Q: Natural Language's only Functional Head[1]

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Abstract

Most current versions of Chomskyan syntax take for granted that maximal or extended projections of the fundamental lexical categories N, A, V and P contain elaborate systems of functional heads and projections (sometimes referred to as "the functional sequence") which are also significantly different for each of these four categories. This study argues that this approach more than "takes to extremes" this proliferation of syntactic categories; I argue here that it is fundamentally misguided. All functional modifier categories truly independent of lexical categories stem from *the natural language ability to count and/or quantify.*

Among its other advantages, this hypothesis reveals for the first time the close affinity of subject phrases and measure phrases, and moreover provides a simple account of differences between English and Japanese regarding both ways of counting and agreement vs. non-agreement of predicates with subjects.

1. Which closed class modifiers are "Functional Category Heads"?

Strangely, one of the prototypical and widely accepted functional heads, the category of Definite morphemes ("D"), fails or is neutral with respect to essentially every empirical test for being a head (Emonds 2012, summarized here in section 2). Rather, the functional head of nominal phrases is *a universal*

1 The first parts of this study revise Emonds (2007), from a locally distributed Japanese journal. An expanded version appears in Kawashima, Philippe and Sowley (2008).

quantifying node Q for counting, which includes cardinal numerals and plurality. Section 3 proposes that this system is formally based on the different ways Q can be "valued" as ±PLUR. Section 4 explores contrasting systems of QP projections for nominals, proposing a parameter distinguishing English from Japanese.

Sections 5 and 6 then extend this "QP hypothesis" for functional heads to the categories AP and PP, showing that degree words and intensifiers are instances of Q and that measure phrases are located in SPEC(Q). Finally the QP hypothesis also covers VPs (section 7), since number agreement with a subject reduces to a default valuing of a Q that would otherwise be empty. Section 8 concludes that that recent work on functional categories has simply missed generalizations expressable in terms of Q and QP, and has thus seriously overstated the number of syntactic primitives.

It is widely accepted that four central lexical categories of language (N, V, A, P) serve as "heads" (notated X or X^o) that project to phrases XP, and that only these categories can be "open," i.e. contain many hundreds of members and accept coining by adult native speakers. Throughout this study, XP is equivalently written as X'. When I refer to X^o and XP together as a class, I write X^j, e.g. both types of nominal projections taken together are N^j. Referring to heads and phases of the same type in this way is called the "bar notation."

Moreover in a given language, lexical heads tend to systematically precede or follow their phrasal sisters or "complement" YPs. This property is often *uniform in a language* across different choices of lexical heads. English for example is "head-initial" and Japanese is "head-final."

In these terms, it is well known that several small closed classes of non-phrasal modifiers can be added to these head X. For N we can call them "n", for V we can call them "v", etc. In head-initial English, the x (=n, v, a, p) are typically free morphemes.

(1) a. $[_{NP}$ two $_n$bunches of $_n$other $[_N$ boys$]$ $[_{YP}$ from the city $]$
b. $[_{VP}$ $_v$has $_v$been $_v$getting $[_V$ cut$]$ $[_{YP}$ from a tree $]$ $]$
c. $[_{AP}$ { $_a$real/ $_a$pretty / $_a$how $_a$much more } $[_A$ important$]$ $[_{YP}$ to you $]$ $]$
d. $[_{PP}$ $_p$down $_p$over $[_p$ into$]$ $[_{YP}$ that forest $]$ $]$

In head-final Japanese, corresponding modifying x are often *bound suffixes*. Straightforward examples in Japanese of such grammatical n, so-called "classifiers," and grammatical v (causative, passive, and politeness verbal suffixes) are given in Emonds (2007).

Now since n and N are not simply two names for the same thing, what differentiates x from X? One clear difference is whether a category has hundreds or thousands of members, i.e. is "open," or has at most perhaps twenty members that adult speakers cannot add to, i.e. is "closed":

(2) Dictionary Insertion. In a single maximal XP, lexical insertion from *open classes X* of the Dictionary is limited to the *most internal X^0 position in XP.*

That is, in a head-initial XP, $[_{XP}\ X_1 - X_2 - \ldots - X_k - \ldots(YP)\ldots]$, an open class of lexical N can appear only in the N_k position. The other N_i must be closed class modifiers n. Research often calls the "small" modifiers (n, v, a, and p) in (1) "functional categories," but what is their actual formal status in a system of syntactic primitives?

Van Riemsdijk (1998) convincingly argues for the following hypothesis about their categorial nature.[2]

(3) Categorial Identity Thesis. Each n ε N, each v ε V, each a ε A, each p ε P.

Some brief examples of arguments for (3), based on the constructions in (1), are as follows. Further arguments for the CIT appear in Emonds (2001).

Each n is an N. *Bunch* and *other* in (1a) have regular N plurals, and *bunch* accepts adjectival and numeric modifiers. Quantity n such as *bunch, couple*, etc. can also function as independent nouns, as can certain Japanese numeric classifiers: *dai* 'box', *nen* 'year'.

Each v is a V. English auxiliary verbs as in (1b) all inflect like verbs. Similarly, Japanese verbal suffixes are themselves verbs, since they are regularly followed by verbal inflections such as the present tense *-(r)u*: *tabe-ru* 'eats', *tabe-sase-ru* 'makes eat', *tabe-rare-ru* 'is eaten', *tabe-mas-u* 'eats' in polite speech.

Each a is a A. *Real* and *pretty* modify A in (1c), yet are clearly adjectives in their own right. Similarly, several contexts reserved for A also accept bare *how*: *How does he seem? How did they treat him?*

Each p is a P. *Down, over,* etc. can be modifiers of P: *down in the street, over toward town.* They can also be independent prepositions: *right down the street, two miles over the hill.* In other combinations like *from behind the barn,* both *from* and *behind* exhibit properties of the category P.

Under van Riemsdijk's CIT, English head-initial structures are thus as in (4).

(4) Functional category structures in head-initial systems: $[_{XP}\ X_1\text{-}X_2\text{-}\ldots\text{-}X_k\text{-}\ldots(YP)\ldots]$

2 This study takes no position on whether each functional x_i in (1) projects to a separate phrasal category xP. Although most studies of functional categories assume that they do, there are empirical arguments for flat structures without such xP, such as Kubo (1996) and Emonds (2001).

Then (2) requires that *open class Xi* must be next to the YP sisters that they select, and not be separated from them by other X_i.

Though the CIT is appealingly simple, it cannot be the whole story on functional categories. For example certain modifiers of adjectives in English (*too, as, quite, rather, somewhat*) actually share no properties with adjectives. It's similarly unlikely that demonstratives are "nouns" (e.g. Japanese *kono, sono, ano* or Spanish *este, ese, aquel*). Nor do lower numerals such as 5-19 typically exhibit properties of other grammatical N, cross-linguistically. These kinds of discrepancies suggest that we must somehow extend or modify the CIT.

