SYMMETRIC OBJECT LANGUAGES AND THE ANALYSIS OF OBJECTS IN LFG

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ROADMAP

- Objects, in LFG and Moro
- Symmetric objects in LFG (previous approaches)
- The present proposal
- Discussion

OBJECTS, IN LFG AND IN MORO

OBJECTS (IN LFG)

- Objects are internal, core arguments of a predicate.
- Objecthood in LFG: the value of an OBJ or OBJ_θ GF at f-structure.
  - OBJ: unrestricted object function.
  - OBJ_θ: set of thematically-restricted object functions, such that θ is equated to some thematic role $\rightarrow \{OBJ_{THEME}, OBJ_{GOAL}, OBJ_{RECIPIENT}, \ldots\}$.
  - Each OBJ_θ function is a primitive of the theory.
- *Consistency* guarantees asymmetrical encoding.

OBJECTS IN MORO

- Moro (Mor. *Dhimorong*) is a Kordofanian (Niger-Congo) language spoken in the Nuba Mountains of South Kordofan, Sudan.
- The properties of objects in Moro have been described by Ackerman et al. (2017).
- Moro exhibits underived ditransitive predicates, as well as both a causative and an applicative construction.
- **All objects in a Moro clause appear to exhibit identical (or near identical) syntactic behaviour.**

MORO DITRANSITIVE I

- Both objects of a ditransitive verb receive accusative case, and either object may be interpreted as either the goal or the theme (resulting in ambiguity).

(1) *é-g-a-natʃ-ó* *ŋállo-***ŋ** *kóʤa-***ŋ**
1SG.SM-CLg-MAIN-give-PFV CLg.Ngallo-**ACC** CLg.Kodja-**ACC**
'I gave Ngallo to Kodja.' / 'I gave Kodja to Ngallo.'

- Either object of a ditransitive verb can be the subject of a passive alternative.

(2) *óráŋ* *g-ʌ-nʌtʃ-ən-ú* *ówːá*
CLg.man CLg.SM-MAIN-give-**PASS**-PFV CLg.woman
'The man was given a woman / to a woman.'

(Examples from Ackerman et al., 2017: 10)

MORO DITRANSITIVE II

- Either object of a ditransitive verb may be realized as an object marker.

(3) *é-g-a-natʃ-é-**lo*** *ŋerá*
1SG.SM-CLg-MAIN-give-PFV-**3PL.OM** CLŋ.girl
'I gave them to the girl.' / 'I gave the girl to them.'

- A single ditransitive clause may include multiple objects realised as object markers, or a combination of object markers and passivisation.

(4) ***óráŋ*** ***g-ʌ-nʌtʃ-ən-ɔ́-ŋɔ́***
CLg.man CLg.SM-MAIN-give-**PASS**-PFV-**3SG.OM**
'The man was given to her.' / 'She was given to the man.'

(Examples from Ackerman et al., 2017: 10-11)

MORO TRITRANSITIVE CLAUSES

- The exact same patterns are observed with derived ditransitive clauses in the causative or applicative.
- The causative or applicative may be applied to a ditransitive predicate, resulting in a tritransitive clause (although one cannot apply both causative and applicative to a single predicate).
- The same patterns given above are observed in the tritransitive case – except that all three objects of the resultant tritransitive clause exhibit symmetrical properties.
- <u>All objects of a Moro tritransitive</u>**:** take any appropriate thematic role (ambiguously); are assigned accusative case; can be the subject of a passive alternation; can be realised as an object marker.

MORO TRITRANSITIVE: EXAMPLE

(5) *í-g-ʌ-nʌʤ-əʈ̪-ú* *aljásər-***o** *kúku-***ŋ** *ŋállo-***ŋ**
1SG.SM-CLg-MAIN-give-**APPL**-PFV CLg.Elyasir-**ACC** CLg.Kuku-**ACC** CLg.Ngallo-**ACC**
'I gave Elyasir to Kuku for Ngallo / Elyasir to Ngallo for Kuku / Kuku to Elyasir for Ngallo / Kuku to Ngallo for Elyasir / Ngallo to Kuku for Elyasir / Ngallo to Elyasir for Kuku.'

