EXTENDING THE APPLICABILITY OF LEXICAL MAPPING THEORY

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Abstract

LFG grants syntactic functions a central role and has developed a theory of argument structure, Lexical Mapping Theory (LMT), which is independent of phrase-structure trees and thus able to account for morpholexical derivations. Yet some fundamental phenomena falling within the scope of morpholexical analysis – such as morphosemantic (meaning-altering) operations, phenomena referred to elsewhere as 'demotions', or subjectlessness – are currently denied satisfactory LMT accounts. This paper offers a way of extending LMT to phenomena which are awkward or impossible to handle with the current widely accepted versions of LMT.

While retaining the main component of LMT – the feature decomposition of syntactic functions – I suggest the following set of revisions: (1) restoring the early LFG distinction between argument positions and semantic roles; (2) allowing the semantic participants to change order and re-associate with different argument positions for non-default (morpho*semantically* altered) mappings; (3) fixing the order of (syntactic) argument positions; (4) reformulating the principles of argument-to-function mapping to make fuller use of the markedness hierarchy of syntactic functions and render the Subject Condition redundant; and (5) using a mechanism of increasing markedness to account for morpho*syntactic* operations referred to as 'demotions' in RG. I demonstrate that these revisions make LMT a cleaner formalism which is immediately applicable to some important phenomena that have so far escaped (good) analyses.[1]

1 Revision 1: Restoring the early LFG distinction between argument positions and semantic roles

LFG's argument structure is the locus of the mapping between semantic roles and grammatical functions. Because it maps from some kind of semantic or conceptual representation to a syntactic representation of grammatical functions, it is widely accepted that argument structure is a representation of the syntactic arguments of a predicate and that it contains some amount of semantic information, even though researchers still do not agree on how much. See Dalrymple (2001:197-200) for an overview of two major approaches to the content and representation of argument structure within LFG: Jackendovian and Dowtyian; and Butt (2006:Chapter 5) for a critical account of Jackendoff's and Dowty's linking theories and the way they have been combined with LMT.

Although the discussion of the semantic component of LMT has concentrated on the source and classification of the semantic content ascribed to the arguments (drawing from the Conceptual Semantics framework of Jackendoff 1983, 1990; or

the Proto-Role classification of Dowty 1991), another relevant issue concerns the degree of association (i.e. either fusion or separation) of the semantic information and the syntactic argument positions. It is the second issue which falls under the scope of the proposed first revision.

Early LFG representations of argument structure implied a dissociation of argument positions and semantic roles, for example (Bresnan 1982:6):

(1)   (SUBJ)   (OBJ)
               | | ← lexical assignment of grammatical functions
     'LOVE (arg 1 ,   arg 2)'   ← predicate argument structure
            (agent)   (theme)

Dalrymple (2001:198) attributes the following representation of the semantic form for *give* to Kaplan & Bresnan (1982):

(2)   SUBJ   OBJ   OBL$_{GOAL}$
     'give ⟨   __   ,   __   ,   __   ⟩'
             AGENT   THEME   GOAL

and explains that the semantic form was thought of as 'expressing a kind of logical formula encoding aspects of the meaning of the sentence as well as the relation between thematic roles and their syntactic functions.'

With the advent of LMT (Bresnan & Kanerva 1989; Bresnan & Zaenen 1990), which offered a substantive account of grammatical functions, argument positions and semantic roles became explicitly fused: 'the grammatically significant participant-role relations in the structure of events are represented by a-structures. An a-structure consists of a predicator with its argument roles, an ordering that represents the relative prominence of the roles, and a syntactic classification of each role indicated by a feature' (Bresnan & Zaenen 1990:48):

(3)   *pound* ⟨   ag   pt   ⟩
                  [– o]   [– r]

Although LMT currently exists in several variants, and there is no agreement about the substance of the participant roles, most researchers seem to adopt a model of argument structure corresponding to the representation in (3) and do not question the collapsed distinction between argument positions and semantic roles.

However, the need to separate these two tiers of representation has already had strong proponents such as Grimshaw (1988:1), T. Mohanan (1990/1994:15ff), Ackerman (1991:12; 1992:57ff), Joshi (1993), Alsina (1996:37), Ackerman & Moore (2001:40ff). In his LFG textbook, Falk (2001:105) offers the following representation of the mappings which are captured by LMT:

(4) *place*:

θ-structure: [Agent] . . . [Patient/Theme] . . . [Location]

a-structure: ⟨   *x*   ,   *y*   ,   *z*   ⟩

f-structure:
$$
\begin{bmatrix}
\text{SUBJ} & [\ \vdots\ ] \\
\text{PRED} & \text{'place } \langle\,(\uparrow \text{SUBJ})\,(\uparrow \text{OBJ})\,(\uparrow \text{OBL}_{\text{LOC}})\,\rangle\text{'} \\
\text{OBJ} & [\ \vdots\ ] \\
\text{OBL}_{\text{LOC}} & [\ \vdots\ ]
\end{bmatrix}
$$
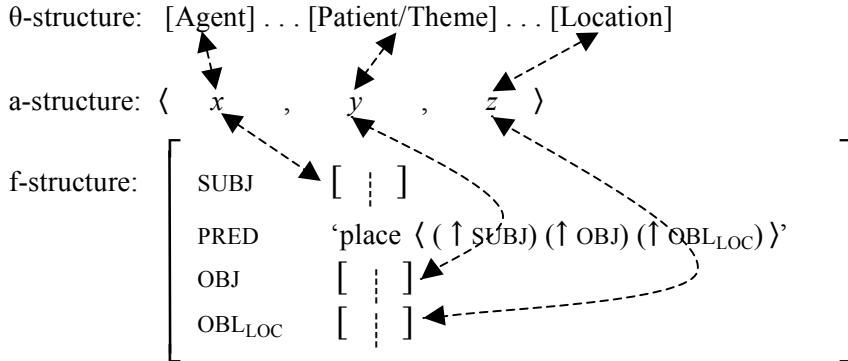
He emphasises that 'a-structure is a representation of the syntactic argument-taking properties of a lexical item' (2001:105); 'arguments fit empty positions in the meaning of a predicate' and 'can be identified by their role in the predicate's meaning' (2001:101). Hence, 'LMT maps between θ-structure and a-structure, and between a-structure and f-structure'; as a syntactic representation, a-structure 'only deals with syntactically relevant aspects of θ-structure and is the locus of constraints' (2001:105).

