THE INTERFACE BETWEEN CATEGORIAL SEMANTICS AND SYNTAX: A CASE IN THE PLURAL -S

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In this paper, I will submit the analysis that the plural *-s* in English is the morphological determiner. In the traditional frameworks in generative syntax, the syntactic difference between common nouns and bare plurals is not well-explained that the former cannot appear as arguments but the latter can though it might be barely possible that the explanation is given by supposing the null determiner ø [+plu] in the head D. I will show that the functional generalization of the plural *-s* and determiners is possible, and also that the analysis explains a phenomenon concerning generic expressions in English and French.

Keywords: *determiner*, *projection*, *quantification*, *intension*, *common noun*

1. Introduction

One of the phenomena that have not been discussed explicitly is the syntactic and semantic differences between common nouns and bare plurals. It is assumed that this might not be so easy, but it is clear that the difference in their syntactic distributions in (1) must be the point to start with:

(1) a. * *Student* should be diligent.

b. *Students* should be diligent.

A common noun *student* does not occurs as an argument as in (1a), whereas its corresponding bare plural *students* does as in (1b). In the traditional frameworks in generative grammar, they have been given the same syntactic categories as in (2):

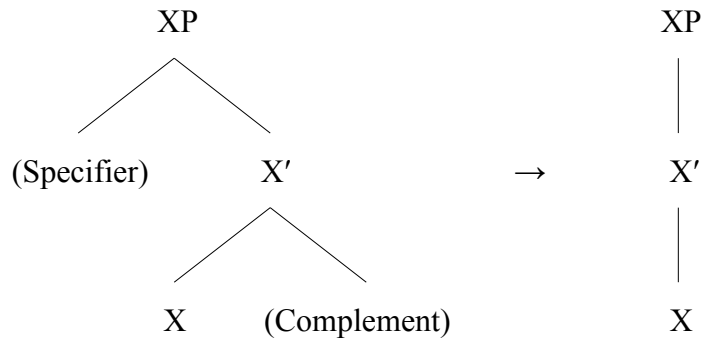
(2) a. $[_{NP}\ [_{N'}\ [_{N}$ student(s)]]]

b. [$_{DP}$ [$_{D'}$ [$_{D}$ ø] [$_{NP}$ [$_{N'}$ [$_{N}$ student(s)]]]]]

c. [$_{Dmax}$ [$_{Dnin}$ ø] [$_{Nmin/max}$ student(s)]]]

In the X-bar theories which (2a, b) rely on (Chomsky (1981, 1986)), vacuous projections can be yielded as in (3) since the specifier and the complement are optional there:

(3)



{N, A, V, + INFL, C, D, etc.}

In the framework in Chomsky (1981), *student*(*s*) is analyzed as NP with no determiner in its specifier position as in (2a), whereas it is analyzed as DP with the null determiner in its head D as in (2b) in the framework in Chomsky (1986) where D is also a head (e.g., Abney (1987)). In the bare phrase structure theory which (2c) relies on (Chomsky 1995), vacuous projections are not produced since structures are constructed by two operations of Merge and Move. In accordance with this, the minimal, intermediate, and maximal projections are only properties which are defined purely relationally from structures: the minimal projection is the projection which projects from no projection, the maximal projection is the projection which projects to no further projection, and the intermediate projection is any other ones.

I claim that the analyses in (2) are problematic, and submit an alternative analysis for bare plurals. To see how the analyses in (2) are problematic, consider the data in (4) and (5):

(4) a. * They *be* students.

b. They *are* students.

(5) a. * They *is* students.

b. They *are* students.

To be observed is that (5a) becomes grammatical by changing *they* and *students* to, say, *he* and *a student* respectively, whereas (4a) cannot by any such changes. This means that there must be found some different type of distinction between *be-are* and *is-are*. The assumption is that *is* and *are* are variants of the same level of projection of V, whereas *be* and *are* the different levels where only the latter can appear syntactically in the canonical position of V. It seems clear that the nature of the data in (1) is something which is to be compared with (4), but not (5).

Let us go back to the analyses in (2). If we accept the analysis of *students* in (2a), *student* should also project up vacuously to NP. But this is not plausible, if NP is associated with the argumental category. Thus, (2a) is problematic, failing to give different categories to *student* and *students*. The situation is the same in (2b, c) since the null determiner ø should also map *student* to DP which is associated with the argumental category. It might be a way out in this case to suppose the null determiner ø [plu] which takes *students* as its complement, but does not *student*, resulting in differentiating *students* and *student* as DP and NP respectively.

In this paper, I submit the analysis to introduce the plural *-s* as the morphemic determiner which realizes in suffixation to the head N, excluding the null determiner ø [plu], to explain the data in (1), and it is given as in (6):

(6) a. $[_{N}$ student]

b. $[_{dP}\ [_{d}$ -s] $[_{N}$ student]]

Though the motivation for the analysis in (6) seems too feeble to give up the null determiner, we will witness in the later sections that this analysis is so profitable. Firstly, the detailed semantics is given to the plural *-s* which is incorporated to that of syntactic determiners (D) in a consistent manner. Secondly, the analysis brings us the generalization that determiners are obligatory for head nouns to be arguments. This solves not only a problem of how to treat

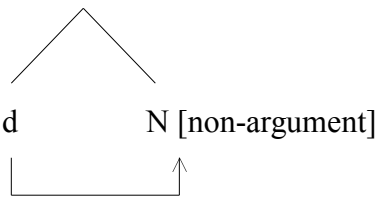
prenominal elements, but also a problem of vacuous projections, making a phrase structure theory possible that conflates the advantage of the X-bar theories and that of the BPS theory. Most importantly, the resulting framework explains various empirical phenomena which have not been given any suitable explanations. I will introduce as one of the examples a treatment of generic expressions in English and French in section 3 and 4.

2. Syntactic Structure

The first of the outcomes in the analysis in (6) is that it leads us to the generalization that determiners are obligatory for nouns to be arguments: it is well known that determiners are the elements that shift nouns as a sort of predicates to nominal expressions as syntactic units (e.g., Montague (1973)), but it has not reached the point that they are obligatory for nouns to be arguments possibly or partly because of the case of bare plurals. The generalization predicts that arguments are either of the cases in (7):[1]

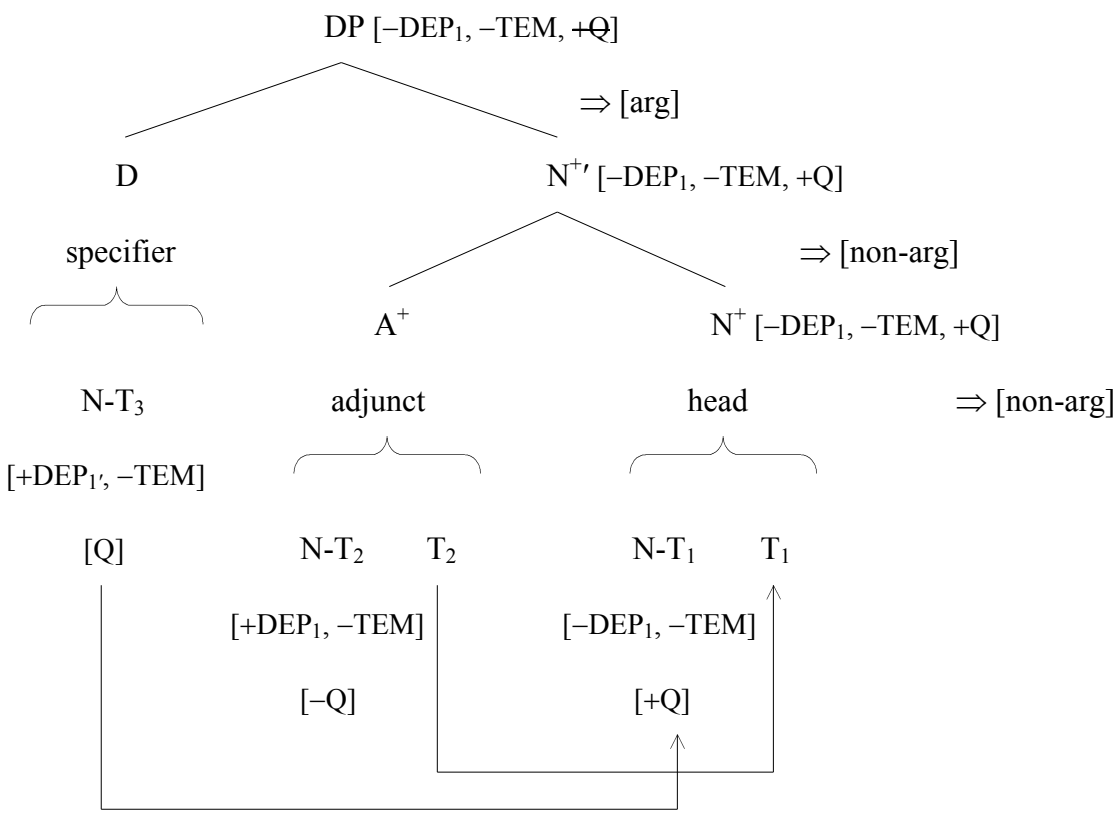
(7) a.