(Ackerman et al., 2017: 14-15)

OBJECTS IN MORO: SUMMARY

- All objects in both (derived and underived) ditransitive and tritransitive clauses exhibit identical syntactic properties.
- Several objects may simultaneously exhibit primary object properties (e.g. object marking and passivisation).

Conclusion: There does not seem to be any non-arbitrary way to syntactically distinguish between objects in a Moro ditransitive or tritransitive clause.

SYMMETRIC OBJECTS IN LFG

BRESNAN & MOSHI (1990) I

- The seminal work on LFG approaches to symmetric object languages is Bresnan & Moshi's (1990) treatment of the Bantu language Kichaga.
- Kichaga applicative clauses exhibit a number of symmetric object properties similar to Moro:
  - either object of the applicative may be subject of a passive alternation;
  - either object may be realised as an object marker;
  - either object may be the target of reciprocalisation;
  - object properties may co-occur on distinct objects (e.g. passive + object marker).
- However (Bresnan & Moshi, 1990: 157-159):
  - Word Order: The applied NP must be adjacent to the verb if it is a beneficiary or recipient, but the patient NP may be adjacent to the verb if the applied NP has any other thematic role;
  - Extraction: No long-distance extraction of beneficiary or recipient objects; patient objects and applied instrumentals/locatives can be extracted.

BRESNAN & MOSHI (1990) II

- The f-projections of object NPs of Kichaga applicative ditransitives are assigned to distinct syntactic representations at f-structure – as the values of OBJ and $\mathrm{OBJ}_{\mathrm{PATIENT}}$, respectively.
- The symmetric properties of Kichaga applicative objects are a result of the mapping theory, rules governing morpholexical operations, and the action of a single parameter of variation – the Asymmetrical Object Parameter (AOP).
- AOP: If the AOP is present in a language, only one non-highest thematic role in a clause may be intrinsically classified as unrestricted [- r].

OBJECT ASYMMETRIES IN MORO?

- **Word order:** Preference for non-Theme argument to immediately follow the verb; this order is required if the Theme is inanimate, while animate Themes may occur immediately post-verbally.
- **Bound anaphora:** A bound anaphor must be bound by a co-argument that (linearly) precedes it.

(7)	(a)	*é-g-a-natʃ-ó*	*óráŋ*	*ádámá*
		1SG.SM-CLg-MAIN-give-PFV	CLg.man	CLg.book
		'I gave the book to the man.'		
	(b)	**é-g-a-natʃ-ó*	*ádámá*	*óráŋ*
		1SG.SM-CLg-MAIN-give-PFV	CLg.book	CLg.man

(8)	(a)	*é-g-a-natʃ-ó*	*ej*	*um:iə*	*ðamala*	*é-ðoŋ=ðoŋ*
		1SG.SM-CLg-MAIN-give-PFV	every	CLg.boy	CLð.camel	CLð.own
		'I gave every boy$_i$ his$_i$ camel.'				
	(b)	**é-g-a-natʃ-ó*	*ðamala*	*é-ðoŋ=ðoŋ*	*ej*	*um:iə*
		1SG.SM-CLg-MAIN-give-PFV	CLð.camel	CLð.own	every	CLg.boy

(Ackerman et al., 2017: 41,43)

SET-VALUED OBJ

- Patejuk and Przepiórkowksi (2016) briefly raise the possibility of an LFG implementation treating OBJ as a set-valued attribute, but this proposal (and its implications for the wider framework, including the mapping theory) is not developed.
- The present proposal aims to develop this possibility as a minimal viable solution to adequately representing the syntax of languages like Moro in LFG.
- To do so, I will draw on the central roles played by thematic roles and the restrictions on their assignment in object properties across languages.

THE PRESENT PROPOSAL

FOUNDATIONAL PRINCIPLES

- Three foundational principles to guide the proposal:
  1. Our analysis should take each language on its own terms.
  2. Asymmetries between objects in object asymmetric languages can be (primarily or exclusively) characterised in terms of thematic role restrictions.
  3. Our final proposal should make full use of the modularity of the LFG Parallel Projection Architecture.

