Symmetric object languages and the analysis of objects in LFG

Toby Lowther • University of Oxford

Lexical-Functional Grammar (LFG) analyses are predicated on the assumption of the asymmetric encoding of objects (Ackerman et al., 2017, p. 4): where two or more objects are present in a clause, each object of that clause must be assigned to either the semantically unrestricted OBJ function or to some member of the set of semantically restricted OBJ_θ grammatical functions, and no two objects can be assigned to the same grammatical function. While this framework adequately characterises object asymmetric languages (see Dryer, 1986; Haspelmath, 2008), it cannot provide a satisfactory analysis for symmetric object languages. In this paper, I discuss a revision to the representation of objects in LFG which allows the framework to adequately characterise object symmetric languages. This approach improves upon previous attempts to account for symmetric object languages in LFG by taking object symmetric languages on their own terms and providing greater empirical coverage, as well as providing a uniquely LFG solution to the problem of (a)symmetric object encoding through its utilisation of the Parallel Projection architecture.

A major challenge to the traditional LFG treatment of objects can be found in object symmetric languages, such as the Kordofanian language Moro (Ackerman et al., 2017). In Moro ditransitive clauses, both objects can be interpreted as either RECIPIENT or THEME (irrespective of order), both objects take accusative case, both objects can be expressed as object markers on the verb, and both objects can be subjects of the passive alternation. (1) shows that the subject of the passive of a Moro ditransitive clause can be interpreted as either THEME or GOAL, demonstrating that either object can be the subject of a passive equivalent. Further, applicative/causative operations can be applied to ditransitive clauses in Moro, resulting in tritransitive clauses which exhibit the same object symmetries between all three objects, exemplified in (2). (For further examples of Moro object symmetries, see Ackerman et al. [2017, pp. 9–16].)

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

(Ackerman et al., 2017, p. 10)

(2) *í-g-ʌ-nʌʤ-***ət̪***-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, pp. 14–15)

Under a traditional LFG analysis, each object of a ditransitive or tritransitive clause is assigned a distinct grammatical function. In the case of Moro, such an assignment is necessarily arbitrary. As all objects in ditransitive and tritransitive clauses exhibit symmetric syntactic properties, assigning these objects distinct syntactic representations results in a difference in representation without a corresponding difference in syntatic behaviour, suggesting the syntactic representation is failing to capture the relevant syntactic facts.

The Moro data also pose a similar problem for previous LFG treatments of object symmetric languages, such as Bresnan and Moshi's (1990) treatment of the Bantu language Kichaga. Similarly to Moro, either object in Kichaga ditransitive applicative constructions can be represented as an object marker or be the subject of a passive alternative. Unlike Moro, however, objects in the Kichaga applicative exhibit word order and extraction asymmetries, and it is these asymmetries that form the bedrock of Bresnan and Moshi's analysis. This analysis accounts for the differences between symmetric Bantu languages like Kichaga and asymmetric Bantu languages like Chichewâ by the absence or presence (respectively) of an Asymmetrical Object Parameter (AOP). This parameter acts as a condition on intrinsic assignments under a traditional Lexical Mapping Theory (LMT) account of thematic role assignment, requiring that only a maximum of two arguments of a verb can be assigned $[-r]$. In languages which exhibit this parameter (such as Chichewâ), this prevents both objects of a ditransitive applicative or causative clause from being subjects of passive alternatives, while the absence of this parameter accounts for the symmetric passivisation pattern observed in Kichaga. The word order and extraction asymmetries in Kichaga are then accounted for by assigning one object to thematically unrestricted OBJ and the other to thematically restricted $\text{OBJ}_{\text{PATIENT}}$.

This analysis struggles to account for the Moro data in a non-arbitrary way because Moro exhibits no such asymmetries in word order or extraction, and as such, assigning each of the Moro objects to a distinct function from the $\{\text{OBJ},\text{OBJ}_\theta\}$ set becomes an arbitrary decision. Thus, we cannot simply adopt Bresnan and Moshi's proposal wholesale to account for the Moro data. To address these data, we require an LFG representation which allows multiple objects in a clause to receive the same syntactic representation. The minimal change required to allow such representations is to replace the various singleton OBJ and OBJ_θ functions with a single OBJ function which takes a set of f-structures as its value. Under such an analysis, thematic restrictions previously accounted for with OBJ_θ GFs are accounted for by syntactic constraints via reference to s-structure thematic roles.

