is not necessarily conveying the meaning in (48-b) (to which (48-a) is technically equivalent if we analyse it along Linkian lines, as in (47)), but rather something like (48-c).

(48) a. The children did watercolours today.

b. Sophie did watercolours today and Olivia did watercolours today and Liam did watercolours today and Noah did watercolours today and... (etc)

c. Today’s class activity was watercolours.

Impure atomisation, then, can be seen as a way to avoid the complexities of plural predication (both its higher-order nature and the necessity of full internal representation of a plurality). Rather than asking ourselves whether a given predicate applies to each individual member of a particular collection, we can simply consider whether the predicate can reasonably be said to apply to the collection as a whole. In the case of (48), for instance, the fact that watercolours were today’s ‘official’ class activity legitimises the application of the predicate did watercolours today to the group of children as a whole, even if Sophie and Noah ended up not participating.

Framing impure atomisation in this way also makes clear why it is linked to low individuation. Individuation represents the degree to which we perceive the parts of some part-whole structure as distinct individuals. The less reason we have to care about the individuality of
the parts, the less important it seems to verify each part’s individual contribution to some property attributed to the whole.

3.2.3 (Non-)maximality

As Winter (2001) notes, adopting a (more or less) freely available atomisation operation for referential plurals allows us to account for the often-made observation that plural predication is weaker than universal quantification, even though under Linkian assumptions, the two are equivalent.

(49) a. Every girl jumped into the lake.
   b. The girls jumped into the lake.

While (49-a) is false if some of the girls did not jump into the lake, (49-b) isn’t necessarily; unlike (49-a), (49-b) is compatible with the presence of exceptions. This is unexpected if we define semantic pluralisation of predicates in terms of closure under sum of singular predicates. In that case, if the sum entity expressed by the girls is a member of the plural predicate jumped into the lake, it necessarily follows that every atomic part of said sum entity must be a member of the singular predicate jumped into the lake. In other words, applying a pluralised predicate to a sum results in full distributivity of the predicate to all the sum’s atomic parts. In the literature, this problem is often solved by ‘uncoupling’ pluralisation and distributivity in such a way that a sum can be a member of a pluralised predicate even if some of its members do not share the relevant property, for example by adopting distributivity over ‘covers’ of a particular sum rather than atomic parts (Schwarzschild, 1996; Brisson, 1998).

However, Winter proposes to analyse non-maximality not as a property of plural predication, but rather as a consequence of singular predication over impure atoms. Thus, (49-b) is true if the impure atom corresponding to the girls is a member of the singular predicate jumped into the lake. What this means can vary across contexts. Perhaps a sufficient proportion of the impure atom’s parts needs to share the property expressed by the predicate (as in (49-b)). Perhaps, in some contexts, it might be enough if the property only applies to some representative member of the group (de Vries (2017), for instance, notes that the sentence The boys are touching the ceiling is false if one boy is touching the ceiling while the others are just standing there, but true if the boys are forming a human pyramid with the topmost boy touching the ceiling; in the context of our discussion in section 3.2.2, note that the boys are highly individuated in the first case but much less in the second case, in which they form a salient spatiotemporal unit with a collective function).

Under Winter’s assumptions, true plural predication is inherently maximal - that is, the two sides of (50-a) are fully equivalent - whereas singular predication over impure atoms only involves defeasible pseudo-equivalence (Winter & Scha, 2015).

(50) a. \( P(x) \land P(y) \land P(z) \iff *P(x \oplus y \oplus z) \)
b. $P(x) \land P(y) \land P(z) \iff P(\uparrow e (x \oplus y \oplus z))$

We are now in a position to see how the assumption that ALL blocks atomisation induces maximality: under a classical Linkian definition of the pluralisation/distributivity operator $\ast$, maximality is simply a natural side effect of semantic pluralisation, which means that enforcing plural predication automatically enforces maximality. On the other hand, singular predication does not formally require maximal participation of the argument’s parts, which means that atomising a plural argument opens the door to non-maximal interpretations.

3.3 Interim conclusions

I have argued that language is subject to an economy-related preference for singular over plural predication, which involves pressure to atomise (that is, ignore the internal structure of) plural referents. This tendency is balanced out by individuation, which involves an opposing pressure to preserve the internal structure and represent the parts of a whole as distinct semantic entities. As a consequence of these opposing pressures, plural referents with a low degree of individuation are more likely to receive an impure atomic interpretation than highly individuated ones. Furthermore, I have proposed that the atomisation process can be blocked by ALL, forcing plural predication. Because of the way pluralisation of predicates is defined formally, maximality automatically follows when atomisation is blocked. In contrast, singular predication over impure atoms allows for non-maximal interpretations.

In the next section, we turn to weak ALL.

4 Weak ALL

While we have technically uncoupled ALL from maximality, treating the latter as a formal side-effect of ALL’s plurality-enforcing semantics rather than its core function, the account in the previous section still involves a very tight link between semantic plurality and maximality. This means we do not appear to be any closer to solving the problem of non-maximal weak ALL. In this section, however, I will show how weak ALL can be tackled when we adopt the assumption (supported by the syntactic and semantic data in section 2) that

\[13\] For collective predication (e.g. The cats gathered on the roof), we need slightly separate but similar assumptions: if we assume that (1) collective predicates are those predicates that inherently include sums, and (2) that a sum $x$ can only be in the extension of a collective predicate $P$ if every atomic part of $x$ is involved in the property expressed by $P$ (which seems a reasonable assumption, since it is hard to see how $P$ could reasonably be seen to represent the meaning of some property or event if it included random uninvolved entities too), it follows that collective predication over sums is inherently maximal. Assuming further that collective predicates may include impure atoms in their extension allows for singular collective predication over atoms, in which case involvement of the atom’s parts becomes a matter of pseudo-equivalence, allowing for non-maximal interpretations.

\[14\] To borrow some terminology from Optimality Theory, the pressure to atomise can be seen as a markedness constraint, while the pressure to preserve semantic plurality is a faithfulness constraint.
weak ALL does not apply to individuals, but to (plural) kinds. When the resulting kind sum is combined with an episodic predicate, the usual mechanism of Direct Kind Predication (Chierchia, 1998) results in (weak) existential quantification over individual instantiations of the kind. While this subsequent quantificational process largely obscures the contribution of ALL, the fact that ALL is only defined for plural arguments ensures that it can only apply when the kind in question has more than one instantiation, which I take to be the source of weak ALL’s scatteredness effect.