I claim nonetheless that the categories conforming to the CIT need only be supplemented with a *single ad*ditional *quantification head* Q. For clarity, I notate Q as Q_X in contexts ___XP across values of X.[3]

(5) The Q-extended CIT. Across languages, a single functional category head Q can extend all four types of XP to XP_Q.

The Q-extended CIT implies that the familiar node DP is to be written as NP_Q or [N, Q]', and that IP = VP_Q = [V, Q]'. By the same token, APs and PPs containing degree words and expressions (or any other closed class modifiers) are to be written as AP_Q and PP_Q. The subscript notation on phrases means that both Q and X^j jointly project or "percolate" to a containing extended XP. The subscript Q *on a bar notation category* X^j thus indicates a feature that can be referred to in stating syntactic principles.

An important property distinguishes "plain XP" from those that project to XP_Q. A plain XP can always project to a higher XP by means of an adjunction, e.g. of and adverbial PP, though it need not. But an XP_Q that contains a phrasal quantification cannot further project. It is thus a "*closed projection*" in the sense of Fukui and Speas (1986). We will see below that languages differ as to if and which projections must be closed in this sense.

While Q_N is not *limited* to numerals (see note 7), it almost certainly includes in any language some numerals for counting items with reference, i.e. nouns. English Q is used for all counting, while some Slavic languages (Veselovská 2001) use it only for high counting, i.e. Q_N > 4. The potential of Q as a counting device can be expressed as (6).

(6) Universal Counting. The unique functional head Q is the category for numerals and can combine with both types of nominal projections N^j.

3 The lexical category subscripts on Q are just shorthand for the category of their sister phrase. Thus, the quantifiers Q_P and Q_A differ formally in the same way as verbs subcategorized differently, such as V, ___PP and V, ___AP. These subscripts do not affect the syntactic identity of the category Q that they appear on.

In the standard use of English numerals to count, X^{j} = N'. English can also combine Q_N with N^0 to create "counting compounds": The phrases in bold in (7 are usually wrongly thought to be a type of measure phrase, i.e. an N'.

(7) a. a crispy [$_N$ **[N [Q fifty] [N dollar(*s)]**] [$_N$ bill]]
those great [$_N$ **[N [Q ten] [N day(*s]]** [$_N$ bus passes]]
b. *a fifty dollar(s) crispy bill
*those ten day(s) great bus passes

But, as can be seen from their singular form (7a) and their ordering after pre-nominal adjectives (7b), they are clearly compound nouns of the form [$_N$ Q_N + N]^0.[4]

Finally, I venture to claim that this basic category Q for counting and quantification is absent in animal communication. Its introduction was thus a fundamental mutation leading to human symbolic communication. Plausibly, the initial possibility of Merging with Q involved the largest, most concrete open class, the nouns N or more generally nominal projections N^j, as stated in (6). Merge of Q and N^j in essence *created existential quantification*, a necessary precondition for counting known in set theory as the Axiom of Choice; counting itself then required in addition only some mental version of a successor function (Peano 1889). While counting itself may have had little survival value, a mutated early human controlling existential quantification could also assert existence in the absence of stimuli, the essential characteristic of human language known as Displacement (Hockett 1960), whose survival value seems unquestionable.

The formal extension of Q_X and SPEC(Q_X) to other categories, features, and their meanings, as in (5), was a further development after this first leap.

2. The content and feature values of QN inside Noun Phrases[5]

I first argue for the Q-extended CIT (5) by establishing its validity for noun phrases. That is, I will show that extended projections of N can contain a single quantifying functional head above N. Other than Q_N, grammatical modifiers closer to N are themselves of category N, as the CIT (3) predicts. Moreover, I contest a widely assumed position—but one never actually *argued for*—that

4 These English [$_N$ Q_N + N] never appear as isolated *head Ns* of NP: **I like a crispy fifty dollar in my pocket; *An ample vacation requires a good ten day.* The English setting of the "Q-Parameter" in Section 4 predicts this, because it requires that head nouns *further combine* with Q_N in $NP_{Q'}$, yielding e.g. *An ample vacation requires a good ten days.*

5 This section summarrizes material presented in Emonds (2007).

noun phrases contain additional heads higher than Q such as demonstratives, definiteness, or other quantifier nodes.

2.1. Quantification of Nouns

A comprehensive generative description of a closed class modifier system for English noun phrases is laid out in Jackendoff (1977: Ch. 4). According to him, nouns can be pre-modified by *two* main independent categories whose most characteristic elements don't seem like Ns. Here I re-name them D and Q_N; they then appear in sequences D – Q_N - N.

(8) Closed class modifiers for English N
D = { *the,* demonstratives, WH-pronouns, universal quantifiers (*each, every, all, both*), *some, any, no, which, what*}. Possessive NPs also compete for the unique D position in this system, co-occurring only with *all* and *both*.
Q_N = { numerals, *many, few, much, little, several, a(n)*}.

According to Jackendoff, a noun in an NP can be modified by only one D and one Q_N. There are a few idiomatic or otherwise atypical uses of these words that don't conform to this statement, not further treated here: *every which way, his every step, what the hell, a few steps,* etc. In the other direction, as Jackendoff shows, D and Q quantifiers with their usual logical meanings typically don't combine in a single NP: **all few, *any many, *each several, *every many, *some much, *no a(n), *every a(n),* etc.

I propose to strengthen the categorial dichotomy in (8) by two general principles for interpreting these categories: (i) The logical role of all Q_N items is *existential quantification* (this seems straightforward), and (ii) D houses what are arguably *universal quantifiers*. These correlations with meaning are interesting consequences of the division in (8), but are *not necessary preconditions* for the validity of such structure. The second correlation, that *D is uniformly a universal quantifier position* in LF, in fact depends on several non-obvious but intriguing and quite plausible auxiliary hypotheses.

a. N. Chomsky (class lectures, early 1980s) proposed that a definite article is simply universal quantification over sets defined within a single universe of discourse. Their close relatives, the demonstratives, should be analyzable in similar terms.
b. Chomsky also proposed that *any* is a universal quantifier with a special property of always taking wide scope. [6]

6 We might treat *no* as a universal quantifier with a wide scope property similar to *any*: "We own no cars" = "For all x, x a car, ~(we own x)."

c. Finally, *which* is often taken as a WH-counterpart to a definite article; like definites it is "Discourse-linked."

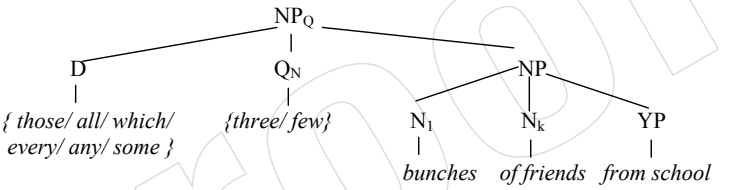
Space prevents developing fuller arguments for these hypotheses, but together they strongly suggest the accuracy of the dichotomy in (9).

(9) In LF, (i) Q_N is existential quantification, and (ii) D is universal quantification.