For this model, I propose three core grammatical functions: $\widehat{\text{GF}}$, OBJ, and OBL. (A similar proposal for three core grammatical functions appears in Alsina, 1996. The possibility of using a set-valued OBJ function was raised by Patejuk and Przepiórkowski, 2016, but the proposal and its implications for mapping theory were not developed.) $\widehat{\text{GF}}$ takes an f-structure as its value, while each of the OBJ and OBL functions take sets of f-structures as their values. In terms of LMT features, each function is specified for $[\pm r, \pm o]$, except OBJ which is unspecified for $[\pm r]$, as given below.

$$\widehat{\text{GF}} \begin{bmatrix} -r \\ -o \end{bmatrix} \quad \text{OBL} \begin{bmatrix} +r \\ -o \end{bmatrix} \quad \text{OBJ} \begin{bmatrix} +o \end{bmatrix}$$

For the Markedness Hierarchy, I follow Dalrymple et al. (2019, p. 336) in assuming that '+' features are more marked than '-' features, with the additional specification that, as [+o] is only compatible with one function, while [+r] is compatible with two, [+o] is taken to be more marked than [+r]. This results in the following hierarchy.

$$\widehat{\text{GF}} > \text{OBL} > \text{OBJ}$$

Besides this revised Markedness Hierarchy, I assume a fairly standard Mapping Principle (henceforth, M.P.) as outlined in Dalrymple et al. (2019, pp. 336–8). For intrinsic assignments, I follow a modified version of the Kibort-Findlay valency frame approach to lexical mapping (Findlay, 2016; Kibort, 2014). The standard formulation of this approach cannot account for underived ditransitives in which both objects can undergo passivisation. In order to account for the data in (1), it is necessary to introduce an additional arg_2 slot, i.e., a second slot with intrinsic [-r] specification (figure 1). By assigning both objects in Moro underived transitives to arg_2 slots, standard lexical mapping assumptions allow us to derive the passivisation behaviour observed in (1).

$$\begin{array}{ccccccccc} \langle & arg_1 & arg_2 & arg_2 & arg_3 & \dots & arg_4 & \dots & \rangle \\ & | & | & | & | & & | & & \\ & [-o/-r] & [-r] & [-r] & [+o] & & [-o] & & \end{array}$$

Figure 1: Modified valency frame with additional arg_2 slot

Under this proposal, thematic restrictions are accounted for directly with the introduction of conditions on s-structure in lexical entries and PSRs. In such restrictions, the metavariables $\uparrow_\sigma$ and $\downarrow_\sigma$ represent the functions $\sigma(\phi(\hat{*}))$ and $\sigma(\phi(*))$ respectively, following Dalrymple et al. (2019, pp. 288–90). In addition, for brevity of expression, I introduce the abbreviation IO (for 'indirect object thematic role', following Bresnan and Moshi's terminology) to represent the set of thematic roles {RECIPIENT, BENEFICIARY, MALEFICIARY}, such that any constraint of the form $\uparrow_\sigma$ IO = $\downarrow_\sigma$ should be read as a constraint of the form,

$$\uparrow_\sigma \{\text{BENEFICIARY}|\text{MALEFICIARY}|\text{RECIPIENT}\} = \downarrow_\sigma$$

Roughly following Bresnan and Moshi (1990), I treat the applicative and causative as lexical operations which introduce an additional argument. This argument must have a $[-r]$ intrinsic specification when its thematic role belongs to the IO set; otherwise, it may be either $[-r]$ or $[+o]$. Following Findlay (2016), these operations are represented as templates applied to lexical entries.

With standard lexical mapping assumptions, this analysis is sufficient to capture the passivisation data in Kichaga, ensuring equivalent empirical coverage to Bresnan and Moshi's (1990) original analysis. Importantly, the addition of the second $[-r]$ arg_2 slot to the base valency frame allows this approach to account for Moro's tritransitives (see [2]) – a schematic derivation is given in figure 2.

		AGENT	RECIPIENT	THEME	BEN$_{\text{APPL}}$	
		|	|	|	|	
'give-for'	⟨	arg_1	arg_2	arg_2	arg_{APPL}	⟩
		Ø	$[-r]$	$[-r]$	$[-r]$	
			$\widehat{\text{GF}}$ / $x \in$ OBJ	$\widehat{\text{GF}}$ / $x \in$ OBJ	$\widehat{\text{GF}}$ / $x \in$ OBJ	
M.P.			$\widehat{\text{GF}}$	$x \in$ OBJ	$x \in$ OBJ	*or*
			$x \in$ OBJ	$\widehat{\text{GF}}$	$x \in$ OBJ	*or*
			$x \in$ OBJ	$x \in$ OBJ	$\widehat{\text{GF}}$	

Figure 2: Moro passive alternation in tritransitive applicative construction, assuming suppression model of the passive.

In addition to constraining applicative and causative templates, s-structural references are used to account for object (a)symmetries in syntactic constraints besides lexical mapping. For example, the free word order of objects in Moro is represented by the lack of thematic constraints on the relevant PSR, while the strict object asymmetries in Kichaga word order are accounted for by the presence of such thematic constraints, as shown in figures 3-4.

$$\text{V}' \rightarrow \underset{\uparrow=\downarrow}{\text{V}} \left(\underset{\downarrow\in\uparrow\ \text{OBJ}}{\text{NP}} \right)*$$

Figure 3: Partial Moro V′ PSR representing free order of objects.

