

Exhaustivity, Predication and the Semantics of Movement

PETER KLECHA AND MARTINA MARTINOVIĆ
*Ohio State University and University of Chicago**

1 Introduction

The narrow goal of this paper is to provide a uniform accounting of two seemingly unrelated phenomena in Wolof – predication and exhaustive identification – which both involve A'-movement of a nominal to Spec,CP. In doing so, we provide a compositional semantics for movement which may be extended well beyond Wolof.

In Wolof, exhaustive identification of a DP involves moving it to Spec,CP, as in (1). The unmarked way of doing nominal predication involves moving the predicative NP to the same position, in (2). In both cases, the complementizer that hosts the moved nominal in its specifier is the A'-movement complementizer *(l)a*.

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) <u><i>Exhaustive Identification</i></u>
Musaa l-a ñu gis.
Moussa <i>l</i> -C _{WH} they see

“ <i>It’s Moussa who they saw.</i> ” ¹ | (2) <u><i>Nominal predication</i></u>
Jangalëkat l-a ñu.
teacher <i>l</i> -C _{WH} 3PL

“ <i>They are teachers.</i> ” |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|

In this paper, we propose a unified analysis which explains why there is a semantic effect (exhaustivity) when some nominals move to the specifier of *(l)a*, but no such effect when some other nominals move. Note that, crucially, we assume that exhaustive identification is separate from the focus phenomenon (see Horvath 2007).

We analyze *(l)a* as having a semantics whereby the unique individual satisfying the property denoted by its complement (the TP containing the trace of movement) has the property denoted by its specifier (the moved nominal). This analysis essentially translates (1) and (2) as (3) and (4), respectively.

- (3) The unique individual they saw has the property of being Moussa.
- (4) The unique individual identical to them has the property of being a teacher.

Thus the exhaustivity imparted in (1) is neutralized in (2) because the property being exhaustified (the property of being a plurality identical to them) is already a singleton.

In order to say this, we must allow for *(l)a* to bind the trace within TP, which is not allowed under a Heim & Kratzer (1998)-style analysis of movement. The broader goal of this

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¹Wolof exhaustive identification sentences are equivalent in meaning to English clefts, and we are therefore translating them as such. They are, however, not syntactic clefts, but monoclausal structures in which the exhaustively identified nominal moves to Spec,CP. See §2 for details.

paper is to show that this move is not only needed to account for this data, but desirable for any theory of movement.

The rule of Predicate Abstraction creates a disconnect between the syntax and the semantics of movement. Syntactically, movement is triggered by an attracting head, for feature-checking purposes. But semantically, the head that triggers movement does no work; strictly following Heim & Kratzer, it doesn't even take the moved element as its semantic argument.

Our proposal is for a more closely aligned syntax and semantics of movement. Attracting heads agree with their attractee. This process also transmits a binding index to the attracting head. The semantics of each attracting head determines how the trace of movement is bound. This eliminates the need for the Predicate Abstraction rule posited by Heim & Kratzer.

What this requires is that assignment functions be acknowledged as part of the model. This move has been made in the past to account for issues relating to binding (Sternefeld 2001), inverse linking (Kobele 2010), and ellipsis (Kennedy 2014). By acknowledging the role of assignment functions in the grammar, a compositional analysis of movement in general can be given, which in turn allows for an elegant accounting of discourse configurability in Wolof.

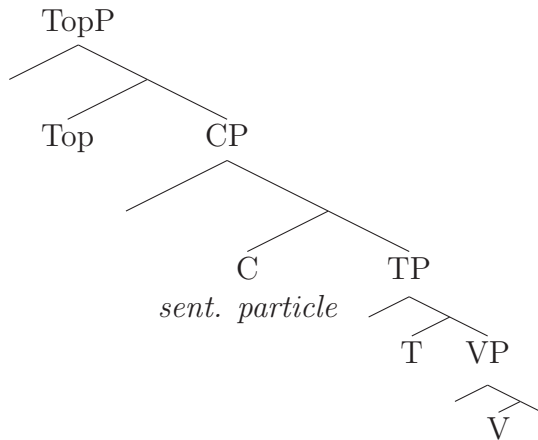
The paper is organized as follows. §2 gives a background of exhaustivity marking and nominal predication in Wolof. §3 gives a background on the dominant semantic theory of movement, explains why it is insufficient for present cases, and presents our alternative proposal of *binding by attractor*. §4 provides an analysis for *(l)a* and shows how it derives the essential data discussed above. §5 shows how this analysis extends to two other copular constructions in Wolof, equatives and specificational sentences. §6 concludes.

2 Background

Wolof is a Niger-Congo language of the West Atlantic branch, most widely spoken in Senegal. It is a typical *discourse-configurational* language, meaning that particular information-structural properties (or discourse-semantic functions) such as topic and focus seem to be realized through a specific structural relation (Kiss 1995). In Wolof, the information-structural property of utterances seem to be closely tied to the type of *sentence particle* used. Sentence particles are complementizer-like elements, in complementary distribution with one another, which occupy the head taking TP as its complement. We follow Dunigan (1994) in assuming that all particles occupy the same position in the clause; for our purposes, it is sufficient to label this position as a C head.² In this paper, we assume that Wolof clauses have the structure in (5).

²Wolof also has a higher embedding complementizer, which can occur with all of the sentence particles.

(5) Wolof clause structure



Different particles induce different syntactic processes in the clause. In a neutral sentence,³ for example, a verb or an auxiliary move to C, whereas in a V/VP-focus sentence, a dummy verb *def* 'do' occurs in C (Dunigan 1994; Church 1981; Torrence 2005, 2012), illustrated in (6). The lexical subject in such clauses is in a left-dislocated position, and a subject pronoun occupies a position to the right of C.

(6) a. Neutral clause

Xale yi gis-na-ñu golo.
 child DEF.PL see-C-3PL monkey
 "The children saw a monkey."

b. VP/V-focus clause

Xale yi d(ef)-a-ñu (>dañu) gis golo.
 child DEF.PL do-C-3SG see monkey
 "The children SAW a monkey." / "It's that the children saw a monkey."

In exhaustive identification of a DP, the sentence particle (*l*)*a* occurs, and the exhaustively identified DP A'-moves to Spec,CP (Dunigan 1994; Martinović 2013; Torrence 2005, 2012 etc). (*L*)*a* has all the properties of an A'-movement complementizer: it is obligatory in long-distance extraction, it occurs in every C position in successive-cyclic movement (as the Irish *aL*; McCloskey 2000, 2001), and it exhibits a subject/non-subject asymmetry, akin to the *that*-trace effect: it surfaces as *a* in case of subject extraction, and as *la* in case of non-subject extraction (Martinović 2013).⁴

(7) a. Exhaustive Identification of a non-subject

Golo_i **l-a** xale yi gis *t*_i.
 monkey *l*-C_{WH} child DEF.PL see
 "It's a monkey that the children saw."

³By 'neutral', we mean a sentence felicitous in an out-of-the-blue or a broad sentence focus context.