Four types of arguments can be put forward in support of the distinction between argument positions (corresponding to Falk's a-structure) and semantic roles (corresponding to Falk's θ-structure):

(i) The strongest evidence in support of this distinction comes from pairs of clauses that exhibit alternative assignments of grammatical functions to the semantic participants competing for the same argument status. Many different types of alternations have been identified where, holding constant both the predicate and the selected participants, there are two (and sometimes more than two) ways of matching the same set of grammatical functions with the participants which are available for mapping. I argue that the different options arise because the mapping is done indirectly, via an independent tier of representation: the argument structure positions (which correspond to Falk's a-structure). A common type of alternation involves two arguments within the verb phrase, either of which can be specified as an object (OBJ) or an oblique (OBL$_{\theta}$). An example is locative alternation, discussed in Ackerman (1991; 1992) and Ackerman & Moore (2001) (see also Levin 1993:49-55 for references):

(5) a. *The peasant loaded   (the) hay   onto the wagon.*
                              OBJ   OBL$_{\theta}$

   b. *The peasant loaded   the wagon   with (the) hay.*
                              OBJ   OBL$_{\theta}$

Levin (1993:Chapter 2) gives the following examples of other alternations in English which involve arguments within a verb phrase: the material/product alternation (transitive) (e.g. *Martha carved a toy out of the piece of wood* ~ *Martha carved the piece of wood into a toy*), the fulfilling alternation (*The judge presented a prize to the winner* ~ *The judge presented the winner with a prize*), the

image impression alternation (*The jeweller inscribed the name on the ring ~ The jeweller inscribed the ring with the name*), the *with/against* alternation (*Brian hit the stick against the fence ~ Brian hit the fence with the stick*), the *through/with* alternation (*Alison pierced the needle through the cloth ~ Alison pierced the cloth with a needle*), the *blame* alternation (*Mira blamed the accident on Terry ~ Mira blamed Terry for the accident*), the *search* alternations (*Ida hunted the woods for deer ~ Ida hunted deer in the woods ~ Ida hunted for deer in the woods*), the possessor and attribute alternation (*I admired him for his honesty ~ I admired the honesty in him*). Finally, Levin notes that the class of English verbs including *grow* participate in the intransitive material/product alternation where either of the participants can be specified as a subject (SUBJ) or an oblique (OBL$_\theta$): *That acorn will grow into an oak tree ~ An oak tree will grow from that acorn.*

Although variants of the constructions involve the same predicates, participants, and even the same grammatical functions, there are some semantic differences associated with the variants (e.g. a holistic vs partitive effect of the locative alternation). However, crucially, neither is more basic than the other, or neither is derived from the other – in this respect, they have equal status. A simple way of capturing the fact that the same predicate may have two (or more) options of matching its participants with grammatical functions is to dissociate the tier of semantic participants from the tier of argument positions.

(ii) The distinction between semantic participants and argument positions is already implicit in standard LFG accounts of 'empty' (athematic) argument roles of raising verbs (Zaenen & Engdahl 1994:200, 203; Bresnan 2001:309, 317). The representations of a-structures of the subject-raising verb *seem* (as in *He seemed to me to be happy*) and the object-raising verb *believe* (as in *I believe him to be happy*) contain athematic arguments which are expressed as gaps in the argument list, because *He* is not a semantic subject of *seem*, and *him* is not a semantic object of *believe*. The following diagrams are from Bresnan (2001:309, 317; but see section 4 below for the alternative):

(6)   *seem*   __   ⟨   x   y   ⟩
                     [– r]   [– o]   [– o]
                     SUBJ   OBL$_\theta$ XCOMP

(7)   *believe*   ⟨   x   y   ⟩   __
                     [– o]   [– o]   [– r]
                     SUBJ   XCOMP   OBJ

Similarly, the non-raising version of *seem* has an athematic subject which in English has to be filled by an expletive (*It seemed to me that John was happy*):

(8)   *seem*   __   ⟨   x   y   ⟩
                     [– r]   [– o]   [– o]
                     SUBJ   OBL$_\theta$ COMP

The athematic arguments are represented outside the angled brackets, which indicates that they do not belong to the set of semantic participants of the event denoted by the predicate. Nevertheless, they do have a specific position in the argument structure relative to the other hierarchically ordered semantic

participants, which gives them greater or lesser priority in the mapping of grammatical functions (Bresnan 2001:309). Having no semantic content, they receive the inherent syntactic classification of [– r]. Thus, athematic arguments imply the existence of a distinct level of argument positions separate from the semantic level, and the representations in (6)-(8) can be translated to the following notation:

(9)
$$
\begin{array}{c}
\qquad\qquad\quad x \qquad\ y \\
\qquad\qquad\quad | \qquad\ \ | \\
\textit{seem} \quad \langle\ \text{arg} \quad \text{arg} \quad \text{arg}\ \rangle \\
\qquad\qquad\ [-\text{r}] \quad [-\text{o}] \quad [-\text{o}]
\end{array}
$$

(10)
$$
\begin{array}{c}
\qquad\qquad\quad x \qquad\ y \qquad\qquad\qquad\qquad\qquad x \qquad\qquad y \\
\qquad\qquad\quad | \qquad\ \ | \qquad\qquad\qquad\qquad\qquad\ | \qquad\qquad\ | \\
\textit{believe} \quad \langle\ \text{arg} \quad \text{arg} \quad \text{arg}\ \rangle \quad \text{or} \quad \langle\ \text{arg} \quad \text{arg} \quad \text{arg}\ \rangle \\
\qquad\qquad\quad [-\text{o}] \quad [-\text{o}] \quad [-\text{r}] \qquad\qquad\qquad [-\text{o}] \quad [-\text{r}] \quad [-\text{o}]
\end{array}
$$

(iii) The distinction between semantic participants and argument positions enables a better analysis of essentially *syntactic* phenomena ('morphosyntactic operations') such as passivisation and locative inversion (see sections 3 & 5 below) which are available to unergative versus unaccusative predicates, respectively. The notion of an 'underlying slot which comes first and is, or is not, a subject' is not easily expressible in thematic terms; in fact, it has been demonstrated that it is impossible to find a common semantic denominator for either the class of syntactically unaccusative, or unergative verbs (e.g. Rosen 1984; Wechsler 1995).