4.1 Singular and plural kinds

In section 2, we concluded that strong ALL applies to definite expressions at the DP level, while weak ALL applies to indefinite expressions at the NP level. These indefinite expressions may be bare plurals, plural this-indefinites, or explicitly kind-denoting constructions like kinds of X. In addition, we have argued that the complementary distribution of weak and strong ALL means we should pursue a unified analysis. Since we have analysed strong ALL as a function that operates on sum entities (the denotations of plural referential DPs), we will assume that weak ALL operates on some kind of entity, too.

Taking our cue from the fact that English ALL is weak when it appears with an explicitly kind-denoting NP (kind/sort/manner of), we will assume that the relevant entities are kinds. Additional support for this idea comes from the fact that kind modification is allowed in weak ALL-NPs (see examples (15-b) and (16-b)). Moreover, bare plurals are usually analysed as kind-denoting, too (Carlson, 1977; Chierchia, 1998).

We have seen that ALL always imposes some kind of plurality requirement on its complement, whether that means a sum of individuals (in the case of strong ALL) or a sum of subkinds or spatiotemporal locations (in the case of weak ALL). Hence, we have defined ALL in such a way that it can only meaningfully apply to plural arguments (sum entities). This means that a uniform analysis of weak and strong ALL requires some notion of plural kinds.

Such a notion is exactly what is argued for in Dayal (2004). Based on data from languages with and without determiners, Dayal argues that definite kind reference should be analysed in terms of an ordinary definite determiner (i.e., the iota operator) applying to a set of taxonomic entities. This may be either a singleton containing an entity that represents the kind as a whole (as in (51-a)), or a set of entities representing the subkinds (as in (51-b)).

(51) a. The whale is a mammal.
   whale = { w }

15 With respect to this-indefinites, the claim that they denote kinds has less precedent in the literature (but see e.g. McNally 1998). Adopting this line does provide us with a new possible interpretation of the notion of ‘noteworthiness’ as it pertains to the referents expressed by this-indefinites (Ionin, 2006): a ‘noteworthy’ referent is one who is capable of representing a kind on their own (in other words, a referent that is quite literally ‘one of a kind’ or ‘in a class of their own’).
b. The orca, the porpoise and the baiji are whales.

\[ \text{whale} = \{ \ o, \ p, \ b \ldots \} \]

Crucially, Dayal assumes that the members of these taxonomic sets are atomic entities, not sums; in order to account for the relation between these singular kind entities and individual instantiations of those kinds, she draws a parallel with the way collective DPs relate to their plural counterparts (cf. our discussion in section 3.2.1).

(52) a. The guinea pig makes a suitable pet for children.
⇔ Guinea pigs make suitable pets for children.

b. The committee voted on the proposal.
⇔ The committee members voted on the proposal.

The difference between Dayal’s singular kinds and the Neo-Carlsonian notion of kinds as intensionalised maximal sums (‘plural kinds’, in Dayal’s framework) is that the latter’s relation to their instantiations is semantically transparent. Thus, plural kinds always allow access to the set of instantiations, as evidenced by their ability to shift to an existential interpretation in episodic contexts ((53-b)); such a shift is unavailable for singular kinds ((53-c)).

(53) a. Chihuahuas / the chihuahua yaps rather than barks.

b. Chihuahuas were yapping all through the night.

c. # The chihuahua was yapping all through the night.

Similarly, contrasts like the one between (54) and (55) show that singular and plural kinds parallel collective DPs and their plural counterparts, respectively, in that the latter but not the former allow quantification over (subsets of) their instantiations or members:

\[
\begin{align*}
\{ \text{Superheroes} & \} \quad & \{ \text{The members of} \\
\{ \text{The Mutant Squad} & \} \quad & \text{have many different shapes and sizes.} \\
& & \text{support each other.} \\
& & \text{have mutually exclusive special abilities.} \\
\} \\
\} \\
\end{align*}
\]

(55) */# \{ \text{The superhero} \\
\{ \text{The Mutant Squad} & \} \quad & \{ \text{has many different shapes and sizes.} \\
& & \text{supports each other.} \\
& & \text{has mutually exclusive special abilities.} \\
\} \\
\} \\

My proposal will be very much in the spirit of Dayal, involving a central role for impure atomicity both in the individual and in the kind domain. However, it differs from Dayal’s framework in that I will assume - in full parallel with our conclusions from the previous section - that atomic kinds may be derived from kind pluralities by an atomisation operator \[ \uparrow_k \]. This means that kind-denoting expressions may be interpreted as semantically atomic even if they are morphosyntactically plural. However, I will assume that the atomisation of kinds is driven by requirements imposed by different classes of predicates, rather than by
general economy principles.

4.2 Three kinds of predication over kinds

First, we note that different kinds of predication over kinds all behave differently with respect to their compatibility with (strong and weak) all. *Kind-level* predication - involving predicates that express properties of kinds as a whole, such as being extinct, being invented at the start of the Industrial Revolution, or occupying a particular position in a taxonomic hierarchy - is incompatible with all forms of all, as (56) and (57) show.

