Possessor-Raising, Demonstrative-Raising, Quantifier-Float and Number-Float in Haida[1]

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ABSTRACT

There are various non-canonical positions for possessives, demonstratives, quantifiers and noun-modifying numbers in Haida. Their diversity in a language without case marking or agreement is of comparative and theoretical interest. We show how a flexible, lexicalist grammar formalism that works only with phonetically-realized string-adjacent syntactic types—Combinatory Categorial Grammar (CCG)—can support a simple account of Haida discontinuities. CCG obeys a tight, compositional relation between syntax and semantics while providing a flexible notion of surface structure that we exploit for Haida word order. We show that a small inventory of lexical categories in combination with CCG's rules supports the discontinuities we discuss, while also accounting for a bracketing paradox that would require considerably more effort in a phrase-structural approach. Our analysis reveals Haida's discontinuities as a spectrum of increasing opacity— *simple*, *adverbial*, and *anaphoric*—with respect to the relation between form and meaning.

[KEYWORDS: Haida, categorial grammar, possessor raising, demonstrative raising, quantifier float]

1. Introduction. The discontinuous expression of noun-phrase meanings is a rich area of investigation in Haida, a moribund language of the Northwest Coast. There was formerly a chain of four Haida dialects extending from Prince of Wales and Dall Islands in Alaska to the south end of the Queen Charlotte archipelago in British Columbia. The southernmost dialect has been extinct for over a century; the other three—Alaskan or Kaigani, Masset and Skidegate (Swanton 1901, 1908)—survive, but probably no further serious work on the language is possible. This paper draws on Masset and Alaskan data collected by the first author during 25 years of fieldwork; Masset examples are marked (M) and Skidegate examples (S) (Enrico 2003, 2005). We analyze Haida noun phrases in the framework of Combinatory Categorial Grammar (CCG) (Steedman 2000), which reveals Haida's discontinuities as a spectrum of increasing opacity— SIMPLE, ADVERBIAL, and ANAPHORIC—with respect to the relation between form and meaning. These three levels are described below:

Simple The simple type regards only canonical categories and a transparent relationship between form and meaning. Discontinuity here is trivial and can be illustrated with Hale's (1983) well known Warlpiri example:[2]

(1) *wawirri ka ngarrka-ngku panti-rni yalumpu*

kangaroo-ABS AUX man-ERG spear-NONPAST that-ABS

'The man is spearing that kangaroo.'

Adverbial This somewhat less transparent type involves mediation of the verb to maintain the relation between the separated noun phrase components. The dislocated material behaves syntactically as an adverbial, as with *all* in *The girls still all know the answer.*

Anaphoric This least transparent type regards dependencies in which there is no possibility of syntactic binding between the separated components, illustrated by the following French example:

(2) *Jean aurait tous aimé oser les rencontrer*

John would.have all like dare them meet

'John would have liked to dare to meet all of them. (Sportiche (1988))'

The category of *tous* here does not syntactically bind the pronoun *les*. The clitic pronoun *les* must satisfy the object subcategorization requirement of *rencontrer* before *tous* may combine with either *les* (simple discontinuity) or *rencontrer* (adverbial discontinuity). For such cases, we propose that the semantics of *tous* contains an underspecified entity argument that is anaphorically identified with *les*.

Our hope is that others will find our perspective on discontinuity intriguing enough to add other languages to the picture and that eventually systemic or functional reasons why the second and third kinds are tolerated will become clear—we assume that they are less efficient and perhaps less reliable ways of conveying meaning than the first kind.

2. Combinatory Categorial Grammar. Explaining our spectrum of discontinuity requires a brief introduction to CCG (see Steedman 1996; 2000 and Steedman and Baldridge [to appear] for more extensive introductions to CCG). We assume that readers are familiar with the basic characteristics of categorial grammars: (1) they are theories of truth-functional meaning; (2) the set of syntactic categories is open-ended, due to their recursive definition as functions on a small set of atomic categories (such as s and np); (3) the structures of meanings ideally parallel those of syntax; (4) the combination of words is basically functional application and simultaneously combines meanings, accounting for compositionality. The basic Ajdukiewicz-Bar-Hillel (AB) system given in Bar-Hillel (1953) has just two rules of function application that are directional variants of each other. Their syntactic and semantic reflexes are defined standardly as follows:

(3) *Function Application*

- *Forward*: $\mathsf{X}/_{\star}\mathsf{Y} : f \quad \mathsf{Y} : a \;\Rightarrow\; \mathsf{X} : fa$ (>)

- *Backward*: $\mathsf{Y} : a \quad \mathsf{X}\backslash_{\star}\mathsf{Y} : f \;\Rightarrow\; \mathsf{X} : fa$ (<)

$\mathsf{X}/_{\star}\mathsf{Y}$ and Y are variables referring to categories such as $\mathsf{s}/_{\star}\mathsf{np}$ and np; f and a are variables referring to logical forms like $\lambda x.\mathbf{walk}(x)$ and **bill**, with fa indicating the application of function f to argument a, e.g. $(\lambda x.\mathbf{walk}(x))\mathbf{bill}$, which reduces to $\mathbf{walk}(\mathbf{bill})$. The main slash in functional categories has the result category on the left and the argument category on the right. The rules of function application ensure that a rightward slash finds its argument to the right and that a leftward slash finds its to the left. So the category for English relative pronoun like *whom* $(\mathsf{n}\backslash\mathsf{n})/(\mathsf{s}/\mathsf{np})$, for example, looks to the right for a complex category s/np that needs a noun phrase on the right to produce a sentence; if there is such a category present, they combine to produce a post-nominal modifier $\mathsf{n}\backslash\mathsf{n}$.

A system with just these rules has some limitations. For example, it does not easily account for object extractions such as *the man whom I thought that Ed saw*. Nonetheless, the categorial strategy of eschewing language specific syntactic rules and providing compositionality is so attractive that various ways of extending the AB system have been developed. CCG is one form of categorial grammar that extends the AB system with a small set of additional universal rules of category combination that are based on the composition and type-raising operators of combinatory logic (Curry and Feys 1958). These

rules are stated as follows, using the multimodal formulation of CCG (Baldridge 2002, Baldridge and Kruijff 2003, and Steedman and Baldridge [to appear]):[3]

(4) *Harmonic (Order-Preserving) Composition*

- *Forward*: $\mathsf{X}/_{\diamond}\mathsf{Y} : f \quad \mathsf{Y}/_{\diamond}\mathsf{Z} : g \quad \Rightarrow_{\mathbf{B}} \quad \mathsf{X}/_{\diamond}\mathsf{Z} : \lambda x.f(gx)$ (>**B**)

- *Backward*: $\mathsf{Y}\backslash_{\diamond}\mathsf{Z} : g \quad \mathsf{X}\backslash_{\diamond}\mathsf{Y} : f \quad \Rightarrow_{\mathbf{B}} \quad \mathsf{X}\backslash_{\diamond}\mathsf{Z} : \lambda x.f(gx)$ (<**B**)

(5) *Crossed (Permutation-Inducing) Composition*

- *Forward*: $\mathsf{X}/_{\times}\mathsf{Y} : f \quad \mathsf{Y}\backslash_{\times}\mathsf{Z} : g \quad \Rightarrow_{\mathbf{B}} \quad \mathsf{X}\backslash_{\times}\mathsf{Z} : \lambda x.f(g\ x)$ (>**B**$_{\times}$)

- *Backward*: $\mathsf{Y}/_{\times}\mathsf{Z} : g \quad \mathsf{X}\backslash_{\times}\mathsf{Y} : f \quad \Rightarrow_{\mathbf{B}} \quad \mathsf{X}/_{\times}\mathsf{Z} : \lambda x.f(g\ x)$ (<**B**$_{\times}$)

(6) *Type-Raising*[4]

- *Forward*: $\mathsf{X} : a \quad \Rightarrow_{\mathbf{T}} \quad \mathsf{Y}/_{i}(\mathsf{Y}\backslash_{i}\mathsf{X}) : \lambda P.Pa$ (>**T**)

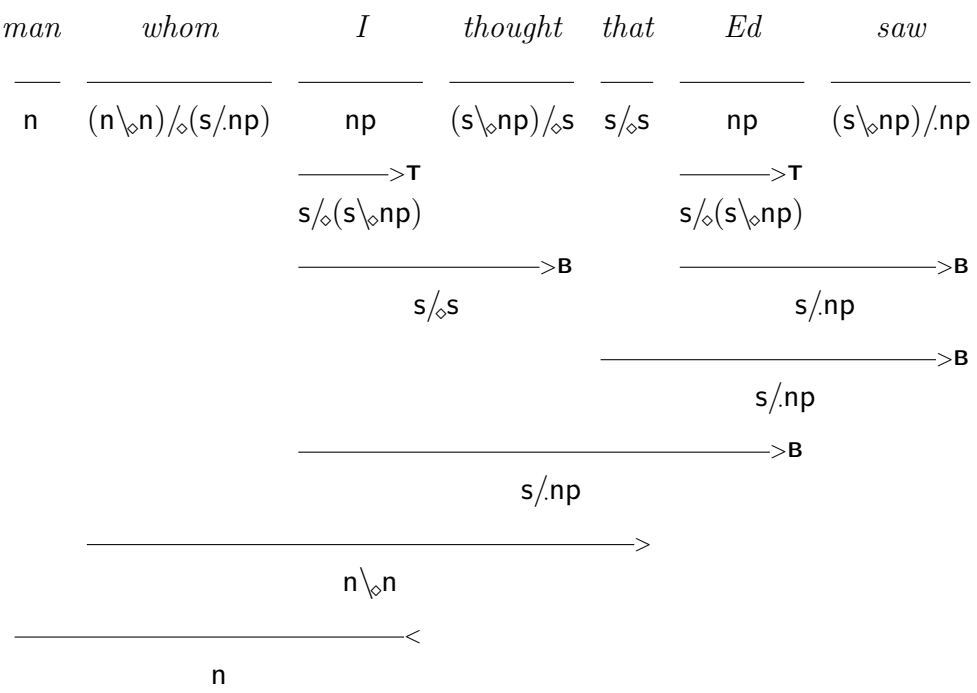
- *Backward*: $\mathsf{X} : a \quad \Rightarrow_{\mathbf{T}} \quad \mathsf{Y}\backslash_{i}(\mathsf{Y}/_{i}\mathsf{X}) : \lambda P.Pa$ (<**T**)

The symbols to the right of these rules are labels that indicate the use of the rule in derivations: $>$ for forward rules, $<$ for backward rules, **B** for composition (with $\times$ for crossed rules), and **T** for type-raising. The modality subscripts on the slashes provide a typing of the slashes such that categories may be lexically restricted to be used only by some subset of the rules. Briefly: $\star$ allows only function application; $\diamond$ allows function application

and harmonic composition; $\times$ allows function application and crossed composition; and $\cdot$ allows all rules.[5] See Steedman and Baldridge (to appear) for further explanation and motivation.

The additional rules provide a straightforward analysis of unbounded object extraction:

(7)



Note that the noun phrase object argument of *saw* is passed up through successive composition steps until it is revealed to the relative pronoun. This establishes the correct semantic dependency of *man* as the object of *saw* in logical form.