(iv) There is general intuition that LMT should be capable of handling morpholexical causativisation, though there is not yet a solution that is widely accepted and has been proven to be applicable to the full variety of causatives cross-linguistically. However, two of the most widely published LFG analyses of causatives, Falk (2001:114-119), who provides a brief account building on the work of Alsina (1996), and Ackerman & Moore (2001), who build on the work on T. Mohanan (1994), both appeal to the distinction between semantic participants and argument positions. Ackerman & Moore in particular argue that a model of argument structure which has an independent valency level predicts that there can be predicate formation processes which introduce semantic properties, but which may not lead to an increase in valency (2001:46). They examine several different instances of causativisation which do not involve an increase in valency and conclude that these data provide empirical motivation for the theoretical assumption that valency slots (i.e. argument positions) constitute an independent level of representation which is used to mediate the relation between semantic roles (understood by them as sets of semantic entailments of the predicate) and grammatical function assignment (2001:48ff).

2   Revision 2: Allowing semantic participants to change order and re-associate with different argument positions for non-default mappings

The most widely used versions of LMT have a fixed hierarchy of thematic roles which determines the ordering of argument positions. The following thematic hierarchies are from Bresnan (2001:307) and Falk (2001:104), respectively:

(11)   agent > beneficiary > experiencer/goal > instrument > patient/theme
                                                                            > location
(12)   agent > patient/beneficiary > instrument > theme
                                                 > path/location/reference object

Most LFG researchers derive the content of their thematic hierarchy either from the Conceptual Semantics framework of Jackendoff (1983; 1990), or from the Proto-Role proposal of Dowty (1991) (see also Butt 2006:Ch.5 for discussion).

However, Levin & Rappaport Hovav (2005:Ch.6) show that it is impossible to formulate a thematic hierarchy that will capture all generalisations involving the realisation of arguments in terms of their semantic roles; Newmeyer (2002) cites 18 *distinct* thematic hierarchies on offer, none of which comes close to working. Ackerman & Moore (2001:27) cite Gawron (1983) as a good critique of the shortcomings associated with delimiting classes of verbs and identifying finite lists of discrete semantic roles. To overcome these shortcomings they assume, following Dowty, that an argument of a predicate is a set of the predicate entailments that is specific to a participant in the event denoted by the predicate; they propose that sets of proto-properties can be ordered from most proto-agentive to most proto-patientive, and they formulate a well-formedness condition on the linking of entailment sets to valency slots (2001:44-45).[2]

As a result of the shift of perspective on semantic participants – from classifying them into discrete roles to seeing them as sets of semantic entailments of the predicate – it is expected that the same semantic participants may align with the available argument positions in two (or more) different ways, as was exemplified in the previous section by locative and other alternations. Furthermore, it is also expected that the semantic participants may 'change order' and re-associate with different argument positions for derived, morpho*semantically* altered, predicates.

The following example from Polish shows a morphosemantically derived predicate in which a sentient causer of the event (normally interpreted as the agent) is portrayed as 'unwilful', i.e. not responsible for the action:

(13)   *Wylała   mi   się   zupa.*
       spilt.3SG.FEM me.DAT   REFL   soup(FEM).NOM
       'The soup has spilt to me.' (meaning: 'I have spilt the soup unintentionally.')

The resulting construction is the common Slavonic anticausative, in which the patient/theme is lexicalised as the subject and the 'unwilful' agent is lexicalised as a dative argument (secondary object).

Thus, even though there may be a default ordering of semantic participants,

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[2] Note, however, that the first suggestion of integrating Dowty's Proto-Role proposal into LMT came from Zaenen (1993). For an overview and discussion of her approach, see Butt (2006:135-138).

evidently it can be altered, the alteration being driven by the change in the interpretation of the predicate together with its sets of entailments. The most straightforward way to model this with LMT (see next section for examples) is to allow the same semantic participants to 'realign' and link to different argument positions for different types of clauses which may or may not differ in valency.

3   Revision 3: Fixing the order of (syntactic) argument positions

After separating the semantic information from the syntactic level of argument positions I argue, following Zaenen (1993:151) and Ackerman & Moore (2001:44ff), that priority should be given to the *syntactic* representation of the predicate's valency rather than the *semantic* representation of thematic roles with which argument positions are linked. Therefore, it is the ordering of argument positions holding at the valency level of argument structure that is fixed, with each position ('argument slot') coming with a particular (fixed) syntactic specification. The following represents the valency template available to a base (non-derived) predicate:

(14) $< \text{arg}_1 \quad \text{arg}_2 \quad \text{arg}_3 \quad \text{arg}_4 \quad ... \quad \text{arg}_n >$
$\quad\quad\ \ $ [–o/–r] [–r]   [+o]   [–o]   [–o]

In the case when all the slots are used (i.e. none are bypassed), the argument in the first slot can be classified as either [–o] or [–r]; the argument in the second slot can only receive [–r] classification; and so on. This ordering corresponds to LFG's hierarchy of syntactic functions (proposed after Keenan & Comrie 1977), but it is based on LMT's atomic values [+/– r/o] instead of *final* grammatical functions. Since valency slots correspond to particular types of predicate entailments,[3] if the base predicate does not have a particular set of entailments, the slot corresponding to that set of entailments is not invoked. Thus, for a particular predicate, the angled brackets contain all and only the selected valency slots for the arguments associated with that predicate, both core and non-core.

As was outlined in section 2, semantic participants may be understood as having a certain default ordering, but their actual ordering is flexible, not fixed. This means that under certain conditions, the actual semantic participants of the event may map onto the argument positions listed in (14) in more than one way. For example, some semantic participants may compete for a certain argument slot (as in locative etc. alternations), or a semantic participant may map onto an unused (but syntactically pre-specified) argument slot (as in the linking of the unwilful agent to a dative in Slavonic, or in 'dative shift' in English – see below).   In

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[3] Note that many Dowtyian approaches, including Ackerman & Moore's (2001), adopt two proto-property sets: proto-agent and proto-patient. However, other researchers have suggested adding a third set: proto-recipient (see Primus 1999). For base predicates, the entailments set of the third argument slot proposed here (arg_3) corresponds to this proto-property set. I will refer to it as proto-beneficiary, since the term 'beneficiary' has been more common in thematic hierarchies. It has been noted that proto-beneficiary needs to be distinguished only for some, but not all, languages.

derived predicates, such re-alignments of participants result from a meaning-altering (i.e. morphosemantic) operation on the predicate's argument structure. The interpretation of the roles of the participants is altered due to the fact that, in the end, the participants bear a different grammatical function to the one they would be getting 'by default'.

