

Quirky Case and ‘Co-generative’ LFG+Glue*

version 2

Avery D. Andrews
ANU, September 2010

Icelandic has an unusually complicated system of cases, significant grammatical positions, and agreement, which has been a subject of interest since the early work of Andrews (1976) and Thráinsson (1979), and, currently, perhaps even more so than previously.¹ A central feature of this system is that the grammatical positions (which can be identified with traditional grammatical relations, whether or not these are taken as structural primitives) can be occupied by NPs carrying either what appears to be ‘regular’ case-marking, or various ‘irregular’ (often called ‘Quirky’) cases, with consequences for how agreement works.

In this paper I will argue that the ‘two level’ analysis of Andrews (1982, 1990a) still provides the best account of the peculiarities of agreement that are associated with the ‘irregularly’ case-marked NPs, under a certain account of which NPs are the irregularly case marked ones (which is not an entirely straightforward issue). The essential idea of the analysis is that the ‘Quirky/irregular’ NPs have some extra material that prevents them from participating in certain kinds of agreement, and arguably has some other effects as well. Although this idea could probably be developed in a variety of frameworks (the original conception was in mid-70s-style TG, owing a lot to Siegel’s (1974) analysis of the genitive case in Modern English), it has as far as I know only been presented in LFG, with some modifications on the 1982 version in Andrews (1990a). We’ll call this treatment A82/90, when minor differences between these versions are irrelevant.

One problem with A82/90 was that it was incomplete in that it issued some promissory notes on the syntax-semantics interface. Although the assumptions made were I think fairly innocuous (along the lines that predicates needed to have suitable arguments in the right places), one would still want to redeem them. Another set of problems was the need for various implausible stipulations, for example to keep person and number features from being dumped into positions in the structure where, intuitively, they can’t get an appropriate interpretation. The recent development of ‘glue semantics’² offers a prospect of fixing these and other problems, which I will here attempt to do using a modified version of glue developed in Andrews (2007a and 2008b). As a side-effect, we will have the outline of a complete ‘Montague fragment’ of this aspect of Icelandic syntax, something which I do not believe has been accomplished before (although there will still be plenty of holes to fill in).

By contrast with the treatment of Quirky/irregular case, the treatment of ‘regular’ case in A82 was not so clear, and significantly modified in A90. There has furthermore been a considerable amount of new data produced about regular case-marking, starting with Sigurðsson (1989), and especially recently, in the areas of ‘nominative objects’, the ‘New Passive’, and related phenomena in Faroese. Although a simple treatment of ‘regular’ case will be presented here, a serious integration of the new material with A82/90 is a substantial job, which I leave to a later paper, one features of which will be a genuine rule of nominative case assignment strongly linked to subject position, making the treatment more like Minimalist analyses of Icelandic nominatives than A82/90 or the present treatment.

* I would like to thank Halldór Sigurðsson, Johanna Barðdal and Tania Strahan for comments and corrections, and Joan Maling, Gísli Jónsson, Thórhallur Eythórsson and Höskuldur Thráinsson for help with references and other information. None of them should be held responsible for my errors, omissions and conjectures.

¹ For a comprehensive, recent presentation, see Thráinsson (2007).

² Dalrymple (2001), Asudeh (2004), and numerous other sources.

An important limitation of scope in this paper is that we will not be making any attempt to systematically deal with the relationships between Quirky case and valence alternations, as explored for example in Svenonius (2002, 2006) and Sigurðsson (2009b). The present LFG approach requires that the ultimate explanations in this area be diachronic, and the fact that case-preservation in passive constructions seems in general ‘parametric’ (varying between individual verbs in Faroese, as discussed in Thráinsson et al., 2004) would seem to support this position. On the other hand, there is also a considerable amount of systematicity, so that some account of it must be given, but that won’t happen here.