(56) a. (*All) common wood pigeons are widespread.
   b. Europese otters zijn (??allemaal) zoogdieren.
      ‘European otters are (all) mammals.’

(57) a. (*All these) common wood pigeons are widespread.
   b. (*Allemaal) Europese otters zijn zoogdieren.

This behaviour parallels the behaviour of group-level predicates which express properties of groups as a whole, like *have n members* or *be founded in 2012*, as discussed in section 3.2.1 (example (45) and further). As we saw, these predicates require their arguments to be atomic. In line with this, I propose that kind-level predication involves predication over singular rather than plural kinds. In the case of group-level predicates, we can diagnose this singularity requirement from the predicate’s incompatibility with (animate) plural subjects; in the case of kind-level properties, it is reflected in the unacceptability of all (which carries a plurality requirement).

*Generic* predication is distinct from kind-level predication in that it expresses properties that generally hold of individual instantiations of a kind, rather than of the kind as a whole.\(^{16}\)

\(^{16}\)The distinction between kind-level and generic predication is not always clear - for instance, being a member of the class Mammalia is a property of kinds and not quite of individuals, but at the same time it is expressed through a cluster of characteristics that hold of individual members of the kind (e.g. individual mammals generally have fur or hair and females have mammary glands). Intuitively, this is why *allemaal* in (56-b) does not sound quite as bad as *all* in (57-a). Dowty (1987) coins the term *subentailment* to account for this phenomenon: subentailment is a form of distributivity where only part of the lexical meaning of a predicate is distributed down to individual members of a plurality. Thus, while *gathered* in (i-a) expresses a property of pluralities, it still has implications for each individual member of that plurality. The same does not apply to *numerous* in (i-b). According to Dowty, the presence of subentailments is precisely why *all* is acceptable in (i-a) but not in (i-b).

(i) a. The children (all) gathered in the auditorium.
   ~⇒ Each child was in the auditorium.
   b. The children are (*all) numerous.
   ~⇒ Each child...?

With kinds, predicates that describe taxonomic hierarchies or are used to classify kinds with respect to each other - such as *herbivorous*, *domesticated*, or *suitable as pets* - tend to fall into this grey area where
When the subject is morphosyntactically plural, generic predication is fully compatible with strong ALL, but not with weak ALL. For instance:

(58)  
\begin{enumerate}
  \item a. Cats are (all) introverts.
  \item b. Kinderen gedijen (allemaal) bij duidelijke regels.
        \begin{quote}
          ‘Children (all) thrive with clear rules.’
        \end{quote}
\end{enumerate}

(59)  
\begin{enumerate}
  \item a. (*All these) cats are introverts.
  \item b. (*Allemaal) kinderen gedijen bij duidelijke regels.
\end{enumerate}

Finally, episodic predication involves predicates that apply to some of a kind’s instantiations at a particular point in time; while it can be analysed in different ways, all analyses on the market involve some kind of covert existential quantification. Not surprisingly given this existential character, it is the only form of predication over kinds that is compatible with weak ALL:

(60)  
\begin{enumerate}
  \item a. (All these) common wood pigeons just ruined my best hat.
  \item b. (Allemaal) hongerige kokmeeuwen cirkelden rond de boot.
        \begin{quote}
          ‘(All these) hungry black-headed gulls were circling around the boat.’
        \end{quote}
\end{enumerate}

Strong ALL is (more or less) compatible with episodic predication too:

(61)  
\begin{enumerate}
  \item a. ?Bottlenose dolphins (all) accidentally swam up the Thames last week.
  \item b. ?Kinderen gooiden op straat (allemaal) met vuurwerk.
        \begin{quote}
          ‘Children were (all) throwing fireworks on the street.’
        \end{quote}
\end{enumerate}

While sentence (61-a) sounds a bit degraded, my English informants all interpret it as equivalent to ‘There were some bottlenose dolphins that all accidentally swam up the Thames last week’, that is, existential quantification and subsequent maximisation of the predicate-verifying dolphin sum. The same applies to the Dutch example in (61-b).

Let’s sum up. ALL, in general, is only compatible with predication over kinds when the predicate expresses a property that holds of individual kind members rather than kinds as a whole. With generic predicates, which support the inference that a particular property holds they sound awkward with strong ALL but not as bad as (56-a) or (i-b), or where speakers disagree about grammaticality (for instance, (ii-b) sounds terrible to me, but is acceptable to some of the other Dutch speakers I consulted).

(ii)  
\begin{enumerate}
  \item a. Orcas are (all) carnivorous.
  \item b. Cavia’s zijn (allemaal) leuk als huisdier.
        \begin{quote}
          ‘Guinea pigs (all) make fun pets.’
        \end{quote}
\end{enumerate}
of kind members in general, **all** is strong and has its familiar maximising effect (‘P holds of every instantiation’). With episodic predicates, whether **all** is weak or strong depends on its position. Prenominal, it is weak. In floating position (insofar grammatical), it contributes the familiar maximising effect of strong **all**, but only applies post-existential quantification (‘P holds of every member of some instantiation of which P holds’).