⁴The analysis of the subject/non-subject asymmetry is not relevant for the present purposes. For different proposals, see Torrence (2005, 2013) and Martinović (2013).

b. Exhaustive Identification of a subject

Xale yi-**a** (>yee) gis golo.
 child DEF.PL-C_{WH} see monkey

“It’s the children that saw the monkey.”

Exhaustive identification marking is usually related to a specialized syntactic position (e.g. É. Kiss 1998; Torrence 2013) and a syntactic feature on a head which triggers movement of the exhaustively identified constituent (such as a focus feature in Horvath 1986, 1995; Brody 1990, 1995 or the Exhaustive Identification operator in Horvath 2007). What throws a wrench in such an analysis are cases of DP movement to the ‘exhaustifying’ position which are not accompanied by exhaustive interpretation. For example, in Hungarian, a textbook case of a *discourse-configurational* language, the position where exhaustively identified constituents are found is to the left of a tensed verb (e.g. Szabolcsi 1981; examples from Onea 2009, p.53):

(8) Exhaustive identification in Hungarian

a. Péter [Marit]_F szereti.
 Peter Mary.ACC loves
“Peter loves Mary (and no one else).”

b. Péter szereti [Marit]_F.
 Peter loves Mary.ACC
“Peter loves Mary (and possibly someone else as well).”

However, elements other than exhaustively focused nominals are found in this position as well (for an exhaustive overview, see Wedgwood 2003), most notably non-verbal predicates (example from Hegedűs 2013, p.61):

(9) Hungarian nominal predicates

János *orvos* lesz.
 John doctor will.be

“John will be a doctor.”

The same thing happens in Wolof, where this pattern is even more puzzling, since sentences with nominal predicates in their most neutral form contain the A'-movement complementizer, and not, for example, the particle *na*, which usually occurs in such contexts, as in (6a). The predicate NP is in the EI-position, but there is no apparent exhaustivity:

(10) Wolof nominal predicates

Xale yi *ndongo* l-a-ñu.
 child DEF.PL student l-C_{WH}-3PL

“The children are students.”

A few proposals in the literature have discussed a link between predication and exhaustivity,⁵ specifically concerning Hungarian. É. Kiss (2005, 2006) offers an informal discussion, proposing that exhaustivity is not encoded in the grammar, but is the result of *specificational predication* – the exhaustive reading arises when a constituent raised to the predicate position (Spec,PredP in her proposal) is a definite or a specific indefinite noun phrase.⁶ Wedgwood (2003) terms the position immediately preceding the tensed verb the position of *main predication* and offers an analysis in the framework of dynamic syntax, proposing that exhaustivity is a pragmatic effect. In this paper, we propose that the exhaustive meaning is encoded by the attracting head (*l*)*a* itself, in the form of an iota operator which binds the trace of movement. This exhaustivity is essentially neutralized in cases like predication, because the remnant of movement already denotes a singleton; thus the exhaustive effect is not informative.

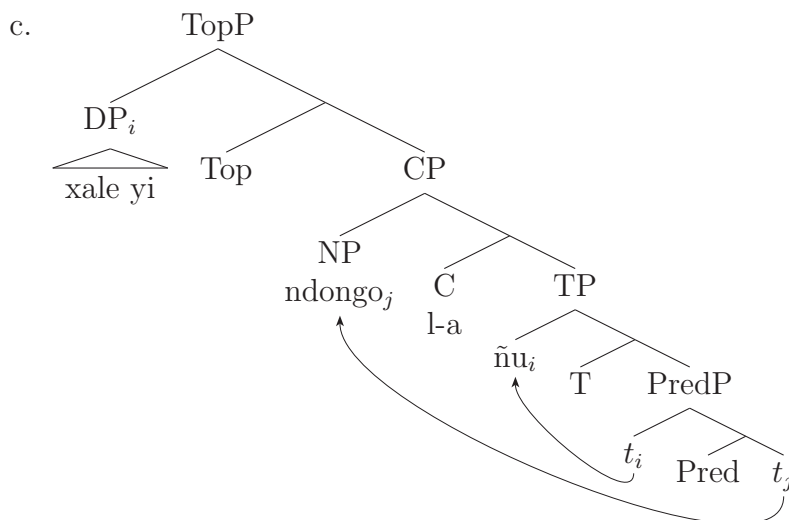
2.1 Copular sentences with nominal predicates

Copular sentences with nominal predicates involve the A'-movement complementizer (*l*)*a* (Martinović 2013, to appear, 2015). We assume that copular sentences with nominal predicates have an underlying asymmetrical small clause (PredP) (e.g. den Dikken 2006), with the predicate nominal (N2) as a complement, and the subject nominal (N1) a specifier of a Pred head. In an information-structurally neutral predicational sentence, N2 moves to Spec,CP, as in (11a). There are two consequences of this structural move. First, N1 in such structures is obligatorily pronominal, as it is in clauses in which a verb moves to C, in (6)). If a lexical subject is present, it must be left-dislocated (see (11b)). Second, only in this case is the verbal copula that occurs in copular sentences with nominal predicates, *di*, not overt. Since verbs in Wolof seem to raise to T (Torrence 2003, 2005; Russell 2006; Torrence 2012), we assume that the copula is the Pred head that raises to T.

- (11) *N2 moves to Spec,CP*
- a. Xale yi ndongo l-a-ñu.
 child DEF.PL student l-C_{WH}-3PL
 “The children are students.”
- b. *Ndongo la xale yi.
 student C_{WH} child DEF.PL

⁵A link has also been proposed to exist between focusing and predication. Since the notion of *focus* is not universally defined, we do not discuss this literature.

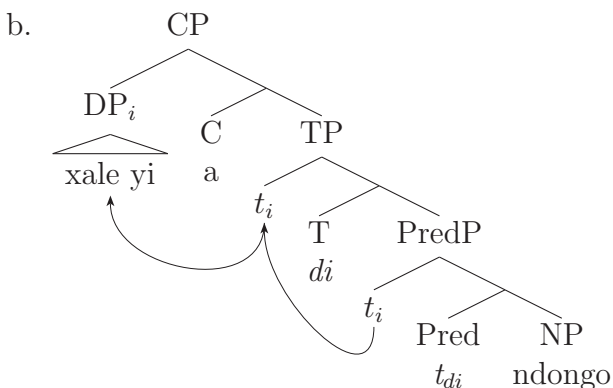
⁶She follows reasoning expressed by Huber (2000), who argues that in specificational sentences the predicate implies that its specification of the individuals that make up the set denoted by the subject is exhaustive. Kiss does not formalize this proposal.



Crucially, there is no exhaustivity in such structures; (11) is the most neutral way to construct a predicational clause with a nominal predicate in Wolof. It is also possible for the subject nominal to be located in Spec,CP. In that case, however, the subject **is** exhaustively identified. Furthermore, whenever N2 is in situ, the copula *di* occurs.⁷

(12) N1 moves to Spec,CP

- a. Xale yi-a di (>yeey) ndongo.
 child DEF.PL-C_{WH} COP student
 “It’s the children who are students.”

