A One-level Analysis of Icelandic Quirky Case

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Abstract

This paper presents a single level analysis of the f-structure of Quirky Case NPs in Icelandic that covers the data of the two-level analysis presented by Andrews (1982, 1990), using the 'split lexicon' and DBA Glue proposal of Andrews (2007, 2008) to deal with the phenomena that motivated the two-level analysis. The resulting analysis is simpler in some ways (although perhaps a bit more stipulative in others), and more consistent with recent developments in LFG such as the Kibort-Findlay Mapping Theory.

1   Introduction

Andrews (1982, 1990) proposed a 'two level' analysis of arguably irregular, or 'Quirky'[1] case in Icelandic in LFG that accommodated a considerable range of difficult data. But there have been both empirical and theoretical developments that indicate that it might be time for a substantial revision.

Empirically, perhaps the most important factor is something that didn't happen with the original analysis: it did not become integrated into a general typology of case-marking and agreement. Its main point was to explain why Quirky Case NPs fail to trigger agreement on certain items which are agreement targets for regularly case-marked NPs, but nevertheless do trigger agreement on certain other kinds of targets, such as secondary predicates. But there are languages like Warlpiri, where inherent case marking has little or no effect on agreement, and Hindi, where regular case-marking suppresses agreement in the same way that arguably non-regular case-marking does. Another empirical point is that the two-layer analysis proposed for agreement with nominative objects doesn't do a great job with the further data presented by Sigurðsson & Holmberg (2008) and later authors such as Ussery (2017a), and, furthermore, doesn't generalize to the data of long distance agreement with object in Hindi from Bhatt (2005).

Theoretically, on the other hand, the two-level hypothesis is not easily compatible with the new Kibort-Findlay Mapping Theory (Findlay, 2016), and neither with any of the previous lexical mapping theories that have been explored in LFG. And there are various technical problems and unexplained phenomena in the data.

A final factor that facilitates a different analysis is the Split Lexicon and DBA Glue proposal of Andrews (2007, 2008), which proposes that the traditional LFG lexicon should be replaced by two, a Morphological Lexicon that

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[†]I would like to thank the two reviewers for very extensive and helpful comments.

[1]Nobody knows who invented this term, and there is furthermore a tendency to reserve 'quirky' for accusative and genitive subjects and genitive objects, which are less semantically predictable than the datives (van Valin, 1991), which are then called 'inherent' (Thráinsson, 2007, 181-182).

is very similar to the traditional LFG lexicon, but without any direct involve-
ment with meaning, and a Semantic Lexicon that associates combinations of
features (both PRED-features and grammatical features) with meanings, using
Glue semantics, but with the meaning-constructors applying (primarily) to f-
structures.[2] This allows a workable analysis to be formulated with less stip-
ulation than its most fully worked out unification-based competitor, Sag et al.
(1992), which requires two kinds of case attributes, plus provisions to equate
them under certain circumstances. With the split lexicon, these provisions can
be replaced by the distinction between 'uninterpreted' (structural) and '(co-
)interpreted' (lexical/inherent/quirky) case, which has a natural representation
in the structures.

In the following sections, I briefly sketch the main features of the origi-
nal analysis, and discuss some of the theoretical and empirical problems that
motivate a revision. Then I describe how the Split Lexicon works, apply it to
develop the proposed new analysis, and, finally integrate that with KFMT.

2   Highlights of the Original Analysis

Icelandic, like German, has preserved the four cases of nominative, accusative,
genitive and dative, although the endings are more numerous and distinct than
in German, and the three genders (masculine, feminine and neuter) are distin-
guished in the plural as well as the singular. Furthermore, predicate adjectives
and passive participles agree with their subjects if these are case-marked in
accordance with the regular structural case-marking rules, whereby subjects
are nominative, and objects are accusative if the subjects are regularly case-
marked[3] (Thráinsson, 2007, 157–159):

(1) a. Hún   er rík.
         she.NOM is rich.NOM
         'She is rich.'

     b. Hún   var handtekin.
         she.NOM was arrested.NOM
         'She was arrested.'

     c. Þeir segja hana   (vera) ríka.
         they say   her.ACC (to be) rich.ACC.
         'They say that she is rich.'

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[2]This is 'Description by Analysis' (DBA) rather than the 'co-description' (Halvorsen & Ka-
plan, 1995) that is normally used for Glue.

[3]The working technical formulation is a bit tricky, and in many situations the dative can be
regarded as 'regular' on a semantic basis, but we ignore these issues here. See van Valin (1991),
Barðdal (2011a, 2011b) and much further literature for discussion.

     d. Þeir segja hana   (hafa   verið) handtekna.
        they say   her.ACC (to have been) arrested.ACC
        'They say that she has been arrested.'

LFG accommodates these and more complex examples by using the mechanism of functional control to allow one NP to be simultaneously the subject or object of multiple verbs, adjectives etc. at the same time, so that they all agree with it, and case marking is determined by the overt position of the NP.