The crossed composition rules support analyses of long-distance discontinuities, such as that between *wawirri* and *yalumpu* in the Warlpiri example (1):[6]

(8)

wawirri	*ka*	*ngarrka-ngku*	*panti-rni*	*yalumpu*
kangaroo-ABS	AUX	man-ERG	spear-NONPAST	that-ABS
np_{abs}	ip/vp	np_{erg}	$(vp\|np_{erg})\|np_{abs}$	$np_{abs}\backslash np_{abs}$
		$vp/(vp\backslash np_{erg})$ (>T)	$(vp\|np_{erg})\backslash np_{abs}$ (>B×)	
		$vp\backslash np_{abs}$ (>B×)		
	$ip\backslash np_{abs}$ (>B×)			
ip (<)				

In addition to being a formalism, CCG also encompasses a number of explicit principles that form the core of a linguistic theory based on the formalism. One of the most significant of these is the Principle of Head Categorial Uniqueness (Steedman 2000):

(9) A single non-disjunctive category for the head of a construction specifies both canonical and non-canonical, bounded and unbounded syntactic dependencies.

This has two important consequences. First, if one initially focuses on canonical bounded constructions (simple clauses), then the combination rules should automatically extend the categories found there to non-canonical and unbounded constructions. One picks out canonical constructions by the usual criteria—they are the earliest learned and the most type-frequent. Second, the category inventory is restricted. To account for grammatical patterns, one could in principle just add new categories as necessary to account

for non-canonical constructions like extractions (though in practice one soon runs into proliferating problems trying to do so – see Baldridge (2002) for a discussion).

Minimizing the number of categories generally improves the explanatory power of analyses based on the theory. The unbounded construction (object extraction) in (7) is also an example of a non-canonical one, since the canonical English transitive verb is $(\mathsf{s}\backslash\mathsf{np})/\mathsf{np}$ "combine first to the right with a noun phrase to give something that combines to the left with a noun phrase to give a sentence." In order for this argument for basic $(\mathsf{s}\backslash\mathsf{np})/\mathsf{np}$ to go through, we have to show that *The purse, Bob grabbed* is less canonical than the above, that it is learned late, for example. Native speakers take this to be obvious. There are many languages, however, like Turkish, Latin, or Haida, in which assuming just one canonical order of verb arguments appears to be misguided. Hoffman (1995) proposed that verb arguments in these cases be given as unordered sets, e.g. the Turkish transitive verb category would be $\mathsf{s}\{\backslash\mathsf{np}_{nom}, \backslash\mathsf{np}_{acc}\}$, accounting for truth-functionally equivalent SOV and OSV. Hoffman's formulation, however, has greater generative power than CCG. Baldridge (2002) revises Hoffman's system to permit set categories for local scrambling while maintaining the same generative capacity as standard CCG.

In this paper, we use set categories to account for such local word order variations,

such as SOV and OSV, in Haida. However, we will display the appropriate standard CCG categories and derivations to improve readability, as will be made clear in the next section.

3. Haida canonical categories and interpretations with simple examples.

3.1. Basic categories. The basic categories are n 'common noun', which we take to denote a kind (e) rather than a predicate $<e,t>$, np 'noun phrase', which denotes a particular singular or plural individual (e again, so that we need to sort e but will not do so in this paper), pp 'postposition phrase',[7] vp 'uninflected clause', usually infinitival, ip 'inflected clause', and cp 'clause with an initial distinguished position behaving in the ways described as "focused."' The labels vp, ip, cp splitting up basic s (denoting t) derive from standard generative grammar—see Baldridge (2002) for more discussion of this connection and for how these categories may be encoded in a typed feature hierarchy as is common in modern Head Driven Phrase Structure grammar (Sag *et al.* 2003). As far as possible, we will confine morphology to the lexicon, so that we will not deal with the suffixal difference between vp and ip in this paper.

Noun phrases in Haida are not automatically generalized quantifiers. Rather, quantifiers generally take definite nouns like *rud-aay* 'box-the', *tllw-aay* 'canoe-the' (with category np) as complements. This does not mean there are no generalized quantifiers in

the language—there are some proportional quantifiers resulting in generalized quantifiers (see the next section). Only Haida nouns denoting humans and higher animals are count nouns that may be referred to with the third-person pronoun. The rest are mass nouns requiring classifiers for enumeration (Chierchia 1998) and having no dedicated anaphor. Plurals can be created without classifiers, which are required only with number stems. The reader should keep in mind than inanimate nouns like *dajing* (S) 'hat(s)' are unspecified for number.

Pronoun subjects and objects are normally clitics and at the same time are case-marked, so that they are type-raised noun phrases (Steedman 2000) like $\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np})$, $(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np},\backslash\mathsf{np})$.

3.2. Functional categories. Haida clauses are rigidly verb-final. The following examples are sentences that are free of discontinuities: a basic transitive clause (10), an intransitive clause with an adjoined prepositional phrase (11), and a clause with an infinitival complement (12).[8,9]

(10) *Bill gyùudanee sdasgiid-an.*

Bill horse.the kick-PA

'Bill kicked the horse.' (M)

(11) *daangaa tiidanee xidgu xaay q'ada-ang.*

your bed.the under dog.the sleep-PR

'The dog is sleeping under your bed.' (M)

(12) *dangra xawaay k'udgudang-aay-gi dii gudang-ga.*

your coffee.the taste-INFIN-P I want-PR

'I want to taste your coffee.' (S)

(10) can also be expressed with the noun phrases permuted: *gyùudan-ee Bill sdasgiid-an.* Transitive verbs such as *sdasgiidan* thus have a *single* set category that covers both orders: $\mathsf{ip}\{\backslash\mathsf{np}^{\mathsf{s}}, \backslash\mathsf{np}^{\mathsf{o}}\} : \lambda\{x, y\}.\mathbf{kick}(x, y)$. However, in order to simplify notation in derivations, we will use whichever of the two standard CCG categories is appropriate for the observed order, as in the following example derivations:[10]

(13)

Bill	*gyùudanee*	*sdasgiidan*
$\mathsf{np} : \mathbf{bill}$	$\mathsf{np} : \mathbf{the.horse}$	$(\mathsf{ip}\backslash\mathsf{np})\backslash\mathsf{np} : \lambda x\lambda y.\mathbf{kick}(y, x)$
	$\mathsf{ip}\backslash\mathsf{np} : \lambda y.\mathbf{kick}(y, \mathbf{the.horse})$ <	
$\mathsf{ip} : \mathbf{kick}(\mathbf{bill}, \mathbf{the.horse})$ <		

(14)

gyùudanee	*Bill*	*sdasgiidan*
np : **the.horse**	np : **bill**	(ip\np)\np : $\lambda x \lambda y.\mathbf{kick}(x, y)$
	ip\np : $\lambda y.\mathbf{kick}(\mathbf{bill}, y)$	<
ip : **kick**(**bill**, **the.horse**)		<

The Haida maximal noun phrase consists of a possessive or demonstrative phrase followed by a noun phrase followed by a lexical quantifier or measure. This description is recursive, so there can be initial sequences of possessives or demonstratives and final sequences of quantifiers. Noun phrases of increasing complexity are illustrated in the following examples from the Skidegate dialect.

(15) *dajing-aay*

hat-the

'the hat(s)'

(16) *7aasii dajing-aay*

this hat-the

'this hat'

(17) *7aaniis Bill gyaara dajing-aay*

this Bill POSS hat-the

'this hat of Bill's'

(18) *dajing-aay t'iiji*

hat-the some.of

'some of the hats'

(19) *s@balii-gaay tsi tleehll t'iiji*

flour-the CL five some.of

'some of each of five bags of the flour'

(20) *7aasgaay Bill gyaara s@balii-gaay tsi tleehll t'iiji*

this Bill POSS flour-the CL five some.of

'some of each of five bags of this flour of Bill's'

Because Haida demonstratives, possessives, and quantifiers combine with definite noun phrases rather than with nouns and this may be unfamiliar to the reader, we describe the semantics of definiteness and (later) how it is involved in the compositions mentioned in some detail. We assume that the meaning of the definite suffix corresponds extensionally to Link's operator σ, where σxPx picks out the supremum of all objects in context that belongs in the denotation of ${}^*P$, the plural predicate of P (Link 1983;1987):[11]

(21) $\sigma xPx := \iota x({}^*Px \wedge \forall y({}^*Py \rightarrow y \prod x))$

where ι is the description operator and $\prod$ is the individual part relation.[12] As an example,

definite *dajing-aay* is produced from *dajing* and *-aay* as follows:

(22)
$$\dfrac{\dfrac{\textit{dajing}}{\mathsf{n} : \lambda x.\mathbf{hat}(x)} \quad \dfrac{\textit{-aay}}{\mathsf{np}\backslash_{\star}\mathsf{n} : \lambda P.\sigma y P y}}{\mathsf{np} : \sigma y \mathbf{hat}(y)}\,<$$

The logical form $\sigma y\mathbf{hat}(y)$ admits individual members (e.g., a single hat) as well as individual sums of members (multiple hats), since *dajing-aay* is vague in this respect.

Inalienable possessives do not involve definiteness marking:

(23) *dii ʔawra*

my mother

'my mother'

(24) *'ll cyaay*

her arm

'her arm(s)'

(25) [*nang ʔiitl'xagidaa-s*] *jaara*

INDEF be.chief-PR wife

'the chief's wife' (lit. '[the one who is a chief]'s wife')

(26) *randl-aay jin*

river-the bank

'the river's/rivers' bank(s)'

Only alienable nouns are marked as definite, and an inalienably possessed noun is basically bare.[13] Inalienable nouns are distinct from alienable ones also in requiring a possessive. The inalienable possessive too is just a bare noun phrase (a pronominal possessive has objective case) before the possessed noun, which is either a part term or a kin term. We uncontroversially assume that inalienable possession consists syntactically and semantically of nouns which take possessors as arguments of certain culturally defined binary "inherent" or "natural" relations between entities, including at least part-of relations and kin relations if not others, e.g. *ʔawra* 'mother' is syntactically $\mathsf{np}\backslash\mathsf{np}$ and semantically (in its basic meaning) $\lambda x.\mathbf{female.who.gave.birth.to}(x)$.

Alienable possessives are illustrated in (27-29). To keep matters simple, we focus on just one of two morphologically distinct kinds of alienable possession (the other involves a possessive marker *gyaara* (S), *gyaa* (M)).