### 4.3 Analysis

In the following, I will remain agnostic on the exact nature of kinds, except for assuming that (1) they are a type of entity that, like individual entities, may be either singular or plural; (2) they bear a systematic relation to their instantiations, which I will formalise as follows:

\[(62) \text{Instantiation sums:} \]
\[\text{If } k \text{ is a (singular or plural) kind, } I(k) \text{ is the instantiation sum of } k. \ I(k) \text{ is an individual entity such that:} \]
\[\text{...when } k \text{ is singular, } I(k) \text{ is the impure atomic entity corresponding to the atomisation of the sum of all } k\text{'s instantiations;} \]
\[\text{...when } k \text{ is plural, } I(k) \text{ is the sum of all } k\text{'s instantiations.} \]

(I follow Carlson (1977) in not further defining the term ‘instantiation’, although if the reader is so inclined, (62) may easily be formalised in Neo-Carlsonian terms (Chierchia, 1998). I avoid this move in order not to bog down the analysis in this section with discussions of intensionality.) Recall further that I am assuming that singular kinds may be derived from plural kinds by an atomisation operator \(↑k\), parallel to the way impure atomic individuals may be derived from plural ones, and that applying **all** blocks this possibility.

#### 4.3.1 Kind-level predication

Unlike Dayal (2004), I do not assume that morphosyntactic plurality of the NP indicates that it denotes a plural kind: as the observed similarity between kind-level predication (\textit{widespread, extinct, a member of the genus Panthera}) and group-level predication (\textit{consist of linguists and philosophers, founded in 1999, have 12 members}) suggests, bare plurals have no problem expressing atomic kinds, and are in fact required to when they appear with a kind-level predicate. Analysing **all**’s incompatibility with kind-level predication, then, is straightforward: if the sentence subject denotes a singular kind, it is incompatible with **all** in the first place, and if it denotes a plural kind, applying **all** blocks the atomisation with \(↑k\) that is necessary in order to provide the kind-level predicate with an argument of the right sort.

---

17 Again, we disregard English prenominal quantificational **all**; see section 2.2.
18 Conversely, however, it does seem that morphosyntactically singular NPs obligatorily express singular kinds; cf. the data in (53-c) and (55).
4.3.2 Episodic predication

For episodic predication, I will follow Carlson (1977); Chierchia (1998) in assuming that it involves a covert mechanism that fixes the type mismatch between episodic predicates (which require individual-denoting arguments) and kind-denoting subjects. I will treat this mechanism as a typeshift following Chierchia (1998) and also adopt his terminology (DKP, for ‘derived kind predication’), although to be consistent with the assumptions at the beginning of this section I will define it somewhat differently from Chierchia:

(63) **Derived Kind Predication (DKP):**

If \( P \) is an episodic predicate over individuals and \( k \) is a plural kind, then

\[
P(k) = \exists x[I(k) \supseteq x \wedge \ast P(x)]
\]

According to (63), an episodic predication over kinds \( P(k) \) is interpreted as ‘there is an instantiation, or sum of instantiations, \( x \) of \( k \) such that \( P(x) \)’. I will assume that \( k \) needs to be a plural kind, as we have seen in section 4.1 that singular kinds do not allow semantic access to individual instantiations. While the proposition in (63) could logically be verified by the existence a single atomic instantiation of \( k \) with property \( P \), we will also assume - as in most current analyses of the semantics and pragmatics of plurality, e.g. Sauerland et al. (2005); Spector (2007); Zweig (2009) - that the use of a plural form pragmatically rules out an atomic interpretation.

When plurality-enforcing **all** applies to a plural kind before DKP, nothing much happens - \( k \) is plural and remains plural, and we end up with an existentially quantified denotation along the lines in (63). In other words, the weak status of the subject NP/DP is not actually contributed by **all** but by the existential quantificational mechanism built into the DKP shift. What **all** does contribute in this particular derivation is an additional plurality requirement on \( k \): in order for **all** to be applicable, \( k \) needs to be non-atomic. That is, the extension of \( k \) in a particular situation needs to involve either multiple instantiations or multiple subkinds. When \( k \) is a mass kind, such as water, the only way to have multiple instantiations is to exist in more than one location. I will assume that this is the origin of the scatteredness effect contributed by weak **all**, as discussed in section 2.3.2.

When plurality-enforcing **all** applies after DKP, it is the plurality of the verifying instantiation \( x \) that is enforced.\(^{19}\) In this case, the effect of **all** is again strong.

\(^{19}\)How to ensure this compositionally is not trivial, as **all** needs to end up within the scope of the existential quantifier somehow despite applying later in the derivation. It is possible an adaptation of the DKP mechanism in terms of choice functions and wide-scope existential closure fares better in this respect (roughly: a choice function-based DKP supplies an individual instantiation; **all** applies; the existence of a verifying choice function is confirmed through existential closure). In addition, an analysis of strong **all** with episodic predication should ideally account for the observation that examples like (61) are somewhat degraded. I will leave this issue for future research.

27
4.3.3 Generic predication

In order to analyse generic predication, we need some additional assumptions. While many authors (including Carlson 1977 and Chierchia 1998) assume that generic readings are derived through a dedicated covert quantifier GEN, we will instead adopt an alternative approach suggested by Dayal (2004), who proposes to treat genericity as a side-effect of predication over singular kinds in a way that essentially parallels our approach to non-maximality in section 3.2.3. With predication over impure atoms, any implications about the involvement of individual parts are due to pseudo-equivalence, which leaves room for all kinds of non-maximal interpretations. The same tolerance for exceptions famously holds for generic statements:

(64) a. Cats have four legs.  
(compatible with the existence of three-legged cats)

b. Peacocks have incredibly colourful tail feathers.  
(compatible with the existence of female peacocks)

And just as before, adding all forces a maximal interpretation (generally false):

(65) a. Cats all have four legs.

b. Peacocks all have incredibly colourful tail feathers.

In a move that further sets the present account apart from Chierchia’s - who does not distinguish between kind-level and generic predicates - I will furthermore assume that generic predicates, like episodic ones, require individual rather than kind arguments (after all, they express properties of individuals; kinds do not have legs or tail feathers). This means that we need a typeshifting mechanism analogous to DKP in order to fix the mismatch between predicate and argument:

(66) **DKP for generic predication:**

If $P$ is a (singular or pluralised) generic predicate over individuals and $k$ is a (singular or plural) kind, then

$P(k) = P(I(k))$

(with $P$ and $I(k)$ matching in semantic number.)