    But Icelandic also has interesting examples of non-agreement with subjects. There are a considerable number of verbs that take subjects in the dative case, fewer that do in the accusative, and a very few in the genitive. There are an impressive number of arguments that these 'putative non-nominative subjects' really are subjects, that is, they function as subjects for a number of grammatical properties, and thereby reside substantially in subject position. Among the strongest of these arguments comes from the fact that they occur covertly, as subjects of infinitives in complements which have empty/PRO/null subjects (Thráinsson, 2007, 159, 165):

(2) a. Stelpunum   leiddist   í skólanum.
       the girls.DAT was bored in school
       'The girls were bored in school.'

     b. Stelpurnar   vonast til   að leiðast ekki í skólanum.
       the girls.NOM hope   towards to be bored not in school
       'The girls hope not to be bored at school.'

Unlike in English, Icelandic infinitives in this kind of complement cannot have overt subjects (if the subject is not coreferential with a suitable controller, a subjunctive clause is used), and, furthermore, Icelandic is not really a pro-drop language, so (b) has to be an infinitive with an obligatorily suppressed something, most plausibly identified as a subject, since clear cases of objects cannot be suppressed in this way.

    So we can now state the interesting fact, which is that except perhaps in some recent, innovative varieties of the language, finite verbs never agree (in person and number) with their non-nominative subjects, while adjective and passive participles agree (in gender, number, and case) only under certain limited circumstances. Nonagreement in number with a dative subject has already been seen in (2a); nonagreement in person and with accusative subjects are illustrated below (Thráinsson, 2007, 159):

(3) a. Mér   býður   við   setningafræði.
       me.DAT loathes.3SG against syntax
       'Syntax makes me sick.'

    b. Strákana   rak   á land á eyðeyju.
       boys-the.ACC.PL drifted.SG to shore on desert island
       'The boys drifted ashore on a desert island.'

Quirky Case is also preserved and fails to trigger agreement under Passive and 'Subject-Raising', as discussed below and extensively in the literature.

    Andrews' proposal was that in the f-structure of the Quirky subjects and objects, there is an extra structural layer that both hides the agreement features of the NP from most things that might want to agree with it, and also prevents the regular case-marking rules from applying, and thereby ruling the sentences out by producing contradictions. In order to emulate the no longer very popular $(\uparrow(\downarrow \text{PCASE})) = \downarrow$ analysis from (Kaplan & Bresnan, 1982, 197–202), Andrews used the case-name as a grammatical functional label, although a constant GF such as OBL could also be made to work:

$$(4) \quad \left[\text{SUBJ} \left[\text{ACC} \begin{bmatrix} \text{GEND} & \text{MASC} \\ \text{NUM} & \text{PL} \\ \text{CASE} & \text{ACC} \\ \text{PRED} & \text{'Boy'} \end{bmatrix} \right] \right]$$

So if a verb comes along wanting to require that the NUM-value of its SUBJ be PL, it wouldn't match up with the 'real' number value provided by the noun, but be stuck on the top level, where it will fail, due to agreement values being associated with constraining equations..

    Non-Quirky NPs would on the other hand have only a single layer in their f-structure, and the regular case-marking rule was that a first or second object (OBJ, OBJ_θ in the analysis to come) would be marked accusative as long as the subject was also non-Quirky. Nominative was treated as the unmarked case, which allows nominative to be the default case value on an object when the subject is Quirky, which gives reasonable results, including in constructions where a nominative subject is raised into nominative object position, where the embedded object remains accusative, just as it would in a normal accusative plus infinitive (ACI) construction with a nominative matrix subject:

(5) Mér   virðist hún   hafa   þann galla   einan, ...
    me.DAT seems it.NOM.F to have that   flaw.ACC only.ACC
    'It seems to me to have only that flaw . . . .'
    http://timarit.is/view_page_init.jsp?pageId=4411344

    This covers non-agreement, but there are also instances of agreement with Quirky NPs that need to be accounted for. These fall into three types:

(6) a. Secondary predicates

b. Control complements of certain verbs that take Quirky (dative) objects

c. Some complicated examples which I claim to be plausibly performance errors

The secondary predicate exceptions are especially interesting in a strengthened form of the complement subject deletion arguments, indicating that the infinitives really did have nonovert subjects in their usual case, even if that case was Quirky (Thráinsson, 2007, 417):

(7) a. að vanta   einan   í tíma er vandræðlegt.
     to be missing alone.ACC.M.SG in class is embarassing
     'It is embarassing to be alone missing from class.'

b. að vera kastað einum   í dýflissu er hræðilegt.
     to be   thrown alone.DAT.M.SG in dungeon is terrible
     'It is terrible to be thrown into the dungeon alone.'

Of course, the full sentence versions of the infinitive clauses here with their overt subjects are also fine (Thráinsson, 2007, 416).

Some control complement examples from Andrews (1990) are:[4]

(8) a. Þeir lýstu   glæpamanninum   sem
     they described the criminal.DAT.M.SG as
     stórhættulegum.
     very dangerous.DAT.M.SG
     'They described the criminals as very dangerous.'

b.
     Glæpamönnum   var lýst   sem stórhættulegum.
     the criminals.DAT.PL was described.SUP as   very dangerous.DAT.PL
     'The criminals were described as very dangerous.'

c. Hann heldur tönnunum sínum   hvítum   og hreinum.
     he   keeps teeth   his.DAT.PL white.DAT.PL and clean.DAT.PL

Note that in (b), the adjective agrees with the dative subject while the passive auxiliary and participle do not.