GRAMMATICAL FUNCTIONS

- Thematic θ-indices are redundant (Patejuk and Przepiórkowksi , 2016).
- If we collapse the $\mathrm{OBJ}/\mathrm{OBJ}_\theta$ distinction, we are left with three core GFs: SUBJ, OBJ and OBL (see also Alsina, 1996; Börjars and Vincent, 2008).
- SUBJ is defined as the external (core) argument function; it is a singleton function that takes an f-structure as its value.
- OBJ and OBL are both set-valued functions.
  - **OBJ is defined as taking the set of internal core arguments of the predicate as its value**
  - **OBL is defined as taking the set of oblique arguments of the predicate as its value.**
- Revised mapping features: SUBJ: $\begin{bmatrix}-r\\-o\end{bmatrix}$ OBL: $\begin{bmatrix}+r\\-o\end{bmatrix}$ OBJ: $[+o]$

MAPPING PRINCIPLE

- Following Dalrymple et al. (2019: 336), I assume that [+] values are more marked than [–] values; as $[+o]$ is unique to OBJ, I assume that $[+o]$ is more highly marked than $[+r]$.
- Revised Markedness Hierarchy: $\mathrm{SUBJ} > \mathrm{OBL} > \mathrm{OBJ}$
- **Mapping Principle (MP):** Argument positions are mapped onto the highest (least marked) compatible function on the Markedness Hierarchy. (See Kibort, 2014: 267; Dalrymple et al., 2019: 336-338.)

Here a *compatible function* is defined as a function whose mapping features do not contradict the feature specification of the argument position.

ARGUMENT POSITION INTRINSIC ASSIGNMENTS

- I follow a modified version of the Kibort-Findlay valency frame approach to mapping theory (Findlay, 2016, 2020; Kibort, 2014).
- In order to account for the Moro data, I propose revising the frame to include a second

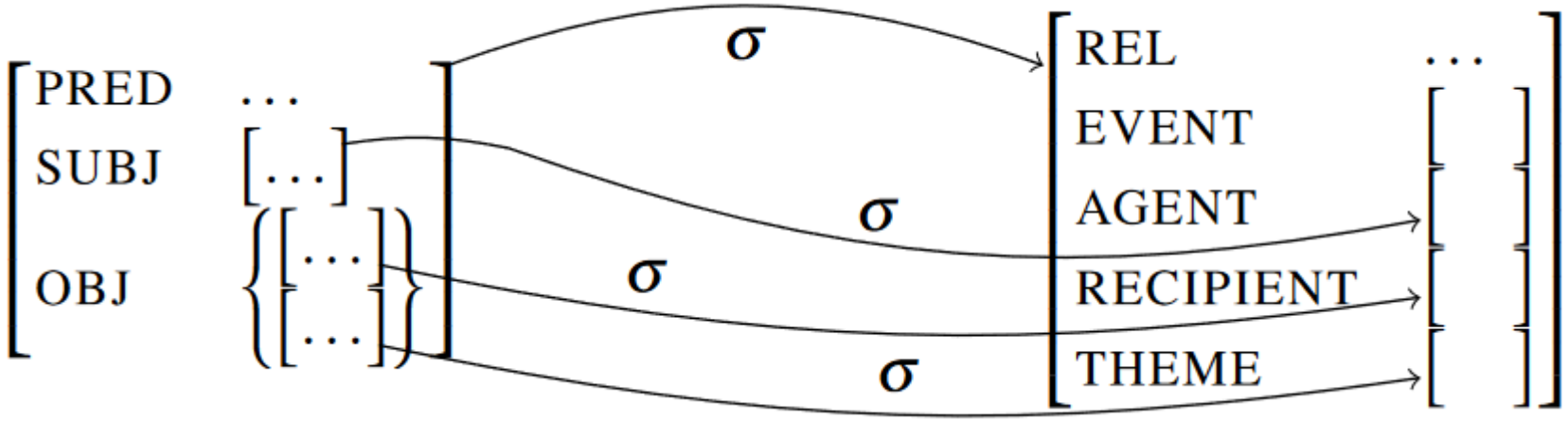
$$\begin{array}{c} arg_2 \\ | \\ [-r] \end{array}$$

position, resulting in a revised valency frame.