It follows that if $k$ is a plural kind (as enforced by all), generic predication is interpreted in terms of the application of a pluralised predicate to $k$’s instantiation sum. Following the reasoning detailed in section 3.2.3, this entails that every atomic instantiation of $k$ has the property expressed by $P$. On the other hand, if $k$ is a singular kind, generic predication is interpreted in terms of singular predication over the impure atom $I(\uparrow k)$ (the atomised version of the sum of $k$’s instantiations following our definition in (62)), and is compatible with exceptions.
4.4 Summary and interim conclusions

The analysis presented in this section can be visually summarised as follows:

\[
\frac{\text{plural kind}}{\uparrow_k} \quad \frac{\text{still a plural kind}}{(\text{ALL})}
\]

\[
\frac{\text{singular kind}}{\text{kind-level}} \quad \frac{\text{generic}}{\text{(non-maximal)}} \quad \frac{\text{generic}}{\text{(maximal)}} \quad \frac{\text{episodic}}{}
\]

\[
P(\uparrow_k(k)) \quad P(I(\uparrow_k(k))) \quad \ast P(I(k)) \quad \exists x \lbrack I(k) \supset x \land \ast P(x) \rbrack
\]

+ distributive pseudo-equivalences

From top to bottom, we see that a plural kind can either be atomised with \(\uparrow_k\) or remain plural (optionally enforced by ALL). In the latter case, it is rendered incompatible with both kind-level predication and non-maximal generics, in parallel to the way pluralities of individuals are incompatible with group-level predicates and non-maximal predication. In the former case, the resulting singular kinds may function as arguments to kind-level predicates or to generic predicates (with a non-maximal result).

Furthermore, when ALL applies to a plural kind, the eventual result can be either weak or strong depending on the type of predication. With a generic predicate, the result is strong: plural kinds produce plural instantiation sums, and since the whole instantiation sum functions as the argument of \(P\), the result is guaranteed to be maximal following the formal properties of plural predication. With an episodic predicate, the predicate’s argument is not the entire instantiation sum, but an (existentially quantified) part of it.

Summing up, we conclude that the term ‘weak ALL’ to refer to non-maximal interpretations of adnominal ALL is actually a bit misleading, as there is nothing weak about ALL itself: rather, the source of this puzzling non-maximality is the inherently non-maximal existential quantification contributed by episodic predication over kinds.

With this, we (finally) conclude our investigation of adnominal ALL.
5 Extending the account to degree-modifying ALL\textsuperscript{20}

We now turn to adverbial *all* which, as we have seen in the introduction, shows a very similar alternation between maximal and non-maximal interpretations.

(67) a. The soil was all dried out.
   b. Mary got all angry at me.

An obvious way to approach sentences like (67-b) is to assume that *all* here is just the same endpoint modifier it is in (67-a), and that the acceptability of *all* with (some) relative adjectives shows that we can, under the right circumstances or for certain rhetorical purposes, re-interpret those adjectives as absolute. So, the communicative intention behind an utterance like *Mary got all angry at me* could be paraphrased as something like ‘Let’s pretend that it’s possible to be maximally angry, well, that is how angry Mary got at me’. This would allow a uniform account of the interpretation of *all* in degree constructions in terms of maximality of or universal quantification over degrees, since an assertion of the form ‘For all anger-degrees \(d\), it holds that Mary is \(d\)-angry’ necessarily includes the maximal degree\textsuperscript{21}. In line with this hypothesis, we find that combinations of endpoint modifiers with relative adjectives are a pretty regular occurrence in informal language, and are not limited to *all*:

(68) Mary is all/completely/totally/entirely obsessed with this Instagram celebrity.

A variation on this idea is to assume that degree modifiers like the ones in (68) involve universal quantification over dimensions, effectively being interpreted as ‘X in all respects’. Unlike the ‘absolute reinterpretation’ hypothesis above, this would explain why such endpoint modifiers are often fine with multidimensional gradable predicates (e.g. *John is a total idiot, Mary is completely obsessed*), but tend to be infelicitous with one-dimensional ones (e.g. *John is totally tall*, *This coffee is entirely expensive*).\textsuperscript{22} The basic idea is the

\textsuperscript{20}I owe the existence of this section to Andrew McIntyre (p.c.), who sent me Buchstaller & Traugott’s (2006) paper when I first expressed an interest in the mysteries of *allemaal* and *all these*. Without it, I would probably not have realised the relevance of *all*’s degree-modifying function, and the way it parallels the weak/strong alternation seen in adnominal *all*. When most of the present paper was already written, I discovered that the alternating behaviour of adverbial *all* is also discussed at length in Burnett (2011), although her analysis is quite different from mine.

\textsuperscript{21}It also includes all non-maximal degrees, but since we are assuming following Heim (2000) that degree predicates are monotone (that is, for every degree \(d\) such that Mary is \(d\)-angry, it follows that Mary is \(d′\)-angry for every \(d′ < d\)), this would be true anyway.

\textsuperscript{22}Multidimensional predicates are degree predicates that involve measurement along multiple scales, such as *healthy* or *geek*; they can be diagnosed using a modifier like ‘in all respects’ or ‘in terms of...’ (e.g. *John is healthy in all respects; Mary is a real geek in terms of her hobbies*). In contrast, one-dimensional predicates like *tall* or *expensive* are mentioned along a single scale (*This coffee is expensive in terms of its price; #John is tall in every respect*). See the work of Galit Weidmann Sassoon (e.g. Sassoon, 2007, 2012) for more on the distinction.
same, however: all degree-modifying uses of ALL convey maximality, either applied to a set of degrees or a set of scales.