The explanation for the agreement with the secondary predicates and dative-controlled complements that was presented in Andrews (1990) was that in order for the results of secondary predication to be semantically interpretable, the secondary predication rule would have to set the inner structure of the NP

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[4]SUP represents 'supine', a form that is morphologically nominative/accusative neuter singular

rather than the entire structure as the SUBJ-value of the adjective, rendering the agreement features visible to agreement. And likewise for the control complement examples, except that it would be the control equations associated with the matrix verbs that did this. This is workable, although it does lead to the implication that there could be languages where Quirky NPs could not be subjects of secondary predicates, which to the best of my knowledge has not been documented.

3   Problems with the Two-Level Analysis

All of this worked reasonably well, in spite of some technical issues, but various problems either emerged over the decades, or were not cleared up. We discuss some but not all of them here, while another, integration with KFMT, will be discussed later when we explain how that integrates with the one-layer analysis.

Perhaps the most serious is that the analysis does not seem to have found a clear place in any reasonable typology of the interactions of case and agreement. The simplest expectation from the analysis would be that the lexically controlled case inhibits agreement, while regularly controlled case does not, but this is false. Warlpiri for example has lexically controlled ergative on subjects, and dative on objects, but the former has no effect at all on agreement (person-number marking on auxiliaries), and the latter hardly any, and that is furthermore enhancing: an overt clitic rather than null for a dative object, as originally noted by Hale (1973), with later supporting argumentation about the grammatical relations and related phenomena by Simpson & Bresnan (1983) and Simpson (1991). Using a two-level analysis for lexically controlled agreement in Warlpiri[5] would require complexifying the conditions for both subject and object agreement.

The opposite problem is provided by Hindi, where Butt & King (2003) discuss in some detail, in an LFG framework, how non-lexically controlled case-marking with a combination of semantic and structural conditioning on both subjects (ergative *ne*) and animate or definite objects (*ko*) inhibits agreement completely. Technically, this can be easily handled by limiting these agreements to nominative case triggers, but the more general point is the absence of a typology where case-marking implemented by two levels plays a clear role.

Another relevant issue is a decline in potential theoretical support from other directions for the two-level analysis. Before the advent of LFG's Glue semantics in the early mid 1990s, it seemed plausible to claim that semantically case-marked NPs needed an extra structural level for a PRED-feature. So a sentence such as (9) might get a structure like (10):

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[5]Exemplified by some intransitive verbs that take ergative subjects, and transitive verbs that take dative objects; a survey of case-marking patterns of verbs is given in Hale (1982).

(9) ngatju pirli-ngka.
I.ABS hill-LOC
I am on the rock/hill (Warpiri, Simpson, 1991, 215)

(10) $\begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`Pro'} \\ \text{PERS} & \text{I} \end{bmatrix} \\ \text{PRED} & \text{`Loc(SUBJ, OBJ)'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{`Rock/Hill'} \end{bmatrix} \end{bmatrix}$

In particular, the rock/hill is introduced into the f-structure as the OBJ of its locative case-marker, which, among other things, averts the possibility of (9) being interpreted as 'I am a/the rock/hill'. For more discussion see Simpson (1991, 196, 215).

But Glue semantics[6] changes this, by allowing grammatical features to appear in a flat structure, but nevertheless introduce operators that apply semantically in succession. This is can happen because an inflected form can introduce a meaning-constructor that in effect operates on the meaning currently associated with an f-substructure and provides a new one. A possible analysis for a locative case might therefore be:

(11) $\lambda yx.At(x, y) : \uparrow_e \rightarrow (\uparrow_e \rightarrow \uparrow_t)$

This converts an entity (corresponding to the first argument) into a predicate over entities (corresponding to the following two arguments) that is true if and only if the second argument entity is located *At* the first argument entity.[7] Space does not permit elevating this to a full analysis, but something using PREDLINK (Laczkó (2012) and references cited there) seems plausible, to keep the locative NP's f-structure distinct from that of the sentence:

(12) $\begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`Pro'} \\ \text{PERS} & \text{I} \end{bmatrix} \\ \text{PREDLINK} & \begin{bmatrix} \text{PRED} & \text{`Rock'} \\ \text{CASE} & \text{LOC} \end{bmatrix} \end{bmatrix}$

Because Glue assembly can do the work of the Completeness and Coherence constraints, it is not even necessary for the entire structure to have a PRED of its own, although analyses using PREDLINK tend to assume this.

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[6]See Dalrymple (2001), Asudeh (2005), Andrews (2010) and Asudeh (2012) for presentations of Glue, Andrews using a somewhat different presentation than Dalrymple and Asudeh, although other than the absence of a semantic projection in Andrews, the theory is the same.

[7]A semantic projection is not used here, because the semantic projection is not needed for this analysis.

That two-level analyses were motivated for semantically case-marked NPs does not imply that they were available for argument NPs, but it does make such an analysis more plausible, since the machinery for generating such NPs would have to be available in the absence of obvious overt evidence for the structures, as can be found for locative NPs in Bantu languages (Bresnan & Mchombo, 1995).