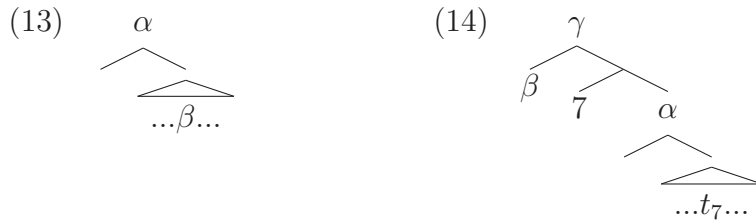


To sum up the discussion so far: It appears that, when certain nominals move to Spec,CP of a particular head, there is a semantic effect, namely exhaustive identification; when other nominals move to the same position, there does not seem to be such an effect. We therefore propose that exhaustivity is a byproduct of binding by an ι -operator, contributed by $(l)a$, the effect of which is made trivial in cases of predication. However, this requires $(l)a$ to bind the trace of movement to its specifier, which standard theories of movement do not allow; we address this directly.

⁷We do not have anything to say about the absence of the copula when the predicate NP moves to Spec,CP. It could be a surface phenomenon, by which the copula is deleted when its complement moves, or be syntactically motivated. Crucially, we assume it is not relevant for the semantic computation.

3 The semantics of movement

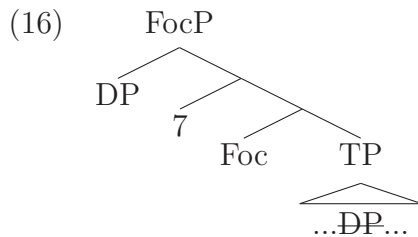
Heim & Kratzer (1998) posit two rules for movement. First, syntactically, they argue that, however movement may proceed in the syntax, the result of applying the operation Move to a structure like (13) is an LF that looks like (14), where “7” is a binding index.



Given this, they posit the Predicate Abstraction Rule for interpreting trees like (14).

- (15) *Predicate Abstraction Rule* (Heim & Kratzer 1998)
 Let α be a branching node with daughters β and γ , where β dominates only a numerical index i . Then, for any variable assignment a , $[[\alpha]]^a = \lambda x [[\gamma]]^{a^{x/i}}$.

The problem with this, if one follows the letter of Heim & Kratzer, is that the semantic effects of movement are highly constrained, being limited to scope-taking and binding. Moreover, such a system is not even sufficient to capture certain cases of scope-taking (Kobele 2010) and binding (Sternefeld 2001). This is clearly problematic for discourse configurational languages. Consider a structure like (16).



In (16), there is a left-peripheral focus head which attracts a DP to its Spec. By the Predicate Abstraction Rule in (15), the lambda-binder is inserted between the focus head and its specifier, intercepting the DP before the focus head can get at it. The meaning of the DP is plugged back in to the gap it vacated, as if movement never happened, unless the DP is of a higher type and takes the new abstract as an argument. In either case, the attracting heads can never take the DP that they attract as semantic arguments.

There are various ways one can get around this. One is that after movement of the DP to Spec,Foc, the attracting head Foc^0 *itself* moves countercyclically to a position between its specifier and the newly generated binding index; this would be a case of what Barker (2007) calls parasitic scope. One obvious problem with this is that the movement of Foc will itself generate a new binding index. Another is that this movement will have no syntactic motivation or explanation, not being driven by feature-checking.

Another way to allow for attracting heads to interact meaningfully with their attractees is to weaken Heim & Kratzer’s syntactic stipulation and allow for the binding index to be inserted in other locations besides immediately below the moved DP. So in the case of (16),

the binding index could perhaps be inserted below the attracting the head in addition to the usual position. The question then becomes: What constraints are there on the insertion of such binding indices?

What’s more, both of these ideas represent a disconnect between the syntax of movement—where we attribute movement to features of a head—and the semantics of movement—where such a head then seems to play no role in the computation of meaning. To address this, we propose an account by which attracting heads themselves bind the traces of the DPs that they attract.

We follow Montague (1970), who argues for treating expressions which are classically analyzed as being of type $\langle \alpha \rangle$ as being instead of type $\langle a, \alpha \rangle$, where a is the type of assignment functions. To avoid complicating composition rules, we modify this approach slightly: For every atomic type α , let α be replaced with $\langle a, \alpha \rangle$. Thus, whereas Montague would have classic predicates go from $\langle et \rangle$ to $\langle a, et \rangle$, we take them to be $\langle ae, at \rangle$. To simplify the notation, abbreviate $\langle a, t \rangle$ as $\langle t \rangle$ and $\langle a, e \rangle$ as $\langle e \rangle$.

(17) Semantic Domains

- a. Let A be the set of assignments and E be the set of individuals.
- b. $D_{\langle e \rangle}$ is the set of functions from A into E .
- c. $D_{\langle t \rangle}$ is the set of functions from A into $\{0, 1\}$.
- d. If α and β are types, then $D_{\langle \alpha, \beta \rangle}$ is the set of functions from $D_{\langle \alpha \rangle}$ into $D_{\langle \beta \rangle}$.

To see how this works, consider a simple inventory of English expressions in (19), which relies on the notational devices given in (18).

- (18)
- a. $\hat{n} := \lambda g[g(n)]$
 - b. $*\phi := \lambda g[\phi]$ (used only if ϕ contains no instances of g or any other variable ranging over assignments)

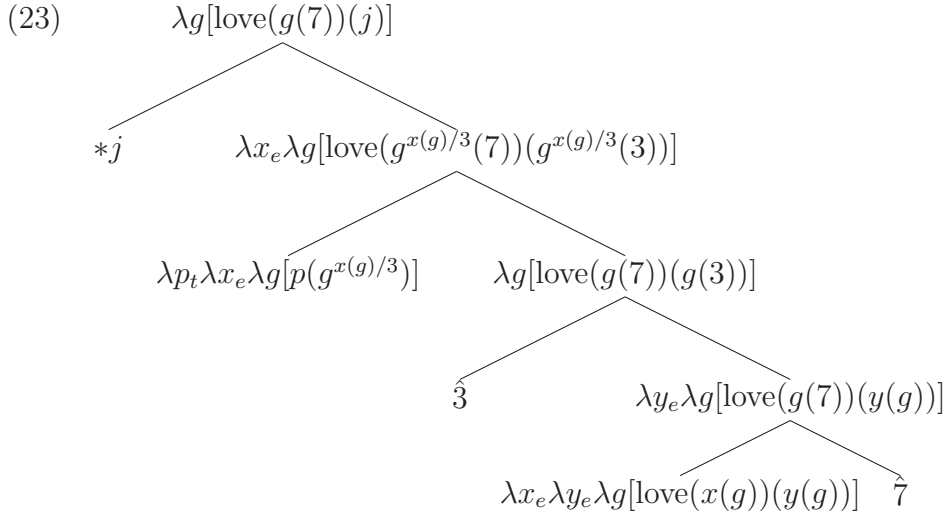
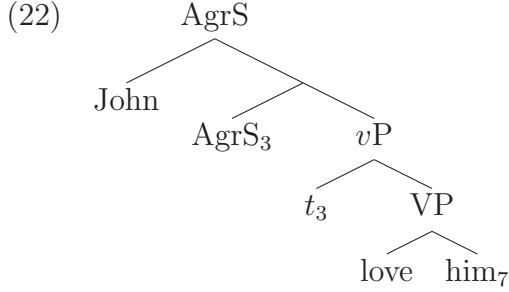
(19) A Simple Inventory of English

- a. $\llbracket \text{John} \rrbracket = *j$
- b. $\llbracket \text{him}_n \rrbracket = \hat{n}$ (For all g , defined iff $g(n)$ is male)
- c. $\llbracket t_n \rrbracket = \hat{n}$
- d. $\llbracket \text{love} \rrbracket = \lambda x_e \lambda y_e \lambda g[\text{love}(x(g))(y(g))]$

Add to this inventory the functional head AgrS, with denotation given in (20). Assume (21) has the LF in (22). Assuming the inventory above and Function Application, its derivation is given in (23).