b.



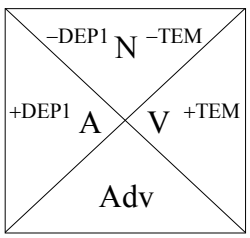
The morphemic determiner which realizes in suffixation to N is expressed in the small letter d as in (7b) to differentiate it from syntactic determiners D. As a result of this generalization, prenominal elements are divided into the obligatory ones which yields arguments (D, d) and the non-obligatory ones which does not (A).[2] This fact is captured in the structural systems as in (8) and (9) in this study. Firstly see the pattern in (8):

(8)



In this framework, the head (H, H′) is defined as the category that provides thematic basis (T) and quantificational indeterminacy ([+Q]) together with categorial features ([–DEP_1, ±TEM]) as its non-thematic part (N-T): whereas the adjunct (AD_1: H′/H, H′/H′) is the category that has the thematic content (T_2) which strengthens the head's thematic basis (T_1) arbitrarily required, but does not have quantificational indeterminacy ([–Q]). N and V are (absolute) heads (H), and A and Adv adjuncts here, and these four thematic categories are systematized as in (9):[3]

(9)



A/Adv is dependent on N/V.

Adv/V is temporal.

[∓DEP_1] ⇒ [±Q]

Among the four thematic categories, only the ones with quantificational indeterminacy [+Q] are heads which is drawn from the categorial feature [–DEP_1] (see section 3 for [+Q] which is different from traditional one, and also section 5 for [±DEP_1]). The rest thematic categories with the feature [–Q] are adjuncts which is drawn from the categorial feature [+DEP_1] (see section 6 for [–Q]). The adjunct does not change the head's syntactic status since it does not

affect on the head's non-thematic part: it does not change the head's categorial features with being categorially dependent on the head, nor resolve its quantaificational indeterminacy with lacking in quantificational force. The projection that the adjunct yields is expressed as H′, which indicates that the head has had some change in its thematic basis.

The specifier (S_1: S_1P/H, S_1P/H') is defined, on the other hand, as the category that only has quantificational force ([Q]) which resolves the head's quantificational indeterminacy ([+Q] ⇒ [~~+Q~~]) obligatorily required and categorial features ([+$DEP_{1'}$, −TEM]): D and T are specifiers for N and V respectively in this framework (see section 3 for [Q] which generalizes D and d. I will not mention [+$DEP_{1'}$] in this paper). The specifier changes the head's syntactic status since it affects on the head's non-thematic part by changing its [+Q] to [~~+Q~~]. The projection that the specifier yields is expressed as S_1P, which indicates that the head has received some change in its non-thematic part by S_1, and has been maximalized. The discussion so far is summarized in the projection principles as in (10):

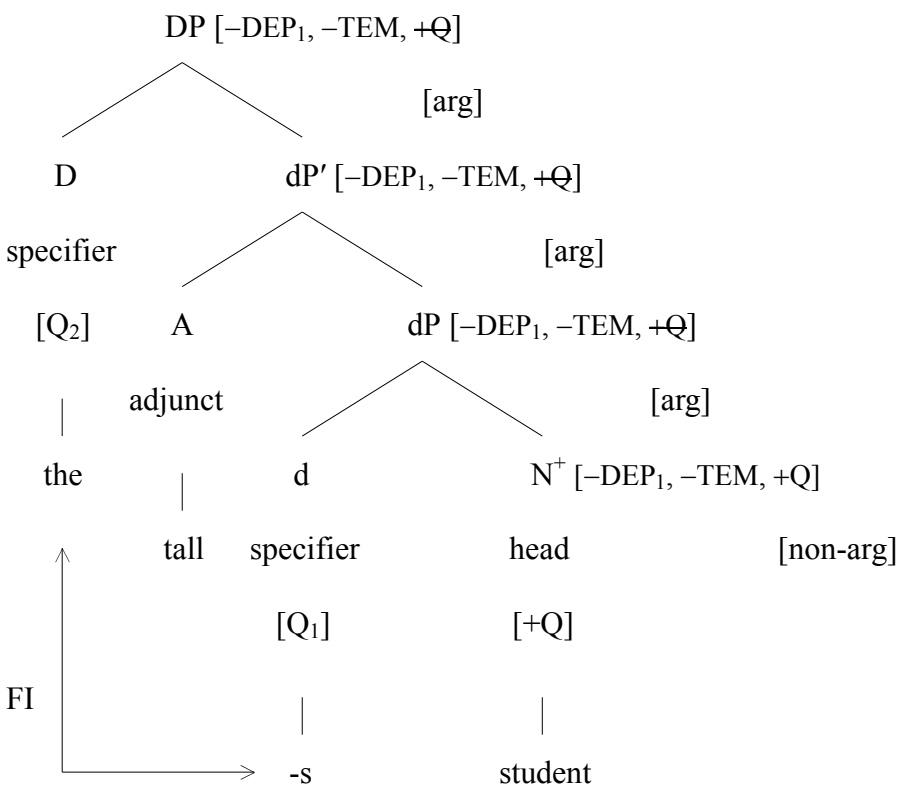
(10) Projection Principle

a. The specification is the semantic process of N and V, which is composed of the optional process which strengthens their thematic bases (= modification) and the obligatory process which changes their non-thematic parts [+Q] (= quantification).

b. The projection is the syntactic process of heads, which is composed of the optional process which yields the single-bar projection (= intermediation), and the obligatory process which closes the projections(= maximalization).