Using different types of predicates I will now illustrate that revisions 1-3 do, on the whole, produce the same syntactic pre-specification as LFG's basic principles for determining the choice of syntactic features (patientlike roles are $[-r]$, secondary patientlike roles are $[+o]$, and other semantic roles are $[-o]$) though, importantly, not in predicates with non-applied beneficiaries, which receive a much simpler analysis in the reformulated LMT than in standard LMT accounts.

First, I will deal with the anticausative exemplified in (13). The argument structure of the basic, non-derived causative variant in (15) is modelled in (16):

(15) *Wylałem   zupę.*   (16) x y
     spilt.1SG.MASC   soup(FEM).ACC | |
     'I have spilt the soup.'   *wylałem* ⟨ arg_1 arg_2 ⟩
                                                              $[-o]$ $[-r]$
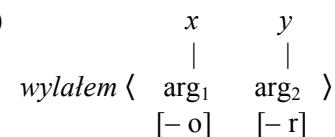
The formation of the anticausative predicate results from an operation which deletes the first argument from the argument structure frame of the base predicate, leaving behind an orphaned semantic role (x) (see Levin & Rappaport Hovav 1995 for a corresponding analysis of externally caused intransitive verbs in English which participate in the causative alternation). Since the predicate loses an argument, and hence its valency decreases, the operation may be referred to as 'lexical detransitivisation'.

The second argument, which can now bear the function of the subject, is interpreted as a 'pseudo-agent', but the event is still understood as requiring an external cause(r). Polish (unlike English) has a strategy of reintroducing the orphaned causer, interpreted as an unwilful agent, to syntax via the argument position of the secondary object (the dative) (for detailed discussion of the anticausative see Kibort 2004:Ch.3). I repeat example (13) as (17) and model it in (18):

(17) *Wylała   mi   się   zupa.*
     spilt.3SG.FEM   me.DAT   REFL   soup(FEM).NOM
     'The soup has spilt to me.' (meaning: 'I have spilt the soup unintentionally.')

(18) y $\boldsymbol{x}$
                                         | |
     wylała się ⟨ arg_2 arg_3 ⟩ [4]
                                      $[-r]$ $[+o]$
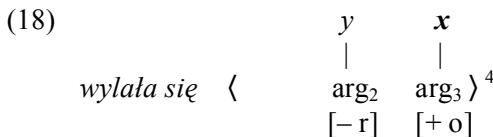
Second, I will outline the mappings in constructions with beneficiaries. In

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[4] I have left gaps in the representations of argument frames only for an easier reading of the diagrams. The gaps have no theoretical significance. Instead, theoretical significance is attributed to the rank of the particular argument position.

many familiar languages, including Polish, dative case marking distinguishes the beneficiary/maleficiary argument from the patient/theme. In Polish, the dative argument differs from obliques in that it cannot be multiplied, though like obliques as well as primary objects (in appropriate contexts) it can be omitted. It can be optionally added to any Polish clause: almost any clause can be expanded to include an optional beneficiary referring to 'self', marked for dative, regardless of the number and type of other dependants of the predicate, and without altering the semantic or syntactic mappings in the predicate's argument structure. Once a semantic participant is selected for the dative in the base predicate, it is not possible to either promote this argument to subject (as in passivisation) or change its status to object (as in 'dative shift') through any argument-structure alteration in the predicate. The dative fits well the LMT's description of the secondary object specified for [+ o]. In the revised version of LMT offered here, it is identified with the unique third argument position (arg_3). In Polish, this argument position is available to predicates both for non-derived mappings (of optional beneficiaries), as in:

(19) *Piotr*   *dał*   *monetę*   *Jankowi.*
      Peter(MASC).NOM gave.3SG.MASC coin(FEM).ACC John(MASC).DAT
      'Peter gave a/the coin to John.'

(20)
$$\begin{array}{cccc}
 & x & y & b \\
 & | & | & | \\
dał \langle & arg_1 & arg_2 & arg_3 \rangle \\
 & [-o] & [-r] & [+o]
\end{array}$$

and for morphosemantically altered mappings (e.g. of unwilful agents, as in (18)).

English ditransitives, which have been the subject of considerable debate in LFG, receive a much simpler account in the revised LMT. Modern English does not mark its beneficiaries for dative. Instead, an English beneficiary is expressed either adpositionally (headed by a preposition), like an oblique:

(19) a. *Peter handed a drink to John.*
     b. *Both parents cooked supper for the children.*

(20)
$$\begin{array}{cccc}
 & x & y & b & \text{'non-dative-shifted'} \\
 & | & | & | \\
handed/cooked \langle & arg_1 & arg_2 & arg_4 \rangle \\
 & [-o] & [-r] & [-o]
\end{array}$$

or in a syntactic argument which is not headed by a preposition, which occupies the surface position of the direct object and behaves like a direct object with respect to passivisation:

(21) a. *Peter handed John a drink.*
     b. *Both parents cooked the children supper.* (Bresnan 2001:315-316)

(22)
$$\begin{array}{cccc}
 & x & \boldsymbol{b} & y & \text{'dative-shifted'} \\
 & | & | & | \\
handed\text{-}to/cooked\text{-}for \langle & arg_1 & arg_2 & arg_3 \rangle \\
 & [-o] & [-r] & [+o]
\end{array}$$

In the non-dative-shifted predicate, as in (20), the third argument position (arg$_3$) is not invoked in English. English has lost the morphological means to distinguish this argument from the primary object and hence base predicates treat beneficiaries as obliques. Note the lack of syntactically intransitive English clauses comprising only subjects and datives but no direct objects:[5] *Both parents cooked the children* meaning: 'Both parents cooked for the children'; and the ungrammaticality of the attempted dative in: *He sold three cars* (*John*), *He gave the book* (**me/him*). However, through dative shift, verbs of a certain class in English are capable of recovering their dative argument position: dative shift (or, dative alternation) in English is a morphosemantic operation on argument structure which alters the mapping of the semantic participants of the predicate onto argument positions by remapping the beneficiary onto the primary object position, and 'downgrading' the theme to the secondary object position.