(27) *Mary-ra qigw-aay*

Mary-POSS basket-the

'Mary's basket(s)' (S)

(28) [*nang ʔiitl'xagidaa-s*]*-ra 'llna-gaay*

INDEF be.chief-PR-POSS town-the

'the chief's town(s)' (S)

(29) *dang-ra t'ask'y-aay*

you-POSS cane-the

'your cane(s)' (S)

Demonstratives, illustrated in (30-35), are very similar to alienable possessives: they are formed from a small set of deictic roots plus an open-ended set of locational phrases by adding certain suffixes (all examples from Skidegate):

(30) *ʔaa-niis tllw-aay*

here-DM canoe-the

'this one of the canoes'

(31) *ʔaa-s-gaay tllw-aay*

here-NOM-DM canoe-the

'these canoes'

(32) *ʔanaru-gaay k'aaw-aay*

last.year-DM herring.roe-the

'last year's herring roe"

(33) *sah-gaay tay dan-aay*

above-DM bed-the

'the upstairs beds' (noun 'above')

(34) *qayd-aay raduuxahl-sii tllg-aay*

tree-the around-DM ground-the

'the ground around the tree(s)"

(35) *tlaal-lng sira-sii raayaw-aay*

husband-own above-DM wave-the

'the waves above her husband"

The productive demonstrative-forming suffixes *-sii*, *-gaay* which combine with any locational phrase are $\lambda x \lambda y . \iota z(^*\mathbf{at}(z, x) \wedge \forall w(^*\mathbf{at}(w, x) \wedge w \prod y))$ for a locational noun phrase y and noun phrase x. Thus, the result is the supremum of all objects that are part of y[14] which are at the specified location x. For example, the following has *chair* as noun phrase x and *inside* as locational phrase y, meaning "the z that is the chair (or group of

chairs) that is (are) at the location indicated by *inside*":

(36) *naa-sii* *ruhlgaangw-ee*

inside-DM chair-the

'the chair(s) inside'

(37)

naa	*-sii*	*ruhlgaangw-ee*
$\mathsf{np} : \mathbf{inside}$	$(\mathsf{np}/\mathsf{np})\backslash_{\star}\mathsf{np} : \lambda x\lambda y.\iota z(^{*}\mathbf{at}(z,x) \wedge \forall w(^{*}\mathbf{at}(w,x) \wedge w \prod y))$	$\mathsf{np} : \sigma y\mathbf{chair}(y)$
	$\mathsf{np}/\mathsf{np} : \lambda y.\iota z(^{*}\mathbf{at}(z,\mathbf{inside}) \wedge \forall w(^{*}\mathbf{at}(w,\mathbf{inside}) \wedge w \prod y))$	
	$\mathsf{np} : \iota z(^{*}\mathbf{at}(z,\mathbf{inside}) \wedge \forall w(^{*}\mathbf{at}(w,\mathbf{inside}) \wedge w \prod \sigma y\mathbf{chair}(y)))$	

For readability, we abbreviate such expressions with an operator τ similar to Link's σ:

(38) $\tau x(Px, y) := \iota x(^{*}Px \wedge \forall z(^{*}Pz \wedge z \prod y))$

So, the logical form result of (37) would be represented as $\tau w(\mathbf{at}(w, \mathbf{inside}), \sigma y\mathbf{chair}(y))$.

A similar analysis holds for alienable possessives with a definite head. The fact that demonstratives and (usually) possessives require the definite suffix on the head noun has the functional explanation that picking out a set of objects by specifying a location or a possessor counts as sufficient for definiteness. Other internal or referential properties of a noun phrase can also be sufficient for the definiteness of its head, e.g., the head of a certain relative clause may be definite because of the content of the relative clause, and the English

noun *fact* must be definite when it occurs with a complement clause Lyons (1999).

The enumerative quantifiers ('many', 'few' and the numbers) are syntactically modifiers np\np (see (15-20) for illustrations). Haida has proportional quantifiers 'some', 'all,' but with the twist that they must combine with definite noun phrases (or generics in the case of 'all', which in Haida are just bare nouns) rather than with nouns as is the case for English.[15]

(39) *rud-ee/*rud t'iij q'aalaa-gang.*

box-the/*box some.of be.empty-PR

'Some of the boxes are empty.' (M, similarly in S)

(40) *rud-aay/ruda ʔwaa dluu xan q'aalaa-gang.*

box-the/box all be.empty-PR

'All of the boxes are empty.' (S; M requires the definite suffix)

(41) *k'aad ʔwaadluwaan q'an taa-gang.*

deer all grass eat-PR

'All deer/all kinds of deer eat grass.' (M, similarly in S)

See Haspelmath (1999) for the functional explanation of the behavior of definite marking here.

The typical assumption for quantifiers like *all* in English is that they have the following

category, where the noun argument is taken semantically as an argument (Montague 1973).

(42) $(\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}))/\mathsf{n} : \lambda P\lambda Q.\forall x(Px \rightarrow Qx)$

A similar category for Haida (just changing $/\mathsf{n}$ to $\backslash\mathsf{n}$) handles (41). However, for (39) and (40), the quantifiers must be able to take np arguments rather than n ones, which suggests the following categories and interpretations:

(43) *ʔwaadluwaan* $:= (\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}))\backslash\mathsf{np} : \lambda x\lambda Q.\forall y(y \in x \rightarrow Qy)$

(44) *t'iiji* $:= (\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}))\backslash\mathsf{np} : \lambda x\lambda Q.\exists y(y \subset x \wedge Qy)$

We will show in Section 4 that these proportional quantifiers in fact have the set category $\mathsf{ip}\{\backslash\mathsf{np}, /(\mathsf{ip}\backslash\mathsf{np})\}$. The following example illustrates the non-floated order:

(45)

rud-aay	*t'iiji*	*q'aalaagang*
box-the	some	are.empty
$\mathsf{np} : \sigma y\mathbf{box}(y)$	$(\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}))\backslash\mathsf{np} : \lambda z\lambda Q.\exists w(w \subset z \wedge Qw)$	$\mathsf{ip}\backslash\mathsf{np} : \lambda v.\mathbf{be.empty}(v)$
	$\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}) : \lambda Q.\exists w(w \subset \sigma y\mathbf{box}(y) \wedge Qw)$	
	$\mathsf{ip} : \exists w(w \subset \sigma y\mathbf{box}(y) \wedge \mathbf{be.empty}(w))$	

We are nearly in a position to discuss Haida noun phrase discontinuities, but we first discuss a syntactic bracketing paradox involving demonstratives and proportional

quantifiers that both presents a significant challenge for a phrase-structure analysis of the Haida canonical noun phrase and showcases the categories and rules that not only resolve this paradox but also extend naturally to an account of noun phrase discontinuities.

4. A bracketing paradox. Consider the following coordination data. Any demonstrative can be associated with a conjoined noun phrase, which it is able to distribute over semantically:[16]

(46) *giiniis* [*kíigs-gee ʔisgyaan cookies-gee*]*-.uu dang tla.àwhlaa-yaa?*

which cake-the and cookies-the-FOC you make-EVID

'Which cake and which cookies did you make?' (M)

(47) *ʔaasgaay* [*dajing-aay-ʔad hlk'idgi-gaay*] *quyaa-ga.*

these hat-the-and dress-the be.expensive-PR

'These hats and these dresses are expensive.' (S)

Similarly, a quantifier can distribute over conjoined material that precedes it, including over demonstrative-noun and demonstrative-noun, shown in (48).[17] Surprisingly, a demonstrative can distribute over the coordination of noun-quantifier and noun-quantifier, shown in (49).[18]

(48) [*ʔaasgee qigw-ee ʔisgyaan waasgee dajang-ee*] *t'iij hl xay-gan.*

these basket-the and those hat-the some.of I weave-PA

'I wove some of these baskets and some of those hats.' (M)

(49) *waasgee* [*kígs-gee t'iij* *ʔisgyaan cookies-gee ʔwaadluwaan*] *hl tla.àwhla-gan.*

those cake-the some.of and cookie-the all I make-PA

'I made some of those cakes and all of those cookies.' (M)

It is straightforward to see how the scope of the quantifier in sentences such as (48) is aligned with syntactic derivation. Consider the analysis of a non-coordinated sentence containing the demonstrative and the quantifier, e.g. *waasgee cookies-gee ʔwaadluwaan hl tla.àwhla-gan* 'I made all those cookies.' Assuming the categories and semantics given in the following derivation, the semantic scope of the quantifier can be directly obtained by first combining the demonstrative with the noun and then the quantifier with their result.

(50)

waasgee	*cookies-gee*	*ʔwaadluwaan*	*hl*	*tla.àwhlagan*
those	cookies-the	all	I	make-PA
$\mathsf{np/np}$	np	$(\mathsf{ip/(ip\backslash np))\backslash np}$	np	$\mathsf{(ip\backslash np)\backslash np}$
$: \lambda w.\sigma z(z{\subset}w \wedge \mathbf{at}(z,\mathbf{loc}))$	$: \sigma u\mathbf{cookies}(u)$	$: \lambda x\lambda Q.\forall y(y{\in}x \rightarrow Qy)$	$: \mathbf{I}$	$: \lambda s\lambda t.\mathbf{make}(s,t)$
$\mathsf{np} : \sigma z(z{\subset}\sigma u\mathbf{cookies}(u) \wedge \mathbf{at}(z,\mathbf{loc}))$				$\mathsf{ip\backslash np} : \lambda t.\mathbf{make}(\mathbf{I},t)$
$\mathsf{ip/(ip\backslash np)} : \lambda Q.\forall y(y{\in}\sigma z(z{\subset}\sigma u\mathbf{cookies}(u) \wedge \mathbf{at}(z,\mathbf{loc})) \rightarrow Qy)$				

$$\mathsf{ip} : \forall y(y{\in}\sigma z(z{\subset}\sigma u\mathbf{cookies}(u) \wedge \mathbf{at}(z,\mathbf{loc})) \rightarrow \mathbf{make}(\mathbf{I},y))$$

Examples like (48) are a straightforward extension of this involving simple coordination of

the two noun phrases before combination with the quantifier.

In contrast, the coordination in (49) requires the quantifiers to combine with their nouns *before* the demonstrative does, leading to a bracketing paradox (Williams 1981). The quantifiers are syntactically outscoped by the demonstrative, but they outscope the demonstrative semantically:

(51)

	SYNTAX	
waasgee	*kígs-gee*	*t'iij*
those	cake-the	some.of
	SEMANTICS	

Phrase structure approaches for dealing with this discrepancy would likely involve movement of the demonstrative out of the coordinands. Suppose one did try to rescue the proposed syntactic structure here by the usual strategy of having an abstract syntactic level at which the required structure existed, corresponding to a deformed structure at a less abstract level. Some form of syntactic distribution of the demonstrative at that abstract level would be needed, e.g:

(52) [[those$_i$ cakes] some.of] and [[t_i cookies] all.of]

→ those$_i$ [[[t_i cakes] some.of] and [[t_i cookies] all.of]]]

The second trace is base-generated. Assuming that a demonstrative modifier can somehow

be construed as a head, its movement would be motivated by the need to c-command the second trace. Unfortunately, this derivation is inadmissible for at least two reasons: first, it moves the demonstrative over the quantifier, which certainly has a better claim to head status than the demonstrative, and therefore violates the Head Movement Constraint (Travis 1984); second, the c-command of the trace by the demonstrative is not minimal, again because the quantifier intervenes.