1 ‘Quirky’ Case

‘Quirky case’ is one of the names that has emerged for the phenomenon whereby nearly a thousand Icelandic verbs specify ‘non-canonical’ cases on their subjects, objects and ‘second objects’,³ in a considerable number of combinations.⁴ In this section we will examine various aspects of the behavior of these ‘Quirky NPs’, and discuss how A82/90 is supposed to account for them.

1.1. QUIRKY VS REGULAR

Unfortunately, there is some controversy about which cases are Quirky/non-canonical, and, indeed, how truly noncanonical most of them are actually are, since they tend to fall into semantically definable groups that have at least limited productivity (Jónsson, 2003, Barðdal, 2011). Therefore, I will begin by characterizing them in a somewhat ‘dogmatic’ manner, hoping to justify the dogma later in the paper.

The default/canonical (and by far most frequent, on either a token or verb-type basis) case for subjects is nominative, but subjects can also be dative, accusative or genitive. The notion of non-nominative subject struck many people as rather exotic when it was introduced, but the evidence for their existence in Icelandic has proliferated to a level well beyond any reasonable doubt. For a recent overview, see Sigurðsson (2004). The most striking property of the non-canonical subjects, which I will take to be the essential attribute of ‘Quirkiness’, is that they don’t participate in person-number agreement with the finite verb.⁵ Some typical examples are:

- (1) a. Við fórum til Íslands
 We(Nom) went(1Pl) to Iceland
 We went to Iceland
- b. mér líkar þessi bíll
 me(Dat) like(3Sg) this car(Nom)
 I like this car
- c. Okkur vantar peninga
 Us(Acc.Pl) lack(3Sg) money(Acc)
 We lack money

³ The term we will use for the second bare NPs after the verb, in SVOO sentences.

⁴ Obeying various restrictions, the most important of which is that truly Agentive subjects can never be Quirky. See Jónsson (2003) for a discussion of the semantic concomitants of Quirky Case.

⁵ However, examples of such agreement do appear in Icelandic performance (Árnadóttir and Sigurðsson, 2008), as will be discussed later, and there are cases where features on a Quirky Subject seem to assist agreement that’s basically with something else (Holmberg and Hróarsdóttir, 2003). Furthermore, similar examples have an impressively high rate of acceptance in Faroese (Jónsson and Eythórsson, 2005). This will be considered later in the paper.

- d. Verkjanna gætir ekki
 Pains(Gen.Pl) is noticeable(3Sg) not
 The pains are not noticeable

In (a), we get full person-number agreement on the verb, while in (b-d) we see combinations of first person and plural number on the subject failing to be registered on the verb, which remains in a ‘neutral’ 3rd person singular form.

For objects, things are a bit more complicated. Any of the four cases can also appear on objects, but subject to certain limitations. Accusative is clearly the commonest, while nominative on objects appears only when the subject is dative, as in (1b).⁶ Dative on objects is however fairly common, and appears to be the default for certain semantic roles, such as ‘propelled object’. Genitive on the other hand is small and dwindling.

When the subject is nominative, the object must be non-nominative, and the way the cases are treated under passivization indicates that the dative and genitive objects are ‘Quirky’ in the sense used here. In the passive, accusative objects become nominative, and both the passive auxiliary and the passive participle form of the verb agree with them (in gender, number and case, for the participle):

- (2) a. Hann barði strákana
 He hit(3Sg) the boys(Acc.Masc.Pl)
 He hit the boys
- b. Strákarnir voru barðir
 the boys(Nom.Masc.Pl) were(3Pl) hit(Nom.Masc.Pl)
 The boys were hit

Genitives and datives, on the other hand, retain their case, and the auxiliary is third person singular, with the participle appearing in a neuter gender singular form that is neutral between nominative and accusative (usually called the ‘supine’ when has active valence, such as after the passive auxiliary and the modal *geta* ‘be able’):

- (3) a. Strákunum var bjargað
 the boysDat.Pl was(3Sg) rescued(Nom.Neut.Sg)
 The boys were rescued
- b. Þeirra var beðið
 They(Gen.Pl) was(3Sg) waited for(Nom.Neut.Sg)
 They were waited for

If we take nonagreement to be a major symptom of Quirkiness, and assume that it is more likely that Passive preserves Quirkiness than imposes it, the conclusion is that the dative and genitive objects are Quirky, whatever this property turns out to be, whether just ‘non-canonicity’ of case-marking, or some peculiar structural feature, as proposed in A82/90 and maintained below.