The only English D that seems to violate (9ii) is the existential *some*. So as to maintain these attractive LF generalizations, I propose that the D *some* "alternatively realizes" the existential quantifier category Q_N; cf. (21) below. This means that *some* spells out as an *uninterpreted* D in PF, while its unpronounced sister [$_Q$ Ø] *is* interpreted, as minimally marked existential quantification.[7] Then, as predicted, no precise LF differences distinguish pairs such as *three X/ some three X; few X/ some few X*.

The general structure of NP_Q for English I thus hypothesize is then (10).

(10)



2.2. Q_N as the unique functional category head of NP_Q

The question immediately posed by (10) is whether D or Q or both are functional category heads of NP_Q. For Q, there can be little doubt: Giusti (1991), Ritter (1991), Veselovská (2001) and Cardinaletti and Giusti (2006) have established that a quantifying and counting head Q, sometimes termed NUM, is indeed a functional head F_n above N within noun phrases; Jackendoff's term for this category is SPEC(N'').[8]

In support of this, the fact that Q exhibits many expected head properties listed in (11), which D conspicuously lacks. Contrary to a widespread assumption

7 For numerous other examples of alternative realization, e.g., agreements, case-marking, Romance clitics, etc. see Emonds (2000: Ch. 4).

8 The English article *a(n)* and quantifiers *many, few, much, little* and *several* are in complementary distribution with cardinals and hence should be in the same categorial position (Jackendoff 1977: Ch. 4). Ritter's (1991) label is NUM, but Q is preferable because Q has uses besides simple counting. Incidentally, since these quantifiers can be further modified by Q_A, they must be As in the Q_N position.

in generative studies dating from Abney (1987), the very same tests that establish that Q is the head of a functional projection show conclusively that D is *not a head.* For more detailed paradigms and arguments for the following contrasts, especially (11d-f), see Emonds (2012).

(11) a. Q has a role in how NPs are *selected*, but D does not.
b. Q has a role as *a head that assigns case to NPs*, but D does not.
c. Q can serve as a *right hand head of Nj'* in Japanese, but D cannot.
d. As complement phrases of a head Q, NPs sometimes *move*. If D were a head, Q + NP would be a phrase D' and hence should sometimes move, but it never does.
e. NP sisters of Q can in certain cases *be coordinated*, but there is no such coordination of putative sisters of D.e.
f. NP sisters of Q can sometimes *undergo ellipsis*, but there are no corresponding paradigms for putative complement sisters of D, i.e. no ellipted sequences Q+NP.

I now briefly exemplify each of the five points (11a-e).

Selection (11a). Q plays a role in selection of extended noun phrases; for example verbs like *disperse* and *gather* require underlying object NPs with plural or collective count noun heads, thus involving a feature of Q. Similarly, Abney (1987: 86-88) observes that various Navajo verbs select for singular, dual or plural NPs, even though "Navajo does not actually mark any of these distinctions (object class or number) in its determiner." Since he does not consider Q as a possible head of extended NPs, he declares the Navajo pattern "a curiosity." In contrast, "D does not appear to be selected by a matrix head" (Abney 1987: 85). For example, no verbs select only definite phrases.

Case Assignment (11b). Like other functional heads (in particular I), Q can sometimes assign case, as well as block case-assignment to its sister NP by a more distant head. In a number of languages, Qs such as existential quantifiers or high numerals assign morphological genitive case to their sister NP. *D has no such role in assigning characteristic case within NPs.* Veselovská (2001) amply illustrates these properties and the contrasting syntax of D and Q in Czech.

Head Placement (11c). in purely head-final Japanese, numerals with classifier suffixes can appear in head position of extended NPs, exactly as expected if they are functional heads Q_N with a preceding NP complement.

(12) *[PP Teburu-no ue-ni] [QP [NP ookina hon] [Q yon-satsu] ga] aru.*
Table-of top-at big book four-CLAS-NOM be
'There are four big books on the table.'

(13) *[QP [NP [YP Sono daigaku no] [N gakusei]] [Q san- nin] ga] tsui-ta.*
that university-GEN student three- CLAS-NOM arrive-PAST
'Three students of that university arrived.'[9]

In contrast, the Japanese demonstratives D *kono/ sono/ ano* 'this/ that/ that' and its WH N-modifier *dono* 'which', have no head-like behavior. Unlike uniformly final Japanese heads, *these Ds must be pre-nominal,* and can be ordered freely among other adjectival and possessive complements and modifiers.

Movement (11d). In general, bare lexical projections such as VP exhibit less robust phrasal behavior than full extended projections (IP/ CP). Similarly, the *NP sisters of Q have some phrasal properties* (11d-f) though fewer than do extended NP_Q. For example, some constructions can exhibit movement of NP sisters of Q (14), though such movements are not so productive.

(14) a. $[_{NP}$ Flowers for Easter$_i$] we don't have many of t_i.
b. Not much t_i was eaten $[_{NP}$ of leftover turkey $]_i$.

Coordination (11e). Examples (15) contain coordinated NP sisters of Q_N.

(15) a. We didn't buy $[_{QP}$ many $[_{NP}$ books on culture] or $[_{NP}$ guides for tourists]].
b. $[_{QP}$ Two $[_{NP}$ students of music] and $[_{NP}$ friends of my sister]] live with me.

The contrasts in (11) thus all favor Q_N over D as a functional head above the N lead in nominal phrases. It appears that the place of D in NP_Q is rather in its "Specifier," a position almost universally accepted in bar notation studies of phrasal projections.

(16) Specifier Position. A functional head Q_X licenses a SPEC(Q_X) on its left, independently of a language's word order.

There is thus extensive support for the prototypical structure (10) for extended NPs in English, Czech and probably many head-initial languages, where D and

9 This construction contrasts with a second way of counting in Japanese, whereby a numeral compound appears as *a modifier inside an NP*, set off from a *final head N* by the subordinating genitive marker *no*. Thus, the following example is an alternative to (12).
(i) *[PP Teburu-no ue-ni] [NP ookina [XP [Q yon-satsu] no] [N hon] ga] aru.*
Japanese numeral compounds can appear with nouns in two further positions (Oga 2002); they can float off the NP rightward *and also leftward* (Okuda 2006). In these configurations Okuda shows they are exterior to NP, even if adjacent to NP.

Q_N are defined as in (8). Jackendoff's "quantifier/ definiteness slot" corresponds to SPEC(Q_N), while his "second quantifier slot" corresponds to the head position Q_N. I thus conclude that Q_N is an independently justified unique functional head above N, analogous to I above V.

The arguments for the structure (10) are more than extensive; they are overwhelming. Here are five further considerations which favor Q as a single functional head outside NP in extended nominal projections.