While there are surely other proposals that could be entertained within the phrase structure tradtion, CCG comes already equipped to handle this paradox using exactly the same categories that are involved when the bracketing for syntax and semantics are parallel. The divergence is mitigated by type-raising the noun so that it becomes a function seeking the demonstrative (Moortgat 1988). Quantifiers may then compose with their (type-raised) noun arguments, maintaining the correct semantic scope before syntactically combining with the demonstrative, as seen below:[19]

(53)

waasgee	*cookies-gee*	*ʔwaadluwaan*
those	cookies-the	all
np/np	np	(ip/(ip\np))\np
$: \lambda w.\sigma z(z{\subset}w \wedge \mathbf{at}(z, \mathbf{loc}))$	$: \sigma u\mathbf{cookies}(u)$	$: \lambda x \lambda Q.\forall y(y{\in}x \rightarrow Qy)$
	np\(np/np) (<T)	
	$: \lambda S.S[\sigma u\mathbf{cookies}(u)]$	
	(ip/(ip\np))\(np/np) (<B)	
	$: \lambda T\,[[\lambda x \lambda Q.\forall y(y{\in}x \rightarrow Qy)]\,[[\lambda S.S\,[\sigma u\mathbf{cookies}(u)]]\,T]]$	
		$\lambda T\,[[\lambda x \lambda Q.\forall y(y{\in}x \rightarrow Qy)]\,[T\,[\sigma u\mathbf{cookies}(u)]]]$
		$\lambda T \lambda Q.\forall y(y \in T[\sigma u\mathbf{cookies}(u)]] \rightarrow Qy)$

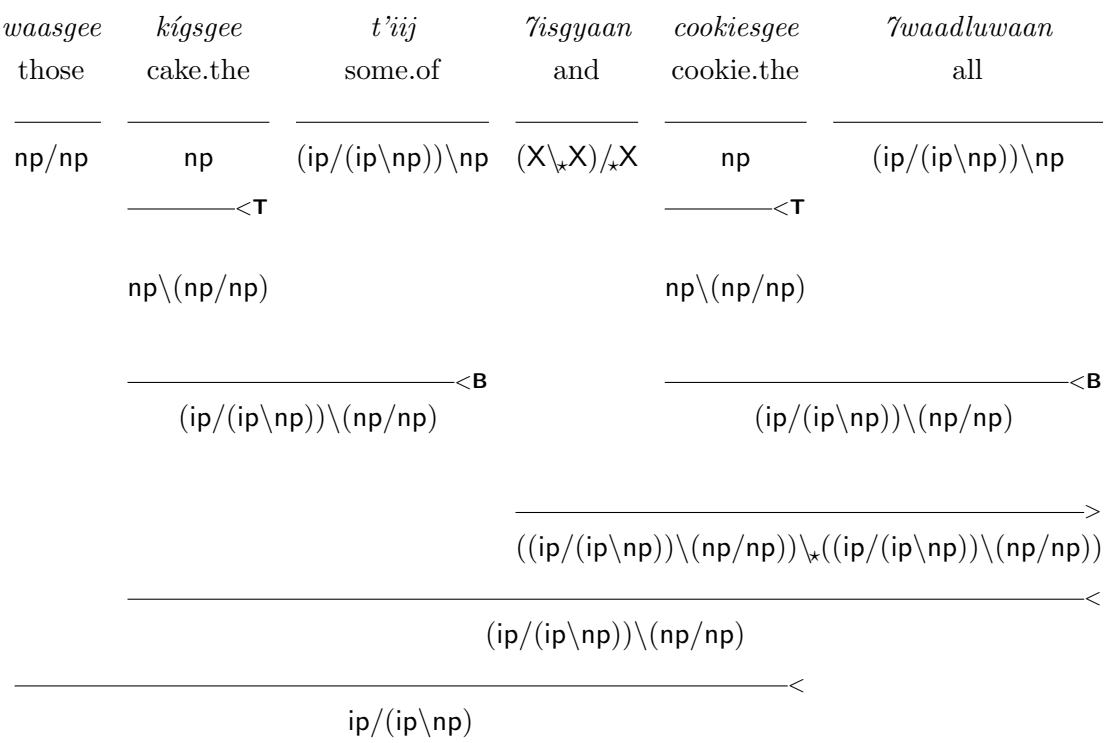
(<)

ip/(ip\np) : $\lambda Q.\forall y(y{\in}\sigma z(z{\subset}\sigma u\mathbf{cookies}(u) \wedge \mathbf{at}(z, \mathbf{loc})) \rightarrow Qy)$

Type-raising and composition guarantee the semantic consistency of the result. The correct scope is thus obtained, with the same category and semantics as derived in (50) for *waasgee cookiesgee ʔwaadluwaan*. The key thing to realize with this is that the same interpretation is reached for these derivations—both using exactly the same lexical categories—and that this is possible because the combinatory rules are semantically consistent.

Because of the availability of alternative derivations, noun-quantifier pairs can coordinate before combining with the demonstrative:[20]

(54)



This produces the desired generalized quantifier meaning for *both* coordinands. The same pattern of type-raising and composition used here furthermore opens the door for an account of discontinuities with demonstratives and alienable possessives. For the discontinuities, other constituents which are not part of the noun phrase slip in through CCG's non-order-preserving crossed composition rules.

5. Discontinuous quantifiers. Both enumerative quantifiers and proportional quantifiers may be separated from the noun phrase they belong to to the right. The following examples show enumerative quantifiers in their canonical (55,57) and displaced positions (56,58):

(55) *sraahlts'iid t'aw.aan* **t'awsun.a.a** *qiihlg-ee-riiga tl'a gi t'awskaal-aa-n.*

flicker feather one.each dish-the-into INDEF poke.in-EVID-PA

(56) *sraahlts'iid t'aw.aan qiihlg-ee-riiga* **t'awsun.a.a** *tl'a gi t'awskaal-aa-n.*

flicker feather dish-the-into one.each INDEF poke.in-EVID-PA

'They poked one flicker feather into each of the dishes (each dish received a feather).'

(M, Swanton (1908, p. 798))

(57) *sqaw hltan.uw-ee* **qwaan** *'lee-.ee qagii-gan.*

chicken feather-the lots him-P stick.to-PA

(58) *sqaw hltan.uw-ee 'lee-.ee* **qwaan** *qagii-gan.*

chicken feather-the him-P lots stick.to-PA

'Lots of chicken feathers stuck to him.' (M)

These are similar to the displaced Japanese numeral quantifiers (Kobuchi-Philip 2007):

(59) *san-nin-no gakusei-ga aruita.*

3-CL-no student-NOM walked

(60) *gakusei-ga san-nin aruita.*

student-NOM 3-CL walked

'Three students walked.'

The difference between Japanese and Haida for such examples is that (1) the canonical position of the enumerative quantifiers is on the left of the quantified NP for Japanese and the right for Haida and (2) the particle *no* (corresponding to the attributive form of the copula *da* (Kobuchi-Philip 2007)) is present only in the canonical Japanese sentence. It is possible in Haida to support both locations for enumerative quantifiers (e.g., (55) vs. (56)) with a single category, $\mathsf{np}\backslash\mathsf{np}$. The displacement of enumerative quantifiers arises straightforwardly in the CCG system, as shown in the following analysis for (55):[21]

(61)

sraahlts'iid t'aw.aan	*qiihlgeeriiga*	**t'awsun.a.a**	*tl'a*	*gi t'awskaalaan*
flicker feather	dish.the.into	one.each	they	poke.in-EVID-PA
np	pp	np\np	np	$((\mathsf{ip}\backslash\mathsf{pp}_{\mathsf{rii}})\backslash\mathsf{np}^{\circ})\backslash\mathsf{np}^{\mathsf{s}}$
	>T: ip/(ip\pp)		<: $(\mathsf{ip}\backslash\mathsf{pp}_{\mathsf{rii}})\backslash\mathsf{np}^{\circ}$	
		<B: $(\mathsf{ip}\backslash\mathsf{pp}_{\mathsf{rii}})\backslash\mathsf{np}^{\circ}$		
	>B×: ip\np°			
<: ip				

There are two main features of CCG that make this derivation possible. One is that backward composition (<**B**) allows the verb to combine with the quantifier before the quantifier has consumed its noun phrase argument. This then brings the verbal functor into string adjacent contact with the postpositional phrase *qiihlg-ee-riiga* that occurs between

the quantifier and its argument. The second is that forward type-raising (>**T**) and forward crossed composition (>$\mathbf{B}_\times$) then allow the displaced postpositional phrase to combine with the verbal functor. The remaining noun phrase can then be consumed straightforwardly through backward application, and its semantics is wrapped in the scope of that of the quantifier.

A similar strategy can be pursued if the intervening constituent is a sentential adjunct, such as the adverb *-ʔisan* 'too' in the following:

(62) *jaasang-ʔisan* **srwaansang** *tl'a* *kyah k'wii-ʔaaw-aa-n.*

own.sister-too one INDEF give.name-PL-EVID-PA

'They gave a name to their one sister too.' (M, Swanton (1908, p. 375))

(63)

jaasang	*-ʔisan*	*srwaansang*	*tl'a*	*kyah k'wiiwaʔaawaan.*
own.sister	too	one	they	give.name-PL-EVID-PA
np	(ip\np)/(ip\np)	np\np	np	(ip\np°)\np^s
			ip\np° (<)	
		ip\np° (<**B**)		
	ip\np° (>)			
ip (<)				

Proportional quantifiers too can be displaced to the right:

(64) *q'a.aay* *hawaan* **t'iij** *tl'a* *ʔihlii gyaa tluu-gwa.a* *ʔijaan*

harpoon.the still some they some poss canoe-aboard be-EVID-PA

gee-rahl-han.isan haw.isan 'laa tl'a *kinhlaawaan*

these-with-too again him they spear-EVID-PA

'Some of the harpoons that were still aboard the canoes of some people, they speared him with those too.' (M, Swanton (1908:659))

(65) *jaasalang-ʔisan* **7waadluwaan** *tl'a* *kyah k'wiiwa-ʔaaw-aa-n.*

own.sisters-too all INDEF give.name-PL-EVID-PA

'They gave names to all their sisters too.' (M)

We have already illustrated that quantifiers like *t'iij* (existential) and *ʔwaadluwaan* (universal) have the syntactic category $(\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}))\backslash\mathsf{np}$ (see derivation (50)). By assuming that the category $(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np})$ is also available for these quantifiers, such discontinuities are captured:

(66)

jaasalang	*-ʔisan*	*ʔwaadluwaan*	*tl'a*	*kyah k'wiiwaʔaawaan.*
own.sister	too	all	they	give.name-PL-EVID-PA
np	(ip\np)/(ip\np)	(ip\np)/(ip\np)	np	(ip\np°)\np^{s}
				ip\np° <
				ip\np >
				ip\np >
				ip <

In this case, the quantifier simply consumes its verbal argument before its nominal one.

The quantifier *ʔwaadluwaan* shows how verbal modification can create the necessary quantification in the semantics. It in fact is the standard category assumed for quantifiers (since at least Montague 1973),[22] except that its outermost argument is the verb phrase (ip\np) rather than the noun phrase np. That is to say, two alternative orders of combination with complements are possible for *ʔwaadluwaan* and *t'iij* and so they have the *single* set category ip{\np, /(ip\np)}.