In principle, then, a maximality-based analysis of ALL can account for its intensifying use just fine (that is, if we accept either ‘angry to every possible degree’ or ‘angry in all respects’ as valid paraphrases of *all angry*). At first glance, our account of ALL as a plurality enforcer might not fare so well, since the interpretation of sentences like Mary got angry is not obviously a plurality phenomenon. However, I will argue that it can, in fact, be analysed as such - along the lines proposed in Dotlačil & Nouwen (2016) - and moreover, that if we do, the intensifying use of degree-modifying ALL follows naturally without the need to reinterpret the adjective as absolute.

### 5.1 Plural degree predication and ALL

Dotlačil & Nouwen (2016) argue that comparatives like *John is taller than every girl*, in which John’s height is compared to several other heights at once, involve distributive quantification over pluralities of degrees. In their analysis, the denotation of the comparative clause *than every girl* is a sum of degrees, where each degree corresponds to one girl’s height. The denotation of *John is taller* is the pluralised set of degrees that John’s height exceeds; so, if John measures 190cm, the set *[[John is taller]]* includes every degree $d < 190$ as well as all possible sums of those degrees. Simplifying Dotlačil & Nouwen’s syntax and semantics considerably:

\[(69) \quad \text{Let the girls and their heights be Sally (150cm), Helen (170cm), and Norah (180cm).}
\]

\[\text{Let John’s height be 190cm. Then:}\]

\[a. \quad [[\text{than every girl (is tall)}]] = 150 \oplus 170 \oplus 180\]

\[b. \quad [\text{John is taller}] = \{...185, 180, 175, 170, 160, 150...(etc)\}\]

\[c. \quad *[\text{John is taller}] = \{...180 \oplus 170 \oplus 150...(etc)\}\]

\[d. \quad [\text{John is taller than every girl}] = 1 \text{ iff } [\text{than every girl}] \in *[\text{John is taller}]\]

\[\Leftrightarrow \forall d_{AT} \subseteq [\text{than every girl}] [ \ d \in [\text{John is taller}] \]

The equivalence in (69-d) is supported by the semantics of the Linkian pluralisation operator $*$: if a sum of degrees is a member of some pluralised set of degrees $*P$, it follows that each atomic part of that sum must be a member of the non-pluralised set $P$. Consequently, *John is taller than every girl* is true iff John’s height exceeds each of Sally’s, Helen’s and Norah’s heights (which is true in this model).

If we assume that sets of degrees can be pluralised, it becomes possible to extend our analysis of ALL as a plurality enforcer to degree-modifying ALL. Intuitively, all degree constructions involve a comparison between different degrees, even when this is not spelled out overtly. In the case of ‘positive form’ sentences like (70), the comparison is between Mary’s height and some contextually derived height-standard:
Mary is tall.

Mary is tall for a women her age.

The standard is generally assumed to be calculated on the basis of a ‘comparison class’, a set of relevant individuals, which can be expressed using a for-phrase (as in (70-b)) or left implicit (as in (70-a)). The idea has been implemented in different forms in e.g. Bartsch & Vennemann (1973); Kennedy (n.d.); Bale (2008, 2011); Solt (2011); Bylinina (2014). Following Bylinina, who bases her line of argument on syntactic data from Fults (2006), we will assume an implementation along the lines of Bartsch & Venneman and Kennedy, in which comparison classes are introduced as arguments to the covert degree morpheme pos (instead of modifying scales directly, as in Bale’s approach). (71) shows one way to formalise this idea (Bylinina 2014, adapted from Kennedy n.d.):

\[
\text{pos} = \lambda C \lambda G \lambda x [\text{max}(\lambda d [G(d)(x)]) > \text{norm}(G)(C)]
\]

where \( C \) is a set of individuals of type \( \langle \text{et} \rangle \), \( G \) a degree predicate of type \( \langle \text{d,et} \rangle \), and \( \text{norm} \) some function that calculates a standard degree for \( G \) based on \( C \).

Thus, a sentence like *Mary is pos tall for a woman her age* is true iff the highest of Mary’s height-degrees exceeds the degree to which women her age are generally tall.

The comparison class does not always have to be a set of distinct individuals. For stage-level adjectives like *angry* - the kind of adjectives that accept intensification with *all* - Toledo & Sassoon (2011) propose that the comparison class consists of distinct stages of the same individual. A sentence like *Mary is angry* is then interpreted as “Mary is angrier than her usual state”, rather than “Mary is angrier than her peers”. We will adopt this assumption.

While (71) gives us a compositional recipe for the involvement of standard degrees in the derivation of the positive form, it does not yet tell us how such norms are calculated. For the sake of simplicity, let’s assume that grammar has some way to calculate an average value for all kinds of degrees, numerical (*tall*) as well as non-numerical ones (*angry*). Thus, the function \( \text{norm} \) calculates an average degree of \( G \) based on all the individuals or stages in the comparison class. Let’s further assume that it does so by incorporating a mapping from degree pluralities to single individual degrees - in an exact parallel to the impure atom formation operation that transforms sums of individuals into singular group individuals. Reflecting this parallel in our notation, we will write this mapping as \( \uparrow_d \).

\[
\text{norm}(G)(C) = \uparrow_d (\bigoplus \{d \exists x \in C [\text{max}(\lambda d'[G(d')(x)])])
\]

where \( \bigoplus (X) \) is the mereological sum of all elements in \( X \) and \( \uparrow_d (y) \) is the average value of the atomic parts of \( y \).