- In Abney's (1987) original cross-linguistic arguments for a functional head above N, *number agreement* plays a central role. Since Q is the locus of ±PLUR, on this score alone Q is a more satisfying candidate than D for the head of extended NPs.
- Taking Q as the head of extended NPs strengthens the parallels in Abney (1987 Ch. 4) between modifiers of As and Ns. He argues that degree words DEG (*more, as, too etc.)* are functional heads of APs, whose SPECs can be measure phrase NPs. Now since degree words indicate quantity, they are more semantically parallel with Q than D.
- Japanese now conforms to UG in having a (final) functional head Q_N above N, though this extended projection is optional in Japanese.
- English no longer has unexplained complementary distribution between possessive phrases and the functional head of extended NPs; rather we observe them together: [$_{SPEC(QP)}$ *John's*] [$_Q$ *three*] *houses,* [$_{SPEC(QP)}$ *today´s*] [$_Q$ *many*] *lectures*, etc.
- Cross-linguistically it is no longer surprising that demonstratives and definite articles are often declined and/or ordered left-to-right like AP modifiers of N; in languages where this happens, that is precisely what they are.

A final advantage of structure (10) is that it makes plausible the following conjecture that relates syntax and reference:

(17) The locus of independent reference. All and only *phrasal projections of nouns* (NP and NP_Q) have independent reference.

The existential quantifier in a (non-generic) NP_Q makes its "actual reference" different from the "virtual reference" of the plain NP it contains, as argued in Milner (1978: chapter 1). In [*manyi/ fivei/ plentyi/ dozensi of* [*young boys*]$_j$.], the reference of the contained plain NP and the containing extended NP_Q are not the same. In contrast, a universal quantifier in an NP_Q never *changes* the reference of the plain NP: *(both) those toys, (any) three toys, (all) my child's toys*, etc.

3. ±PLURAL as the principal feature value of QN

Let's review now the general structure of English NPs in terms of van Riemsdijk's CIT (3), my extension of it (5) and the position of Specifiers (16). Since the main function of Q_N is for recursive counting, I take its most basic interpretation in LF to be ±PLURAL.

(18) $[_{NP,Q}$ SPEC(Q_N) (=D) [Q_N, ±PLURAL] $[_{NP\ ...}$ N_1 ... N_2 ... N_k ...(YP)...]]

In this structure:

(19) (i) N_k is the open class lexical head;
(ii) any preceding N_i are closed class n such as *couple, bunch* and *other*;
(iii) Q_N is the unique and obligatory functional head of the extended NP_Q;
(iv)(only) the exterior NP_Q cannot further project (it is *closed*); and
(v) the functional head Q_N of this larger NP precedes its sister NP by the head-initial parameter of English, but follows D by principle (16).

As noted earlier in (8), English possessive nominals are in *complementary distribution* with the definite article and demonstratives, as well as with most D quantifiers {*some, any, no, each, every, which, what*}.[10] I treat all these items as SPEC in schema (18), even though among them only possessives are overtly phrasal. This grouping corresponds to the "first SPEC(N^j) position" in Jackendoff's nominal structures, which also accounted for this same complementary distribution. I notate this frequently phrasal position as SPEC(Q_N). In the theory here, the SPEC position can occur only in the presence of Q (across categories). If Q is not present, no initial SPEC, phrasal or non-phrasal, is available either.

A salient English paradigm that confirms the obligatory nature of Q_N (19iii) is that count nouns cannot appear "bare," i.e. with no realization of either Q of D.

(20) **Soon book will be cheap.*
**Large house was for sale.*

I propose to explain this by applying to (18) the idea of Chomsky (2001) that grammatical features are "unvalued" at the outset of a syntactic derivation, and then must receive interpretable values during a syntactic derivation. From this perspective, we can reconceptualize ±PLURAL in (18) as the LF values of Q_N, and thereby actually eliminate PLURAL as a separate feature. That is, [Q_N, ±PLURAL]

10 This complementarity does not hold in many languages whose Ns project to N_Q, including Czech. This study does not analyze this discrepancy.

is to be replaced by $\pm Q_N$, i.e. Q_N receives a ± value from any lexical numeral or quantifier inserted under it, as follows. When a lexical N is a count noun, lexical singular Q_N such as *a(n)* and *one* provide the value $-Q_N$, while all other lexical Q_N (*two, many, several,* etc.) becomes $+Q_N$. A third possibility is that no morpheme is inserted directly under Q_N. Then, if nothing else happens, this Q_N remains unvalued and the derivation is ill-formed ("crashes") at LF:

However, another means of valuing a covert English Q_N with count nouns is by "Alternative Realization," a widely applicable syntactic device for closed class items whose uses and restrictions are outlined in Emonds (2000: Ch. 4).

(21) Alternative Realization (AR). A syntactic feature F canonically associated in UG with category B can be alternatively realized in a closed class morpheme under B*, provided that projections of B and B* are sisters.[11]

In these terms the traditionally written +PLURAL is simply the positively valued canonical feature Q_N. If a head N of Q_N's sister NP contains a plural suffix, it has the form $[_N$ N - $+Q_N]$. AR then applies with B = Q_N in canonical position and B* = N. That is, Q_N is valued and because the plural morpheme *alternatively realizes it under NO*

Q_N can remain covert in this configuration because AR operates in tandem with an "Invisible Category Principle," which licenses empty categories (Emonds 2000: Ch. 4).

(22) Invisible Category Principle (ICP). If all marked canonical features F on B are alternatively realized by AR, then B may be empty.

Thus, if Q_N has no other marked features, i.e. is neither an existential quantifier nor a numeral, the plural suffix on N is enough to permit Q_N to be empty: *Soon books will be cheap; Large houses were for sale.*

There is moreover a second way that AR and the ICP can value a covert Q_N. A SPEC morpheme generally *agrees in number* with its Q, so that an overt SPEC(Q_N) also alternatively realizes $\pm Q_N$ (= ±PLURAL). Since these SPECs are sisters of Q_N, they can also license an empty $\pm Q_N$ in its base position: *This [Q Ø] book was cheap; Each [Q Ø] large house was for sale.*[12]

11 Throughout, one possible projection of a node is simply the node itself.

12 English mass nouns do not require an overt N_Q or D. We might account for this by simply identifying the descriptive label "mass noun" with an alternative realization of $-Q_N$ as a lexical feature on mass nouns. This move would involve extending AR to marked subsets of open class items. I leave for future research whether one can do this in a formally restricted way. French mass nouns behave more as this study's framework expects, in that they must appear with an overt singular $-Q_N$, namely a singular partitive article *du/ de la*.

4. The Q Parameter: obligatory Q-extended projections in English

This previous section's account of excluded English bare count nouns (20) is based on assuming that *all English noun phrases must project to NPQ*, with a functional head Q_N that must be valued as (±PLURAL) in LF. Since NPs include those with mass noun heads, gerunds and complex event nominals headed by *–ing* (Grimshaw 1990), these heads must be specified as $–Q_N$. This forced projection of NP to NP_Q is a language-specific property, formulated here in a way similar to an earlier proposal of Fukui and Speas (1986):

(23) Q-Parameter. Maximal NP (=N^1) in English must be *closed* by a Merge with a Q_N head. NPs in Japanese *need not be closed* by merging with Q_N.