It seems likely that the cross-linguistic tendency for numbers and generalized quantifiers to occur closer to the verb than to a nominal head (in other words, the tendency for quantifier and number floating), which in English and French requires these words to have additional adverbial and anaphoric categories, reflects a tendency to emphasize their

aspectual relevance. Evidence for this is that the most common floated quantifier mentioned in the literature on floated quantifiers is the perfective 'all,' which, as we'll see, floats even when that requires it to have a category that will not work in the noun phrase.

The examples considered so far consider local discontinuities that occur within the same matrix clause. We now turn to discontinuities with possessives and demonstratives to show how the grammar can be restricted as needed, and also how long-distance discontinuities fall out from the analysis presented thus far.

6. Discontinuous possessives and demonstratives. Some but not all Haida inalienable possessives can be dislocated. Part terms as in (67) and (68), but not kin terms as in (69), allow leftward separation of possessive arguments in the same way as the quantifiers discussed in the previous section.

(67) *tluu ra srwaana-7asing hlragilda-sda gicyaa7w-aay gist'a-gan-ii.*

canoe CL other-too Skidegate-from sail-the leave.shore-PA-TC

'The sail of another canoe too left shore from Skidegate.' (S, Swanton (1908:105)

(68) *sang7aay Bill huu.isan cyee st'i-gan.*

in.morning Bill again arm hurt-PA

'Bill's arm was hurting again this morning.' (M)

(69) **sang7aay Mary huu.isan 7aww st'igan*

in.morning Mary again mother sick

(for: 'Mary's mother was sick again this morning.' M)

Assigning such part terms the (obvious) category $\mathsf{np}\backslash\mathsf{np}$, like that of enumerative quantifiers, allows these examples to be derived similarly to (63). Permutation with kin terms can be blocked by giving them the restricted category $\mathsf{np}\backslash_{\star}\mathsf{np}$; the more restrictive slash disallows forward crossed composition, which would otherwise allow the adverb to intervene as in (63) (see Baldridge 2002).

These dislocated inalienable possessives appear to be focused. Part terms that are arguments of embedded clauses can also be separated from their possessor when the possessor is in marked or explicit matrix focus:

(70) *dii 7aww-.uu yaank'ii.an [sgwaay cilda-yee]-ga 'la gudang-gang.*

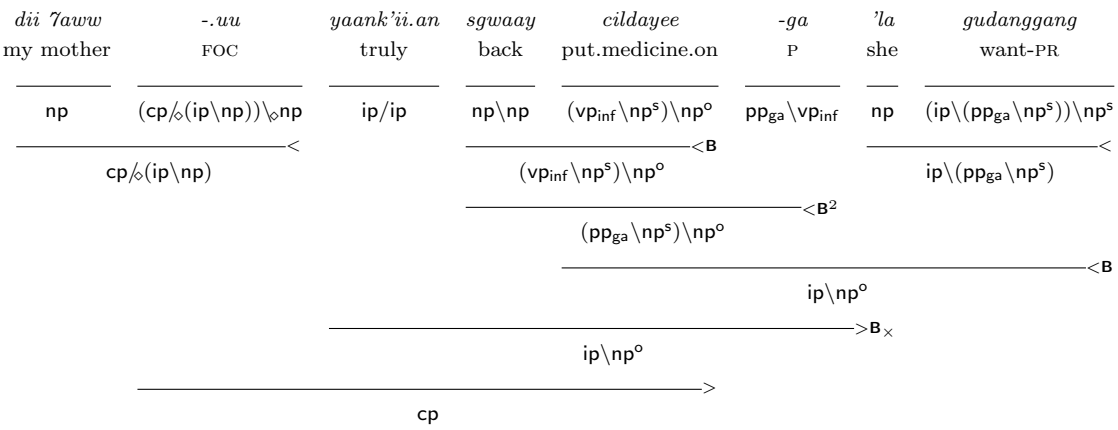
my mother-FOC truly back put.medicine.on-INFIN-P she want-PR

'It's my mother whose back it's true she wants to put medicine on.' (M)

The verb *gudanggang* 'want' has the subject control category $(\mathsf{ip}\backslash(\mathsf{pp}_{\mathsf{ga}}\backslash\mathsf{np}^{\mathsf{s}}))\backslash\mathsf{np}^{\mathsf{s}}$, and *cildayee* 'put.medicine.on' has the obvious transitive category. We need the category

$(\mathsf{cp}/_{\diamond}(\mathsf{ip}\backslash\mathsf{np}))\backslash_{\diamond}\mathsf{np}$ for the focusing particle *.uu*; otherwise, the derivation for this sentence falls out of the lexicon that has been constructed so far:[23]

(71)



The cp result type for the focus particle and the harmonic slashes for its arguments ensure that the focused noun phrase appears at the front of the sentence. This analysis is similar to a movement analysis in which the features of the focusing clitic are checked at Spec of CP (Baldridge 2002).

Sentences may have multiple discontinuities. The following example has a quantifier and a part term which have been separated from their mutual argument:

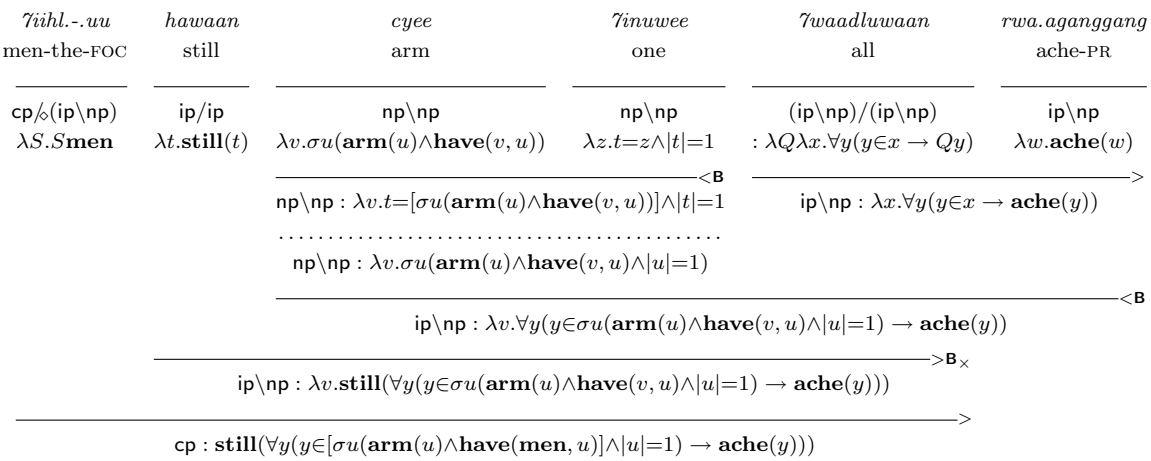
(72) *ʔiihlaants'adee-.uu hawaan* [*cyee ʔinuwee*] *ʔwaadluwaan rwa.agang-gang.*

men-the-FOC still arm one all ache-PR

'One arm of each of all the men is still aching.' (M)

The analysis utilizes the same categories proposed to handle previous examples:

(73)



As with previous examples showing semantics, the interpretation provided by this derivation is meant primarily to be suggestive and to show that the categories and their combinations deliver an interpretation with the correct basic dependencies.

Demonstratives and alienable possessives, which also canonically occur immediately before nouns (in this case taking them as arguments), may be separated from the latter—both to the left (75) or right (76-80) for possessives, to the left (74) for demonstratives:[24]

(74) *ʔadàahl-gee hawaan sablii-gee qaganaa-gang.*

yesterday-DM still bread-the be.left-PR

'There is still some of yesterday's bread.' (M)

(75) *'laangaa hawaan ʔaanàa k'ùudaats'-ee ʔiij-ang.*

her still in.next.room coat-the be-PR
'HER coat is still in the next room.' (M)

(76) *ʔaxad-aay-rii qaang-ra 'laa dannanan-s-ii gyaan ...*

net-the-P uncle-POSS he rip.up-PR-TC and ...
'He ripped up his uncle's net and ... (S, Swanton (1908:382))

(77) *raxaay-gi naara candies 'laa giida-gan.*

children.the-to my candies she give-PA
'She gave candies to my children.' (S)

(78) *raxaay q'uhlra naara candies 'laa ʔisdagan*

children.the near my candies she put
'She put the candies near my children.' (S)

(79) *raxaay.the singraay naara 'laa qyaangaagan*

children this morning my she saw
'She saw my children this morning.' (S)

(80) *qawk'al-ee-gu diinaa George taa-gaa?*

party.food-the-Q my George eat-EVID
'Did George eat my party food?' (M)

Here we focus on left and right separation of alienable possessives. The *-ra* possessives can

host only two of the many Haida clitics (the imperative and interrogative clitics, as it turns out (Enrico 2003:685); therefore, the leftward occurrence of the possessive in (75) is not marked with the focus clitic *.uu*. The leftmost position, however, is that of structural focus, and we have no examples of left-dislocated possessives that are not in that position.

When other material comes between a possessive and its argument, the category np/np assumed for alienable possessives is still sufficient. The analysis relies on the *same* process of type-raising the argument noun used for handling scope under coordination in (53), shown here for (75):

(81)

'laangaa	*hawaan*	*ʔaanàa*	*k'ùudaats'ee*	*ʔiij-ang*
her	still	in.next.room	coat-the	be-PR
cp/(ip\(np/np))	ip/ip	pp_{loc}	np	$(ip\backslash pp_{loc})\backslash np^{s}$
		>T: ip/(ip\pploc)	<T: np\(np/np)	
			<B: $(ip\backslash pp_{loc})\backslash(np^{s}/np)$	
		>B×: $ip\backslash(np^{s}/np)$		
	>B×: $ip\backslash(np^{s}/np)$			
>: cp				

At first glance, it would seem that rightward separation in (76-80) could be handled by generalizing the category for possessives to be np|np. This would allow a pronominal *-ra*

possessive to appear immediately after its noun phrase argument in the Skidegate dialect (82), but would incorrectly allow similar patterns in Masset (83) and (84):

(82) *raxaay naara-gi candies 'laa giida-gan.*

children.the my-to candies she give-PA
'She gave candies to my children.' (S)

(83) **ra.aay diinaa-ga candies 'la giida-gan.*

children.the my-to candies she give-PA
(for: 'She gave candies to my children.') (M)

(84) **dajangee diinaa ʔinggu gusrwaan-.uu 'la ʔisdagan*

hat.the my P one-FOC he put
(for: 'He put it on one of my hats.') (M)

Nor will the category $\mathsf{np}|\mathsf{np}$ work for examples like the (79) and (80) in which something intervenes between the noun and the possessive. Therefore rightward displaced possessives are adverbial elements having the category $(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np})$. To block the Masset examples in (83) and (84), we must assume that Masset postpositions have a category of the form $\mathsf{np}\backslash_{\star}\mathsf{np}$ that does not combine via functional composition (Baldridge 2002):

(85) *ra-.aay $[\text{diinaa}]_{(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np})}$ $[\text{ga}]_{\mathsf{np}_{\mathsf{ga}}\backslash_{\star}\mathsf{np}}$ $[\text{candies 'la giida-gan}]_{\mathsf{ip}\backslash\mathsf{np}}$.