Nominative objects on the other hand never Passivize, and show some other behaviors which cause me to put them into the non-Quirky basket, although it is important to recognize that this is a theoretically rather than observationally driven judgement that could be misguided. Since nominative on an object is presumably ‘non-canonical’ by virtue of being part of a

⁶ Thráinsson (2007) discusses some other instances of potential nominative objects, but these are all idiomatic expressions in which the nominative apparent object and the verb constitute a complex predicate.

minority Dat-Nom case-marking pattern, this decision requires that Quirkiness not be the same thing as noncanonicity.

In addition to the patterns presented above, there are Acc-Acc verbs (a few), and one Acc-Gen verb, which appears to no longer be colloquial (Thráinsson, 2007, 169). These will be argued below to involve two QC NPs.

Moving on to ditransitives, the Nom-Dat-Acc (NDA) pattern is by far the commonest, although there are several others. The subject is always nominative, and there is a regularity that if the second object is an accusative true participant, then the first object is always dative.⁷ This means that, observationally, the dative on the first object of a ditransitive verb is highly predictable, a point first made by van Valin (1991). However, in terms of behavior under the passive, it's the dative that acts 'Quirky'. This gives us a relatively concrete observational indication that there might be a difference between Quirkiness and noncanonicity.

It's an interesting fact about the passivization of the NDA verbs that for some of them, either the dative or accusative can appear in the subject position, but, whichever does, the dative retains its case, and the accusative becomes nominative. Furthermore, the auxiliary and participle agree with it:

- (4) a. Hann gaf mér peningana
 He gave me(Dat) the money(Acc.Masc.Pl)
 He gave me the money
- b. Mér voru gefnir peningarnir
 me(Dat) were(3.Pl) given(Nom.Masc.Pl) the money(Nom.Masc.Pl)
 I was given the money
- c. Peningarnir voru gefnir mér
 the money(Nom.Masc.Pl) were(3.Pl) given(Nom.Masc.Pl) me(Dat)
 I was given the money

Ditransitives, and the agreement phenomena, will be discussed later; for the present, note that the case-preservation of the dative recipient indicates that in spite of its predictability, it is Quirky, according to the definition used here (and the usual arguments for non-nominative subjects show that the dative is indeed the subject in (b)). For ditransitives other than these, only the first object becomes subject under Passive.

Having introduced some of the behavior of Quirky NPs, we'll present a hypothesis to account for it, and possibly even explain it, to some degree.⁸

1.2. THE QUIRKY STRUCTURE HYPOTHESIS

In the analysis of Andrews (1982), the NPs that I've characterized as 'Quirky' have a structural peculiarity that is supposed to explain their resistance to agreement in a very simple way.

⁷ The two instances of an NAA pattern, *cost* and *take* (a period of time) have the second accusative as a semantic measure-phrase (Thráinsson, 2007, 173). I take these to not be true participants.

⁸ Although, in a sense, the 'real' explanation is presumably historical, in that once upon a time, agreement was limited to subjects, and the QC NPs weren't subjects. Ancient Greek would be a good representative of this putative original state, with four cases (plus vocative), and nothing resembling a respectable argument for non-nominative subjects. What the structural synchronic explanation does is account for the stability of grammatical phenomena, especially ones that are rare enough in performance to create an issue as to how they can be transmitted reliably.