In this framework where the projection is the process to strengthen and establish meaning, non-thematic (= functional) categories do not project in themselves. They are significant, however, for establishing the heads' syntactic status and meaning, so the resulting category is called like DP (the phrase which is specified functionally by D). Let us then see the pattern in (11) including -*s* as a determiner:

(11)



Since d is a specifier, it affects on the head's non-thematic part [+Q] with its quantificational force [Q_1] to yield a maximal projection dP which is an argument. Since A is an adjunct, it affects on the head's thematic part with its thematic content to yield a single-bar projection dP′ which is an argument because of its inheriting the feature [+~~Q~~] from dP. Since D is also a specifier, it affects on the head's (dP′) non-thematic part [+~~Q~~] with its quantificational force [Q_2] to yield a further maximal projection DP which is again an argument. In this process, the main function of *the* strengthens that of *-s*, and its sub-function does not conflict with that of *-s* (see section 3 for the details of *the* and *-s*). Thus, d and D do not exclude each other, and are able to co-occur. I call this functional interaction (FI).[4] Thus, the data in (12) are explained without appealing to a rule as in (13), nor a phrase structure theory as in (3) that nullifies cleverly the disjunctive prediction in (13) in the effect that the italicized constituents are all maximal projections:

(12) a. [$_{dP}$ *Cars*] can be useful.

b. [$_{dP'}$ *Fast* [$_{dP}$ *cars*]] can be useful.

c. [$_{dP'}$ [$_{A'}$ *Very fast*] [$_{dP}$ *cars*]] can be useful.[5]

d. [$_{DP}$ *Those* [$_{dP'}$ [$_{A'}$ *very fast*] [$_{dP}$ cars]]] can be useful. Yoshida (1984: 78-9)

(13) $S \rightarrow \left\{ \begin{matrix} NP \\ N \end{matrix} \right\} - AUX - VP$

3. Semantic Structure

In this section, we will see several of the questions which we are now faced with: what the quantificational indeterminacy [+Q] of N is, what the quantificational force [Q] is where the function of d is generalized into that of D, and what the detail of the functional interaction is, specifically that between *the* and *-s*. The starting point in this paper is the semantics of N, and it is drawn inductively from the intensions of proper nouns (Montague (1973)). Let us imagine a dog called John. The intension of a proper noun *John* is formulated here as in (14) (cf. Montague (1973)):

(14) a. ‖*John*‖= the unique set of properties on dog-scale (D_J) ⇒ the conceptual dog

b. ‖*John*‖= a unique set of properties on a scale (X_J) ⇒ a conceptual individual

(15) Properties

a. Physical Complex: ‖*hairs*‖, ‖*a tail*‖, ‖*four legs*‖, etc.

b. Physical Simple: ‖*brown*‖, ‖*small*‖, ‖*fat*‖, etc.

c. Conceptual Simple: ‖*domestic*‖, ‖*clever*‖, ‖*brave*‖, etc.

d. Conceptual Complex: ‖*John likes bathing*‖, ‖*John belongs to Mr. Smith*‖, ‖*John was born in New York*‖, etc.

‖ ‖ is the sign in this paper to indicate the intension of a linguistic form inside, and ‖*John* ‖ represents the intension of *John*. What is characteristic to the formulation in (14a) is that the conceptual decomposition of John is allocated to the intension of *John*: “on dog-scale” is the term here to indicate that the unique set of properties contain the set of properties that forms,

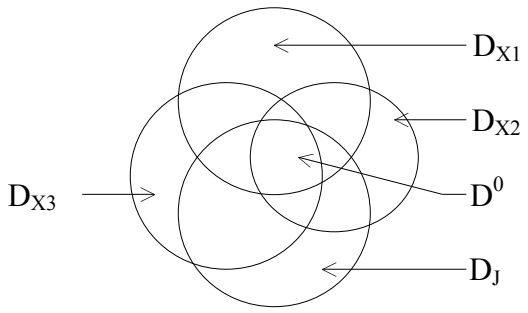
dogness. The idea is that the extension of *John* is, as generally is, a certain actual entity (= individual), whereas the intension of *John* is also a certain entity as its image and its linguistic formulation (= conceptual individual) (cf. Frege (1892)). Thus, the intension and extension are parallel fundamentally, being different in whether they are actual or not. However, it is also possible to construct an entity of image linguistically with no corresponding extension. Thus, the intension can be fictional in relation to the extension, and whether it is parallel or fictional depends on syntactic or extra-linguistic contexts. To be strict, *John* tells nothing in itself about what-scale it concerns without contexts, and hence the intension of *John*, or any other proper noun, is formulated generally as in (14b). I call the intension of a proper noun ($\|\text{PN}\| = X_Y$) conceptual individual, whereas, if is on dog-scale ($\|\text{PN}\| = D_Y$), conceptual dog.

The properties in (14) are sorted out in four types as in (15) here. The complex properties the properties which are decomposed into the four types of properties as $\|John\|$ is, whereas the simple properties are the ones which are not, only being the components of $\|John\|$. The intension of N is formulated as in (16):

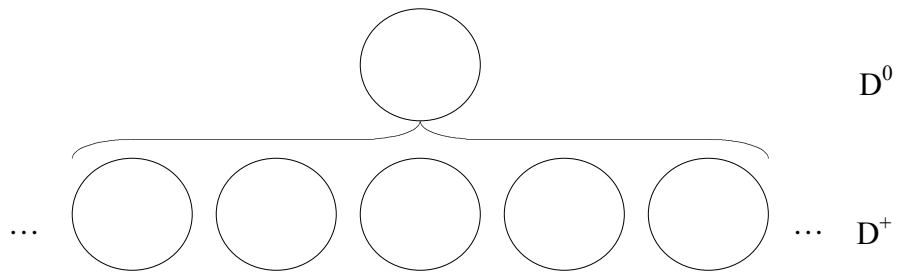
(16) a. $\|dog^0\|$= the set of properties shared by all conceptual dogs[6] (D^0) $\Rightarrow$ the ideal dog

b. $\|dog^+\|$= the set of ideal dogs (D^+) $\Rightarrow$ ideal dogs

(17) a.



b.



The intension of a common noun *dog* (= $\|dog\|$) is formulated dually: firstly in the singular-

like state as in (16a) which is obtained inductively as the intersection of all conceptual dogs, and hence the vague image of entity that is deprived of all conceptual dog-specific properties; and then in the plural-like state as in (16b) since the ideal dog is found in all conceptual dogs. I call the intension of a common noun (‖CN‖= X) ideal individual, and that of *dog* (‖*dog*‖= D) ideal dog.

To be noticed is that D^0 and D^+ are continuous, being unstable between the two states, but are rather different in their degree of abstraction: the former is more function-like, whereas the latter more phenomenon-oriented, being ready to denote all individuals of the kind. That is, they are not completely equal from a cognitive point of view. From this, a hypothesis is drawn as in (18):

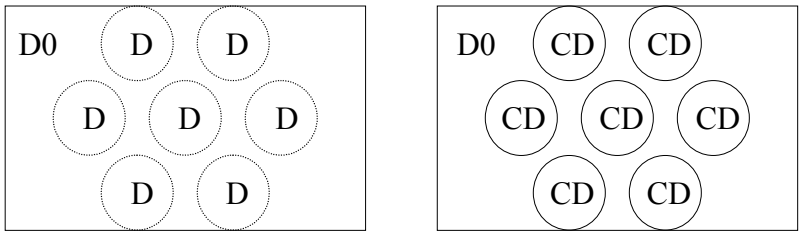
(18) Every language selects either $\|N^0\|$ or $\|N^+\|$ as N's normal intensional state. If a language selects $\|N^0\|$, then it is a N^0-language (e.g., French), and if a language selects $\|N^+\|$, then it is a N^+-language (e.g., English).[7]

The next to notice is that even if either of the states is selected as a normal state in a language, $N^{0/+}$ is not determined still as singular or plural, holding for any or all conceptual individual(s) of a kind. This means that $N^{0/+}$ holds for any or all individual(s) of a kind in the actual world, and this is considered in this study that $N^{0/+}$ has no extension (= denotation) as its semantic value (cf. Montague (1973)).[8] This is the precise of quantificational indeterminacy [+Q] of N here, and its effect can also be understood by the familiar term of referential inability. In accordance with this quantificational indeterminacy of N, the quantificational force [Q] which resolves [+Q] of N to [~~+~~Q] is defined as in (19):

(19) the quantificational force [Q] is to determine the place (main-function, M-F) and the number (sub-function, S-F) for $\|N^{0/+}\|$.