There have been further developments in LFG since the 1980s which make it easier to capture all of the original data without a two-level analysis. One of these is the concept of 'inside-out-functional uncertainty' (iofu), which makes it possible to write into a lexical item a constraint meaning 'I am an adjunct', such as:[8]

(13) (ADJUNCT↑)

The idea here is that '↑' designates the f-structure that the item is appearing in, and the sequence of grammatical functions in front of ↑ indicates a list of grammatical functions which one must be able to climb up, in inverse order, from that f-structure. See Nordlinger (1998) for discussion with a focus on case-marking in Australian linguistics. We will return to this when we need to use it.

Another problem arises with the phenomenon of agreement with nominative objects. Recent work on this has been reviewed and extended by Ussery (2017a), but Andrews (1990, 211–213) discusses a form of example that does not seem to have been much considered in the literature, with at least some exceptions, such as Alsina & Vigo (2017).[9] These are cases where a matrix verb agrees optionally with the object of its functionally controlled (ECM) complement:

(14) a. Honum eru taldir   hafa   verið gefnir
         him.D   are believed.M.N.PL to have been given.M.N.PL
         hestarnir.
         the horses.M.N.PL
         'To him are believed to have been given the horses.'

     b. Honum er talið   hafa   verið gefnir
         him.D   is believed.SUP to have been given.M.N.PL
         hestarnir.
         the horses.M.N.PL
         'To him are believed to have been given the horses.'

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[8]Such expressions are in general instances of functional uncertainty, because f-structures can contain re-entrancies.

[9]Who cites Sigurðsson (2004), where I can't this form of example, although I do think I recall that he has discussed them somewhere.

c. *Honum er talið hafa verið gefnið hestarnir.
   him.D is believed.SUP to have been given.SUP the horses.M.N.PL
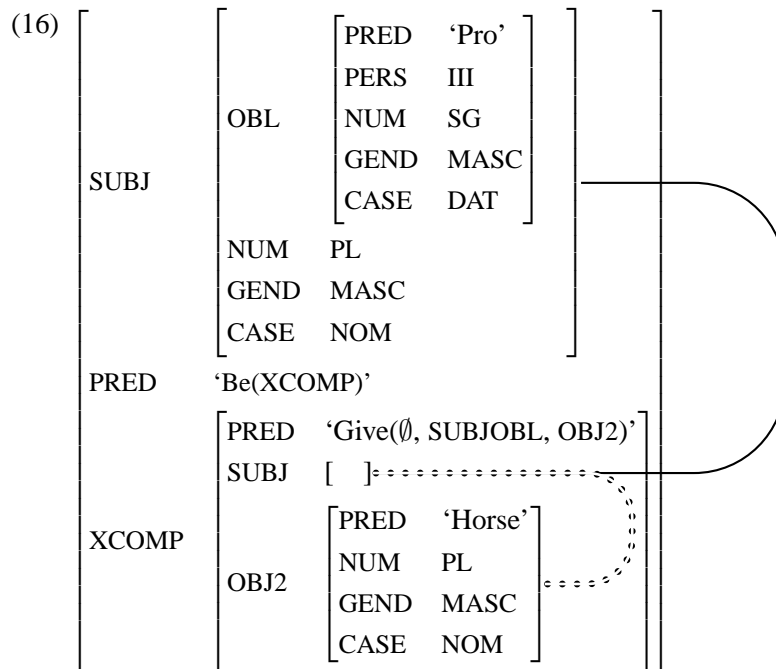
In (a) we see agreement of the matrix verb with the complement object, in (b) nonagreement, while in (c) we see the ungrammatical result of neither complement nor matrix verbs agreeing. This is a consequence of the fact that agreement of a passive with its nominative second object is obligatory, even though most other cases of agreement with nominative objects are optional. The judgements from a questionnaire returned by seven people at Háskoli Íslands are:[10]

(15)		✓	?	?*	*?	*
	a)	4	2	0	0	1
	b)	5	1	1	0	0
	c)	0	1	0	0	6

The questionnaire results justify treating (a) and (b) as grammatical, and (c) as ungrammatical, although Alsina and Vigo, working in an OT framework, claim only (a) to be grammatical.

Andrews' proposal was that there was an equation in lexical entries that would copy the gender, number and case of a nominative object to the outer layer of a dative subject, apparently obligatory for passive participles of ditransitives with dative subjects, but in general optional for other verbal forms with dative subjects. The features on the outer layer will then be visible to and trigger agreement on everything of which this dative is a subject, as illustrated in (16) below, where to reduce complexity, the generally optional *hafa verið* sequence is omitted. The structure uses the original 'OBJ2' label, which would now be replaced with 'OBJ$_\theta$', the semantic role to which these 'second objects' are restricted being Theme. The double-dotted line represents the feature-sharing between the complement subject and second object, which cashes out as feature sharing between the latter and the matrix subject thanks to the functional control represented by the solid line:

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[10]In the instructions, '✓' was explicated as 'fully acceptable and natural, '?' a bit questionable ('acceptable, but perhaps somewhat unnatural'). '?*' as 'questionable', '*?' as 'worse, but not totally unacceptable', and '*' as bad.