(86) *dajangee [diinaa]$_{(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np})}$ [7inggu]$_{\mathsf{np}_{7\mathsf{inggu}}\backslash_\star\mathsf{np}}$ [gusrwaan-.uu]$_{\mathsf{cp}\diagup_\diamond(\mathsf{ip}\backslash\mathsf{np})\backslash_\diamond\mathsf{np}}$ 'la

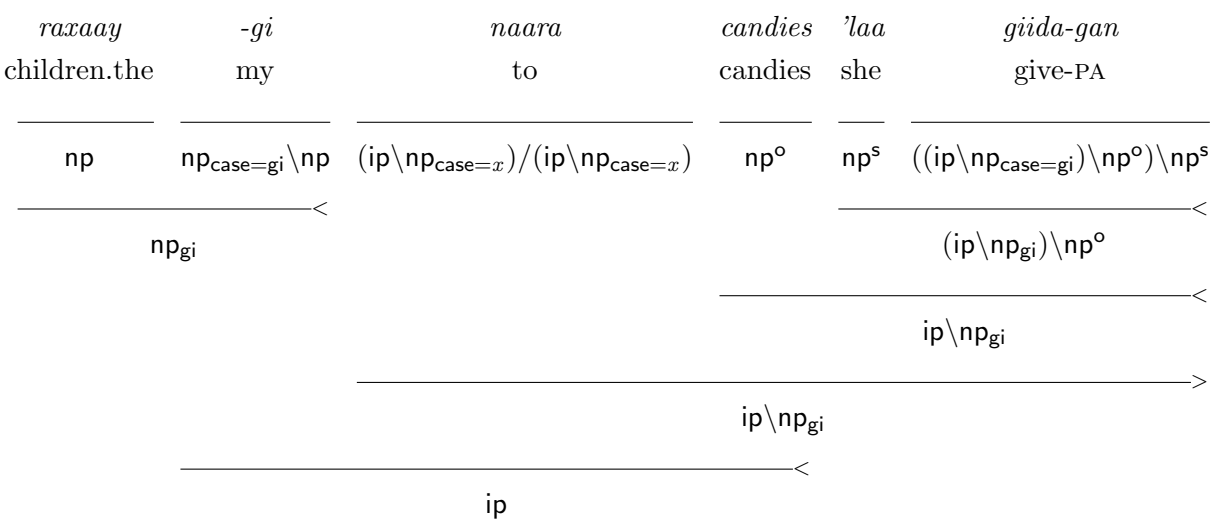
7isdagan

The $\star$ modality blocks composition of the verbal function with the postposition, making it impossible for *diinaa* to combine with the verb. In the case of (86), any derivation is further blocked by the fact that *gusrwaan-.uu* produces cp rather than ip (this captures an analysis in which noun phrases which are focused with particles like *.uu* occupying [Spec, CP].

Besides being necessary, this adverbial analysis is supported by these facts: (1) right-dislocated possessives in texts are invariably pronominal and by this analysis they share with clitic pronoun arguments an adverbial category—pronouns gravitate to the verb cross-linguistically, (2) we need adverbial categories for floated (dislocated) quantifiers in English and French anyway (see below).

Adverbial rightward displaced possessives combine with the verb and then consume their object:

(87)



It is even possible for both a postposition and a possessive to be dislocated:

(88) *ts'aanuwee-hl sang7aay rii diinaa sginanang*

firewood-IMP in.morning P my chop
'Chop my wood in the morning.'

This is handled by assuming that right dislocated postpositions also have an adverbial category; the postposition then may compose into the possessive and the result of their combination forward cross composes into the verb.

(89)

ts'aanuwee	*-hl*	*sang7aay*	*rii*	*diinaa*	*sginanang*
firewood	IMP	in.morning	P	my	chop
np	$(\mathsf{cp}\backslash\mathsf{np})/((\mathsf{ip}\backslash\mathsf{np})\backslash\mathsf{np}^{\mathsf{s}})$	ip/ip	$(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np}_{\mathsf{rii}})$	$(\mathsf{ip}\backslash\mathsf{np}_x)/(\mathsf{ip}\backslash\mathsf{np}_x)$	$(\mathsf{ip}\backslash\mathsf{np}_{\mathsf{rii}})\backslash\mathsf{np}^{\mathsf{s}}$
			>B		
			$(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np}_{\mathsf{rii}})$		
			>B×		
			$(\mathsf{ip}\backslash\mathsf{np})\backslash\mathsf{np}^{\mathsf{s}}$		
		>B×			
		$(\mathsf{ip}\backslash\mathsf{np})\backslash\mathsf{np}^{\mathsf{s}}$			
	>B				
	$\mathsf{cp}\backslash\mathsf{np}$				
<B					
cp					

Note that the category for *-hl* consumes the subject noun phrase. Its semantics is of the form $\lambda P \lambda x.\mathbf{COMMAND}(P\ \mathbf{you}\ x)$.

Finally, a dislocated possessive can be associated with any (definite) argument. For example, in the following sentence, the possessum of *naara* is the subject:

(90) *raxaay* *singraay* *naara* *'ll* *qyaang-aa-gan*

children.the in.morning my her/him see-EVID-PA

'My children saw her/him this morning.' (S)

The category $(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np})$ given for *naara* can modify any of the np arguments of a verb and thus handles such cases as is.

Thus, many apparently complex discontinuities can be captured by characterizing

displaced elements as adverbials. Furthermore, the adverbial category is just like that which would be needed to capture adverbial analyses of English floating quantifiers (e.g. Brisson 2003 and Kobuchi-Philip 2007) (example from Bobaljik 2003):

(91) (All) the children (all) would (all) have (all) been (all) doing that.

Brisson argues that the immediate prenominal position involves NP modification, while the others are adverbial. This is exactly parallel to our analysis for Haida's proportional quantifiers: the category $(\mathsf{s}/(\mathsf{s}\backslash\mathsf{np}))/\mathsf{np}$ covers the prenominal modification and the related category $(\mathsf{s}\backslash\mathsf{np})/(\mathsf{s}\backslash\mathsf{np})$ handles the rest of the cases via adverbial modification.

There are further discontinuities in Haida for which the dependencies cannot be bound syntactically using the CCG machinery and we must resort to an anaphoric analysis. Consider the following sentences, in which a possessive has been displaced out of a controlled infinitival clause ending with the infinitive suffix *aay* (92) and a possessive *diinaa* has been dislocated from a dislocated possessive *xaay gyaa* (93).

(92) *xawaay k'udgudang-aay-gi dangra dii gudangga*

coffee taste-INFIN-P your I want
'I want to taste your coffee.' (S)

(93) *qiihlgee-t'aa-.uu xaay gyaa Mary diinaa qaahlii hihldagan*

dish-about-FOC dog POSS Mary my got.mad
'It was my dog's dish that Mary got mad about.' (M)

These examples will force us to assume that, at least in some cases, dislocated possessives are ip/ip modifiers which do not syntactically control a verbal argument – unlike the (ip\np)/(ip\np) category. The latter allows the argument of the possessive to be directly bound by the syntax; in the case of ip/ip, we must assume that the possessive links to its argument anaphorically instead.

To see why the (ip\np)/(ip\np) does not work for (92), it suffices to observe that *gudangga* 'want' does not subcategorize for the argument of the possessive (*xawaay* 'coffee'). For (93), note that *diinaa* 'my' seeks *xaay* 'dog' while *qaahlii hihldagan* 'got mad' seeks *Mary*; the former combination is blocked by *Mary* while the latter is blocked by *diinaa*. Furthermore, *diinaa* cannot combine with the verb using (ip\np)/(ip\np) since the verb seeks *qiihlgee* 'dish', not *xaay* 'dog'.

It would be possible to account for (92) by giving *dangra* 'your' the additional category (vp\np)\(vp\np), but this would still leave (93) unanalyzed. Instead, we claim that these possessives are anaphorically bound. Note that a construction with similarities to (93)

exists in English (we stress that this example is *not* a translation of (93)):[25]

(94) As for the dish, it was my dog's that Mary got mad about.

In general, possessives may be used as full noun phrases in English, with the possessed argument found anaphorically:

(95) My cat's dish is yellow, and my dog's is red.

There are at least two differences between English and Haida with respect to anaphoric possessives. First, whereas English distinguishes possessive pronouns (*the dog is* ***hers***) and possessive determiners (***her*** *dog*), Haida does not. More importantly, Haida allows the entire possessive noun phrase to be fronted (96), whereas English does not (97):

(96) *diinaa xaay gyaa qiihlgee-t'aa-.uu Mary qaahlii hihldagan*

my dog POSS dish-about-FOC Mary got.mad
'It was my dog's dish that Mary got mad about.' (M)

(97) *As for my dog's dish, it was t_i that Mary got mad about.

This discrepancy points to an analysis of (94) where 'As for the dish' is an adjunct with category cp/ip and 'my dog's' is a full noun phrase. Haida, on the other hand, maintains the

category np for possessed noun phrases while the possessive phrases are adjuncts. Not only does this keep in line with our adverbial analysis of displaced possessives thus far, it also simply would not work to assign both *xaay gyaa* 'the dog's' and *diinaa* 'my' the category np in these sentences since the verb only subcategorizes for one object noun phrase.

We thus end up with three categories for possessives like *diinaa*:[26]

(98)
- $\mathsf{np}/\mathsf{np} : \lambda x.x \wedge \mathbf{have}(\mathbf{I}, x)$
- $(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np}) : \lambda P\lambda x.Px \wedge \mathbf{have}(\mathbf{I}, x)$
- $\mathsf{ip}/\mathsf{ip} : \lambda P.P \wedge \exists x(\mathbf{have}(\mathbf{I}, x) \wedge x \in [\![ADR]\!])$

In the semantics for the last category, ADR represents the set of accessible discourse referents which are available at the time *diinaa* is processed. We do not formalize this set here – the basic idea would be compatible with just about any suitable account of the discourse and its participants, e.g. Discourse Representation Theory (Kamp *et al.* 2005). The ip/ip category leads to the following analysis for (92):

(99)

xawaay	*k'udgudangaaygi*	*dangra*	*dii*	*gudangga*
coffee	taste	your	I	want
np : **coffee**	$(\mathsf{vp}_{\mathsf{gi}}\backslash\mathsf{np})\backslash\mathsf{np}$: $\lambda x\lambda y.\mathbf{taste}(y,x)$	ip/ip : $\lambda Q.Q \wedge \exists z(\mathbf{have}(\mathbf{you},z) \wedge z{\in}[\![ADR]\!])$	np : **I**	$(\mathsf{ip}\backslash(\mathsf{vp}_{\mathsf{gi}}\backslash\mathsf{np}))\backslash\mathsf{np}$: $\lambda x\lambda P.\mathbf{want}(x, P\ x)$
	$\mathsf{vp}\backslash\mathsf{np}$: $\lambda y.\mathbf{taste}(y,\mathbf{coffee})$ (<)			$\mathsf{ip}\backslash(\mathsf{vp}_{\mathsf{gi}}\backslash\mathsf{np})$: $\lambda P.\mathbf{want}(\mathbf{I}, P\ \mathbf{I})$ (<)
		$\mathsf{ip}\backslash(\mathsf{vp}_{\mathsf{gi}}\backslash\mathsf{np})$: $\lambda P.\mathbf{want}(\mathbf{I}, P\ \mathbf{I}) \wedge \exists z(\mathbf{have}(\mathbf{you},z) \wedge z{\in}[\![ADR]\!])$ ($>\mathbf{B}_\times$)		
		ip : $\mathbf{want}(\mathbf{I}, \mathbf{taste}(\mathbf{I}, \mathbf{coffee})) \wedge \exists z(\mathbf{have}(\mathbf{you},z) \wedge z{\in}[\![ADR]\!])$ (<)		