(20) $\llbracket \text{AgrS}_n \rrbracket = \lambda p_t \lambda x_\alpha \lambda g[p(g^{x(g)/n})]$

(21) John loves him.



By giving AgrS the semantics in (20), the effect of Predicate Abstraction is duplicated: The meaning is as if the thing had never moved. Thus AgrS has the meaning that any otherwise vacuous attracting head should have.

Note that this requires an important assumption about the syntax: That the attracting head is valued with the binding index. But no burdensome stipulation is required to explain this: It is already a part of Minimalist syntactic frameworks that movement is driven by agreement between the attracting head and its attractee. Thus the binding index may be transmitted by the same operation that transmits phi-features. In fact, if we adopt the claim that phi-features *are* indices (Sudo 2012), no stipulation is required at all; the binding index is simply the interpretation of $-s$.

QR can also be accounted for easily in this system, whether or not it is driven by attracting heads. On a theory where QR is not agreement-driven, quantifiers need only have denotations like (24), of type $\langle et, tt \rangle$ as in Kennedy (2014).

(24) $\llbracket \text{every}_n \rrbracket = \lambda P_{\langle e,t \rangle} \lambda p_t \lambda g [\forall g' [\exists x [g' = g^{x/n}] \ \& \ P(\hat{n})(g') \rightarrow p(g')]]$

(25) *Extension to the Inventory*

- a. $\llbracket \text{boy} \rrbracket = \lambda x_e \lambda g [\text{boy}(x(g))]$
- b. $\llbracket \text{his}_n \rrbracket = \lambda R_{\langle e,et \rangle} \lambda g [\iota x [R(\hat{n})(*x)(g)]]$
- c. $\llbracket \text{mother} \rrbracket = \lambda x_e \lambda y_e \lambda g [\text{mother}(g(x))(g(y))]$

(26) $[\text{Every}_2 \text{ boy } [_{\text{AgrSP}} t_2 \text{ AgrS } [_{vP} t_2 \text{ loves his}_2 \text{ mother}]]]$

(27) *Derivation*

- a. $\llbracket \text{his}_2 \text{ mother} \rrbracket = \lambda g [\iota x [\text{mother}(g(2))(x)]]$

- b. $\llbracket \text{love his}_2 \text{ mother} \rrbracket = \lambda y_e \lambda g [\text{love}(\iota x [\text{mother}(g(2))(x)])(y)(g)]$
 c. $\llbracket t_2 \text{ love his}_2 \text{ mother} \rrbracket = \lambda g [\text{love}(\iota x [\text{mother}(g(2))(x)])(g(2))]$
 d. $\llbracket \emptyset_{\text{AgrS}t_2} \text{ his}_2 \text{ mother} \rrbracket = \lambda y_e \lambda g [\text{love}(\iota x [\text{mother}(y)(x)])(y)]$
 e. $\llbracket t_2 \emptyset_{\text{AgrS}t_2} \text{ his}_2 \text{ mother} \rrbracket = \lambda g [\text{love}(\iota x [\text{mother}(g(2))(x)])(g(2))]$
 f. $\llbracket \text{every}_2 \text{ boy} \rrbracket = \lambda p_t \lambda g [\forall g' [\exists x [g' = g^{x/2}] \& \text{boy}(g'(2)) \rightarrow p(g')]]$
 g. $\llbracket \text{every}_2 \text{ boy } t_2 \emptyset_{\text{AgrS}t_2} \text{ his}_2 \text{ mother} \rrbracket$
 $= \lambda g [\forall g' [\exists x [g' = g^{x/2}] \& \text{boy}(g'(2)) \rightarrow \text{love}(\iota x [\text{mother}(g'(2))(x)])(g'(2))]]$

This brings two significant advantages; the first is that syntactic and semantic theories of movement are brought in line. Movement is triggered by agreement, which results in the transmission of morphosyntactic features and a binding index, which are possibly one and the same. No rule of Predicate Abstraction is needed to interpret such structures, and no rule of binding-index-insertion is needed to feed Predicate Abstraction.

The second advantage is that it allows us to give a meaning to Wolof *la* which binds the trace of movement to its specifier.

4 Analysis

Central to the analysis is the following denotation for $(l)a$.

$$(28) \quad \llbracket (l)a_n \rrbracket = \lambda p \lambda Q \lambda g [Q(*\iota x [p(g^{x/n})])(g)]$$

$(l)a$ binds the trace of movement to its specifier, but unlike AgrS, which binds it to a λ -abstract, $(l)a$ binds to an iota operator. Note that this semantics requires that the specifier of $(l)a$ be a property; in the case of predicative NPs, this works. In the case of referential DPs, as in cases of exhaustive identification, a typeshifter is needed. Call this typeshifter ID – it is the lexical reification of Partee’s IDENT.

$$(29) \quad \llbracket \text{ID} \rrbracket = \lambda x \lambda y \lambda g [x(g) = y(g)]$$

DPs attracted by $(l)a$ must have first combined with ID.

As discussed above, movement must be driven by agreement and feature-checking. We argue that $(l)a$ attracts the nearest NP to its specifier. By assuming that ID selects category DP but is itself category N, we account for the fact that the only things that can appear in Spec, $(l)a$ are NPs of type $\langle e, t \rangle$. These proposals are summarized by the full lexical specifications for $(l)a$ and ID.

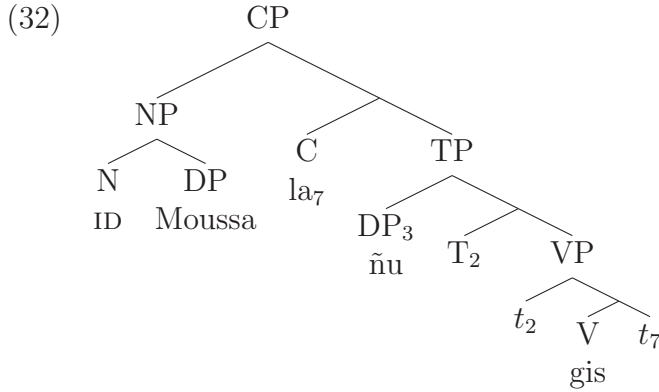
(30) *Wolof Inventory*

$$\begin{array}{l} \text{a.} \\ \text{b.} \end{array} \left[\begin{array}{l} \text{PHON } (l)a \\ \text{CAT } C \\ \text{SEL } \left[\begin{array}{ll} \text{COMP} & TP \\ \text{SPEC} & NP \end{array} \right] \\ \text{SEM}_n \lambda p \lambda Q \lambda g [Q(*\iota x [p(g^{x/n})])(g)] \end{array} \right] \\ \left[\begin{array}{l} \text{PHON } \emptyset \\ \text{CAT } N \\ \text{SEL } [DP] \\ \text{SEM } \lambda x \lambda y [x = y] \end{array} \right]$$