(16)
$$
\begin{bmatrix}
\text{SUBJ} & \begin{bmatrix}
\text{OBL} & \begin{bmatrix}
\text{PRED} & \text{`Pro'} \\
\text{PERS} & \text{III} \\
\text{NUM} & \text{SG} \\
\text{GEND} & \text{MASC} \\
\text{CASE} & \text{DAT}
\end{bmatrix} \\
\text{NUM} & \text{PL} \\
\text{GEND} & \text{MASC} \\
\text{CASE} & \text{NOM}
\end{bmatrix} \\
\text{PRED} & \text{`Be(XCOMP)'} \\
\text{XCOMP} & \begin{bmatrix}
\text{PRED} & \text{`Give}(\emptyset,\ \text{SUBJOBL, OBJ2)'} \\
\text{SUBJ} & [\quad] \\
\text{OBJ2} & \begin{bmatrix}
\text{PRED} & \text{`Horse'} \\
\text{NUM} & \text{PL} \\
\text{GEND} & \text{MASC} \\
\text{CASE} & \text{NOM}
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}
$$

This provides a clever account of (14a), but not of (14b), since, given that the agreement features have been copied onto the shared complement subject and matrix object, they ought to be equally visible in both places. Andrews suggested that the acceptability of (b) was due to a performance effect caused by the greater distance between the agreement target and trigger, but it would be better to not have to resort to such explanations if possible.

The evident alternative is to have agreement with nominative objects (both OBJ and OBJ_θ) implemented by a second rule that applies if there is no suitable SUBJ agreement trigger. This is in general optional for non-passive verbs (but more optional or even dispreferred under circumstances investigated by Ussery (2017a) and many previous investigators, which we cannot pursue further here). This would be obligatory for passive participles, but a functional uncertainty expression to allow reference to a matrix dative subject would be optional.

The final problem is integration with the Kibort-Findlay Mapping Theory (KFMT). I will defer presentation of this problem until we have presented the proposed reanalysis of Quirky Case.

4 The Split Lexicon

The theoretical and empirical issues discussed in the previous section create difficulties for the two-level analysis; the idea we discuss here provides the infrastructure for the new one. This is the proposal for DBA Glue and the Split

Lexicon described in Andrews (2007, 2008). Its relevance is that it provides a rationale for distinguishing between case imposed by specific lexical items as opposed to structural rules, which requires less stipulation than other single-layer approaches, such as that of Sag et al. (1992).
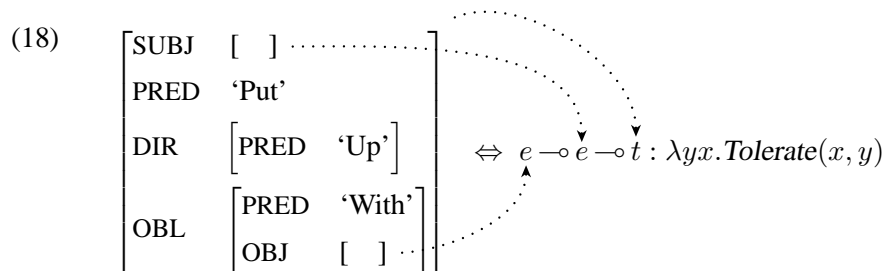
Current Glue semantics performs compositional semantic interpretation by means of 'meaning constructors' in unitary lexical entries that contain all the information about a word and its meanings (Dalrymple, 2015). This works, but, as discussed in Andrews (2007, 2008), leads to awkwardness in some areas, such as with the numerous idiomatic verb-particle-preposition constructions in Germanic languages, and the lack of any explanation for the relatively consistent interpretation of grammatical features such as tense and number.[11] The original LFG analysis of Quirky Case was based on the idea that meaning was contributed by PRED-features. Therefore, the verb of such combinations, as well as that of ordinary idioms, would, would have PRED-features, while the other contributers would not, but would rather have other properties, such as CASE or FORM features. For example, a lexical entry for a combination such as *put up with* might get a (somewhat informal) lexical entry like this (assuming that idomatic prepositions introduce an attribute PFORM to avoid possibe FORM-feature clash):

(17) *put*: V, $(\uparrow \text{PRED}) = \text{'Put}_{up\ with}(\text{SUBJ, OBL[PFORM} =_c \text{WITH]}),$
$(\uparrow \text{DIR FORM}) =_c \text{UP}.$

This assumes that particles bear a grammatical function DIR, whose value can be a semantically meaningful directional, which would have its own PRED-features, but can also be a FORM-feature, which determines a morphological form with no independent meaning. This is workable, but it is awkward to provide so many forms with both PRED and FORM features, especially when the former are no longer playing a central role in semantics. And the original $(\uparrow(\downarrow \text{PCASE})) = \downarrow$ analysis of prepositional complements has not remained popular.