Also, such a category is needed for *diinaa* 'my' in (93). However, *xaay gyaa* 'the dog's' may be given the adverbial category which allows direct access to the possessed argument *qiihlgee* 'dish' in the verb's semantics (see (78b)):

(100)

qiihlgee	*t'aa.uu*	*xaay*	*gyaa*	*Mary*	*diinaa*	*qaahlii hihldagan*
dish	about-FOC	dog	POSS	Mary	my	got.mad
np	$(\mathsf{cp}/\!\!\diamond(\mathsf{ip}\backslash\mathsf{np}_{\mathsf{taa}}))\backslash\!\!\diamond\mathsf{np}$	np	$((\mathsf{ip}\backslash\mathsf{np}_x)/(\mathsf{ip}\backslash\mathsf{np}_x))\backslash\mathsf{np}$	np	ip/ip	$(\mathsf{ip}\backslash\mathsf{np}_{\mathsf{taa}})\backslash\mathsf{np}$
	$\mathsf{cp}/\!\!\diamond(\mathsf{ip}\backslash\mathsf{np}_{\mathsf{taa}})$ (<)		$(\mathsf{ip}\backslash\mathsf{np}_x)/(\mathsf{ip}\backslash\mathsf{np}_x)$ (<)			$(\mathsf{ip}\backslash\mathsf{np}_{\mathsf{taa}})\backslash\mathsf{np}$ ($>\mathbf{B}^2_\times$)
	$\mathsf{cp}/(\mathsf{ip}\backslash\mathsf{np}_{\mathsf{taa}})$ ($>\mathbf{B}$)				$\mathsf{ip}\backslash\mathsf{np}_{\mathsf{taa}}$ (<)	
			cp ($>$)			

The anaphoric category is also needed for the Haida possessor-raising construction. A pronominal inalienable possessor is often supplemented with a following coreferential alienable pronominal possessor outside the noun phrase in the string of clitic pronouns preceding the verb: (examples from Masset—simply because the data for this phenomenon

happen to have been collated for that dialect, not because the dialects differ):

(101) *tsiin-ee 'la qaj qaahlii -.ii 'laa 'la xats'agaang-aa-n-ii.*

salmon-the his hair inside into his he rub.in-EVID-PA-TC
'He rubbed the (cooked) salmon into his (another person's) hair.' (Swanton 1908:349)

(102) *'la kye.ee-ran 'laangaa tl'a ʔunsadahl-ʔaaw-aa-n.*

their names-P their people learn-PL-EVID-PA
'People learned their names.' (Swanton 1908:375-76)

(103) *'la q'uluu-han.isan tada 'laangaa tla.ralansdlaa-yaa-n.*

her legs-too cold her cook-EVID-PA
'Her legs too, the cold had "cooked" [frostbite].' (Swanton 1908:400)

This construction both involves a possessor in the matrix rather than in its noun phrase and conveys affectedness of the inalienable possessor. It is obvious that the matrix alienable possessor is anaphoric in (101-103), because the inalienable possessor required by the inalienable noun in such examples composes with the latter, leaving the remaining clitic alienable possessor without any semantic role to fill. The only addition we need for a full account of the possessor-raising construction is whatever semantic features are needed to capture affectedness of the inalienable possessor.

Looking briefly at other languages, adverbs affecting a verb's arguments may have the property of being able to freely associate with an argument, not being restricted to particular types of argument (this is so for Haida adverbial possessives – see (79) and (90)), or they may be restricted in types of argument (as are Haida adverbial quantifiers discussed in Chapter 9 of Enrico (2003)).[27]

English floated quantifiers differ in syntactic category depending on whether they occur with subjects (*The men all came in*) or objects (*He ate the cookies all up*). There is not even the possibility of being able to modify more than one type of argument in that case. However, French floated *tous* can associate with either subjects or objects Sportiche (1988):

(104) *Les enfants$_i$ les$_j$ ont tous$_i$ tous$_j$ lu*

the children them have all all read.

'All the children have read them all.'

(105) *Jean aurait tous aimé oser les rencontrer*

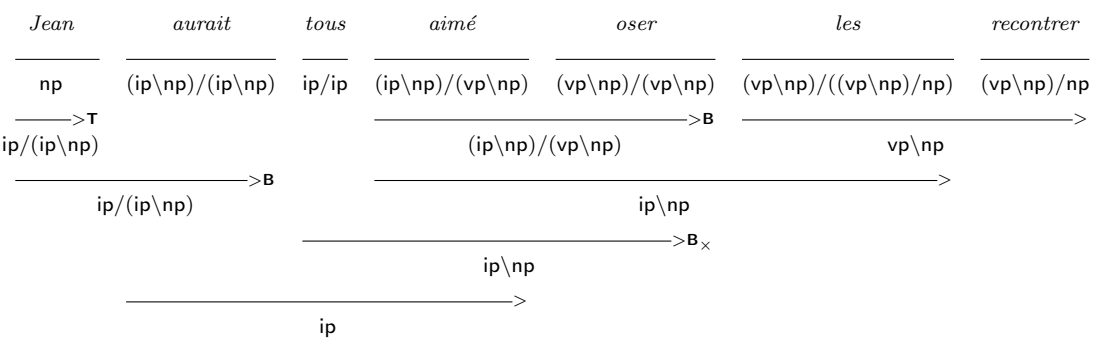
John would.have all like dare them meet

'John would have liked to dare to meet all of them.'

For (104), argument-controlling adverbial categories of the form $(\mathsf{vp}\backslash\mathsf{np})/(\mathsf{vp}\backslash\mathsf{np})$ and $((\mathsf{vp}\backslash\mathsf{np})/\mathsf{np})/((\mathsf{vp}\backslash\mathsf{np})/\mathsf{np})$ allow syntactic binding of arguments of the floated quantifiers.

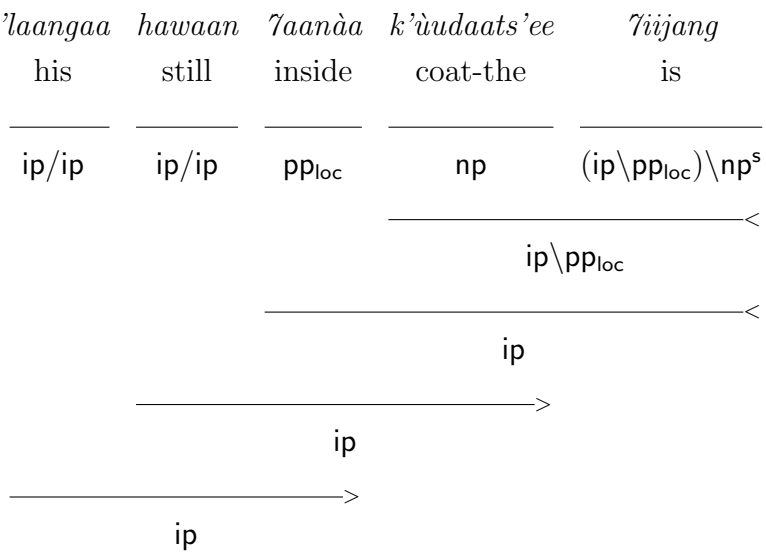
However, for *tous* in (105), this is not possible since the clitic *les* has already consumed the object argument before the quantifier can combine with *rencontrer*. Thus, the anaphorically-binding adverbial category ip/ip is necessary for *tous* in this sentence:[28]

(106)



Returning to Haida adverbial possessives, the existence of the three alternative categories given in (98) lead to alternative analyses. When the possessive precedes heads, as in (75), the ip/ip category can be used as follows:

(107)



Similarly, the ip/ip category would also be adequate for other positions, including those in (79-88). It would be conceivable then to have only the ip/ip category in the grammar. Nonetheless, it is preferable, when possible, to use the categories which syntactically access their arguments so that semantic binding has a syntactic correlate. This preference is captured in CCG by the Principle of Categorial Type Transparency (Steedman 1996; 2000) and by its inverse. The PCTT is:

(108) For a given language, the semantic type of the interpretation together with a number of language-specific directional parameter settings uniquely determines the syntactic category.

Cf Klein and Sag (1985). The inverse of this (see Steedman 2000:36 for an early statement) obviously must state a preference rather than an absolute condition. The answer to why anaphoric discontinuity developed for Haida possessives would seem to involve two facts. First, as remarked above, right-dislocation of Haida possessives in texts is entirely of pronominal ones, there being no examples of right-dislocated non-pronominal possessives. Second, Haida pronouns are cliticized to the verb. So the adverbial categories for pronominal possessives could have arisen because they enable the cliticization of such possessives to the verb, in a manner similar to their pronominal verb-argument cousins discussed earlier.

7. Conclusion. We have explored a range of types of noun-phrase discontinuities in Haida. In some cases they enable a sub-part of a noun phrase to appear on the left of the sentence for focus, while for other cases –such as with cliticization of pronominal possessives– they allow appearance directly before the verb. Our categorial treatment allows the former by way of type-raising and (crossed) composition (but otherwise keeping the lexicon fixed), whereas the latter is accounted for with additional adverbial and anaphoric categories. This paper illustrates how a careful compositional analysis of these phenomena with a formalism with restricted generative capacity reveals interesting facts.

First, we see that the bulk of the discontinuities can be straightforwardly handled with a small category inventory backed by the derivational flexibility provided by the type-raising and composition rules. The same categories and flexibility simultaneously provide a straightforward solution to the bracketing paradox discussed in Section 4 (this is an illustration of how CCG can explain data points that initially appear to be unrelated). This is a remarkable range of discontinuity, especially given that the generative capacity of the system is only slightly more than context-free.

Next, the discontinuities that we analyze as anaphoric likely would require greater power were we to seek a directly compositional analysis. This raises a number of points.

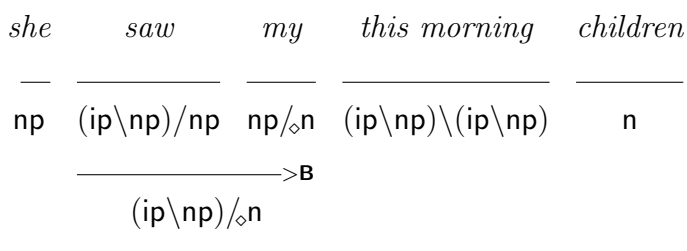
One: the anaphoric analysis is well-motivated by sentences in which possessives (for example) are clearly anaphoric without any discontinuity involved, and by parallels with similar anaphoric possessives in English. Two: choosing to add further rules to the system that would allow a compositional analysis would likely lead to many more undesirable word orders due to the extra degrees of freedom it would allow. Three: adding more categories while using the core CCG system would be an option to capture particular constructions like those in (92) and (93), but these would be too specific to be of general interest. In sum, we seek to maintain sentence-level compositionality as far as it can be supported with the core CCG system without resorting to construction-specific categories, but we can resort to anaphoric binding when the data supports it.