This process by [Q] is called quantification here. Let then see how [Q] in (19) realizes in determiners, focusing on the cases concerning *-s* and *the* in (20)-(23):

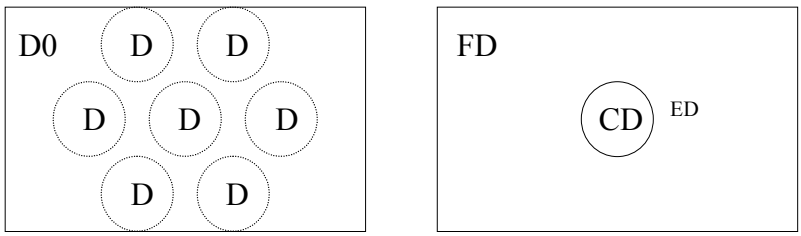
(20)



$\|dog^{+}\|$ $\|dog\text{-}s\|$

D0 (Domain 0) is the mental domain which correlates with the actual world, and where ideal dogs (= $\|dog^{+}\|$) are distributed: as already mentioned, ideal dogs are unstable entities which are abstracted up to the ideal dog under some syntactic conditions. The function of *-s* is to select ideal dogs exhaustively from $\|dog^{+}\|$ and convert them to conceptual dogs ([+plu], M-F), determining the place of existence for $\|dog^{+}\|$ in effect as D0 ([–def], S-F). Thus, $\|dog\text{-}s\|$ denotes fundamentally all individuals with dogness in the actual world.[9] In the case of *-s*, the determination of the number of the existence for $\|dog^{+}\|$ precedes that of the place, and hence works as the main-function.

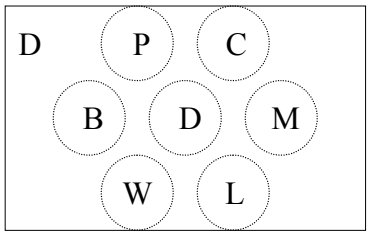
(21)

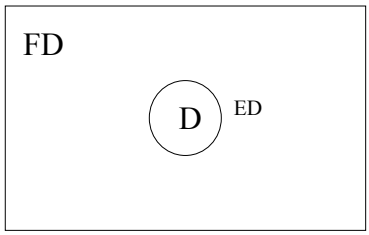


$\|dog^{+}\|$ $\|the\ dog\|$

FD (Functional Domain) is the domain which is independent of D0 and reflects the speaker's cognitive effect, whereas ED (Exclusive Domain) is the domain that is offered on FD. The function of *the* is to determine the place of existence for $\|dog^{+}\|$ as ED ([+def], M-F) and carry out exclusive selection ([–sing], S-F), selecting in effect an ideal dog exclusively from $\|dog^{+}\|$ and converting it to the conceptual dog.[10] Thus, $\|the\ dog\|$ denotes fundamentally some specific individual with dogness in a part of the actual world:[11] the uniqueness which is established as a result of the exclusive force by *the* is fundamentally local, therefore what is denoted by $\|the\ dog\|$ varies from contexts to contexts. We have another interpretation for *the dog* as in (22):

(22)

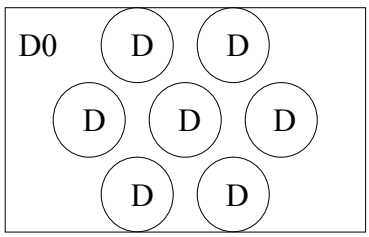


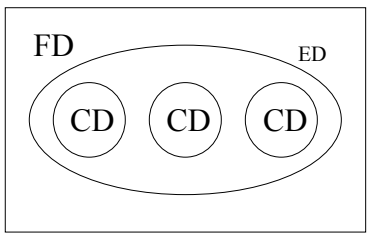


$\|dog^0\|$ $\|the\ dog\|$

D (Domain) is the mental domain which does not directly correlate with the actual world, and where ideal individuals across scales including the ideal dog are distributed: the ideal dog is, as already mentioned, the unstable entity which is abstracted down to ideal dogs under some syntactic conditions. The point is that the exclusive force of *the* converts ideal dogs up to the ideal dog, converting D0 to D, and then determines the place of existence for $\|dog^0\|$ as ED ([+def], M-F) and carries out exclusive selection ([−sing], S-F), selecting in effect the ideal dog exclusively from ideal individuals across scales.[12] Thus, $\|the\ dog\|$ can denote all individuals with dogness in the actual world indirectly as a result of the exclusive selecting of the function-like entity. Now the case of the co-occurrence of *-s* and *the* is given as in (23):

(23)





$\|dog\text{-}s\|$ $\|the\ dog\text{-}s\|$

In this case, *the* determines the place of existence for $\|dog\text{-}s\|$ as ED ([+def], M-F) and carries out exclusive selection ([−sing], S-F), selecting in effect a set of ideal dogs exclusively from $\|dog\text{-}s\|$ and converting them to the set of conceptual dogs. Thus, $\|the\ dog\text{-}s\|$ denotes some specific set of individuals with dogness in a part of the actual world. In this process, the main-function of *the* [+def] strengthens the sub-function of *-s* [−def], offering the restriction ED on D0, and the sub-function of *the* [−sing] does not strengthen the main-function of *-s* [+plu] nor conflict with it: the exclusive selection of *the* is drawn only secondary from its main-function, and does not have any specific number specification in itself: if something is

not singular nor plural, it appear as if it is singular. I call this pseudo-singular, and express it as [−sing]. This is the precise of the functional interaction between *the* and *-s*, where they are co-operative to be allowed to co-occur.

4. Cross-linguistic Variation

In this section, I will show that the framework in this paper is highly promising also from a cross-linguistic viewpoint. The data to be considered are generic expressions in English in (24) and French in (25):

(24) a. *Pandas* are extinct.

b. *The panda* is extinct.

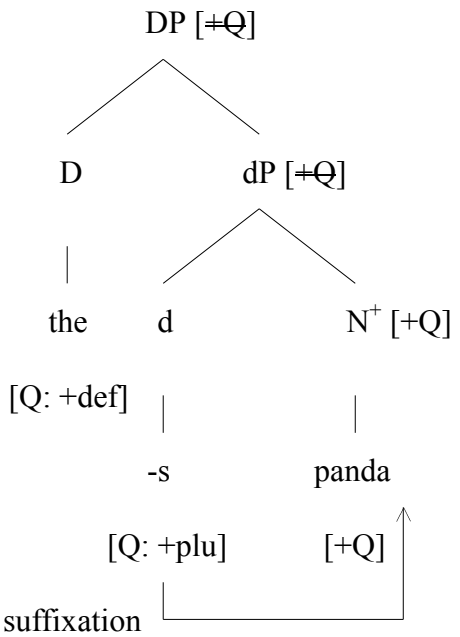
(25) a. * *Pandas* sont éteint.

b. *Le panda* est éteint.

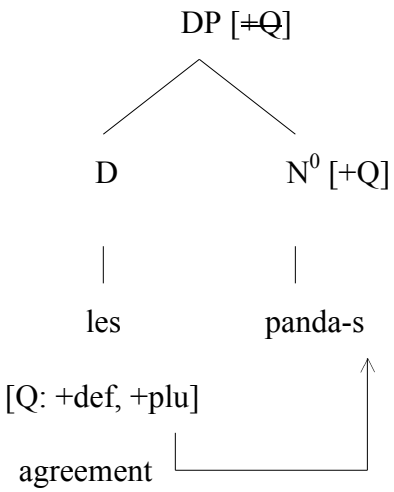
c. *Les pandas* sont éteint. (Krifka et al. 1995: 68)

It is observed that bare plurals are possible in English as in (24a), but they are not in French as in (25a), though definite plurals are instead possible as in (25c) in French. The framework here treats the data without extra theoretical operation, giving the analysis as in (26):

(26) a.

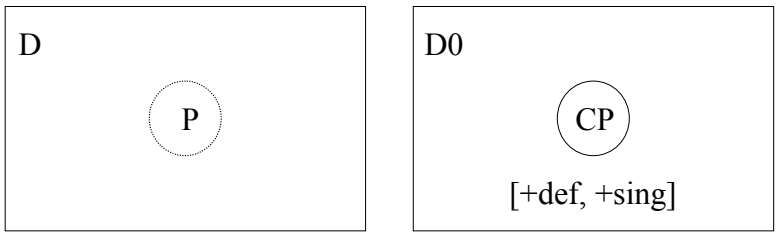


b.