The proposal of the Split Lexicon is that in addition to the original LFG lexicon, in which the PRED-features functioned to a considerable extent as a substitute for a theory of semantics rather than a theory of semantics, there is also a Semantic Lexicon, where feature-values or constellations of feature-values are associated with meaning constructors. For *put up with*, we can represent a Semantic Lexicon Entry (SLE) as follows:

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[11]The exceptions to this consistency, such as lexically determined grammatical gender and *pluralia tantum*, can be handled by allowing features to also be 'co-interpreted' with a lexical stem, similarly to idioms (Andrews, 2008, 8).

$$(18) \quad \begin{bmatrix} \text{SUBJ} & [\ ] \\ \text{PRED} & \text{`Put'} \\ \text{DIR} & \begin{bmatrix} \text{PRED} & \text{`Up'} \end{bmatrix} \\ \text{OBL} & \begin{bmatrix} \text{PRED} & \text{`With'} \\ \text{OBJ} & [\ ] \end{bmatrix} \end{bmatrix} \Leftrightarrow e \multimap e \multimap t : \lambda yx.\textit{Tolerate}(x,y)$$

The material to the right of the double arrow is the meaning-contribution, where positions in the f-structure are connected to argument-positions in the meaning-constructor. The meaning item '*Tolerate*' should be seen as a placeholder for a substantive account of lexical meaning. The order of order of the 'glue side' to the left of the colon and 'meaning-side' to the right is swapped from the usual, to better fit this form of presentation.

What is relevant for us here is how the SLEs connects meaning-constructors to f-structures. The way this works is that the Morphological Lexicon (which, in terms of recent work on LFG morphology, such as Dalrymple (2015), should probably just be regarded as the Morphology) and the c-structure rules would produce an f-structure, and then the SLEs would apply, 'checking off' interpretable features (semantic case, but not structural case) subject to the constraint that each interpretable feature gets checked off once and only once.[12] Most SLEs check off only one feature, but (18) checks off three. The meaning constructors introduced by these SLEs are then assembled, subject to constraints of Glue semantics as presented in the literature, for example Dalrymple (2001) or Andrews (2010). If the verb is *walk* rather than *put*, there is no SLE that also checks off *with* and *up*, so something like *Jack walked up with Jill* requires the particle and preposition to choose one of their individual meanings, such as accompaniment and upward directionality.

There are various ways in which checking off could be implemented, but a natural way to do it would be to have interpretable feature-values having a pointer to the list of meaning-constructors introduced by the SLE (more than one is possible, as discussed in Dalrymple's 2001 discussion of attributive adjectives). This can be 'undefined' for interpretable features that are not yet checked off, and a nil or list-terminating value for uninterpretable features. The result is that we obtain a natural distinction between the 'Quirky' cases that inhibit agreement, and the uninterpretable/structural ones that do not. We are now ready to present the analysis.

First, how do we implement regular case-marking, for which I think that LFG has never had a fully satisfactory account. The best so far is that of

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[12]It would however be plausible to allow there to be 'environmental' features that must be present for an SLE to apply, but don't get checked off. But it is not clear that this is necessary.

Nordlinger (1998), in which case-marked morphological forms introduce inside-out functional uncertainty (iofu) specifications for the environments they can (or must) appear in, but this account provides no explanation for why case *features* exist, even though they are clearly needed in many languages to explain phenomena of agreement. My suggestion here is that in addition to the 'semantic licensing' implemented by the checking-off mechanism, there is also 'structural licensing', implemented by iofu as presented by Nordlinger.[13]

Amongst the issues to be dealt with are a) how to deal with case on nonvert NPs (which creates problems for implementation in the PS rules as proposed by Neidle (1982)), b) how to make case-marking obligatory when it is (as is usually the case for the major standardized languages, but my impression from listening to field workers over the decades is that this is not always the case, especially for case-markers with a substantial degree of morphological autonomy). For the accusative in Icelandic, I provisionally propose this, superscript 0 on a feature meaning uninterpreted/structural:

(19) ACC: $((\text{OBJ}|\text{OBJ}_\theta \text{ CASE} \uparrow) \text{SUBJ CASE}^0)$

This says that an ACC value of CASE is licensed if this occurs as the OBJ or OBJ_θ value of a structure that also has an uninterpreted SUBJ CASE-value. This will be nominative in a finite clause or anaphorically controlled að-infinitive, accusative in an ACI construction. Space limitations preclude saying more here about the justifications for various aspects of (19). The case features are assumed to be introduced into the f-structure by the morphology, including agreement, and (19) applies to any instance of the feature. Such syntactic licensing is then an alternative to licensing ('checking off') by a meaning-constructor.

A concomitant of (19) is that we have to analyse the nominative as another uninterpreted case-value, rather than the absence of any case-value. This value seems to behave as an 'elsewhere case', appearing where no other is licensed.[14] So we will need further provisions to require accusative to be present when its licensing condition is met, nominative otherwise, which can be done in various ways; the choice is not relevant here and so will not be discussed further.

5 A One-level Analysis

The basic generalization is that except with adjectival adjuncts as in (6a), certain control predicates (6b), and perhaps in a rather complex control construction (6c), both finite verbs and predicate adjectives and participles agree only

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[13]And, on the basis of Butt & King (2003), there also appears to be dual licensing, for example, of cases on subjects expressing modality in Hindi and Urdu.