$$\langle \quad \begin{array}{c} arg_1 \\ | \\ [-o/-r] \end{array} \quad \begin{array}{c} arg_2 \\ | \\ [-r] \end{array} \quad \begin{array}{c} arg_2 \\ | \\ [-r] \end{array} \quad \begin{array}{c} arg_3 \\ | \\ [+o] \end{array} \quad \ldots \quad \begin{array}{c} arg_4 \\ | \\ [-o] \end{array} \quad \ldots \quad \rangle$$

Figure 1: Modified valency frame with additional arg_2 slot

REFERENCING THEMATIC ROLES



- Thematic restrictions are expressed by direct reference to s-structure.
- I assume that s-structure attributes are labelled according to their thematic role – i.e., not as $\mathrm{ARG}_1, \mathrm{ARG}_2$, etc., but as $\mathrm{AGENT}, \mathrm{PATIENT}, \mathrm{RECIPIENT}$, etc. (see above)
- Metavariables $\downarrow_\sigma$ and $\uparrow_\sigma$ abbreviate $\sigma(\phi(*))$ and $\sigma(\phi(\hat{*}))$, respectively.
- I introduce the abbreviation $\mathrm{IO} = \{\mathrm{BENEFICIARY} \mid \mathrm{MALEFICIARY} \mid \mathrm{RECIPIENT}\}$.

FORMAL MAPPING THEORY REVISIONS I

- I primarily follow Findlay (2020) for the formal specification of the Mapping Theory, modified to accommodate the set-valued OBJ analysis. Note that OBJ is underspecified for [+/- r].

$$\text{MINUSO} \equiv \{\text{SUBJ}|\text{OBL}\} \qquad \text{PLUSO} \equiv \text{OBJ}$$
$$\text{MINUSR} \equiv \{\text{SUBJ}|\text{OBJ}\} \qquad \text{PLUSR} \equiv \{\text{OBJ}|\text{OBL}\}$$

$$\textsc{Map}(GF, arg) :=$$
$$\{(\uparrow GF)_{\sigma} = (arg) | (arg)_{\sigma^{-1}} \in (\uparrow GF)\}$$

$$\textsc{Preferred}-\textsc{Mapping}(GF, arg) :=$$
$$\left\{ @\textsc{Map}(GF, arg) \quad | \quad \begin{matrix} (\uparrow GF) \\ \neg @\textsc{Map}(GF, arg) \end{matrix} \quad | \quad @\textsc{NoMap}(arg) \right\}$$

← DEFAULT-MAPPING template is unchanged, while NOMAP and DEFAULT-$\widehat{\text{ARG}}$ are minimally adjusted to take s-structures as arguments.

FORMAL MAPPING THEORY REVISIONS II

- Argument templates are revised for proposed GFs and to account for multiple arg_{2-4} slots. The revised ARG2 template is given here as an example.

$$\textsc{Arg2}(arg) :=$$
$$@\textsc{Default}-\textsc{Mapping}(\text{OBJ}, arg, \text{OBL})$$
$$@\textsc{Preferred}-\textsc{Mapping}(\text{SUBJ}, arg)$$
$$(\uparrow \text{SUBJ})_\sigma \neq (arg) \Rightarrow \left\{ (\uparrow \text{SUBJ})_\sigma = \left(\uparrow_\sigma \widehat{\text{ARG}}\right) \middle| (\uparrow \text{SUBJ})_\sigma = \begin{matrix} (\uparrow_\sigma \text{ARG}) \\ (\rightarrow \text{ARGTYPE}) = \text{arg2} \end{matrix} \right\}$$
$$(arg\ \text{ARGTYPE}) = \text{arg2}$$

- ARG is defined as the set of thematic role labels: $\text{ARG} \equiv \{\text{AGENT} \mid \text{THEME} \mid \text{RECIPIENT} \mid \ldots\}$
- **Key take-away:** Arg2 is [-r] and gets preferential SUBJ billing after $\widehat{\text{ARG}}$.