It might be possible to draw the assumption that since $\|N^0\|$ which is the more function-like entity is higher in its degree of abstraction than $\|N^+\|$ is, it requires the stronger functional operation to be referential, and it is the more systematic article system by the simultaneous specification of the place of existence and the number where the plural *-s* is an agreement morpheme. Let us then consider the cases concerning le and les in (27)-(30):

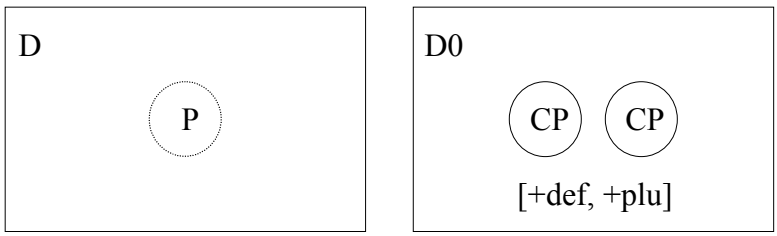
(27)



$\|panda^0\|$ $\|le\ panda\|$

The function of *le* is to offer the command [+def, +sing] (M-F, S-F) on the ideal panda and convert it in effect to the conceptual panda, converting D to D0. Thus, $\|le\ panda\|$ denotes fundamentally some specific individual with pandaness in a part of the actual world.

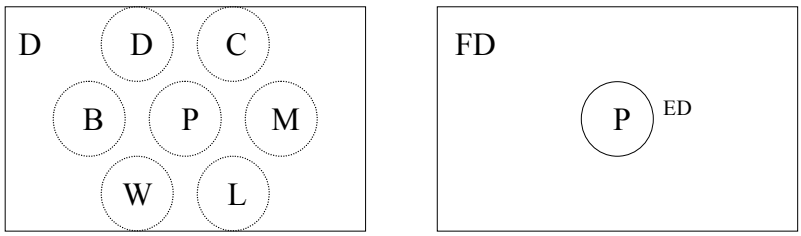
(28)



$\|panda^0\|$ $\|les\ panda\text{-}s\|$

The function of *les* is to offer the command [+def, +plu] (M-F, S-F) on the ideal panda and convert it into the conceptual pandas, converting D to D0. Thus, $\|les\ panda\text{-}s\|$ denotes fundamentally some specific individuals with pandaness in a part of the actual world.

(29)

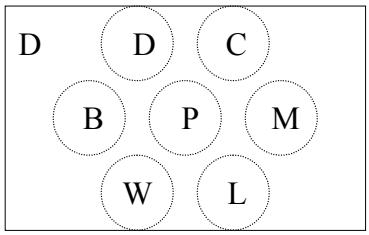


$\|panda^0\|$ $\|le\ panda\|$

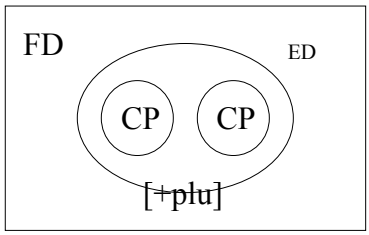
The function of *le* may realize in the exclusive force that determines the place of existence for $\|panda^0\|$ as ED ([+def], M-F) and carries out exclusive selection ([–sing], S-F), selecting the

ideal panda exclusively from ideal individuals across scales. Thus, ‖*le panda*‖ can denote all individuals with pandaness in the actual world indirectly as a result of the selection of the function-like entity of the ideal panda.

(30)



‖*panda*^{0}‖



‖*les panda-s*‖

In this case, the function of *les* is divided into *le* [+def, –sing] and *-s* [+plu]: the former is the exclusive force that determines the place of existence for ‖*panda*^{0}‖ as ED ([+def], M-F) and carries out exclusive selection ([–sing], S-F), whereas the latter the command [+plu] ([S-F]) on the ideal panda which has just been selected exclusively from ideal individuals across scales, converting the ideal panda to conceptual pandas. Thus, ‖*les panda-s*‖ can denote all individuals with pandaness in the actual world.

Let us compare the plural *-s* in French to that in English. The plural *-s* in French is, as we have seen, the agreement morpheme that appears as a result of the functional command by *-s* ([+plu]) in D on N^0 that always follows *le* ([+def, ø], [+def, ±sing]) to make up or strengthen the sub-function of *le*. It is now understandable why *pandas* (in French) does not work as an argument, much less a generic expression. The correspondence of *pandas* in English to *the pandas* in French, and the contrast between *the pandas* in English and *the pandas* in French are rather interesting phenomena from a comparative view point.

It is clear that this difference in the plural *-s* in the two languages comes from the difference in the intensional state of N in them. That is, the plural *-s* can be a determiner only if ‖N‖ is inclined to ‖N^+‖. If we try to apply the plural *-s* as a determiner to ‖N^0‖, it must involve the process to convert ‖N^0‖ to ‖N^+‖ before the conversion of ‖N^+‖ to conceptual individuals on a scale. However, the plural *-s* is not so powerful as to cover these two processes in contrast

to that *the* in English is powerful enough to do the conversion of $\|N^+\|$ to $\|N^0\|$, preceding its normal function as in (22). $\|N^+\|$, on the other hand, is the more concrete level of intension to compensate this weakness of the plural -*s*, being ready to converted conceptual individuals on a scale in a step, therefore it allows the plural -*s* as a determiner.

5. Conceptual System of Thematic Categories

In this section, I will put the focus on adjectives to draw the categorial features [±DEP]. We have assumed a dog called John in section 3 which is made up of a considerable number of properties of four types, physical-complex (PC), physical-simple (PS), conceptual-simple (CS) and conceptual-complex (CC): PC are hairs, a tail, and four legs, PS are brown, small, and fat, CS are clever, domestic and brave, CC are John likes bathing, John belongs to Mr. Smith, and John was born in New York. The PC properties are not only the components of John but also the composites that are decomposed into various properties, whereas the PS and CS properties cannot be the composites but only are the components of John, being physically or conceptually parasitic to John. The CC properties are, like the PC properties, not only the components of John but also the composites: a property that John likes bathing, for instance, is made up of John, bathing, and some static property that has held between John and bathing since a certain point of time, possibly, the time when John was born. Thus, the discussion so far is summarized as in (31)-(33):

(31) a. $\|$*John*$\|$= the unique set of properties on dog-scale (D_J)

b. $\|$*John*/PN$\|$= a unique set of properties on a scale ($X_{J/Y}$)

(32) a. $\|$*brown*$\|$= the property that cannot but be a component of D_J (D_J^{brown})

b. $\|$*brown*(/A)$\|$= the property that cannot but be a component of X_Y (X_Y^{brown})

(33)

form		~~connotation~~/intension		denotation/extension
John	(~~connote~~)	D_J	(denote)	$[\![D_J]\!]$
brown	(~~connote~~)	D_J^{brown}	(denote)	$[\![D_J^{brown}]\!]$

We have already seen the content in (31a, b) in section 3. In much the same way as we have formulated the intension of *John*, we can formulate the intension of *brown* as in (32a) by allocating the conceptual status of *brown* to the intension of *brown*. Strictly, however, the intension of *brown* cannot only be a component of the intension of *John*, so it is formulated generally as in (32b). The term "property" is used ambiguously between the extensional and the intensional levels here, therefore the intension of an adjective ($\|$*brown*/A$\|$= $X_Y^{property}$) is also called simple property. To be noticed in (33) is that there is no verb that corresponds to *denote* for intra-linguistic entities: *connote* cannot be the case since it is for the implication as the non-literal meaning. Now we have the common noun counterpart in (34)-(36):

(34) a. $\|dog^0\|$= the set of properties shared by all conceptual individuals on dog-scale (D^0, $D \subseteq D_{Y\text{-}i}$)

b. $\|CN^0\|$= the set of properties shared by all conceptual individuals on a scale (X^0, $X \subseteq X_{Y\text{-}i}$)