The Japanese setting of this Parameter is motivated by the fact that *all its open class nouns can be in bare NPs*, i.e. its plain NPs need not project to NP_Q.

A further condition, which remains a stipulation here, applies to phrases in SPEC:

(24) SPEC Categories. Phrasal categories in SPEC(Q) positions must be nominal, i.e. N^j.

Since the category Q_N can receive its LF feature values from either the lexical item it houses or (by AR) from the head of its sister phrase NP, material in the SPEC(Q_N) position need not interact with Q_N. Consequently, as many studies remark, a "genitive" NP in SPEC(Q_N) *can stand in any pragmatic or argument relation to the head of NP*. In particular, if the definition of a subject of a phrase X' picks out the lowest NP_Q (= "DP") which c-commands X', then possessive a noun phrase in the SPEC(Q_N) position can even be *the subject/ external argument* of any lexical head X^0 of NP.

Now according to the Q-Parameter (23), Japanese NPs can and most often do lack a Q_N sister to NP; its NPs need not be "closed." As a result, such NPs have no SPEC(Q_N) position. At the same time, since Japanese NPs are "open" and head-final a head NP can merge (repeatedly) with adjoined non-head NPs on its left, which can then satisfy the definition of subject/ external argument or a possessor for an N head. In fact, as is well known, several NP+*no*, not contained in each other, can modify a single Japanese N.

(25) Japanese NP with multiple internal subjects/ possessors:

a. $[_{NP}$ *Daijobu– no* $[_{NP}$ *Taro- no* $[_{NP}$ *Kobe- no* $[_{NP}$ *shimbun*]]]]

Saturday's Taro's Kobe's newspaper

'Taro's Kobe newspaper of Saturday'

b. $[_{NP}\ NP_{poss}$ *– no* $[_{NP}\ NP_{poss}$ *- no* $[_{NP}\ NP_{poss}$ *- no* $[_{NP}$ ...(YP)... - N_k - ... - N_1]]]]

Notice that these multiple possessors are quite unlike the recursive possessive NPs in English. In Japanese, each NP_{poss} directly modifies the highest head N, whereas in English, a first possessive N must modify the next (as in *John's father's newspaper's headlines*) rather than the highest head N.

Since these exterior NPs are not in any structural relation with a functional head Q_N (in this respect there is no difference from English), any of them can either serve as a subject or take on any thematic or pragmatically sanctioned role relative to the lexical N head of NP.

5. Q in the context ___AP

5.1. Degree Words and Measure Phrases

Bresnan (1973) and Jackendoff (1977: Ch. 5) isolate a class of largely mutually exclusive adjectival modifiers, often called degree words (DEG). I propose that this class instantiates Q in the context ___AP and so should be notated Q_A.[13]

(26) Q_A = *very, so, quite, rather, somewhat, this, that, more, most, less, least, as, too, how.*

Since multiple members of Q_A generally cannot co-occur, as seen in (27), it appears that the underlined Q_A must select APs lacking Q. That is, just like Q_N, a single *QA functions to close AP projections.*

(27) a. These chairs are <u>how</u> old?/ <u>so</u> old.
*These chairs are how so/ so how old?
b. We want a <u>less</u>/ <u>quite</u> bright room.
*We want a less quite/ quite less bright room.
c. Is she <u>rather</u>/ <u>that</u> clever?
*Is she rather that/ that rather clever?
d. We consider John <u>very</u>/ <u>too</u> arrogant.
*We consider John very too / too very arrogant.

Since adjectives are "properties" rather than "things," a Q_A as in (26) can't measure quantity with integers, but only in terms of stronger, weaker, equal or

13 Another candidate for Q_A is *enough*, which in Germanic languages surfaces *after* A.

deictic degrees. But the counting potential of Q_A emerges clearly with *more, less, as, that* and *too*. These Q_A license measure phrase NPs in the context ___Q_A-AP (Neeleman, van de Koot and Doetjes 2004).

(28) $[_{AP}[_{NP}$ three times/ a bit $][_{Q}$ more/ less $][_{AP}[_{A}$ clever$][_{YP}$ in math$][_{ZP}$ than you$]]]$
$[_{AP}[_{NP}$ two days/ a good deal $][_{Q}$ too $][_{AP}[_{A}$ short $]]]$
$[_{AP}[_{NP}$ three times $][_{Q}$ as/ that $][_{AP}[_{A}$ far/ long/ old/ expensive $]]]$

Adjective phrases apparently conform perfectly to the earlier statements (16) and (24):

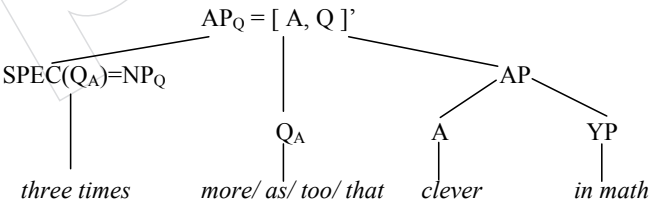
(16) Specifier Position. A functional head QX licenses a SPEC(QX) on its left, independently of a language's word order.

(24) SPEC Categories. Phrasal categories in SPEC(Q) positions must be nominal, i.e. Nj.

In the light of a second use of NPs in SPEC(Q) as measure phrases, a possible explanation of (24) may follow from a relation between quantities expressed in Q and their "measure" in an NP_Q in SPEC. That is, SPEC's fundamental role is to further specify number and/or quantity, which is a characteristic meaning of NP with a Q head.

A tree for an English quantified (measure) AP is thus as in (29). As with Q_N, the structure is flat, as there is no motivation for grouping Q_A with AP; both AP and Q_A project as features to a closed extended projection AP_Q. And as with NP_Q, I claim that no further functional head is needed for APs, again in conformity with the Q-extended CIT (5).

(29)



The structure (29) replicates the structure inside English NPs; compare (29) with (10). Here, however, the only LF role of the (again optional) NP in SPEC(Q_A) is to associate certain Q_A with some discrete, counted measure, which inherent features of Q_A in the context ___AP can't provide. The difference between the two subtypes of Q categories is that the measure for discrete nouns is *inherent* in Q_N's own content, i.e. the numerals, existential quantifiers, and ±PLURAL. In contrast, a discrete "measure" for Q_A is *external* to it, in SPEC(Q_A).

Returning briefly to NPs, there is in fact a little noticed complementary distribution between subject phrases and measure phrases, which testifies to their identical single structural position SPEC(Q_N).

(30) a. My mother didn't like preparing for my father's (one) vacation.
My mother didn't like preparing for several days more vacation.
*My mother didn't like preparing for my father's several days more vacation.
b. This grant provides two hundred dollars more salary every month.
This grant provides that assistant's salary every month.
*This grant provides that assistant's two hundred dollars more salary every month.