PARAMETERS OF VARIATION I

- Parameters of variation expressed by differences in templates.
- Example: An APPLIED-BENEFICIARY template introduces a [-r] arg_2 BENEFICIARY argument. The AOP, if present, requires all other arg_2 are [+o].

$$\frac{\begin{array}{l}\textsc{Applied}-\textsc{Beneficiary}(ben) := \\ \quad @\textsc{Arg2}(ben) \\ \quad \ldots\end{array}}{\begin{array}{l}\textsc{AOP}-\textsc{Applied}-\textsc{Beneficiary}(ben) := \\ \quad @\textsc{Arg2}(ben) \\ \quad (\uparrow \text{SUBJ})_\sigma \neq (ben) \Longrightarrow (\uparrow \text{SUBJ})_\sigma = \begin{array}{c}(\uparrow_\sigma \text{ARG}) \\ (\rightarrow \text{ARGTYPE}) \neq \text{arg2}\end{array} \\ \quad \ldots\end{array}} \text{[AOP]}$$

PARAMETERS OF VARIATION II

- Example: We posit two AGENT-THEME-RECIPIENT-VERB templates, differing by presence or absence of the AOP (e.g. Standard English vs. Moro).

$\textsc{Agent}\text{—}\textsc{Theme}\text{—}\textsc{Recipient}\text{—}\textsc{Verb}(ag, th, rec) :=$

…

$@\textsc{Arg}1(ag)$

$@\textsc{Arg}2(th)$

$@\textsc{Arg}2(rec)$

…

$\textsc{AOP}\text{—}\textsc{Agent}\text{—}\textsc{Theme}\text{—}\textsc{Recipient}\text{—}\textsc{Verb}(ag, th, rec) :=$

…

$@\textsc{Arg}1(ag)$

$@\textsc{Arg}3(th)$

$@\textsc{Arg}2(rec)$

…

- Key Take-away: Non-AOP theme and recipient are both [-r]; AOP theme is [+o].

EXAMPLE – PASSIVE I

- Recall that Moro di- and tritransitives exhibit symmetric passivisation.

(2) *óráŋ* *g-ʌ-nʌtʃ-ən-ú* *ówːá*
CLg.man CLg.SM-MAIN-give-**PASS**-PFV CLg.woman
'The man was given a woman / to a woman.'

		AGENT	THEME	RECIPIENT	
		|	|	|	
'give'	⟨	arg_1	arg_2	arg_2	⟩
		∅	$[-r]$	$[-r]$	
			SUBJ / $x \in$ OBJ	SUBJ / $x \in$ OBJ	
M.P.			SUBJ	$x \in$ OBJ	*or*
			$x \in$ OBJ	SUBJ	

EXAMPLE – PASSIVE II

- Assume a modified version of Findlay's (2020) PASSIVE template (specifying %arg1 in Passive).

$$@\textsc{Default}-\textsc{Mapping}(\text{SUBJ}, \uparrow_\sigma \text{AGENT}, \text{PLUSO})$$

$$(\uparrow_\sigma \text{AGENT ARGTYPE}) = \text{arg1}$$

$$(\%\text{arg1}) = \begin{array}{c}(\uparrow_\sigma \text{ARG}) \\ (\rightarrow \text{ARGTYPE}) = \text{arg1}\end{array}$$

$$\{@\textsc{Suppress}(\%\text{arg1}, \textsc{Closure}) | @\textsc{Map}(\text{PLUSR}, \%\text{arg1})\}$$

← First four lines constrain AGENT. 1-2 are ARG1 template, 3-4 are from PASSIVE (slightly expanded for clarity).