[14]In contrast to the behavior of the nominative in languages such as English, Modern Irish, and Ancient Greek, where the nominative seems associated with finiteness.

with uninterpreted case-values, that of their subject if this exists, otherwise, sometimes, with an object. Such agreement with subjects will be the main topic here, objects raising numerous questions of optionality and variation. Subject agreement can be restricted to non-Quirky NP triggers by including NOM^0 or ACC^0 in the agreement specifications, as illustrated in (20), where the full specifications will also include gender and number:[15]

(20) $(\uparrow SUBJ\ CASE) = NOM^0/ACC^0$

Turning to the three cases in (6), we need to provide forms for all cases, not just nominative and accusative. Case (a), secondary predicates, can be managed by adding to an agreeing form (agreement target) a specification to the effect it must be a member of the ADJUNCTS grammatical function. This is easy to specify with an iofu constraint:

(21) $(ADJUNCTS \in \uparrow)$

Furthermore, when this specification is present, no requirement is imposed that the case of the agreement trigger be uninterpreted. I will not explore the kinds of notation that might be proposed to achieve this effect, since it clearly can be done with templates.

Case (b) is more challenging, because in current LFG, these would be treated as XCOMPs, just like 'Subject Raising' constructions (Bresnan et al., 2016, 289ff.). Therefore a simple extension of (21) to specify something like the original LFG ACOMP can't be used. But this requires these verbs to impose various kinds of category restrictions on their complements, because some of them take only a restricted range of possibilities, for reasons that are not entirely clear; explicable semantically to some degree, but not entirely:

(22) a.   John grew unhappy.

b.   *John grew a seasoned administrator. [must be transitive to be intelligible, therefore beyond current technology; contrast *became* instead of *grew*]

c.   The tree grew into a fine provider of shade.

d. ?*John grew into enjoying syntax [seems off to me, construction not found from major dictionaries]

Given this need to impose properties on the complement, we can also impose one that permits agreement with NPs bearing interpreted case, which appears

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[15]And should plausibly be reformulated to use something like AGR as in Alsina & Vigo (2017), but I will not pursue this here.

to be allowed only when the complement is restricted to not being verbal. The formulation is trivial.

The final case, (6c), involves examples in which Quirky accusative NP appears in ACI position of a passivized functional control verb (Andrews, 1990, 191). Some examples from the questionnaire referred to previously are (A.F.SG abbreviating ACC.F.SG):

(23) a. Þeir segja hana   (vera)   talið/talda   vanta
        they say her.ACC.F.SG (to have) been.SUP/ACC.F.SG to lack
        peninga.
        money
        'They say that she is believed to lack money.'

     b. Þeir segja strákana (vera)   talda/*talið   elska Svein.
        they say her.A.F.SG (to have) been.ACC.F.SG/SUP to love Svein
        'They say that she is believed to love Svein.'

The results were

(24)   ✓   ?   ?*   *?   *
     a) SUP   1   3   0   1   2
     a) AGR   5   2   0   0   0
     b) AGR   5   1   1   0   0
     b) SUP   0   0   0   0   7

It seems evident that (a) these sentences are not really very good (I have not managed to find such 'stacked functional control' constructions in web searches), and that agreement of the passive participle with a non-Quirky accusative overt object that is its f-structure subject is obligatory, but with a Quirky one, optional (indeed, agreement is better than non-agreement in this situation). Andrews (1990) suggested that the acceptability of agreement in (a) was due to a performance effect, due to the fact that the information that the accusative is Quirky is not provided until after the passive participle is produced, whereas, in the simpler and common examples, the Quirkiness of the subject is immediately evident, since it is sitting in a overt subject position.

This is plausible, but we should still look for ways of avoiding performance accounts of inconvenient data, and recent work on Icelandic and Faroese does reveal some threads to pull at. In particular, there is work indicating that agreement with Quirky NP is not actually as bad as originally thought. In Faroese, Jónsson (2009) showed that agreement with dative subjects was common enough to be reasonably regarded as grammatical, and Árnadóttir & Sigurðsson (2008) find some similar examples in Icelandic. In Andrews' 1982 original LFG analysis, extension of agreement to Quirky NPs would require either a reanalysis of the structures, or a complexification of the agreement

conditions to allow access to the inner level, both somewhat complex (and it is unclear how to implement the former idea). On the present account, however, all that is necessary is to remove a restriction on the agreement specification, a more natural operation. The explanation for how the restriction got there in the first place would be diachronic: originally, the oblique subjects were not subjects.

6   Kibort-Findlay Mapping theory

We now show how to integrate the one-level analysis with the Kibort-Findlay Mapping Theory (KFMT). This is a version of lexical mapping theory that is fully explicit, formulable within the LFG formalism, and integrated with glue semantics. KFMT terminologically abandons the popular idea of 'argument structure', but replaces it with an elaboration of the 'semantic projection' of Glue semantics, which can perhaps be regarded as a kind of argument structure.[16] This is a projection from f-structure, which KFMT populates with attributes such as ARG_1, ARG_2 and more, which, in practice, partially reflect a classification of semantic roles in terms of their typical syntactic behavior.