(35) a. $\|$*brown*$\|$= the property that is inherently parasitic to D^0 (D^{0brown})

b. $\|$*brown*(/A)$\|$= the property that is inherently parasitic to X^0 (X^{0brown})

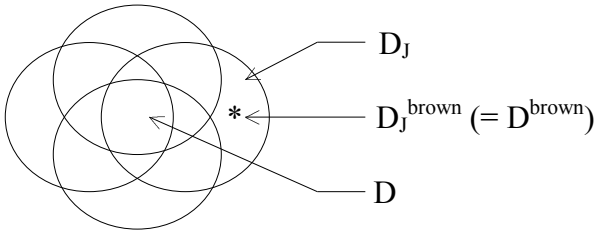
(36)

form		~~connotation~~/intension		denotation/extension
dog	(~~connote~~)	D	(denote)	$[\![D]\!]$= ø
brown	(~~connote~~)	D^{brown}	(denote)	$[\![D^{brown}]\!]$= ø

We have already seen the content in (34a, b) in section 3. Apparently, the intension of *brown* cannot be a component of that of *dog*, but some neutral degree of color property that is shared by all conceptual dogs should be. Thus, the intension of *brown* is formulated as in (35a): the intension of *brown* is continuous with the mean value of its color property among conceptual

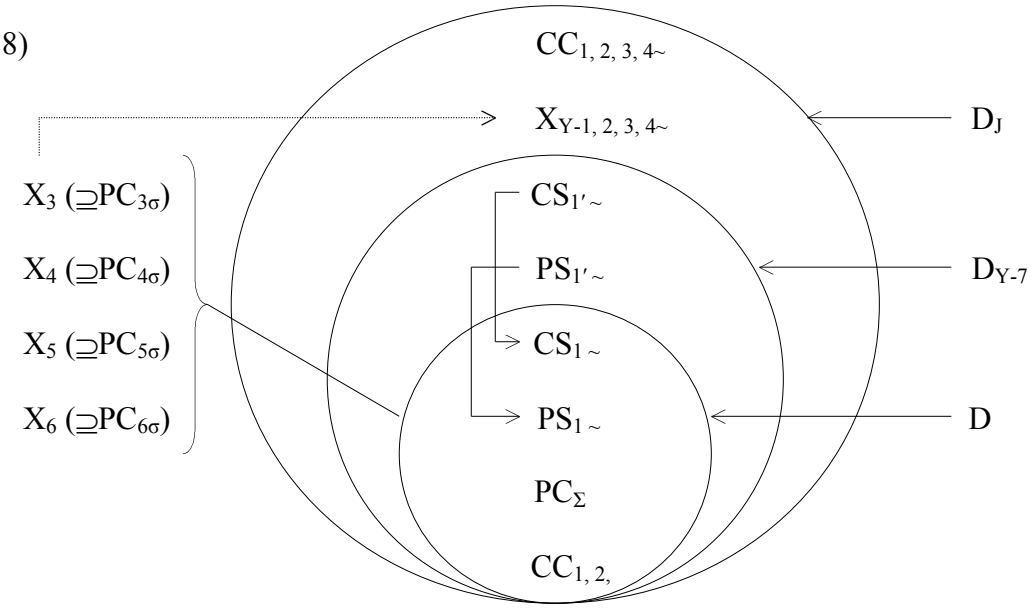
dogs which is confined in D with being parasitic to its physical basis. Exactly, however, the intension of *brown* cannot only be inherently parasitic to the intension of *dog*, therefore it is formulated generally as in (35b). What to be noticed in (36) is that neither *dog* nor *brown* has its extension (= denotation) as its exact semantic value as indicated by ø though it holds for any or all individual(s) with dogness or browness (see fn. 8). The relation among D_J, D and D_J^{brown} (= D^{brown}) is illustrated as in (37):

(37)



And then, the close internal structure of D_J is given as in (38):

(38)



PC_Σ is the top sum of the PC properties downwards ($PC_{3\sigma\sim}$). It is specified with various simple properties of the mean values among all conceptual dogs respectively ($PS_{1\sim,}$ $CS_{1\sim}$), and constitutes ideal dog D together with the complex properties which are habitual properties of the kind ($CC_{1, 2}$). Every simple property in D has its more specific degree of property in its outside ($PS_{1'\sim}$, $CS_{1'\sim}$). In the outside of D, there are many complex properties that constitute highly specific aspect to the conceptual dog D_J ($X_{Y\text{-}1, 2, 3, 4\sim}$, $CC_{3, 4\sim}$). An ideal individual X_3, for instance, is the idea tail T (= ‖*tail*‖) which is the set of properties shared by all conceptual

tails of all conceptual dogs. Notice that ‖*tail*‖ is confined in D, but a conceptual tail $T_{Y\text{-}3}$ (= e.g., ‖*a long tail*‖) is packed in the outside of D with such a conceptual individual $S_{Y\text{-}1}$ (= e.g., ‖*a scar (on the forehead)*‖) any degree of which cannot be found in D.

What is significant here is that the type of category correlates with the type of intension: the intensions of adjectives (and adverbs) are simple types, whereas those of noun phrases (and sentences) complex ones. The only difference between simple properties and complex ones is that simple properties have their mean values of properties among conceptual individuals on a scale confined in its ideal individual. To explicate the effect of this correlation, consider the examples in (39)-(41):

(39) a. the [clever $_{CS}$] dog

b. the [brown $_{PS}$] dog

(40) a. the [winning the race $_{CC\text{-}CS}$] dog (The dog [won/is wining the race $_{CC}$].)

b. the [bathing $_{CC\text{-}CS}$] dog (The dog [bathed/likes bathing $_{CC}$].)

(41) a. the [long-haired $_{PC\text{-}PS}$] dog (the dog [$_{PC}$ with long hair])

b. the [scarred $_{PC\text{-}PS}$] dog (the dog [$_{PC}$ with a scar])

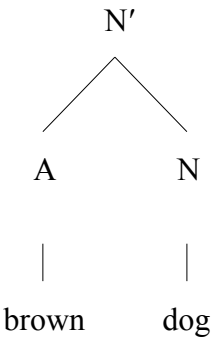
I may call specifically a type of prenominal modifiers as in (39) inherent adjectives, and those in (40)-(41) derived adjective. A simple property ‖*clever*‖ divides ‖*dog*‖ into the ‖*clever*‖-type and the ‖*non-clever*‖-type, whereas such a natural classification is impossible in a non-inherently simple property like ‖*winning the race*‖ though the intension of a derived adjective behaves as if it does ‖*dog*‖ in being positioned pronominally. Thus, (40a) does not mean the dog with the habit to win the race but mean the dog which happen to have such a behavior normally though it is still possible to find a tint of implication of the dog with the habit to win the race: as a matter of fact, there are no such a sub-kind of dogs as have the habit to win the race. This is the same in (40b) and (41b). On the other hand, (41a) means the dog with the habit to be long-haired, however.[13] Since the intension of a derived adjective thus behaves

as pseudo-simple properties, they are represented as CC/PC-CS/PS as in (40)-(41). Let us see an opposite case in (42):

(42) a man [of braveness $_{\text{CS-CC}}$] (an [brave $_{\text{CS}}$] man)

While *a brave man* means a member of a sub-kind of men who have the habit to be brave, *a man of brave* means a man who is associated to braveness rather exceptionally, implying that there are no such sub-kind of men as have the habit to be brave though there actually are. The inherent parasitism of a simple property to the ideal individual realizes syntactically as A's direct connecting to N as in (43):

(43)