$$@\textsc{Default}-\textsc{Mapping}(\text{OBJ}, \uparrow_\sigma \text{THEME}, \text{OBL})$$

$$@\textsc{Preferred}-\textsc{Mapping}(\text{SUBJ}, \uparrow_\sigma \text{THEME})$$

$$(\uparrow \text{SUBJ})_\sigma \neq (\uparrow_\sigma \text{THEME}) \Longrightarrow \left\{(\uparrow \text{SUBJ})_\sigma = \left(\uparrow_\sigma \widehat{\text{ARG}}\right) \middle| (\uparrow \text{SUBJ})_\sigma = \begin{array}{c}(\uparrow_\sigma \text{ARG}) \\ (\rightarrow \text{ARGTYPE}) = \text{arg2}\end{array}\right\}$$

$$(\uparrow_\sigma \text{THEME ARGTYPE}) = \text{arg2}$$

← Next four lines constrain THEME argument. All lines come from ARG2 template.

$$@\textsc{Default}-\textsc{Mapping}(\text{OBJ}, \uparrow_\sigma \text{RECIPIENT}, \text{OBL})$$

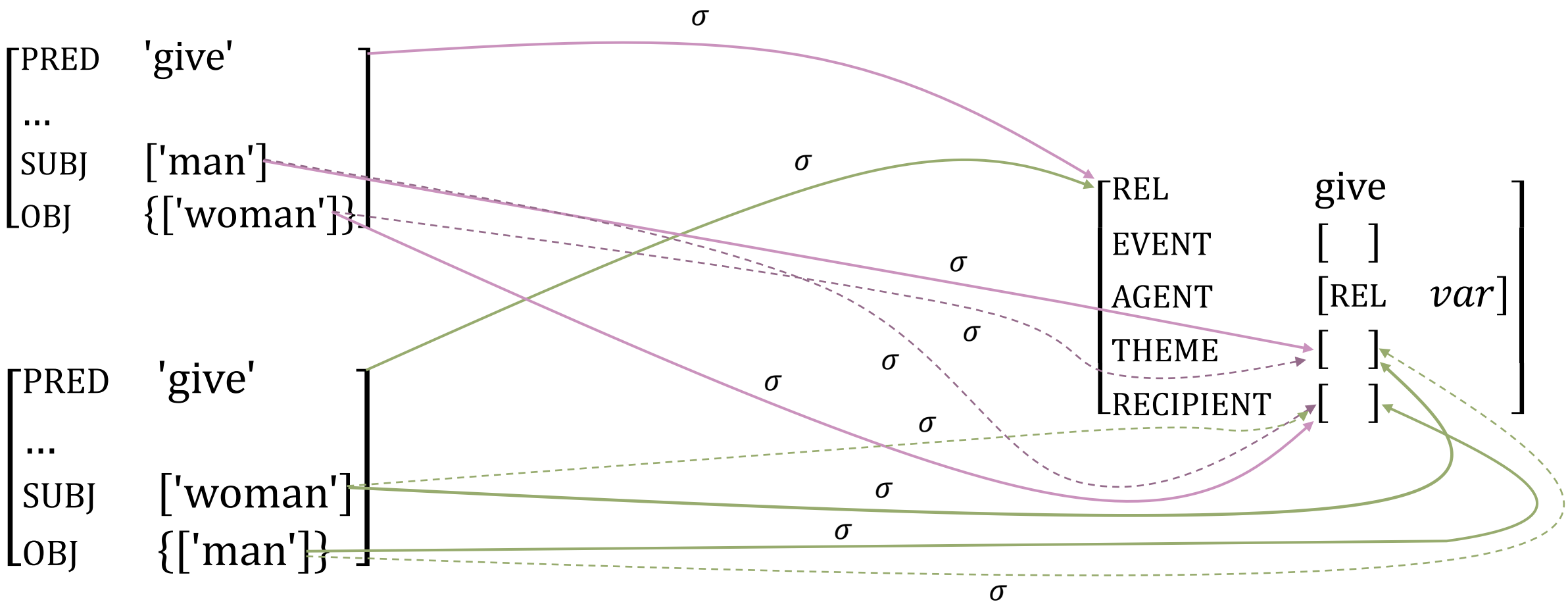
$$@\textsc{Preferred}-\textsc{Mapping}(\text{SUBJ}, \uparrow_\sigma \text{RECIPIENT})$$

$$\ldots$$

← Repeat for RECIPIENT.