It is only because Q_N needs no external specification that SPEC(Q_N) is free to house NPs with *any pragmatic relation to the head N*, the notoriously varied semantics of "possessive" NPs. The NPs in SPEC(Q_A) have no such freedom; they can serve only as "measure phrases." Previous analyses have failed to identify *measure phrases inside APs* with *possessive NPs inside NPs*, even though in English both types must be unique, and both must be NPs; see again (30). Thus, the grammatical source of the much studied possessives is in "less frequent" measure phrases, which are in turn nothing but an extension of the primitive linguistic ability to count.[14]

5.2. Measure Phrases without Degree Words

A small closed class of English adjectives (*long, high, tall, deep, wide, old, long, square*) allow measure NPs in SPEC(Q_A) even in *the absence of* an overt Q_A.

(31) These chairs are ten years [$_Q$ Ø] { old/ *obsolete/*creaky }.
The path seemed many miles [$_Q$ Ø] { long/ *lengthy/ *rocky}.
His hedge got three feet [$_Q$ Ø] { wide/ *broad/ *overgrown }.

These NP, naturally enough, cannot occur with any overt Qs that disallow measure phrases.

14 In general, less frequent grammatical variants of a construction reveal more than more frequent variants. Along such lines, less frequent dependent clauses better indicate underlying word order than main clauses; negated sentences reveal more about deep grammar than positive clauses, etc.

(32) *These chairs are ten years [$_{Q}$ very] old.
*The path seemed many miles [$_{Q}$ so] long.
*His hedge got two meters [$_{Q}$ somewhat] wide.

Since these adjectives form a closed class, I postulate a syntactic feature F^{m} common to those Q_{A} (*more, as, too,* etc.) that permit measure phrases in SPEC(Q_{A}); the As in (31) then alternatively realize this feature. As a result, their (English) lexical entries and the ICP (22) together allow their Q_{A} to be empty. Essentially, F^{m} = "compatible with discrete measures."[15]

In summary, NPs in a SPEC(Q_{A}) position quantify properties expressed in APs as greater or less, or as excessive or not. Only certain overt Q_{A} permit these phrases, even though they are also permitted by a few head adjectives in English that license an empty Q_{A}.

6. Q in the context ___PP

Consider PPs of space and time, whose P express these notions. Since one can't "count" a spatial or temporal span without discrete units of measure, English "intensifiers" of P such as the overt Q_{P} *right* are incompatible with any measure phrase in SPEC(Q_{P}).[16]

(33) John put his books [$_{PP(Q)}$ (*six inches) [$_{Q}$ right] [$_{PP}$ behind the door]].
The doorbell rang [$_{PP(Q)}$ (*a few seconds) [$_{Q}$ right] [$_{PP}$ after six]].
It was [$_{PP(Q)}$ (a few seconds)[$_{Q}$ right] [$_{PP}$ after noon]] that they arrived.
Jim kicked the ball[$_{PP(Q)}$ (*30 meters) [$_{Q}$ clear] [$_{PP}$ across the field]].
You'll find some restaurants [$_{PP(Q)}$ (*a few blocks) [$_{Q}$ straight] [$_{PP}$ down this road]].

Just as in the contexts __AP, a preceding NP provides Q with a discretely measured value for many P: *before, after, above, below, behind, inside, away, back,* etc. Yet again because these P still form a closed class, they are susceptible to AR (21). Like the English As that license measure phrases (31), these P apparently also alternatively realize the syntactic F^{m} of a Q_{P} that licenses such phrases, as in (34). Then as a result of the ICP (22), Q_{P} is empty.

15 A language-particular treatment of (32) seems appropriate, as their exact French translations are ungrammatical: **Ces chaises sont dix ans vieilles; *Le sentier semblait plusieurs kilomètres long.*

16 Jackendoff (1977: Ch. 5) notes that measure phrases in these PPs don't occur with *right.*

(34) John put his books [$_{PP}$ [$_{NP, +PL}$ three feet] [$_{Q, F}{}^{m}$ Ø] [$_{PP}$ behind the door]].
Her ball landed [$_{PP}$ [$_{NP, +PL}$ a few paces] [$_{Q, F}{}^{m}$ Ø] [$_{PP}$ (away) from mine]].
It was [$_{PP}$ [$_{NP, -PL}$ an hour] [$_{Q, F}{}^{m}$ Ø] [$_{PP}$ after midnight]] that they arrived.

Most English adjectives disallow a combination of an empty Q_A and a measure phrase, as seen in (31); so also many Ps are incompatible with the configuration in (34).

(35) John put his books [$_{PP}$ (*a few inches) at the door].
Her ball landed [$_{PP}$ (*two steps)] with mine.
It was [$_{PP}$ (*an hour) until the party] that they were singing.

Thus, the use of SPEC for measure phrases in PPs parallels that in APs. What differentiates the two is that no *overt* English Q_P take a measure phrase, unlike Q_A such as *more, as* and *too.*

7. Q_V in English clauses: where "subject agreement" comes from

7.1. The parallel structure of English Noun Phrases and Clauses

Suppose by parsimony that English clause structure (36) parallels that of NP as in (18).

(18) [$_{NP,Q}$ SPEC(QN) (=D) [QN, ±PLURAL] [$_{NP\ ...}$ N1 ... N2 ... Nk ...(YP)...]]
(36) **[VP,Q SPEC(QV) [QV, ±PLURAL]** [$_{VP\ ...}$ V_1 ... V_2 ... V_k ...(YP)...]]

The bolded VP_Q, SPEC(Q_V) and Q_V correspond respectively to what Chomsky (1986) calls IP, SPEC(IP) and I. So let's partly rewrite (36) with more familiar symbols as (37), though if the parallel in (18) and (36) is "real," these special symbols should play no formal role.

(37) Clause structure: [$_{IP}$ SPEC(IP) [$_{I}$ Q_V, ±PL] [$_{VP\ ...}$ V_1 ... V_2 ... $V_{k\ ...}$ (YP)...]]

As with the NP structure, there are no empirical reasons for grouping together Q_V (= I) + VP as a constituent I'. The only justification ever given for such an I' is based on parenthetical adverbials after a subject NP:

(38) Mary, within a month, should enroll for school.
This process, I've learned, is a new way to make ice cream.
Smoking upstairs, to my knowledge, doesn't bother Bill much.

Is there any alternative to an I' constituent for the post-parenthetical sequences in (38)? In fact, it appears that subjects in SPEC(IP) come to precede these parentheticals by raising *leftward* around them, apparently to a focus position, as in (39).

(39) $Mary_i$, within a month, [$_{IP}$ t_i should enroll for school].
$This\ process_i$, I've learned, [$_{IP}$ t_i is a new way to make ice cream].
$Smoking\ upstairs_i$, to my knowlsege, [$_{IP}$ t_i doesn't bother Bill much].

Moreover, we know independently that expletive subjects cannot move into focus position (i.e. serve as new information), as seen in (40a). So if expletive subjects replace the full NP subjects in (39), the results are equally ungrammatical (40b). If follows that the pre-parenthetical NPs are in a focus position, outside of IP, and so cannot be used to argue for the existence of an I' separate from IP.