So, at some point in the derivation of the positive form, we are dealing with a sum of degrees representing the \( G \)-degrees of all individuals or stages in \( C \), which is then averaged-out in order to derive a single standard degree. In order for the sentence as a whole to be true, this standard degree must be among the degrees exceeded by the subject’s degree of \( G \).
Minus the averaging-out, this is exactly the kind of derivation that Nouwen & Dotlačil propose for plural comparatives. In order to make the parallel more obvious, we can further decompose $\text{NORM}(G)(C)$ into a series of successively applied operations. To illustrate this, let’s assume a model in which Mary’s degrees of anger at various representative stages in her life (represented numerically for illustrative purposes) are 30, 20 and 10, and her current degree of anger is 30.

(73) \[
\lambda G \lambda x [\max(\lambda d'[G(d)(x)]) > 20]
\]

We can read the formula derived in (73) in terms of the application of a predicate $< (\max(\lambda d'[G(d)(x)]))$ to the argument 20, or, alternatively, a membership statement: in order for the formula to be true, the degree 20 must be among the members of the set of degrees exceeded by $\max(\lambda d'[G(d)(x)])$. Substituting angry for $G$ and m for $x$, this means the sentences in (70-a) are true iff 20 is among the set of degrees smaller than 30 (Mary’s current degree of anger), which it is.

So far there is nothing really new here - we have just set up our compositional analysis of the positive form to parallel Nouwen & Dotlačil’s analysis of the comparative, including the presence of a sum of degrees which forms one half of the comparison. We have also isolated a single compositional step responsible for turning this degree-sum into a degree-atom, writing it $\uparrow_d$ in a heavy foreshadowing of our next move: the assumption that, just as before, it is precisely this step that is blocked by ALL.

Assuming that ALL blocks the atomisation of a sum of degrees, a sentence like Mary got all angry can be analysed in terms of plural degree predication, exactly along the lines of (69) above. The only difference with Nouwen & Dotlačil’s plural comparatives is that the argument degree-sum is derived from a covert rather than overtly expressed comparison class. As in the case of (69) above, we will assume that sets of degrees can be pluralised with * to yield a set of degree-sums.

(74) Let the degrees of anger of the relevant Mary-stages be 30, 20, and 10. Then the denotation of Mary was all angry, assigned a largely covert structure roughly paraphraseable as ‘Mary was angrier ALL than Mary was angry at her various stages’, is derived as follows:
According to this, while *Mary got angry* is true if Mary got angry compared to her average stage, *Mary got all angry* is true iff Mary is angry compared to all of the stages in her comparison class, which necessarily involves a higher degree of anger - hence the intensifying effect. Intuitively, the sentence can be paraphrased as something like “Mary got as angry as ever” (perhaps, given the strongly subjective flavour of intensifying *all*, we can assume that the comparison class is limited to those anger-stages that can be judged from the speaker’s experience, resulting in the paraphrase “Mary got as angry as I’ve ever seen her”). As with the paraphrases I tentatively suggested in the introduction to this section, it is admittedly hard to judge whether this paraphrase accurately captures the semantics of *Mary got all angry*, a construction whose usage is so constrained by contextual and sociolinguistic factors that it is very hard to isolate any ‘pure’ model-theoretic truth conditions from it. However, as a proof of concept, it shows that treating *all* as a plurality enforcer has the potential to explain why something that looks like it should be an endpoint modifier could function as an intensifier when combined with a particular class of gradable adjectives that lack maximal degrees, without having to reanalyse the adjective.

5.2 *ALL* with absolute predicates

The account above can be extended to absolute adjectives in order to capture the maximising effect of *all*, in parallel to the way we analysed strong adnominal *all* in section 3.2.3. Just as before, I assume an operator $\uparrow_d$ that turns degree-sums into atomic standard degrees. I will assume, following Kennedy (n.d.), that for independent economy-related reasons the standard for absolute adjectives is identified with the scale endpoint, rather than a contextual average. However, it is also often observed (e.g. Yoon, 1996; Rotstein & Winter, 2004; Toledo & Sassoon, 2011; Burnett, 2011) that this identification with the endpoint is ‘non-maximal’ in the sense that non-modified absolute degree predication is not as strict as its explicitly endpoint-modified counterpart:

\[
\begin{align*}
a. & \quad I \text{ suppose the window is clean, but it could be cleaner.} \\
b. & \quad I \text{ suppose the window is completely/totally/all clean, } \# \text{ but it could be cleaner.} \\
c. & \quad \text{The restaurant was already empty, but after a mouse was spotted it quickly emptied even further.} \\
d. & \quad \text{The restaurant was already completely/totally/all empty, } \# \text{ but after a mouse}
\end{align*}
\]
was spotted it quickly emptied even further.

I assume that the standard degree for absolute adjectives is only ‘pseudo-equivalent’ with the scale endpoint, just like singular predication over impure atoms is only pseudo-equivalent to true plural predication. And just like predication over impure atoms leaves room for some exceptions, degree predication based on an ‘impure’ standard degree leaves some wiggle room at the top end of the scale. In contrast, blocking the atomisation of the degree-sum that represents a scale associated with an absolute adjective ensures that the truth conditions of e.g. *The restaurant is all empty* are derived through true plural predication over the sum of degrees of emptiness; this boils down to stating that *all* possible degrees of emptiness must be met or exceeded by the restaurant.

5.3 Degree-modifying ALL: conclusions and outlook

An analysis as sketched here neatly captures the observation that *all* functions as an endpoint modifier when it combines with an absolute adjective, but as an intensifier when it combines with a relative one. Beyond that, however, it leaves many questions unexplained. For instance, it does not account for the ‘marked’ nature of intensifying *all* (unlike other intensifiers) is odd with individual-level predication (cf. Bolinger’s (1972, p.47) observation that intensifying *all* is OK with ‘accidental’ but not with ‘essential’ properties):

(76) a. Mary got very/really/all angry at me.
   b. Mary is very/really/?? all clever.
   c. Stop acting all clever.