The analysis sketched out above accounts for the passivisability patterns of the non-dative-shifted and dative-shifted predicates in English, and avoids invoking an additional constraint, the Asymmetric Object Parameter (which rules out argument structures with two unrestricted [− r] arguments for some languages), which was proposed specifically to handle languages with dative shift.[6] Further examples showing the redundancy of the AOP will be given below.

Finally, earlier in this section I outlined the mapping that occurs in the anticausative, see examples (17)-(18). This construction results from a type of morphosemantic operation, lexical detransitivisation, that targets directly the level of argument positions. I suggested that the anticausative operation deletes the first (core) argument from the valency frame of the base predicate:

(23) *I spilt the soup.*   (24) *The soup spilt.*

$$\begin{array}{cc} x & y \\ | & | \end{array} \qquad\qquad\qquad \begin{array}{cc} x & y \\ & | \end{array}$$

$$spilt_{\text{trans}} \; \langle \quad arg_1 \quad arg_2 \; \rangle \qquad spilt_{\text{intrans}} \; \langle \qquad\; arg_2 \; \rangle$$
$$\qquad\qquad [-\text{o}] \quad [-\text{r}] \qquad\qquad\qquad\qquad\qquad\quad [-\text{r}]$$

(Recall also that the anticausative does not delete the semantic participant – typically, the event denoted by the verb does not cease to require an external causer. I demonstrated that some languages with anticausatives have a way of optionally retrieving the causer to project it to syntax through a different argument position.)

It is expected that an operation with the opposite effect to lexical

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[5] A possible exception are clauses with the verb *give* which, for some speakers, has retained a fossilised structural dative (arg$_3$) position, as in (20), even in the base variant. Hence: ?*Peter gave John*, ?*A book was given John (by Peter)*. See Kibort (2004:79-88) for examples, discussion and references.

[6] The Asymmetric Object Parameter is undesirable for one more reason: in the revised LMT, transitive unaccusatives (the class of verbs including *cost, last,* and *weigh*) are those predicates whose both arguments (arg$_1$ and arg$_2$) are pre-specified as [− r], hence their unavailability for passivisation (see section 5). The fact that the Parameter does not need to be invoked to account for dative shift leaves no reason to keep it. This, in turn, frees the revised LMT from a theory-internal solution.

detransitivisation can also be found. This is 'lexical transitivisation', which targets the same level of representation of the predicate as the anticausative, the level of argument positions, and adds to it a core argument. Dative shift, discussed above, is an example of a lexical transitiviser. Like the detransitivising anticausative in English, it is not expressed with any special verbal morphology. However, we acknowledge that the predicate and its set of entailments have been altered by indicating that the base verb's lexical meaning has changed, e.g. from *handed* and *cooked*, to *handed-to* and *cooked-for*. The following non-dative-shifted examples are repeated from (19)-(20):

(25) a. *Peter handed a drink to John.*
  b. *Both parents cooked supper for the children.*

(26)
$$\begin{array}{cccc} & x & y & b \\ & | & | & | \\ handed/cooked & \langle\ \text{arg}_1 & \text{arg}_2 & \text{arg}_4\ \rangle \\ & [-\,o] & [-\,r] & [-\,o] \end{array}$$

and the following dative-shifted examples are repeated from (21)-(22):

(27) a. *Peter handed John a drink.*
  b. *Both parents cooked the children supper.*

(28)
$$\begin{array}{cccc} & x & \boldsymbol{b} & y \\ & | & | & | \\ handed\text{-}to/cooked\text{-}for & \langle\ \text{arg}_1 & \text{arg}_2 & \text{arg}_3\ \rangle \\ & [-\,o] & [-\,r] & [+\,o] \end{array}$$

Dative shift increases the transitivity of the base mono-transitive predicate (*handed, cooked*) by adding an 'objective' [+o] argument to its valency frame. The arguments are ordered according to LMT's atomic values [+/− r/o], and the new argument slot occupies a position that conforms to this ranking. The semantic participants map onto the new set of argument positions in a way that matches the sets of semantic entailments produced by the derived predicate (*handed-to*, *cooked-for*).

English does not express the addition of a new core argument with verbal morphology, and also has a different option of expressing the beneficiary: mapping it onto an oblique argument. However, many languages do not have the option of expressing the beneficiary as an oblique argument, and their strategy to bring beneficiaries and other peripheral participants into the verb's lexical meaning is the transitivising applicative, a construction which is typically marked by special verbal morphology.

In the standard LMT account, the transitivising applicative is analysed as adding a new theta role to the theta structure of a verb, below the highest role (Alsina & Mchombo 1988, 1990, 1993; see also Bresnan & Moshi 1993). Bresnan & Moshi explain that '[t]his change in the argument structure is induced by an underlying change in the lexical semantic structure. (...) Informally, the action of the base verb *v* is applied to a new argument *x*, yielding a derived meaning paraphrasable as "do *v* for/to/with/at *x*"' (1993:73, ft. 30).

In the revised LMT, the transitivising applicative is analysed as targeting the

same level of representation of the predicate as the anticausative, the level of argument positions, and adding an argument pre-specified as [+ o] to the valency frame of the base predicate. In this respect, it is like dative shift (to which this construction has been likened in the literature), except that it is accompanied by dedicated verbal morphology. Applicative formation increases the transitivity of the base verb, and allows the semantic participants to map onto the new set of argument positions in a way that matches the entailment sets produced by the derived predicate (e.g. 'eat-for' when a beneficiary is added; 'eat-with' when an instrument is added; or 'eat-because-of' when a motive is added; etc.).

The 'applied' participant is typically mapped onto the second argument position of the primary object (which enables it to become a passive subject). However, for many predicates, the entailment sets corresponding to the two object positions ([– r] and [+ o]) allow the peripheral participant and the patient/theme to re-align and map in either way. Whichever participant maps onto the primary object position ([– r]) may become a passive subject. As can be expected, the argument in the primary object position ([– r]) is also privileged over the argument in the secondary object position ([+ o]) with respect to adjacency to the verb and availability for long-distance extraction (Bresnan & Moshi 1993:59-61).