ARG_1 is like the 'external argument' of GB/Minimalism, while ARG_2 is like the non-oblique 'internal argument' of GB/Minimalism. ARG_4 and below (with higher subscripts) are obliques, while ARG_3 is complicated, and will be discussed shortly below. KFMT also uses Davidsonian event semantics, with semantic projection attribute EV, so that verbs are fundamentally of type $ev \rightarrow t$.

A feature of current KFMT practice which I question here is that all (or perhaps most) arguments are added with templates that in effect attach the argument with its semantic role, in effecting converting a predicate of type τ into one of type $e \rightarrow \tau$ (that is adding another argument). This is workable for the commonly discussed semantic roles as Agent, Theme, Beneficiary, etc., but, as pointed out by an anonymous referee, is not required by the theory itself, and I think is rather questionable for the arguments of many verbs such as *predecease*, *outlive*, *survive* and *lack*. I don't think that anything goes wrong if we allow verbs to start out with some basic arguments, two at least, which is the maximum number that can take Quirky case.

This would give us an f-structure and semantic projection for a simple clause structure of an accusative subject and object verb such as *vanta* 'lack', where the assignments of ARG_2 and ARG_3 will be explained shortly. :

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[16]Specifically, the 'lightweight' version of argument structure as proposed for example by Alsina (1996) or Andrews & Manning (1999) that imposes some classification and hierarchical ordering on the arguments, without digging into their semantics to any great extent.

(25)
$$\begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{CASE} & \text{ACC} \end{bmatrix} \\ \text{PRED} & \text{`Lack'} \\ \text{OBJ}_\theta & \begin{bmatrix} \text{CASE} & \text{ACC} \end{bmatrix} \end{bmatrix} \qquad \begin{bmatrix} \text{EV} & [\ \ ] \\ \text{ARG}_2 & [\ \ ] \\ \text{ARG}_3 & [\ \ ] \end{bmatrix}$$

The SLE for *vanta* then ascribes the semantic roles to the two ARG-values, with an issue involving the CASE-values, as discussed further below

An essential component of KFMT is rules which equate ARG-values with GFs, which in effect apply optionally, via mechanisms not discussed here. The two relevant ones for this example are:

(26) a. $(\uparrow\{\text{SUBJ}|\text{OBJ}\})_\sigma = (\uparrow_\sigma \text{ARG}_2)$

     b. $(\uparrow\text{OBJ}_\theta)_\sigma = (\uparrow_\sigma \text{ARG}_3)$

Given the principles of the theory, the 'Lacker' argument needs to be ARG_2 in order to be subject (likewise for passivizable Quirky arguments such as the (dative) 'Helpee' of *hjálpa*), leaving the object OBJ_θ associated with ARG_3.

Using some notational shortcuts, we can now propose the following SLE (27) below for *vanta*. It accesses attributes of both f-structure (PRED) and s-structure (ARG and EV), consuming two type e arguments to produce a predicate over events (type $ev{\to}t$), using the standard convention that rightmost parentheses are omitted:

(27)

$$\begin{bmatrix} \text{PRED} & \text{`Vanta'} \\ {}_\sigma\text{EV} & [\ \ ] \\ {}_\sigma\text{ARG}_2 & \begin{bmatrix} {}_{\sigma^{-1}}\text{CASE} & \text{ACC} \end{bmatrix} \\ {}_\sigma\text{ARG}_3 & \begin{bmatrix} {}_{\sigma^{-1}}\text{CASE} & \text{ACC} \end{bmatrix} \end{bmatrix} \quad \Leftrightarrow\ e{\to}e{\to}ev{\to}t : \lambda yxe.Lack(e,x,y)$$

The projections are a bit awkward-looking, but they could be eliminated with the aid of a 'coercion' convention similar to what most programming languages deploy when one mixes reals and integers in an arithmetic operation: functions are supplied automatically to make the types match in a useful way. In this case, when we see an s-structure attribute in an f-structure, we insert that σ projection, and, when we see an f-structure attribute in an f-structure, the σ^{-1} projection. Furthermore, it is necessary to interpret the inverse projections non-constructively, because even if the projections are functions, there is no guarantee that their inverses are, so the inverses need to be treated like iofu (a point which originated in some discussion with Mary Dalrymple and others).

We can now see the problem that the two-level analysis faces; not only would we need to specify the case, but somehow coordinate iofu specifications for a function such as OBL with rules such as (26), which is not necessarily impossible, but would still be a considerable nuisance, and is avoided by the present one-level analysis.

7 Conclusion

In conclusion, we see that Andrews' original 2-level analysis can be replaced with a 1-level analysis, where a major facilitating role is played by the proposal of the split lexicon, with semantics based on DBA of f-structure attributes rather than unitary lexical entries. This approach provides an independently motivated distinction between 'Quirky' and 'non-Quirky' case-values, which can control their differences in agreement behavior. A feature of this analysis is that 'Quirkiness' is not identified strictly with irregularity; there is plenty of evidence that the Quirky Datives are highly predictable, but from the meanings of lexical items rather than syntactic configurations. An interesting example of this that shows that more needs to be done in the application of KFMT to this material is the analysis of 'inversion' in Ussery (2017b), which shows that Quirky Case is fundamentally associated with semantic roles rather than s-structure attributes.

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