(40) a. *$There_i$ Bill believed t_i to be no reason for a meeting.
*It_i Sue didn't think t_i bothered Bill much to smoke upstairs.
b. *$There_i$, I've learned, t_i is a new way to make ice cream.
*It_i, to my knowledge, t_i doesn't bother Bill much to smoke upstairs.

Since an analysis with I' is unable to account for examples like (40b), we are free to retain the structure in (37) in which *I and VP do not form a constituent*.

Let's now see how the QP_V structure for clauses relates to a description of Japanese. I introduced in Section 4 a Q-Parameter (23), according which Japanese NPs need not be "closed" by a Merge with Q. If we extend (23) to Japanese and English clauses, it then follows that Japanese VPs can be "bare," i.e. not project to an IP. That is, the structure (37) is *not obligatory* for Japanese clauses.

(41) Generalized Q-Parameter. Maximal NP and VP in English *must be closed* by a Merge with a Q head. Japanese NPs and VPs *need not* be closed by a Merge with Q.

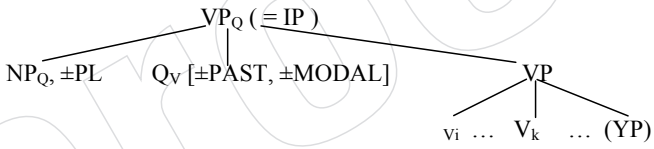
This formulation is in fact formally equivalent to the central parameter distinguishing English and Japanese made explicit in the title of Kuroda (1992): "Whether We Agree or Not: A Comparative Syntax of English and Japanese." However, though he discusses many insightful ramifications of his hypothesis, he does not extend his parameter to the structure of nominal phases, as under the QP Hypothesis; he treats only differences in clausal structure.

I do however have reservations about the way Kuroda uses "optional agreement" to analyze Japanese case alternations. These differences go well beyond the scope of this paper. In short, my view is rather that, since Japanese does not need to project its VPs to IPs, it is more economical not to, and so perhaps it never does; in this case there simply are no IP structures in Japanese. Its finite clauses are then actually traditionally termed VPs with subjects in (possibly multiple) adjoined positions, as in Fukui and Speas (1986).[17]

7.2. Valuing and interpreting Q_V (=I) in syntax

The inherent features of Q_V (=I) in (37) are those of tense and modals. This yields an English clausal structure as in (42). This tree is the familiar structure of finite clauses, but replaces terms such as I, INFL and Tense with the general and (I propose) *only* functional category Q modifying VP. V_i represents possible grammatical verbs v such as *be, have* and causatives, while V_k is the open class lexical head.

(42)



All English IPs that are finite have the obligatorily overt structural subject NP shown in (42); their head I either is a Modal or agrees in number with this subject.[18] This specification for number suggests that Q_V (= I) is in fact a sort of "default quantification" over V, in that it provides Q_V with ±PLURAL values in case lexical members of this category, e.g. Modals, are absent.[19] Just as with Q_N (modifying count nouns) that are unvalued by a lexical numeral or quantifier, Q_V can receive its value by Alternative Realization, whose definition I repeat for convenience.

17 Since Japanese subjects are adjoined to VP rather than located in SPEC(Q_V), they can sometimes be PPs, with the Ps *de* 'at' or *kara* 'from', an analysis argued for on independent grounds in Inoue (1998).

18 More accurately, subjects of a finite verb must be overt *or* a trace of a subject fronted to a clause's left periphery.

19 Gerunds and participles lack both Modals and agreement because they are not IPs to start with: participles have A heads (Emonds 2000: chs. 5 and 7), and gerunds have N heads (section 4.7); nor do "bare VPs" in causative constructions project to separate IPs (ch. 6). For reasons of space, this study cannot analyze the lack of agreement on infinitives.

(21) Alternative Realization (AR). A syntactic feature F canonically associated in UG with category B can be alternatively realized in a closed class morpheme under B*, provided that projections of B and B* are sisters.

Here F is Q, B is the Q_N head of a subject phrase and B* = Q_V. Formally, Q_V must be valued in a well-formed derivation that leads to an interpretable LF. Like Q_N, this value, which includes but is not limited to ±PLURAL, can be provided by a lexical item in Q_V, i.e. a Modal. But when Q_V dominates no such item, it can alternatively realize ±PLURAL located on one of Q's sisters in (42), either VP or SPEC(Q_V). Since VP has no Q feature, the only possible source for valuing Q_V is the ±PLRUAL of a subject NP_Q. In more familiar terms, the category I *must* agree in number with an NP in SPEC(IP).

This analysis derives from Chomsky's (2001) conception of using syntactic derivations to value features, and thus implies that number agreement plays a role at LF. This conception overturns a long-standing assumption that English subject-verb agreement is "meaningless," i.e. adds nothing to the simple specification of NPs as singular or plural. It also departs from my own previous working assumption, namely that alternatively realized features contribute to LF only by licensing features in their canonical positions.[20] In addition to these matters, a reader might hesitate to relate "plural verbs" so closely to the rather more concrete counting system of numerals.

Nonetheless, though syntactic categories invariably have a concrete cognitive basis, they are often used to express concepts not included in these original bases. For example, the category N is certainly based on naming material objects. Yet open class items such as *flaw, vacuum, ubiquity, ether, immortality, existence* don't refer to observable or even material entities. They are "things" only circularly, in that they are grammatically Ns. Similarly, though P's basic function is to locate in space and time, "marked' P" like *of, without, despite,* most uses of *for* etc. don't do this. It is typical of natural language to *formally extend use of a syntactic category beyond its cognitive basis.* In this sense, the category I (= Q_V) simply extends counting and quantification into verbal domains.

What then can be the semantics of verbs being "quantified" as ±PLUR? Traditional grammar remarks only that a plural verb doesn't mean a plurality of *successive* events. That is, any predication, in English at least, is true if its verb holds of a subject *at a given time,* namely that of the verb's Tense. However,

20 There are other constructions where alternatively realized features can make independent, if secondary, contributions to LF. In work in progress, I argue that LF representatiions of certain complex Tenses such as the English perfect must use together two values of Tense in one clause, one in its canonical (V) and one in its alternatively realized (I) position.

+PLUR on V does imply a *plurality of simultaneous events/ states*: those with different subjects. That is, the unmarked interpretation of the agreement on Q_V is a counting of *simultaneous events* (or states).[21]

(43) The boys were eating ice cream. (several "eatings")
The boys resemble their father. (several "resemblances")

In this section's analysis, number agreement with the subject NP_Q (the AR of the latter's number feature) is a *default means* for valuing Q_V; what is obligatory is not agreement itself but the valuing of Q_V as ±PLUR. This leaves open the possibility that both [Q_V, +PLUR] and [Q_V, -PLUR] might be specified independently of the value of PLUR on the subject phrase. Such marked constructions indeed exist, and support the analysis here over a more traditional variant in which number agreement is simply obligatory.