Passivisation patterns in Kichaga (as described in Bresnan & Moshi 1993) reveal that several different mapping options are available for the base predicate which has been subjected to applicative transitivisation and has two participants competing for the primary object position. For illustration, I have schematised some options below, using thematic labels for the participants only for easier reading:

(29)   *agent   benef   pat/theme*
          agent   instr   pat/theme
          agent   loc   pat/theme
          agent   motive   pat/theme
          agent   pat/theme   benef
          agent   pat/theme   instr
          agent   pat/theme   loc
              | | |
        ⟨   arg₁   arg₂   arg₃   ⟩
            [– o]   [– r]   [+ o]

Although the primary object argument is privileged (can become a passive subject, is adjacent to the verb and available for long-distance extraction), Kichaga treats both objects in the same way with respect to object marking on the verb.

Languages like Kichaga are referred to as 'symmetric'. In standard LMT accounts this is understood with reference to the Asymmetric Object Parameter. It is argued that the AOP, which regulates the occurrence of argument structures with two unrestricted [– r] arguments, is present in asymmetric languages like English and Chicheŵa, but lacking in symmetric languages like Kichaga (Alsina & Mchombo 1988; Bresnan & Moshi 1993). In the revised LMT, there is no need to invoke the AOP, and symmetric languages can be defined as those which allow

both their 'applied' participant and their patient/theme to be mapped onto either of the object argument positions ([– r] or [+ o]).[7]

The other type, 'asymmetric' languages, impose restrictions, or limitations on their secondary object position ([+ o]). In those languages, the [+ o] argument slot is not suitable for the mapping of the beneficiary participant (whether a 'dative-shifted' beneficiary as in English, or an 'applied' beneficiary as in Chicheŵa); only the primary ([– r]) object is treated as an object with respect to object marking on the verb; and the secondary ([+ o]) object cannot be 'dropped' (left unspecified) in the transitivised predicate (this applies regardless of whether the predicate has undergone dative shift or applicative transitivisation).

Preventing the secondary object position from accepting beneficiaries results in fewer mapping options in asymmetric languages such as Chicheŵa:

(30)
	agent	*benef*	*pat/theme*
	agent	*instr*	*pat/theme*
	agent	*loc*	*pat/theme*
	~~*agent*~~	~~*pat/theme*~~	~~*benef*~~
	agent	*pat/theme*	*instr*
	agent	*pat/theme*	*loc*
	|	|	|
⟨	arg_1	arg_2	arg_3 ⟩
	[– o]	[– r]	[+ o]

Thus, both the passivisation patterns in asymmetric languages, as well as different treatment of the two types of objects (primary and secondary) in asymmetric languages, can be accounted for by the revised LMT without having to invoke an additional parameter such as the AOP.

It has also been noted that, in some languages, the transitivising applicative can add more than one core argument – specifically, it has been found to add up to two core arguments, both in symmetric and asymmetric languages (Bresnan & Moshi 1993:52). In the revised LMT, the second applied argument position will also be pre-specified as [+ o], and the grammatical function mapped onto this argument will be OBJ$_\theta$. The two secondary objects will be distinguished by their subscripts.

4 Revision 4: Reformulating the principles of argument-to-function mapping to make fuller use of the markedness hierarchy of syntactic functions and render the Subject Condition redundant

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[7] Note that, according to the standard LMT account, in symmetric languages a predicate has its third argument pre-specified as [+ o] for some clauses (e.g. an unaltered active) and as [– r] for other clauses (e.g. passive). Although LMT allows to interpret both pre-specifications as being appropriate for 'patient-like' arguments, the selection of either one or the other pre-specification for the same argument in the same predicate requires a non-monotonic change of information.

The features [+/– r], (thematically/semantically) (un)restricted, and [+/– o], (non)objective, group grammatical functions into natural classes (Bresnan & Kanerva 1989; Bresnan & Zaenen 1990; see also Bresnan 2001:308):

(31)

	[– r]	[+ r]
[– o]	SUBJ	OBL$_\theta$
[+ o]	OBJ	OBJ$_\theta$

where OBL$_\theta$ abbreviates multiple oblique functions, and OBJ$_\theta$ abbreviates secondary objects. Since the negatively specified features in diagram (31) indicate unmarked feature values, SUBJ is the least marked grammatical function and the restricted object (OBJ$_\theta$) is the most marked function, and the diagram can be read as a 'markedness hierarchy of syntactic functions' (Bresnan & Moshi 1993:71) or a 'partial ordering of basic argument functions' (Bresnan 2001:309):

(32)   Markedness Hierarchy of Syntactic Functions

[–o]/[–r] SUBJ >   [–r]/[+o] OBJ, [–o]/[+r] OBL$_\theta$ >   [+o]/[+r] OBJ$_\theta$

In one of the most widely accepted versions of LMT, the Markedness Hierarchy feeds into the syntactic principles for mapping argument structures to surface grammatical functions, i.e. the Mapping Principles (Bresnan 1990; Bresnan 2001:311):

(33)   (a)   Subject roles:
            (i)   a [–o] argument is mapped onto SUBJ when initial in the argument structure;[8] otherwise:
            (ii)   a [–r] argument is mapped onto SUBJ.
        (b)   Other roles are mapped onto the lowest (i.e. most marked) compatible function on the markedness hierarchy.

However, the Mapping Principles in (33) do not make full use of the Markedness Hierarchy, even though it is possible to derive the principles of argument-to-function mapping directly from the Markedness Hierarchy, without

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[8] The actual LFG formulation of this mapping principle is as follows: '$\hat{\theta}_{[-o]}$ is mapped onto SUBJ when initial in the a-structure' (Bresnan 2001:311), where $\hat{\theta}_{[-o]}$, referred to as the 'logical subject', is defined as 'the most prominent semantic role of a predicator' (p. 307). However, this formulation seems to contain superfluous information. Specifically, due to the Subject Condition, LFG excludes the formation of predicates with no core arguments; according to the principles of semantic classification of thematic roles for function, LFG allows only those thematic roles which will map onto 'subjective' (core) or oblique (non-core) functions to be classified as [–o]; and finally, due to the thematic hierarchy (and the Subject Condition), thematic roles which will map onto oblique functions can never be initial in the argument structure or higher than the 'subjective' role. It follows from this that a [–o] argument which is *initial* in the argument structure (i.e. has position adjacent to the left bracket; see also Falk 2001:108) can *only* be the most prominent thematic role, and it can never be an oblique participant. Thus, the formulation of the subject mapping principle in (33a)(i) is in fact just a more concise, but still faithful, version of the LFG principle.

building in the condition that the first *encountered* argument needs to be pre-specified as either [–o] or [–r]. Hence, I propose a reformulation of the Mapping Principles into the following, single Mapping Principle:

(34)   MAPPING PRINCIPLE
       The ordered arguments are mapped onto the highest (i.e. *least* marked) compatible function on the markedness hierarchy.