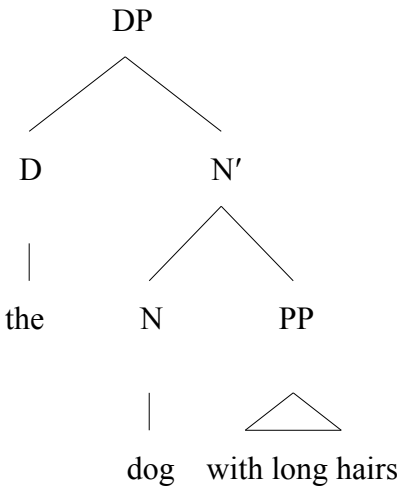


I call this the inherent dependency of A on N, and express it as [+DEP$_1$]. Thus, A and N are given the categorial features respectively as in (44):

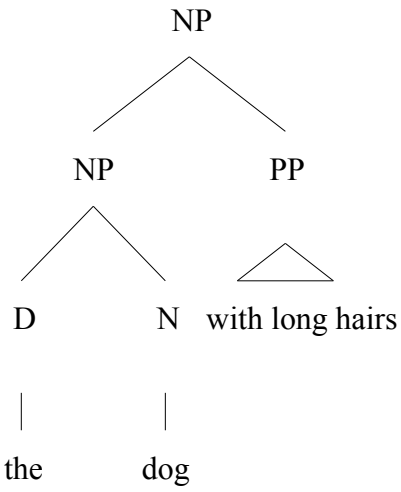
(44) A is [+DEP$_1$], and N is [−DEP$_1$]

Furthermore, this leads us to assume that the non-inherent parasitism of a complex property realizes syntactically as PP's indirect connecting to N as in (45b) rather than (45a):

(45) a.



b.



Such a correlation between the ontological status and the syntactic status brings us about the explanations for why proper nouns do not take any modifications (**brown John*, **John with long hair*s/*that likes bathing*) and why noun phrases only take postnominal modifications (**brown the dog*, *the dog with long hairs*/*that likes bathing*): the intension of a proper noun is the composite of all properties concerning (see D_J in (38)), whereas that of a noun phrase is not, excluding complex properties ($D_{Y\text{-}7}$ in (40)). Now it is possible to have the noun phrase counterpart as in (46)-(47) (see $D_{Y\text{-}7}$ in (38)):

(46) a. ‖*the dog*‖ = the minimally unique set of properties on dog-scale ($D_{Y\text{-}7}$)

b. ‖*the dog*/DP‖ = a minimally unique set of properties on dog-scale ($D_{Y\text{-}i}$)

(47) a. ‖*brown*‖ = the property that cannot but be a component of $D_{Y\text{-}7}$ ($D_{Y\text{-}7}^{brown}$)

b. ‖*brown*(/A)‖ = the property that cannot but be a component of $X_{Y\text{-}i}$ ($X_{Y\text{-}i}^{brown}$)

It is assumed that the intension of a noun phrase *the dog* is the ideal dog which completes the specification of the mean values of simple properties, although the specification is putative. The resulting value is exact, and something which is more than only zone value such as ‖*brown*‖ and ‖*small*‖. This means that the resulting entity is a conceptual dog. This putative specification is brought about indirectly as a result of the function of *the*, if not, the intension of *the dog* is absolutely unique, denoting always the same individual irrespective of contexts. Thus, the intension of *the dog* is formulated dually as in (46): (46a) is the formulation which considers the function of *the*, whereas (46b) is the one which only considers the ontological status of *the dog*: exactly speaking, (46a) only considers the general function of determiners, and hence it holds for noun phrase in general. The intension of a noun phrase (‖NP‖= $X_{Y\text{-}i}$) may be called, specifically, minimal conceptual individual, and that of *the dog* (‖*the dog*‖= $D_{Y\text{-}i}$) minimal conceptual dog since they do not include any complex properties which are highly conceptual individual/dog specific. Since the intension of *brown* cannot only be a component of that of *the dog*, it is formulated generally as in (46b).

6. More on Adjective

In this section, we will go more closely into the intensions of adjectives to supplement the discussion in the previous section. In accordance with the dual formulation of N in (16), A is also formulated dually as in (48):

(48) a-1. $\|brown^0\|$= the property that is inherently parasitic to x (x^{bronw})

a-2. $\|brown_{'}^0\|$= the property that cannot but be a component of X^0 (X^{0brown})

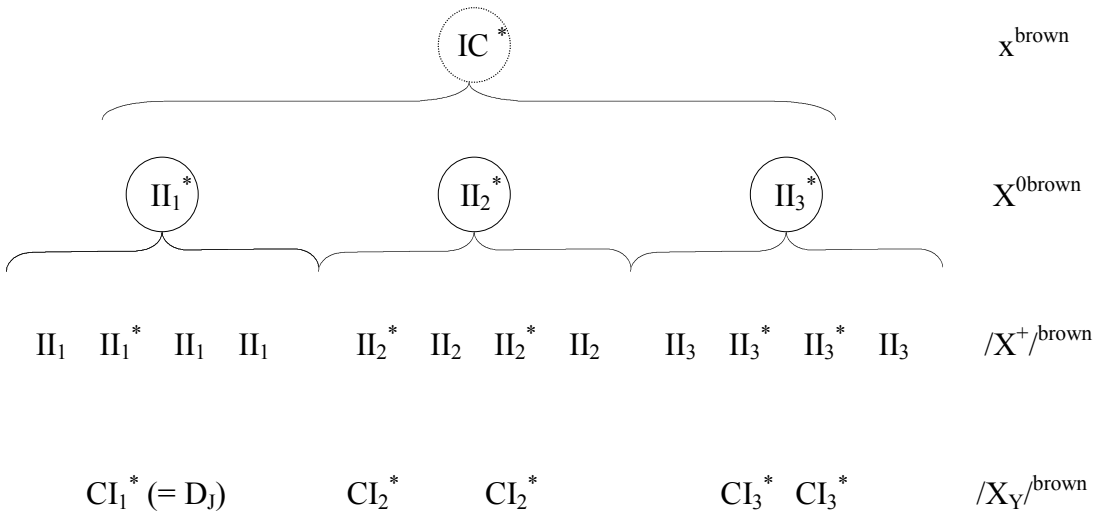
b-1. $\|brown^+\|$= the property that cannot but be the components of $/X_Y/$ ($/X_Y/^{brown}$)

b-2. $\|brown_{'}^+\|$= the property that is inherently parasitic to $/X^+/$ ($/X^+/^{brown}$)

(49) $\|\varnothing\|$= the set of properties shared by all ideal individuals across scales (x, $x \supseteq X$)

$\Rightarrow$ the individual concept

(50)



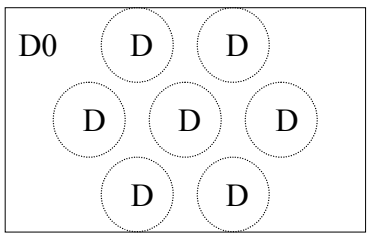
We have seen in the section 5 that the intension of *brown* cannot only be a component of the intensions of *John* (= D_J), and hence should be formulated based on a conceptual individual (= X_Y) as in (32b) in general. Exactly, however, the intension of *brown* must be formulated based on a subset of conceptual individuals across scales (= $/X_Y/$) as in (48b-1) in general. We have also seen in the section 5 that the intension of *brown* cannot only be inherently parasitic to the intension of *dog* (= D^0), and hence should be formulated based on an ideal individual (= X^0) as in (35b) in general. To be exact, however, the intension of *brown* must be formulated based on a subset of ideal individuals across scales (= $/X^+/$) as in (48b-2).

(48b-1) and (48b-2) are identical in their substance, and work as $\|A^+\|$-aspect of A.