Though we have sought to limit categorial ambiguity in our analysis, we nonetheless do use this degree of freedom when the data calls for it, e.g. the three categories for possessives in (98). Whether a lexical item has more than one category is an empirical question. If a single category does not suffice, further categories may be added. Since language really does seem to work this way (quantifier floating is a well known if not so well understood example), categorial flexibility is a potentially fruitful area of empirical syntactic investigation rather than a theoretical deficiency to be ruled out by some *ad hoc*

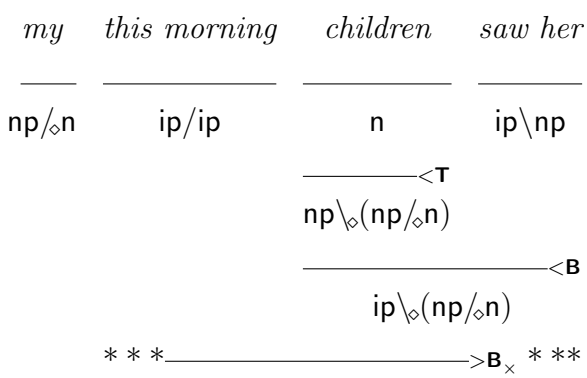
principle. We see this as preferable to adding further rules that increase the power of the system.

Nonetheless, it is still desirable where possible to use categories that handle many different configurations. In the case of demonstratives and alienable possessives, it is the ability of type-raising to turn their arguments into functions looking for them which allows both discontinuities to occur and the bracketing paradox to be resolved (see (53)). The account of discontinuities relies on the categories for numbers, demonstratives and alienable possessives having permissive slash types (Baldridge 2002) which permit the permutation-inducing crossed composition rules to combine categories. The general use of these permissive slashes also enables intervening material, such as adverbs with categories ip/ip, to compose with the verb and allows the verb to continue seeking its argument. The Haida permissive slash types contrast with those in English determiners (including possessives), which can compose with verbs only in an order-preserving way due to their use of the $/_\diamond$ slash. Thus, ungrammatical strings like **she saw my this morning children* and **my this morning children saw her* (compare with the similar allowed Haida sentences (79) and (90)) are blocked:

(109)



(110)



Like Haida, English nouns can type-raise to become functions seeking functions seeking them, such as possessive determiners. However, those functions must remain order preserving by the definition of type-raising, and so the type-raised functions also disallow permutation (e.g., $\mathsf{np}\backslash_\diamond(\mathsf{np}/_\diamond\mathsf{n})$ in (110)), and thus block intervening constituents such as adverbs within the noun phrase string.

English verbs, on the other hand, do allow permutation, such as heavy-NP shift (e.g., *They saw* ***yesterday*** *a large group of people walking down the street*). When elements such as floating quantifiers like *all* do separate from their noun phrases, they must do so with an adverbial category. Haida, in contrast, allows permutation within both noun phrases and verb phrases and thus allows much more radical discontinuities, like Walpiri.

These different levels of word order permissiveness exhibited by (so-called) configurational and non-configurational languages are naturally captured with the few degrees of freedom provided by CCG: it has a small set of empirically-based universal combination rules that are selectively accessed by lexical items. This enables constituent structures and the very different word orders that are allowed across languages to be entirely projected by their lexicons.

Notes

[1]The authors would like to thank David Beaver, John Beavers, Fred Hoyt, and the editor, associate editor and two anonymous reviewers for helpful feedback and discussion. Jason Baldridge's work was supported by the project "Multilingual Text Interpretation" funded by the Morris Memorial Grant from the New York Community Trust and by the project "Reducing Annotation Effort in the Documentation of Languages using Machine Learning and Active Learning." funded by the National Science Foundation's Documenting Endangered Languages program (grant BCS 06651988).

[2]Hale explicitly states that the meaning of the demonstrative *yalumpu* in this example is the same as its demonstrative meaning when directly after the noun *wawirri*.

[3]If a language is freely able to choose from these rules of combination—application, type-raising, composition, etc.—it will over-generate. Steedman (1996, 2000) dealt with this by stating restrictions on individual rules. This reduces the explanatory and predictive power of the theory. Hence, Baldridge (2002) and Baldridge and Kruijff (2003) redefined the rules of CCG to encode such restrictions via lexical modalities—marked by subscript symbols on main slashes—that state which combination rules particular lexical items can participate in. We will have to draw on them only at a few places in this paper and will not go into more

details of this well-motivated recent development.

[4]As is standard, we assume that type-raising is actually a lexicalized operation or is constrained to apply non-recursively.

[5]As is customary, we suppress the $\cdot$ modality; thus, $\backslash\!\!\cdot$ and $/\!\!\cdot$ are written as $\backslash$ and $/$, respectively.

[6]The "up-down" slash '|' allows both left and right combination.

[7]We could dispense with the basic category pp by treating postpositions as case-markers that add features to their arguments (which can be any of np, vp, ip, or cp), so that the dative postposition *gi* (S), *ga* (M), for example, lexically adds a feature "$\pm gi$," say. However, there are a couple of reasons why this is not possible. First, postpositions can occur as separate words, either with anaphoric objects or discontinuous with their objects. Second, a case system typically marks a small set of abstract relational notions, but the Haida postpositions are numerous and semantically specific. Postpositions are therefore $\mathsf{pp}\backslash\mathsf{np}$, $\mathsf{pp}\backslash\mathsf{ip}$, etc.

[8]For the most part the orthography is self-explanatory, only the following need explanation: the grave accent - low tone (on syllables that would otherwise have high tone), **c** - velar fricative, **r** - unaspirated uvular stop in Skidegate, pharyngealized glottal stop in Masset, **x** -

uvular fricative in Skidegate, pharyngeal fricative in Masset, **7** - glottal stop, **@** - low vowel (mostly in Skidegate), and a period between letters representing an abstract consonant or unlinked C slot.

[9]Abbreviations are: M 'Masset dialect of Haida', S 'Skidegate dialect', CL 'classifier', the 'definite suffix', DM 'demonstrative-forming suffix', EVID 'evidential', FOC 'focus-marking clitic', INDEF 'indefinite pronoun', INFIN 'infinitive suffix', P 'postposition', PA 'past', PL 'plural', PR 'present', POSS 'possessive', Q 'question particle', TC 'topic change suffix', 3RD 'third person pronoun'.

[10]Note that the superscripts s(ubject) and o(bject) are for readability and perform no grammatical work whatsoever—the important thing is the binding of the syntactic arguments to the semantic arguments via the λ-terms.

[11]We are not taking a rigid stand on the correct way to represent the semantics of definites in Haida. See Westerståhl (1984), von Fintel (1994), Chierchia (1995), Asher and Lascarides (1998a,b), and Gillon (2006) for a different model of the semantics of definites as pragmatically determined via presupposed sets identified with some underspecified entity. We use Link's lattice based approach as it adequately captures the core meaning conveyed while being much simpler as a representation in derivations with our λ-calculus representations.

[12]The predicate $\prod$ satisfies the biconditional $a \prod b \leftrightarrow a \oplus b = b$, where $a \oplus b$ is the plural object of a and b. Thus, $a \prod b$ implies that a is a part of b since forming a plural object from a and b is the same as b itself.

[13]In fact, there are commonly also unproductive lexicalized possessive suffixes *-ra* or *-(ʔ)ii* on the possessum, as in the first three examples here.

[14]We leave open the possibility that $z = y$.

[15]Actually, Skidegate speakers can omit the definite suffix on nouns before 'all,' presumably because it is redundant—note that this does not occur before 'some' and see the semantics of 'all' below.

[16]It can also be associated with just the first conjunct rather than with the whole conjoined phrase, e.g., for (46), a second translation is 'Which cake plus the cookies did you make?'

[17]The quantifier can also be associated with just the last conjunct.

[18]A reviewer raised the interesting question here of whether two distinct pointing gestures could actually accompany this sentence. Since only one demonstrative occurs in the original Haida sentence, it seems clear that only one gesture would be normal. But even while uttering an English sentence like *Those houses are due to be torn down*, one can point separately to

each house one has in mind, so the question seems moot.

[19]We explicitly show the reductions of the λ-terms joined by the $<\mathbf{B}$ rule, including the introduction of the variable T due to the rule. Square brackets indicate order of application of the functions to their arguments.

[20]The variable X in the coordination category $(\mathsf{X}\backslash_\star\mathsf{X})/_\star\mathsf{X}$ is not formally important. It can be viewed simply as a schema over categories; we use the schema to simplify the presentation of the derivation. More importantly, it encodes the standard assumption that constituents coordinate with others of the same type. In this particular case, the category is that given in (a) with the semantics given in (b):

(a) $(((\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}))\backslash(\mathsf{np}/\mathsf{np}))\backslash_\star((\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}))\backslash(\mathsf{np}/\mathsf{np})))/_\star((\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}))\backslash(\mathsf{np}/\mathsf{np}))$

(b) $\lambda R\lambda S\lambda P\lambda Q.([RP]Q \wedge [SP]Q)$

The category plus semantics looks complex, but it is really just part of a simple, general schematization of the syntactic and semantic effect of the coordinator: see Steedman (2000) page 266, fn. 10 for more discussion.

[21]As noted before in footnote 10, the superscripts s and o do *not* perform *any* grammatical work and are present *only* to make clear which noun phrase arguments of the verb correspond

to the subject and object.

[22]E.g., *all* in *all the boys left* has the category $(\mathsf{ip}/(\mathsf{ip}\backslash\mathsf{np}))/\mathsf{np}$.

[23]As with previous examples, the subscripts on some noun phrases perform no grammatical function and are present only to help the reader follow the derivation.

[24]The demonstratives are potentially appositional (parenthetical deictics or anaphors) when discontinuous to the right. Right-separated demonstratives are not discussed here for that reason.

[25]Thanks to David Beaver for pointing this example out.

[26]They would also have the category np for contexts where such possessives act like English possessive pronouns such as *yours* and *mine*.

[27]Haida adverbial quantifiers are restricted semantically: they do not apply to agentive transitive subjects in the Masset dialect.

[28]We use the category ip/ip for simplicity to demonstrate the basic idea here. A more developed analysis would of course need to account for tense and verbal form features. Also, giving *tous* the category $(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np})$ would eliminate the need for using $>\mathbf{B}_\times$ in derivation (106) and ensure that **tous Jean aurait aim'e oser les rencontrer* could not be derived (as

it can be with ip/ip). We avoid using this alternative category $(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np})$ in the main text to avoid superficial similarity to the adverbial category for Haida and make it clear that the quantification really is established anaphorically. The np's in $(\mathsf{ip}\backslash\mathsf{np})/(\mathsf{ip}\backslash\mathsf{np})$ bind the *subject*, while it is the *object* noun phrase that is quantified in (105).

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