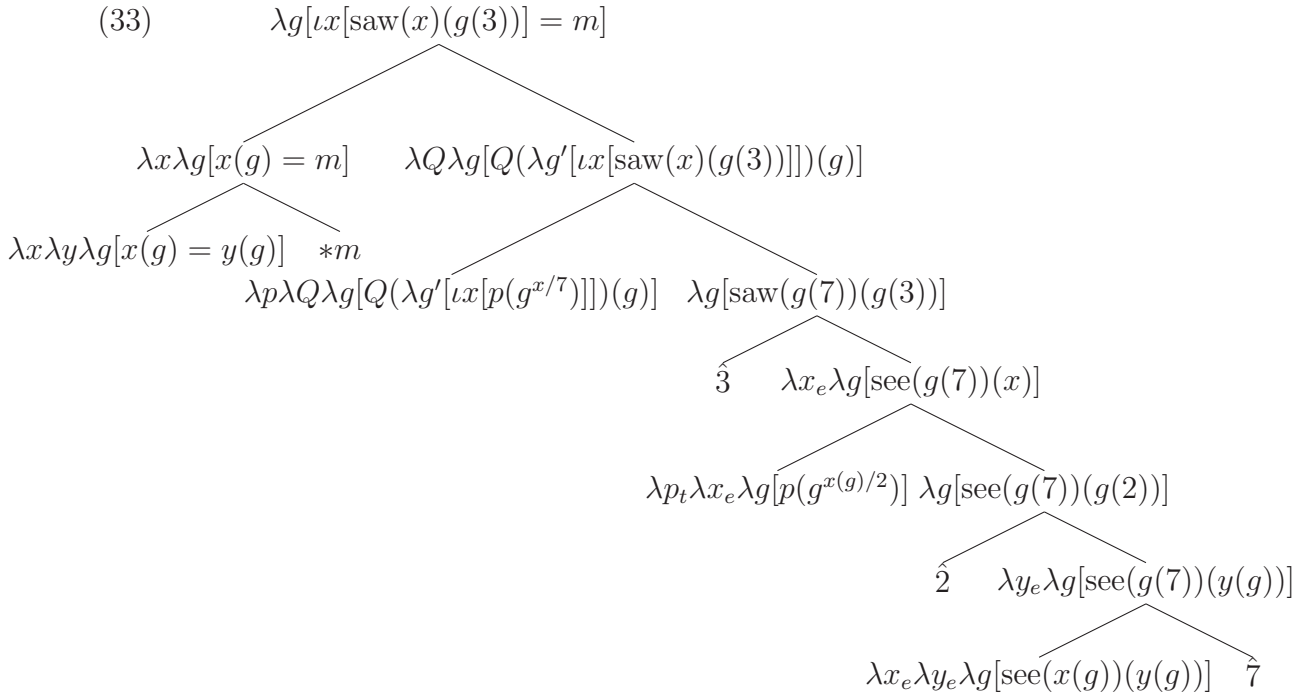
4.1 Deriving Exhaustivity

Consider (31), which has the structure as in (32).

- (31) Musaa l-a-ñu gis.
 Moussa *l*C_{WH}-3PL see
 “It’s Moussa who they saw.”



We derive the interpretation of (31) in (33). (31) is true for assignment g iff the unique individual who was seen by the third individual identified by g is identical to Mary. Ignoring the contribution of tense, we give Wolof T the same denotation as English AgrS in (20).



In (33), TP has the interpretation $\lambda g[\text{saw}(g(7))(g(3))]$, i.e., a function from an assignment to true iff the third individual identified by the assignment saw the seventh such individual. The complementizer (*l*)*a* combines with this proposition, a property, and an assignment to return true iff that property holds of the unique individual x such that when altering the assignment so that its third individual is x , the proposition is true of the altered assignment.

The property supplied is simply the property of being Moussa, and the result is something which essentially means: Moussa is identical to the one who they saw.

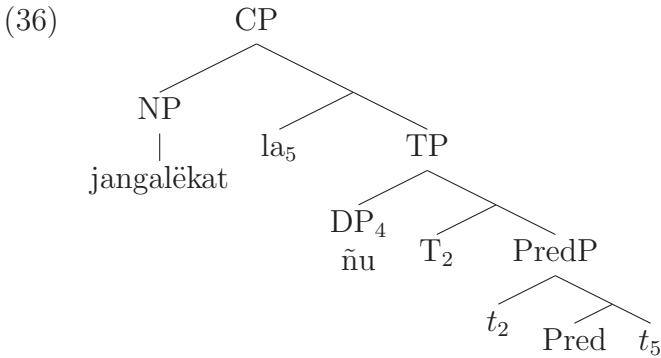
4.2 Deriving Predication

In cases of simple predication, the predicative NP has both the necessary properties for movement to Spec of $(l)a$: It is an NP and it is of type $\langle e, t \rangle$. A normal predicative structure contains just the predicative NP and a simple referential DP, so the remnant of movement will be a singleton. The upshot of this is that binding by the ι -operator induced by $(l)a$ has a trivial effect; this is why the usual exhaustifying contribution of $(l)a$ is not detected in cases of simple predication.

One caveat must be made, however. When the predicative NP moves, as with NPs derived by ID as in the exhaustivity case, its trace is of type $\langle e \rangle$. This should derive a type mismatch if the other DP in the predicative small clause is also type $\langle e \rangle$. To account for this we stipulate that pronouns, unlike full DPs, can in principle have any type, including $\langle e, t \rangle$. As long as there is an individual salient in the discourse, a DP may refer to the property of being that individual as easily as it can refer to the individual itself. This predicts that predicative sentences with a fronted predicative NP are only possible with pronominal subjects; and in fact, this is the case.