(i) In British English, when a subject is a collective noun (*government, army, team),* Q_V can be independently specified as +PLUR, which seems to mean that the members of the group act severally but in concert.

(44) a. This government is/ *are known for its austerity program. (Normal agreement)
b. The government are planning reforms. (The government is a group acting together)

(ii) Q_V can have an independent singular form, which then imposes on the NP in SPEC an interpretation as a single event, regardless of the latter's inherent number.

(45) a. *Normal agreements:*
Too many boys make a bad party.
Sienna's neighborhood flags waving in the wind were a colorful sight.
Being late and not being apologetic are not considered polite.
b. *When QV is inherently marked –PLUR, the subject NP is taken as a single event:*
Too many boys makes a bad party.
Sienna's neighborhood flags waving in the wind was a colorful sight.
Being late and not being apologetic is not considered polite.

21 With "symmetric predicates" (*we* married; *the boys* met), plural "simultaneous events" are indispensable, and so might be pragmatically viewed as one event. But even here, two people marrying each obtain new legal status, so two legal events must have transpired.

Of course, many and perhaps most plural NPs are simply incompatible with "single event" interpretations, as seen in (46).

(46) Three severe storms were/ *was due to global warming.
Student answers on this test have/ *has provided entertainment.

Again, mechanical agreement itself is *not* obligatory. What is obligatory prior to LF is only the *valuing of QV as ±PLUR*, which in some contexts such as (44b) and (45b) can occur independently and not as a default.

As noted above, these extensions of a feature ±PLUR, beyond its original cognitive basis with N, are typical in formal syntax. Even though Q_V is *not* used for quantifying temporal duration of an event or state, nor for counting their repetitions, a Q_V expressed as agreement nonetheless does actually seem to count.

Recall finally that in the closed projections PP_Q and AP_Q, the interpretation of Q can be further specified by a preceding measure phrase NP. We can extend this condition to VP_Q:

(47) Valuing Q. Whenever Q_X lacks inherently specified numeric features, i.e., when $Q \neq Q_N$, it can receive a default LF interpretation by being specified for quantity by an NP in SPEC(Q_X).

That is, *a subject NP of an agreeing verb acts structurally as a measure phrase* that supplies a quantitative interpretation of Q_V, and thus satisfies a general requirement in Chomsky (2001) that syntactic derivations must value features.[22]

This study's approach to functional categories has thus predicted number agreement of finite verbs with subjects for any languages which have the English setting for the Generalized Q-Parameter (41), whose NPs and VPs must Merge with Q. (41) moreover reveals why subject agreement is so central in syntax; it signals that a closed VP_Q rather than a open VP is structurally present.

22 This conclusion sheds some light on a puzzling asymmetry in Jackendoff (1977: Ch. 5). English measure phrases optionally precede all open class heads except Vs. In order to quantify an activity of a V over time, one must use a *post-head* adverbial phrase:

a. **She may several hours talk about it.* *She may talk about it (for) several hours.*
b. **We two miles followed that car.* *We followed that car (for) two miles.*

Now the Q-extended CIT (5) in fact is compatible with an English I (= Q_V) specifying some measure. But this measure apparently counts *only simultaneous* events or states specified by the predication NP+VP, i.e. SPEC(Q_V)+VP. Consequently, there is no way for Q_V or SPEC(Q_V) to indicate any other kind of measure for V, either over time or space.

8. How many categories are there in syntax?

This paper has widened the use of QP, via the Q-extended CIT (5), to English APs, PPs and VPs. In particular, measure phrase NPs have turned out to be counterparts in APs and PPs to subject NPs in IP and possessive NPs inside larger NPs (sections 5-7).

Though the inclusion of VP projections under (5) in section 7 is far from obvious, it allows the Q-extended CIT to subsume an ingenious idea of Kuroda (1992), whereby the functional head I above VP is crucially identified with subject-verb agreement in English and an absence of agreement in Japanese. That is, agreement's crucial component is the ±PLUR number on I, i.e. the syntax-assigned values $\pm Q_N$. In this perspective, English IPs should be considered to be VP_Q, which Japanese then lacks, as argued in both Fukui and Speas (1986) and Kuroda (1992). To express this difference, I have generalized a Q Parameter (23) for noun phrases to verb phrases as in (41):

(41) Generalized Q-Parameter. Maximal NP and VP in English *must be closed* by a Merge with a Q head. Japanese NPs and VPs *need not* be closed by a Merge with Q.

The basis of the Q-extended CIT (5) is that in English *a QV must be valued in LF, and as a default quantified, even though a predicate V or VP cannot be.* Unlike in other projections X^j, neither V^j itself nor a measure phrase in SPEC(Q_V) can separately provide a value to Q_V. The only way an unvalued feature Q_V can satisfy the requirement that all LF features be valued is via a constituent whose Q is *already valued*, i.e. by agreement with the ±Q on an NP_Q in SPEC(Q_V). These NP_Q of course structurally correspond to the familiar subject NPs in SPEC(IP). An agreeing I thus turns out to be nothing other than a Q_V formally receiving its value from a Q_N in subject position.

All functional categories that are not lexical categories in disguise (i.e., functional categories of "small x" for x = n, v, a, p which obey van Riemdijk's CIT) thus reduce to a single functional head Q. And in light of the following additional considerations, there is no need for a significantly larger category inventory in syntax than that just reviewed.

(i) What are usually called D or DET are single words dominated by SPEC(Q_N).
(ii) The only *productive* category of adverbs are heads that are of category A.
(iii) C (= COMP) reduces to P (Emonds 1985: Ch. 7).

This reduced set of head categories, namely {N, V, A, P, Q}, recalls the categorical parsimony of generative semantics, whose advocates wished to reduce the set of syntactic categories to a small group of basic categories of

logic. In my view, they rightly claimed that syntax needs only a reduced set of categories, comparable to those in some kind of "natural language logic," i.e. what is called today LF. However, generative semantics prematurely substituted categories found in modern symbolic logic for those of empirically justified Logical Forms for natural language. Consequently, this approach emphasized items expressing predicates (V), reference (N) and quantification (Q). But since place and time are extraneous in symbolic logic, it wrongly ignored critical roles of PP structures.

Since symbolic logic was nothing but Bertrand Russell's simplified, intuited version of LF, it was a circular exercise to hypothesize a natural language LF dependent on symbolic logic. Rather, natural language logic and its categories must be *newly discovered* on the basis of syntactic research, using the method (Chomsky 1957) of contrasting acceptabilities for similar syntactic sequences. We then find that natural languages *distinguish* (do not conflate) four kinds of categories N, A, V and P, which both take arguments (a property of symbolic logic predicates) and at the same time can all be constants and variables in larger propositions. These are supplemented by a single category Q which is first and foremost used to *count Ns*, and second to *existentially quantify* them, and then to measure properties (A) and locations and times (P). Finally, the role of Q in V projections, as a source and carrier of agreement, becomes almost totally formal.[23]

23 From an evolutionary perspective, this parsimonious scenario greatly improves on systems that proliferate functional categories.

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