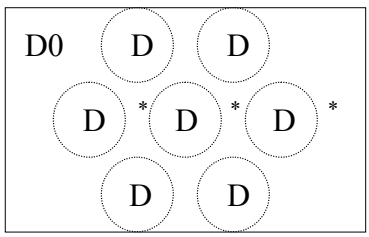
$\|A^0\|$-aspect of A is formulated by introducing the notion of individual concept (IC, x) that is formulated as in (49). The individual concept is the ultimate entity with individuality that is obtained inductively as the intersection of all ideal individuals across kinds, but without its linguistic form. With this ultimately abstract and neutral host that is expressed as x, we get the formulation of the intension of *brown* as in (48a-1). This x^{bronw} works as a component of X^0 by virtue of its being the subset of X^0, not a property of inherent parasitism to X^0 which is in the outside of X^0. Thus, we get the formulation as in (48a-2). Notice that what we have seen in (35b) rather corresponds to (48b-2), not (48a-2). (48a-1) and (48a-2) are identical in their substance, and work as $\|A^0\|$-aspect of A.

In accordance with N's being unstable between $\|N^0\|$ and $\|N^+\|$, A is also unstable between $\|A^0\|$ and $\|A^+\|$, and its state depends on N's state. Let us see what is happening in N^+-A^+ in (51) and N^0-A^0 in (52):

(51)



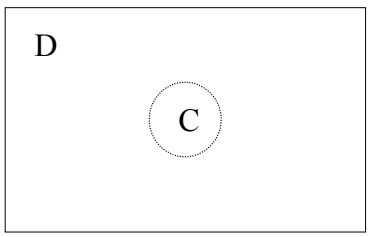
$\|dog^+\|$



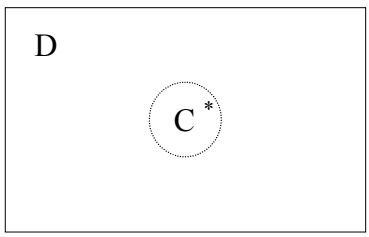
$\|brown^+\ dog^+\|$

Since $\|A^+\|$ is just a zone value which is not so exact as to select any specific conceptual individual, it has no force to resolve the quantificational indeterminacy [+Q] of $\|N^+\|$ only to reduce the set $\|N^+\|$ with its thematic force.

(52)



$\|chien^0\|$



$\|chien^0\ brun^0\|$

Since $\|A^0\|$ is purely abstract notion which relies its existence on the individual concept, it

has no force to resolve the quantificational indeterminacy [+Q] of $\|N^0\|$ only to strengthen the notion $\|N^0\|$ with its thematic force.

In concluding this section, I will mention to [−Q] of A (see section 2). I have mentioned in section 2 that [+Q] is drawn from [−DEP_1] (N, V), whereas [−Q] from [+DEP_1] (A, Adv). That N is [+Q] means that ‖N‖ needs specification in the place and the number of existence, and this is to say that ‖N‖ needs II-MCI conversion (except in some generic readings): ‖N‖ needs be converted from II (ideal individual)-level to MCI-(minimal conceptual individual)-level to obtain minimum uniqueness. Clearly, this property of N comes from [−DEP_1] which implies that the intension of N is the place of accumulation of properties. That A is [−Q] means that ‖A‖ needs no specification in the place and the number of existence, and this is to say that ‖A‖ needs no II-MCI conversion: ‖N‖ need not be converted from II-level to MCI-level as we can see from the illustration in (52) where $/X^+/^{brown}$ is identical to $/X_Y/^{brown}$, and is continuously related to X^{0brown} which is identical to x^{brown}. It is clear that this property of A comes from [+DEP_1] that implies that the intension of A is not the place of accumulation of properties, but a simple properties that only participate in the accumulation of properties.

References

Abney, Steven, P. (1987) The English Noun Phrase in its Sentential Aspect, Doctoral dissertation, MIT.

Chomsky, Noam (1981) Lectures on Government and Binding, Foris, Dordrecht.

Chomsky, Noam (1986) Barriers, Linguistic Inquiry Monograph 13, MIT Press, Cambridge, MA.

Chomsky, Noam (1995) The Minimalist Program, Current Studies in Linguistics 28, MIT Press, Cambridge, MA.

Frege, Gottlob (1892) "Über Sinn und Bedeutung," Zeitschrift für Philosophie und philosophisches Kritik, vol. 100, 25-50.
[Translated in Translations from the Philosophical Wrttings of Gottlob Frege, ed. by Peter Geach and Max Black, 1952, 56-78, Basil Blackwell, Oxford.]

Krifka, M., Pelletier, F. J., Carlson, G. N., ter Meulen, A., Link, G., and Chierchia, G. (1995) "Genericity: An Introduction," The Generic Book, ed. by Gregory N. Carlson and Fransis Jeffry Pelletier, 1-124, The University Chicago Press, Chicago.

Montague, Richard (1973) "The Proper Treatment of Quantification in Ordinary English," Approaches to Natural Language, ed. by K. J. J. Hintikka, J. M. E. Moravcsik, and P. Suppes, 221-242, Reidel, Dordrecht.
[Reprented in Formal Philosophy: Selected Papers if Richard Montague, ed. by Richmond H. Thomason, 1974, 425-434, Yale University Press, New Heaven.

Yoshida, Seiji (1984) Henkei Togoron: Chomsky Kakudai Hyoujyun Riron Kaisetsu, Kenkyusha, Tokyo. [Japanese Translation from Transformational Syntax: A Student Guide to Chomsky's Extended Standard Theory, by Andrew Radford, 1981, Combridge U. Press, Combridge.]

FOOTNOTES

[1] I do not refer to the apparent counterexamples (e.g., I consider him *author* of the book.) in this paper because of the space.

[2] As a result of this generalization, *many* which straddles between an adjectival element and a sort of determiner in the literature is analyzed in the framework here as a determiner.

[3] A and Adv can be the heads locally for such categories as Deg (e.g., very).

[4] Of course, the sub-functions of d and D may exclude each other between, say, *-s* and *a*.

[5] Under the framework here, there is no such category as AP since A is [–Q]. Since *very* is

an adjunct for A, *very fast* is A (see f.n.3).

[6] If we interpret "all conceptual dogs" as to include the conceptual dogs which are defective in some of the properties as in (17), say, the conceptual dogs with ‖*three legs*‖, the conceptual dogs with ‖*hairless*‖, and so on, the resulting set is the empty set. However, it is not the case that we set up the intension directly from the actual world as we can see from the fact that we have set up the intension of *John* from an individual which can only be supposed to exist. In the same vain, we can set up the intension of *dog* by neglecting a set of actual dogs which are defective in some way or other, say, the dogs with three legs, the dogs with no hair, and so on. That is, we can set up the intension of *dog* by neglecting the conceptual dogs which brings the resulting intension into the empty set, and hence "all conceptual dogs" should be interpreted weakly, excluding exceptions. I call this indirectionality of the intension, and it is clearly what includes fictionality. Thus, the intension does not completely overlap with the extension, and the level of world where the abstraction works which may result in allowing fictional entities or in neglecting entities which have their corresponding actual entities (= individuals). This might be because the intension should be open to be predictable and productive.

[7] The normal state in a language may change to the other state in some syntactic conditions.

[8] In the framework in Montague (1973), N is analyzed to denote the set.

[9] ‖*dogs*‖ may denote all individuals with dogness in the partial world if D0 of ‖*dogs*‖ has restrictions in some syntactic and lexical conditions such as *I saw dogs* where D0 of ‖*dogs*‖ is restricted to a partial domain by ‖*saw*‖.

[10] The intension of *the dog* (= ‖*the dog*‖) is the/a minimally unique set of properties, and this is also the/a conceptual dog (see 5.0 for the intension of D + N).

[11] It is not necessarily the case that *the* + N has the denotation as its exact value, and which value is meant varies depending on contexts. Also, *the* + N may denote a certain individual in the actual world if *the* + N is used to denote some fixed individual irrespective of contexts

(e.g., the statue of liberty).

[12] Notice that this conversion is in the opposite direction from the one we have seen in (23).

[13] I cannot go into the reason why ‖*long-haired*‖ can divide ‖*dog*‖ as a natural class into the two types in being a non-inherently simple properties, when ‖*big-mouthed*‖ cannot.