- (34) Jangalëkat l-a-ñu.
 teacher l -C_{WH}-3PL
 “They are teachers.”
- (35) *Jangalëkat l-a Musaa.
 teacher l -C_{WH} Moussa

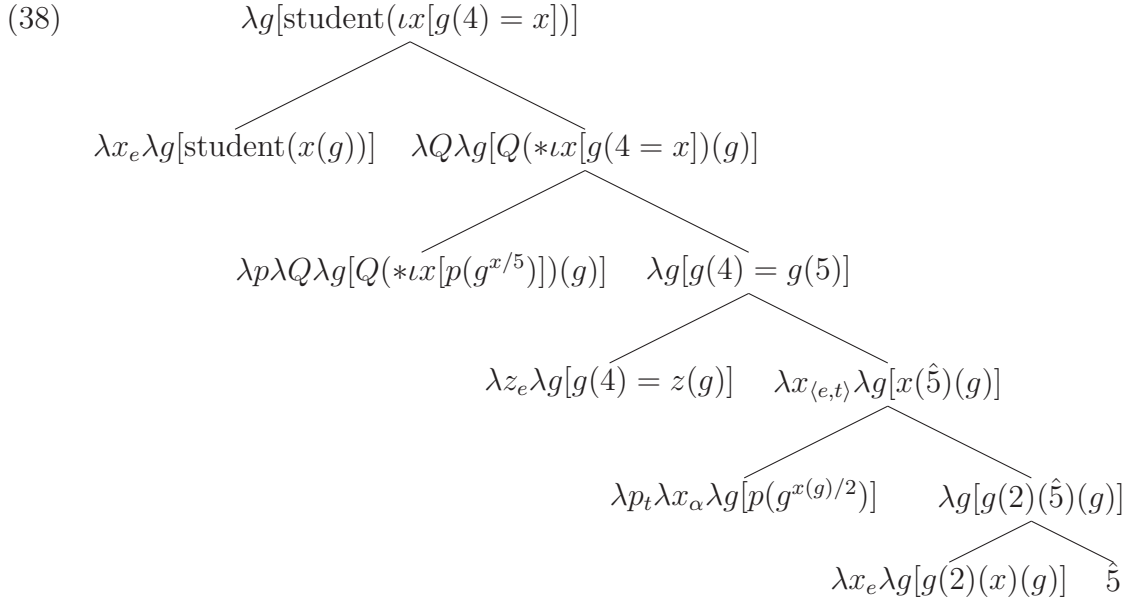
The LF for (34) is in (36).



Incorporating the assumption about pronouns laid out above, take (37a) to be the denotation of the pronoun in (34). Assume also that when XPs of type $\langle e, t \rangle$ move, they may leave traces of type $\langle e \rangle$, or of type $\langle e, t \rangle$. Such traces have the meaning given in (37b). Given these preliminaries, the derivation of the interpretation of (34) is shown in (38); assume also that the predicative head Pred is vacuous.

- (37) *Property Pronouns and Traces*
 a. $[\text{pro}_n^{\text{prop}}] = \lambda x_e \lambda g[g(n) = x(g)]$

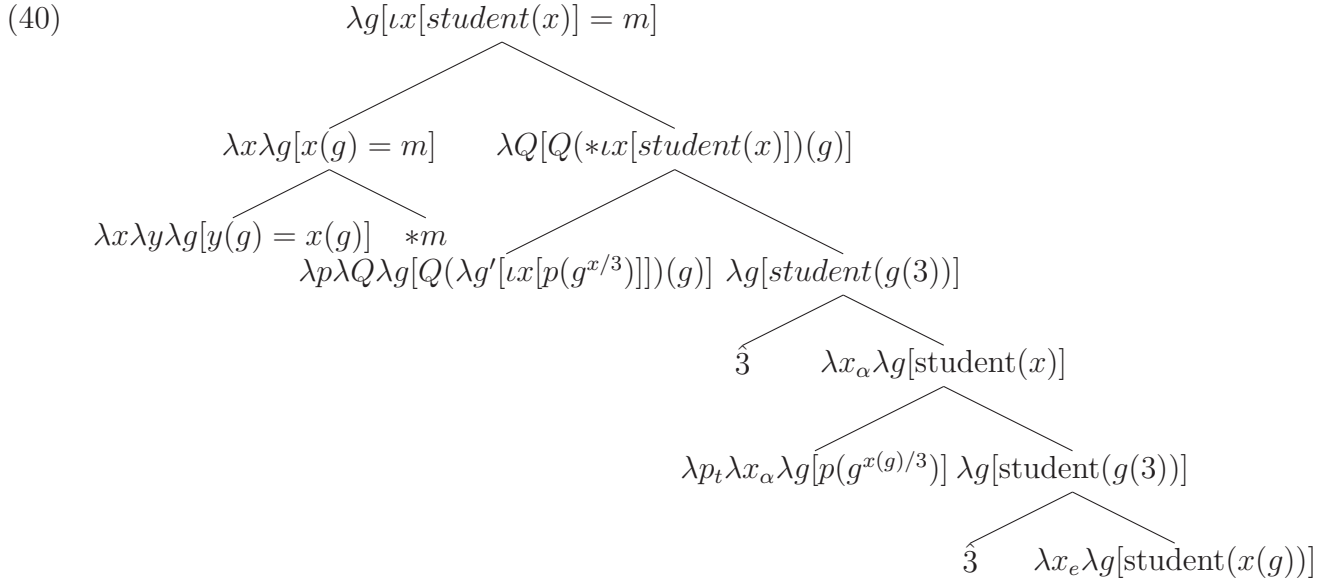
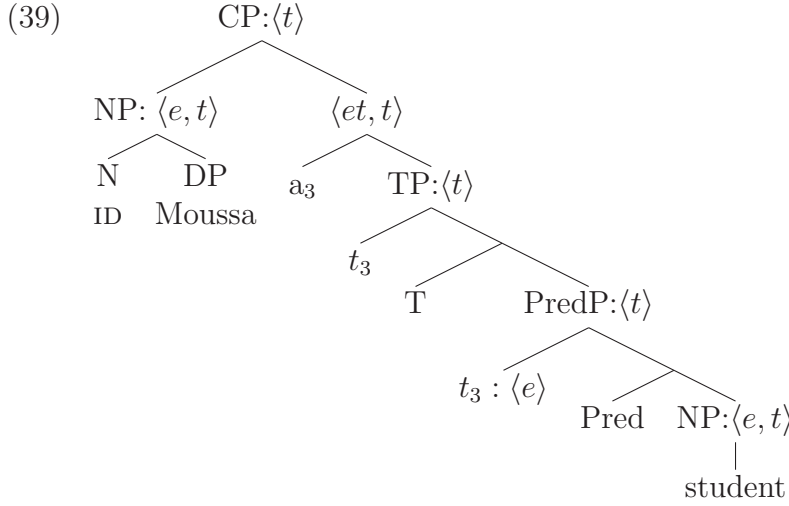
b. $\llbracket t_n^{prop} \rrbracket = \lambda x_e \lambda g [g(n)(x)(g)]$



The LF in (36) is generated when $(l)a$ attracts the nearest NP – in this case, the predicative NP *jangalëkat*. The trace of this movement is of type e . The pronoun denotes a the property of being the relevant individual, and leaves a property-typed trace (doing otherwise would cause a type-mismatch and crash). The result is that the TP denotes a proposition which is essentially equative in nature. Binding this with an iota results in the following individual description: $\lambda g [\iota x [g(2) = x]]$. This can be reduced simply to $\lambda g [g(2)]$; this is the trivialization of the exhaustivity of $(l)a$. Likewise the final denotation, $\lambda g [\text{student}(\iota x [g(2) = x])]$ can be reduced to $\lambda g [\text{student}(g(2))]$, i.e., simple predication.

Recall that full DPs cannot be in subject position in predicative structures like (34), because they do not denote type $\langle e, t \rangle$. But the theory presented here does allow a mechanism for shifting referential DPs into type $\langle e, t \rangle$ – namely, ID. So what if such a shifted DP were put in subject position in a predicative construction?