The reformulated Mapping Principle achieves correct mappings for various classes of predicates discussed in the literature (including unaccusatives and ditransitives – see below for examples), but avoids stipulating any specific principles where their result is already partially determined by the markedness hierarchy. In this way, it avoids redundancy both in the account of the mapping itself, as well as in the formulation of any conditions or constraints pertaining to the subject.

Thus, the Subject Condition ('Every predicator must have a subject'; e.g. Bresnan 2001:311) is now redundant, since the provision of the subject for any personal clause is ensured by the more general Mapping Principle. Note that the Subject Condition had been assumed incorrectly even when it was allowed to be parametrised, since it would rule out inherently impersonal predicates in a language which otherwise has to be analysed as having the parameter present. Without the Subject Condition, it is now possible to account for inherently impersonal predicates which have no subject at any level of analysis (a-structure, f-structure, or c-structure) (see Kibort 2006 for examples and discussion).

I will now give a few concise examples illustrating the correct mappings achieved by the revised Mapping Principle in (34):

(a) with unergative[9] transitive verbs such as *clean* in *I clean the floor*, the Mapping Principle ensures that the first ([–o]) argument is linked to SUBJ and the second ([–r]) argument is linked to OBJ;

(b) with unaccusative intransitive verbs such as *come* in *I come*, the Mapping Principle ensures that the first ([–r]) argument is linked to SUBJ because this is the grammatical function which is the highest compatible one on the markedness hierarchy in (32);

(c) with unaccusative transitive verbs such as *cost* in *The book cost £10*, the Mapping Principle ensures that the first ([–r]) argument is linked to SUBJ (the highest grammatical function compatible with this specification) and the second ([–r]) argument is linked to OBJ;

(d) the non-raising version of the verb *seem*, as in *It seems to me that John was happy*, selects three argument positions: the (athematic) subject position and two non-core argument positions for the expression of the experiencer and the proposition; the positions are pre-specified as [–r], [–o], and [–o], respectively; the Mapping Principle ensures that the first (athematic) ([–r]) argument is linked to SUBJ, the second (experiencer) argument is linked to OBL$_\theta$, and the third

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[9] Following the RG tradition, I treat unergativity/unaccusativity as a primarily syntactic phenomenon, and as irrespective of transitivity (hence it is orthogonal to valency). For some discussion, see Kibort (2004:71-75, 357).

(propositional) argument is also linked to a type of oblique function, COMP;[10]

(e) the raising version of the verb *seem*, as in *He seemed to me to be happy*, selects three argument positions: the subject position and two non-core argument positions for the expression of the experiencer and the infinitival complement; the positions are pre-specified as [–r], [–o], and [–o], respectively (note that *seem* cannot have an unergative, i.e. passivisable subject argument in either version, non-raising or raising); the Mapping Principle ensures that the first ([–r]) argument is linked to SUBJ, the second (experiencer) argument is linked to OBL_θ, and the third (infinitival complement) argument is linked to a type of oblique function, XCOMP;

(f) the raising version of the verb *believe*, as in *I believe him to be happy*, selects three argument positions: the subject position, the primary object position, and a non-core position for the expression of the infinitival complement; the positions are pre-specified as [–o], [–r], and [–o], respectively; the Mapping Principle ensures that the first ([–o]) argument is linked to SUBJ, the second argument is linked to OBJ, and the third (infinitival complement) argument is linked to a type of oblique function, XCOMP;[11]

(g) non-derived predicates with a proto-beneficiary participant, as in (19)-(20), derived dative-shifted predicates, as in (21)-(22), and derived predicates with an 'applied' non-core participant, as in (29) and (30), receive straightforward argument-to-function mapping by the Mapping Principle: their first argument (whether [–o] or [–r]) is linked to SUBJ, their second ([–r]) argument is linked to OBJ, and their third ([+o]) argument is linked to OBJ_θ.

5   Revision 5: Using a mechanism of increasing markedness to account for morpho*syntactic* operations

Finally, using only a mechanism of increasing markedness, and retaining the principle of monotonicity, I will demonstrate how LMT can elegantly account for morpho*syntactic* phenomena that are referred to as 'demotions' in RG.

Morphosyntactic operations interfere with the 'default' argument-to-function mapping, but do not affect the lexical or semantic tiers of representation of the predicate (i.e. both the argument positions and the alignment of the participants with the argument positions remain unaffected). Hence, morphosyntactic operations do not affect the interpretation of the predicate together with its sets of semantic entailments, or the interpretation of the roles of the semantic participants. They affect only the final mapping of grammatical functions to arguments. Logically, this can be done only in one way: since the Markedness Hierarchy orders grammatical functions from the least restricted to the most restricted, and the Mapping Principle matches the ordered arguments with functions beginning from the least marked functions (i.e. the highest ones in the Markedness Hierarchy), the only way to disrupt this default mapping is by restricting the

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[10] Zaenen & Engdahl (1994) analyse COMP and XCOMP as specialised type of OBL_θ.

[11] See Falk (2001:140), example (54), for a corresponding analysis.

unrestricted arguments before applying the Mapping Principle. I refer to this as a 'mechanism of increasing markedness': a morphosyntactic operation can only restrict an argument by adding a 'marked' specification ([+r] or [+o]) to its syntactic pre-specification. The principle of monotonicity ensures that the restriction of [+r] cannot be added to a [–r] argument, and the restriction of [+o] cannot be added to a [–o] argument, as these operations would involve a change of information in the argument structure.

Hence, the available morphosyntactic (i.e. restricting) operations are: adding the [+r] specification to a [–o] argument; adding the [+o] specification to a [–r] argument; and adding the [+r] specification to a [+o] argument. Each of these operations would not only change the mapping of the grammatical function onto the affected argument, but also, in consequence of that altered mapping, it may also affect the mapping of grammatical function(s) onto other argument(s) (if the predicate selects more than one argument).