EXAMPLE – PASSIVE III

- All conditions are compatible with either **THEME** or **RECIPIENT** being assigned to **SUBJ**.



WORD ORDER I

- Word order constraints can be characterised in thematic (+ semantic) terms.
- Bresnan & Moshi (1990: 158): The applied NP must be adjacent to the verb if it is a beneficiary or recipient, but the patient NP may be adjacent to the verb if the applied NP has any other thematic role and patient NP is animate.

{ (NP)	NP NP	NP NP	NP NP	NP NP	... }
$\downarrow \in (\uparrow \text{OBJ})$	$\downarrow \in (\uparrow \text{OBJ})$	$\downarrow \in (\uparrow \text{OBJ})$	$\downarrow \in (\uparrow \text{OBJ})$	$\downarrow \in (\uparrow \text{OBJ})$	$\downarrow \in (\uparrow \text{OBJ})$	
	$(\uparrow_\sigma \text{IO}) = \downarrow_\sigma$	$(\uparrow_\sigma \text{PATIENT}) = \downarrow_\sigma$	$(\uparrow_\sigma \text{PATIENT}) = \downarrow_\sigma$	$(\uparrow_\sigma \text{IO}) \neq \downarrow_\sigma$	$(\uparrow_\sigma \text{IO}) \neq \downarrow_\sigma$	$(\uparrow_\sigma \text{PATIENT}) = \downarrow_\sigma$	
			$(\downarrow_\sigma \text{ANIMATE}) = +$			$(\downarrow_\sigma \text{ANIMATE}) = +$	

WORD ORDER II

- Ackerman et al. (2017: 41): Non-Theme argument must be immediately post-verbal if the Theme is inanimate; if all objects are animate, any order is possible.

{	(NP)*	|	NP	NP	(NP)*	| … }
	$\downarrow \in (\uparrow \text{OBJ})$		$\downarrow \in (\uparrow \text{OBJ})$	$\downarrow \in (\uparrow \text{OBJ})$	$\downarrow \in (\uparrow \text{OBJ})$	
	$(\uparrow_\sigma \text{ ANIMATE}) = +$		$(\uparrow_\sigma \text{ THEME}) \neq \downarrow_\sigma$	$(\uparrow_\sigma \text{ THEME}) = \downarrow_\sigma$		
				$(\uparrow_\sigma \text{ ANIMATE}) = -$		

DISCUSSION

MERITS OF THE CURRENT PROPOSAL

- Provides a thorough formal treatment of the 'set-valued OBJ' proposal.
- No difference in syntactic representation without a corresponding difference in syntactic behaviour.
- Takes full advantage of the Parallel Projection Architecture to offer a uniquely LFG solution to the problem of symmetric object languages.
- Contributes positively towards theoretical discussion around the dubious status of the $\mathrm{OBJ}/\mathrm{OBJ}_{\theta}$ distinction (see Börjars and Vincent, 2008).
- Can freely distinguish between different degrees of symmetry among 'object symmetric' languages (e.g. Kichaga vs. Moro).

CONCLUSION

- Objecthood and object properties exist at the intersection of syntactic, thematic, and semantic properties.
- By utilising direct reference to semantic structures when characterising syntactic constraints, we can leverage the power of the Parallel Projection Architecture to produce a robust, empirically adequate, and less redundant formal analysis of object properties across languages.
- This is not the only solution, but I argue that this proposal constitutes the minimal development on contemporary LFG approaches necessary to satisfactorily account for the data presented by highly symmetric object languages like Moro.

THANK YOU FOR LISTENING

- Any questions?
- If you wish to discuss this project with me in greater detail afterwards, please do not hesitate to send me an email on toby.lowther@ling-phil.ox.ac.uk.

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