What we predict is that because $(l)a$ attracts the nearest NP, the subject itself will raise to Spec of $(l)a$, leaving the predicative NP *in situ*. In fact, if the traces that the subject DP/NP leaves are both type $\langle e \rangle$, we predict this to be interpretable.



The meaning we predict for an LF like (39) is something like: Moussa is the one who is a student. And in fact, this is the correct prediction. Not only is (41) grammatical, it has exactly this meaning.

(41) Exhaustive identification in a predicational copular sentence

Musaa-a di (>Mussaay) ndongo.
 Moussa-C_{WH} COP student

“It’s Moussa who’s a student.”

5 Extending to Other Copular Constructions

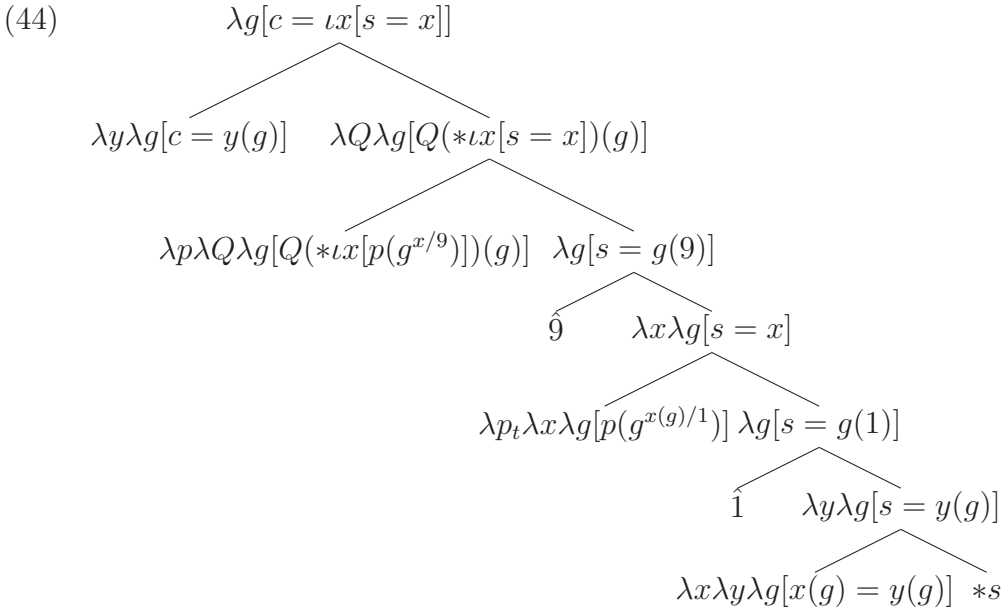
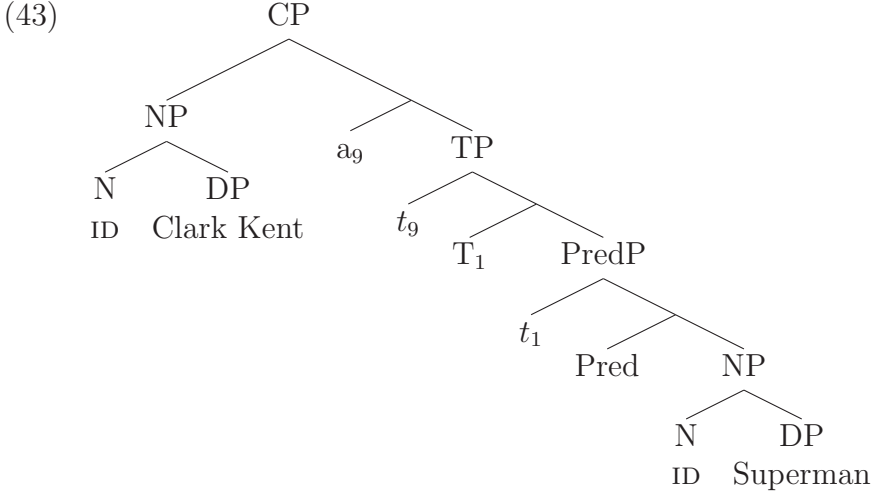
Derivation of exhaustivity and predication both involve an equative semantics; in the case of the former, it is contributed by the typeshifting head ID, in the case of the latter by the pronominal subject. This raises the question of whether equatives themselves involve (*l*)*a*, and in fact they do (42).

(42) Equative copular sentence in Wolof

Clark Kent-a di (>Kentay) Superman.
 Clark Kent-C_{WH} COP Superman

“Clark Kent is Superman.”

These sentences are captured by our theory. If both DPs are typeshifted by the ID, the higher one will be attracted by (l)a and provide the correct interpretation – again, the exhaustifying effect is neutralized.



Again, $\lambda g[c = \iota x[s = x]]$ can be reduced to $\lambda g[c = s]$.

Two relevant predictions are made by this proposal. The first is that equatives where the complement of Pred is raised to Spec of (l)a rather than the subject should be bad when the subject is a full DP; this is borne out by the data, as (45) shows.

(45) *Superman l-a Clark Kent.
 Superman l-C_{WH} Clark Kent

The second prediction is that equatives where the complement of Pred is raised to Spec of *(l)a* are permitted when the subject is pronominal. This prediction is not born out: (46) cannot mean that the individual Clark Kent is identical to the individual Superman.

- (46) *Clark Kent Superman *l-a-∅*.
 Clark Kent Superman *l-C_{WH}-3SG*
 intended: “*Clark Kent is Superman.*”

We follow Martinović (to appear) and propose this to be the result of a pragmatic constraint. In particular, sentences such as those in (46) have a topic-comment structure, which has the purpose of attributing some property (comment) of an already established discourse referent (topic) (Lambrecht 1994). This syntactic configuration forces the two DPs in copular sentences to be asymmetric in a broader sense: N2 must in some way contribute information about N1. Specifically, it is argued that N1 in such sentences must be higher on the familiarity/givenness hierarchy (Gundel *et al.* 1993; Mulkern 1996) compared to N2.⁸

So-called specificational sentences also involve *(l)a*, and are also accounted for on this proposal. Their syntax is identical to the syntax of predicational sentences:

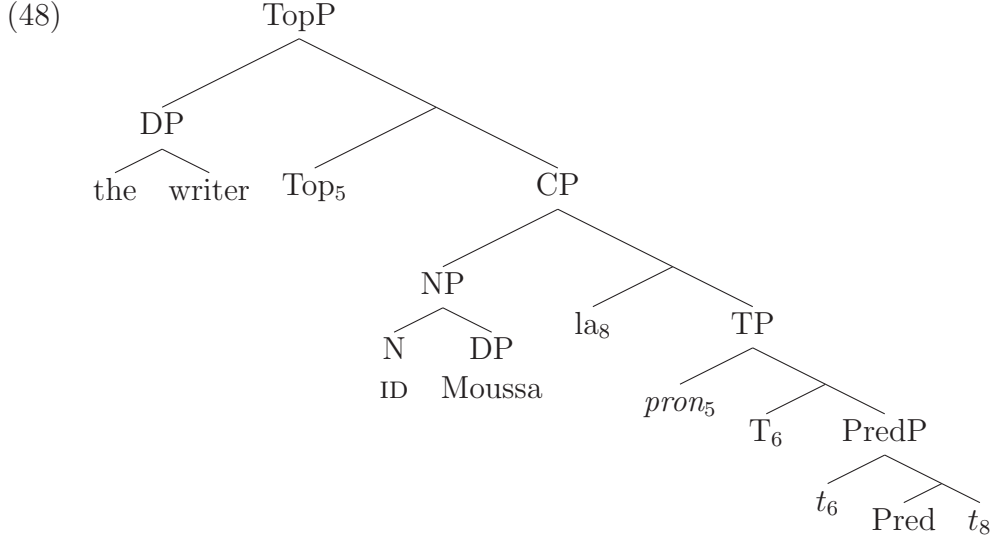
- (47) *Specificational copular sentence in Wolof*
 Bindëkat bi Musaa *l-a-∅*.
 writer DEF.SG Moussa *l-C_{WH}-3SG*
 “*The writer is Moussa.*”

In the case of specificational sentences, a topicalized definite binds the subject pronoun, while a referring object DP is moved to Spec of *(l)a*. Following, e.g., Coppock & Beaver (2012) who argue that definite DPs are of type $\langle e, t \rangle$, and assuming that pronouns can, like traces, refer directly to properties (in addition to being able to have functional-pronoun-like denotations as in predicatives and marked equatives), these are neatly derived. The LF for (47) is given in (48).⁹

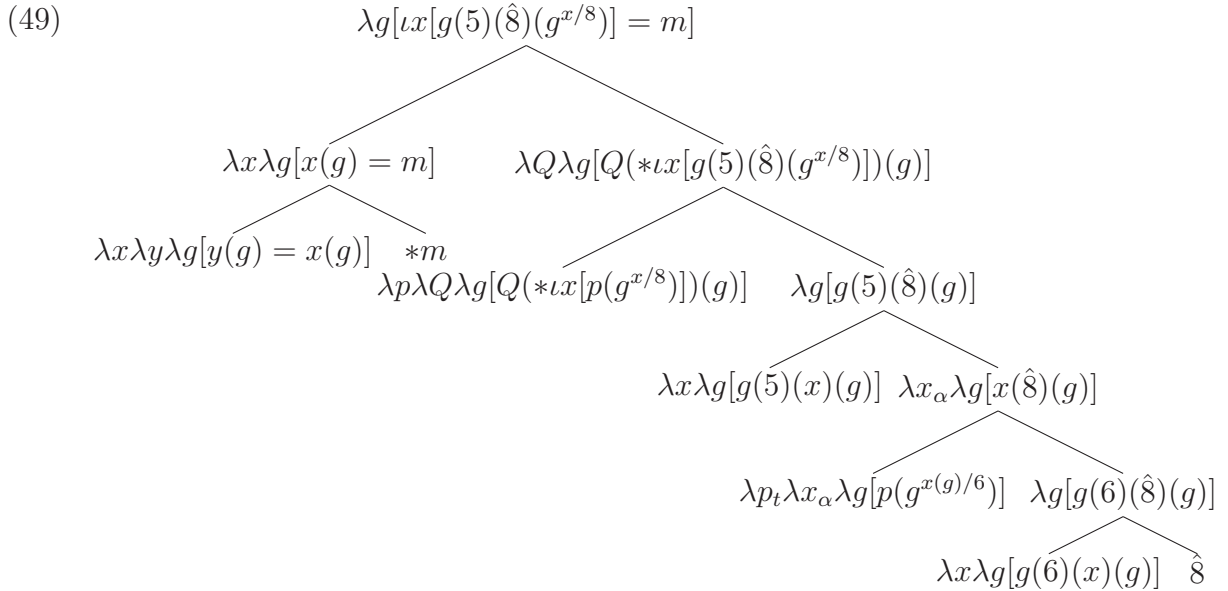
⁸It is possible to have structures such as N1 N2 *la* in which both nominals appear to be referential. On closer inspection, however, they seem to actually be predicational structures: (1) is true iff, for example, Moussa sings like/as well as Youssou N’Dour. In this case, N2 is actually interpreted as the most salient property of the individual picked out by the referential expression.

- (1) Musaa Yusu Nduur *l-a-∅*.
 Moussa Youssou N’Dour *l-C_{WH}-3SG*
 “*Moussa is Youssu N’Dour (in some relevant way).*”

⁹Note that we assume that N1 (*the writer*) is co-indexed with the subject pronoun, generated in Spec,PredP, and N2 (*Moussa*) as the complement of Pred. The underlying structure of specificational sentences is a matter of much debate and disagreement (see, for example, Mikkelsen (2005) for a discussion on different types of analyses of specificational copular sentences). We are here assuming a non-inversion-style analysis of specificational copular sentences.



Derivation of (48) is provided up to CP, given a property-denotation for the subject pronoun which is identical to the property denotation for traces provided in (37b).



Adding denotations for *the* and Top allow for the derivation to be completed. We assume an analysis of *the* a la Coppock & Beaver (2012). We assume that Top is synonymous with English AgrS as given in (20). Note that this requires Top to be assigned an index by agreement, but that this agreement is not of the movement-triggering variety.

- (50)
- [[the]] = $\lambda Q \lambda x \lambda g [Q(x)(g) \ \& \ \neg \exists y [x(g) \neq y(g) \ \& \ Q(y)(g)]]$
 - [[Top₅]] = $\lambda p_t \lambda y_\alpha \lambda g [p(g^{y(g)/5})]$
 - [[CP]] = $\lambda g [\iota x [g(5)(\hat{8})(g^{x/8})] = m]$
 - [[Top₅ CP]] = $\lambda y_\alpha \lambda g [\iota x [y(\hat{8})(g^{x/8}) = m]]$
 - [[the writer]] = $\lambda x \lambda g [\text{writer}(x(g)) \ \& \ \neg \exists z [x(g) \neq z(g) \ \& \ \text{writer}(z(g))]]$
 - [[the writer Top₅ CP]] = $\lambda g [\iota x [\text{writer}(x) = m]]$

6 Conclusion

This analysis provides two major benefits. The first is that it captures the use of Wolof (*la*) across a disparate range of copular sentences, including predicational, equative, and specificational sentences, as well as non-copular sentences, namely in exhaustively interpreted expressions. The crucial point here is that (*la*) does have an exhaustifying semantics, and targets bare nouns to move its specifier; but this happens to also target predicative nouns (in predicative constructions) and typeshifted DPs (in equatives and specificational sentences). In these three copular cases, however, the exhaustifying effect is neutralized.

The second major benefit of this analysis is that it provides a framework for interpreting overt movement compositionally. Following Kennedy's (2014) move to do the same for QR, we reinterpret attracting heads as binding the traces of movement to their specifiers. This eliminates the need for rules like Predicate Abstraction and unifies the syntax and semantics of movement by making agreement a requirement not only for the syntactic operation of movement, but also for its interpretation. This could potentially be extended to improve the account of many phenomena, especially discourse configurationality, by which movement to a peripheral head creates a semantic interaction between the head and its attractee.

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