In brief, the morphosyntactic operation which restricts the first, unergative, argument pre-specified as [–o] by adding to it the [+r] specification is passivisation. As a result of this restriction, the first argument receives an oblique grammatical function (OBL$_\theta$) (hence the RG term 'demotion of subject to an oblique'), and the second (core) argument, if there is one, receives the SUBJ function by the Mapping Principle, as in (35). If there is no second core argument, the resulting construction is an impersonal passive, as in (36):[12]

$$
\begin{array}{llll}
(35) & x & y & (36) \qquad\qquad x \\
& | & | & \qquad\qquad\qquad | \\
verb_{\text{passive}} \;\langle\; & \text{arg}_1 & \text{arg}_2 \;\rangle & \qquad verb_{\text{passive}} \;\langle\; \text{arg}_1 \;\rangle \\
& [\text{–o}] & [\text{–r}] & \qquad\qquad\qquad [\text{–o}] \\
& \mathbf{[+r]} & & \qquad\qquad\qquad \mathbf{[+r]} \\
& \text{OBL}_\theta & \text{SUBJ} & \qquad\qquad\qquad \text{OBL}_\theta
\end{array}
$$

The morphosyntactic operation which restricts the first, unaccusative, argument pre-specified as [–r] by adding to it the [+o] specification is locative inversion (Bresnan & Kanerva 1989). As a result of this restriction, the first argument receives the OBJ function (hence 'demotion of subject to an object'). If the verb selects a non-core [–o] argument, by the Mapping Principle it will receive the SUBJ function, as in (37). If there is no [–o] argument, the resulting construction is inversion without the locative, as in (38):[13]

$$
\begin{array}{llll}
(37) & x & z & (38) \qquad\qquad x \\
& | & | & \qquad\qquad\qquad | \\
verb_{\text{loc.inv.}} \;\langle\; & \text{arg}_1 & \text{arg}_4 \;\rangle & \qquad verb_{\text{(loc).inv.}} \;\langle\; \text{arg}_1 \;\rangle \\
& [\text{–r}] & [\text{–o}] & \qquad\qquad\qquad [\text{–r}] \\
& \mathbf{[+o]} & & \qquad\qquad\qquad \mathbf{[+o]} \\
& \text{OBJ} & \text{SUBJ} & \qquad\qquad\qquad \text{OBJ}
\end{array}
$$

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[12] See Kibort (2001) and (2004) for detailed discussion of the passive, including arguments for the 'demotional', as opposed to 'promotional', analysis of the passive, and arguments against analysing the oblique agent as an adjunct (esp. 2004:360-363).

[13] For examples and discussion, see Kibort (2001) and (2004), esp. (2004:364-368).

The morphosyntactic operation which restricts the second, primary object argument pre-specified as [–r] by adding to it the [+o] specification can be called 'object preservation' (Kibort 2004:368-372). As a result of this restriction, in a situation where the second argument could receive the subject function by the Mapping Principle, it is prevented from doing so and is instead 'preserved' as an OBJ. This is observed, for example, in the common personal active with subject instrument that may not be conceptualised as an agent, as in the Polish equivalent of *The axe broke the slab*, represented in (39),[14] and in inherently impersonal predicates whose *only* argument is a 'primary patientlike' object, e.g. Polish *słychać ją* 'hear.[NON-PERSONAL] her.ACC' (Kibort 2006), represented in (40):

(39) x y z (40) y

$\qquad\qquad\qquad$ | $\quad$ | $\qquad\qquad\qquad\qquad\qquad\qquad\quad$ |

$verb_{\text{obj.pres.}}$ $\langle$ arg_2 arg_4 $\rangle$ $verb_{\text{NON-PERS}}$ $\langle$ arg_2 $\rangle$

$\qquad\qquad\qquad$ [–r]   [–o] $\qquad\qquad\qquad\qquad\qquad\qquad$ [–r]

$\qquad\qquad\qquad$ **[+o]** $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ **[+o]**

$\qquad\qquad\qquad$ OBJ   SUBJ $\qquad\qquad\qquad\qquad\qquad\qquad$ OBJ

Finally, the morphosyntactic operation which restricts the third, secondary object argument pre-specified as [+o] by adding to it the [+r] specification can be understood as 'secondary object preservation'. As a result of this restriction, in a situation where the second argument could receive the object function, it is prevented from doing so and is instead 'preserved' as an OBJ_θ. This is occurs in the Polish anticausative, as in (17)-(18), where, after the removal of the first argument from the predicate's valency frame, the remaining core argument is mapped onto subject, but the retrieved causer participant (the 'unwilful agent') can only have the secondary object function, but not a primary object function in this construction.[15]

6   Conclusions

In the sections above I have outlined a revised Lexical Mapping Theory which has theoretical and practical (descriptive) advantages over the currently

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[14] One of the semantic factors which determine the mapping of the instrument participant (i.e. a peripheral participant) onto a particular argument position is whether the entity behind the instrument participant can be conceptualised as the causer of the event. Intermediary instruments which may not be conceptualised as agents (unless they are personified), but which may be mapped onto active subjects, do not have to be re-mapped onto the first argument position to be assigned the function of the subject. I argue in Kibort (2004:127-129, 371) that this is the correct analysis for Polish.

[15] This could be due to the fact that in a non-derived, 'causative' predicate, there can always be a proto-beneficiary participant expressing the causer through a reflexive pronoun. More generally, while in Polish the two types of object preservation are obligatory in the constructions or predicates that I exemplified, there may be languages in which these operations occur as a result of optional choice, just like passivisation and locative inversion, with the two options (object preserved vs object non-preserved) having different discourse or other functions.

used, accepted versions of LMT. It combines the best insights about argument structure mappings from dispersed sources into a coherent model. I have demonstrated that it can handle a wide range of complex phenomena handled by the accepted LTM variants, as well as constructions that standard LMT does not or could not handle (e.g. morphosemantically altered predicates with participant-to-function mappings which do not conform to the preferred thematic hierarchy; the impersonal passive; the (locative) inversion without the locative argument; inherently impersonal predicates). The revised LMT enables an elegant account of dative shift and the transitivising applicative, without having to compromise the principle of monotonicity. It eschews some redundant or theory-internal solutions, and, as demonstrated by the precursors of revision 1, promises a fruitful approach to the analysis of causatives. The suggested theoretical revisions to LMT may, furthermore, enable it to apply more universally and account for participant-to-argument mappings in languages other than those whose relational clause structure can be uncontroversially described with the use of syntactic functions.

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