$$\text{V}' \rightarrow \underset{\uparrow=\downarrow}{\text{V}} \left\{ \left(\underset{\downarrow\in(\uparrow\ \text{OBJ})}{\text{NP}} \right) \middle| \underset{\substack{\downarrow\in(\uparrow\ \text{OBJ})\\(\uparrow_\sigma\ \text{THEME})=\downarrow_\sigma}}{\text{NP}} \quad \underset{\substack{\downarrow\in(\uparrow\ \text{OBJ})\\(\uparrow_\sigma\ \text{IO})\neq\downarrow_\sigma}}{\text{NP}} \middle| \underset{\substack{\downarrow\in(\uparrow\ \text{OBJ})\\(\uparrow_\sigma\ \text{IO})=\downarrow_\sigma}}{\text{NP}} \quad \underset{\substack{\downarrow\in(\uparrow\ \text{OBJ})\\(\uparrow_\sigma\ \text{THEME})=\downarrow_\sigma}}{\text{NP}} \right\}$$

Figure 4: Partial Kichaga V′ PSR representing object asymmetries characterised by thematic role restrictions.

At the final analysis, both objects in a Moro underived ditransitive clause would be daughter of V′ and sister of V at c-structure, and members of the OBJ set at f-structure (the latter represented schematically in figure 5). This model therefore satisfies our primary goal: an LFG account of symmetric object languages in which there is no difference in object representation without a corresponding difference in syntactic behaviour.

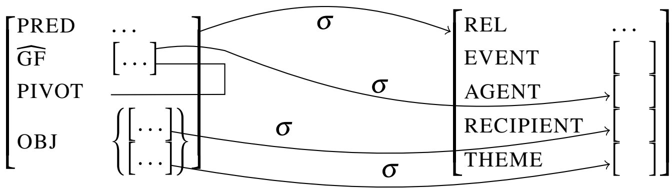

Figure 5: Schema for partial f-structure and s-structured projection with set-valued OBJ function.

This proposal has a number of advantages over previous proposals for handling symmetric object languages in LFG. By treating OBJ and OBL as set-valued functions, this proposal avoids the strong commitments of proposals such as Bresnan and Moshi's (1990), which require either that every language exhibits some object asymmetry in some part of the syntax, or that symmetric objects are assigned different syntactic representations without any difference in syntactic behaviour. While similar empirical coverage could be achieved by applying Ackerman et al.'s (2017) HPSG proposal to a modified LFG approaching using the DEPS proposal of Patejuk and Przepiórkowski (2016) and Przepiórkowski (2016), the present proposal achieves equivalent empirical coverage with fewer deviations from standard LFG assumptions and principles. In addition, this proposal represents a uniquely LFG solution to the problem of symmetric object languages, leveraging the potential of the Parallel Projection architecture to ensure that thematic properties are exclusively specified at s-structure, rather than redundantly specifying thematic roles at both s-structure and f-structure through θ-indices (see also Alsina, 2001; Asudeh and Giorgolo, 2012). Beyond immediate applications in LFG, this proposal further demonstrates the greater empirical coverage that can be achieved by taking typologically diverse languages on their own terms, as well as the importance of recognising the role that semantic properties can play in syntactic constraints.

Selected references

• Ackerman, F., Malouf, R., & Moore, J. (2017). Symmetrical objects in Moro: Challenges and solutions. *Journal of Linguistics*, *53*, 3–50. • Alsina, A. (1996). *The role of argument structure in grammar*. CSLI Publications. • Alsina, A. (2001). On the nonsemantic nature of argument structure. *Language Sciences*, *23*, 355–389. • Asudeh, A., & Giorgolo, G. (2012). Flexible composition for optional and derived arguments. In M. Butt & T. H. King (Eds.), *The proceedings of the LFG12 conference* (pp. 64–84). CSLI Publications. • Bresnan, J., & Moshi, L. (1990). Object Asymmetries in Comparative Bantu Syntax. *Linguistic Inquiry*, *21*(2), 147–185. • Dalrymple, M., Lowe, J. J., & Mycock, L. (2019). *The Oxford Reference Guide to Lexical Functional Grammar*. Oxford University Press.
• Dryer, M. S. (1986). Primary objects, secondary objects, and antidative. *Language*, *62*(4), 808–845. • Findlay, J. Y. (2016). Mapping theory without argument structure. *Journal of Language Modelling*, *4*(2), 293–338. • Haspelmath, M. (2008). Ditransitive Constructions: Towards a new Role and Reference Grammar account? In R. Van Valin Jr. (Ed.), *Investigations of the Syntax–Semantics–Pragmatics Interface* (pp. 75–100). John Benjamins Publishing Company.
• Kibort, A. (2014). Mapping out a construction inventory with (lexical) mapping theory. In M. Butt & T. Holloway King (Eds.), *Proceedings of the LFG14 Conference* (pp. 262–282). CSLI Publications. • Patejuk, A., & Przepiórkowski, A. (2016). Reducing grammatical functions in LFG. In D. Arnold, M. Butt, B. Crysmann, T. H. King, & S. Müller (Eds.), *Proceedings of the Joint 2016 Conference on Head-driven Phrase Structure Grammar and Lexical Functional Grammar* (pp. 542–559). • Przepiórkowski, A. (2016). How not to distinguish arguments from adjuncts in LFG (D. Arnold, M. Butt, B. Crysmann, T. H. King, & S. Müller, Eds.), 560–580.