This observation may well be related to the novelty requirement that weak *allemaal* imposes on its referent: there’s a sense that the behaviour or property expressed by the adjective needs to be new in order for *all* to be appropriate, while individual-level predicates, by definition, express permanent properties. However, I will leave discourse-related questions like this for further research. (For a related discussion on the ‘social meaning’ of intensifying *totally*, see Beltrama (2016) - Beltrama concludes, among other things, that the use of *totally* with expressions other than absolute adjectives “creates an effect of surprise and unexpectedness”, another observation reminiscent of our discussion of the discourse properties of weak adnominal *ALL*.)

23It bears repeating, though, that Dutch *heel* ‘whole/all’ is perfectly natural with relative adjectives including individual-level ones, which suggests we do not actually want to build this markedness into the core of our semantic analysis of intensifying *ALL*.
6 Remaining issues & discussion

6.1 The semantics of plurality enforcement: a sketch

So far, I have not provided an actual compositional semantics for ALL, only made a claim about its effect. I will briefly sketch one possible formal implementation of plurality enforcement here for the sake of explicitness.

Given that impure atomisation is defined as a sort shift on referential plural individuals (that is, sum entities), the most obvious way to prevent it from happening involves lifting these entities to their corresponding (plural) generalised quantifier denotations:

\[(77) \text{ALL}(x) := \text{LIFT}(x) := \{ P \mid x \in P \}\]

(only defined if \(x\) is non-atomic)

This approach nicely establishes a formal relation between our plurality-enforcing \text{ALL} and its quantificational cousin (\textit{All students came to the meeting}):

\[(78) \text{ALL}_{\text{et,et}}(A)(B) = 1 \text{ iff } \sqcup A \in B \text{ (with both } A \text{ and } B \text{ predicates over sums)}\]

which means that

\[
\text{ALL}_{\text{et,et}}(A) = \{ P \mid \sqcup A \in P \}
\]

In both cases, \text{ALL} makes sure that the only predicates included in the extension of the DP are plural predicates that contain the sum entity associated with \text{ALL}’s argument. This ‘associated sum entity’ can be directly supplied by the argument (as in (77)), or, if the argument is not a sum but a set, derived by taking the join of all the set’s elements (as in (78)).

For reasons of space, I will leave an investigation of all the implications of this move (especially the way it might play out in the kind and degree domains) for future research.

6.2 Variation within ALL

In this paper, I have deliberately focused on the similarities between different forms of \text{ALL} (both within and between languages), in order to argue that plurality enforcement is the semantic core of all of them. However, there are also many differences between different forms of \text{ALL} that are to some extent obscured by the common semantics proposed in this paper.

For instance, I have assumed that English \textit{all} is ambiguous between a universal quantifier (that applies to sets) and a plurality enforcer (that applies to entities), with the former accounting for the obligatorily strong interpretation of prenominal \textit{all} (e.g. \textit{all students} or \textit{all water}). However, if this is true, why can’t we assign a kind denotation to \textit{students} or \textit{water} and end up with a weak interpretation parallel to Dutch \textit{allemaal studenten} or \textit{allemaal water}? Clearly, a bit more needs to be said about English prenominal \textit{all} and its
inability to receive a weak interpretation with complements that are not explicitly kind-denoting.

Another remaining variation question pertains to the surprising division of labour between Dutch heel, which is ungrammatical with absolute adjectives but grammatical with relative ones, and helemaal, which is grammatical with absolute adjectives and only marginally acceptable with relative ones. Treating them both as forms of ALL does not account for the fact that helemaal shows the strong-with-absolutes, weak-with-relatives pattern characteristic of degree-modifying ALL, while degree-modifying heel can only be used as an intensifier (‘very’) even though it is clearly a member of the ALL-family in other contexts (e.g. heel het dorp ‘all the village’).

Such distributional variations between, and individual restrictions on, different forms of ALL will need to be taken into account in order to provide a complete syntactic and semantic analysis of ALL. At the same time, I believe that the present paper presents an important step forwards. Lumping all forms of ALL together might lead to a slight overgeneration, but given that it is always possible to build in additional restrictions on particular lexical items and take into account more contextual factors, some overgeneration is clearly preferable to the massive undergeneration presented by maximality-based accounts of ALL which, by definition, are unable to account for the many contexts in which ALL is non-maximal.

7 Conclusions

The central mystery of this paper involved the systematic availability of non-maximal interpretations with ALL, despite the fact that maximality is usually treated as the core semantic contribution of ALL. I have shown that, by treating ALL as a plurality enforcer instead, both weak and strong interpretations of ALL follow from its interaction with other semantic phenomena: the maximality seemingly contributed by strong ALL is in fact a general property of plural predication, and the non-maximality seemingly contributed by weak ALL follows either from the inherently existential nature of episodic predication over kinds (in the case of adnominal ALL), or from the nature of comparison classes (in the case of adverbial ALL).

In the process, I have made several more general arguments: first, that the data show the need for a notion of impure atomicity - that is, an atomic interpretation of seemingly plural referents - and moreover, that languages employ impure atomisation as an economy strategy. I have also argued in favour of an understanding of kinds and predication over kinds in the vein of Dayal (2004), which as an additional welcome result allows us to do away entirely with the ‘generic quantifier’ GEN. Finally, the paper provides support for Dotlačil & Nouwen’s (2016) claim that semantic number is active in the domain of degrees, too.

References


Burnett, H. (2011). From quantification and intensification to slack regulation: adjectival ALL. (Handout of a talk presented at NELS 42, University of Toronto)