This is that they contain an outer structural level, which is what the agreement morphology normally sees, rather than the features of the ‘inner’ NP itself. A overt model for this kind of structure, where the two layers and the effects on agreement are morphologically obvious, is provided by certain Bantu languages such as Chichewa (Bresnan and Mchombo, 1995). In the example below (50a, p.209), we can see the two morphological layers on the subject NP, with the verb agreeing with the outer layer, which expresses a locational relationship:

- (5) Pa-mu-dzi w-áthú p-ó-chítítsa chĩdwi pá-ma-sangaláts-á alěndo
 16-3-village 3-us 16-NONFIN-attract interest 16-PRS HAB-please-IND 1-visitor
 Our interesting village pleases visitors

Interestingly, attributive modifiers can agree with either layer, depending on their concentric position with respect the head noun, as discussed by Bresnan and Mchombo.

The A82/90 analysis resembles this treatment of Bantu, except that the outer layer doesn’t have any ‘native’ feature content, and in f-structure, the inner layer appears as value of the case-label, used as an attribute, a formalistic trick that we will dispense with later.

So for example the sentence (6a) gets the structure (5b):

- (6) a. Okkur rak á land
 us(A.PL) drifted(3SG) to shore
 We drifted to shore

$$b. \left[\begin{array}{l} \text{SUBJ} \left[\begin{array}{l} \text{ACC} \left[\begin{array}{l} \text{PRED} \text{ ‘Pro’} \\ \text{NUM} \text{ PL} \\ \text{PERS} \text{ I} \end{array} \right] \end{array} \right] \\ \text{TENSE} \text{ PAST} \\ \text{PRED} \text{ ‘Reka(SUBJ ACC, PCOMP)’} \\ \text{PCOMP} \left[\begin{array}{l} \text{PRED} \text{ ‘Á’} \\ \text{OBJ} \left[\begin{array}{l} \text{PRED} \text{ ‘Land’} \end{array} \right] \end{array} \right] \end{array} \right]$$

This structure is supposed to explain the failure of finite verb agreement to register the person and number features of the Quirky subject, as follows.

In LFG, the agreement specifications for finite verbs need to specify person and number values for the subject attribute of the verb, in a manner that can be conveniently depicted like this for the first person plural:

$$(7) \text{um:} \left[\begin{array}{l} \text{SUBJ} \left[\begin{array}{l} \text{PERS} \text{ I} \\ \text{NUM} \text{ PL} \end{array} \right] \end{array} \right]$$

The idea is that in a structure like (6b), these specifications would have to apply to the top level of the structure, which would cause a problem.

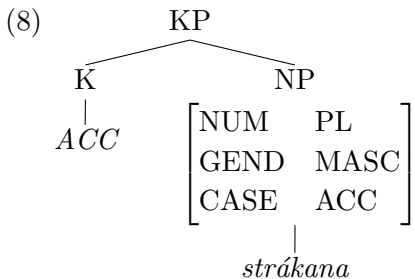
But exactly what problem? In Classic LFG, there is in fact no reason why a specification like (7) (really, its obvious recasting as a set of ‘defining equations’) couldn’t just dump person and number features at will into the upper level of the SUBJ-value of (6), thereby allowing things like *Okkur rökuð (2Pl) á land*, as well as *Okkur rökum(1Pl) á land*. But this

is typologically unheard of. A82/90 stipulatively imposed the restriction that the agreement specifications be ‘constraining equations’, an LFG facility whereby a specification can require something to present without actually putting it there. This works technically, but is clearly too stipulative. A possible alternative would be to install some kind of conflicting values for NUM and PERS on the upper level, but this would also be stipulative, especially because LFG makes no use the kinds of feature-typing constraints that might be used to install such values automatically. Requiring specific feature-values in the outer layer would furthermore run into difficulties with the A82/90 analysis of agreement with nominative objects, as we shall see.

Andrews (1990a) discussed this problem, suggesting that the real answer had something to do with semantics, but was unable to propose anything of a concrete nature. Using glue semantics, we will finally be able to fix this problem, essentially on the basis that person and number features can’t exist in f-structures without being semantically interpreted, in a sense we’ll develop more precisely later.

The two-level idea can be seen as a specific form of what might be called the ‘Quirky Structure Hypothesis’ (QSH), the idea that the Quirky NPs have some kind of structural peculiarity inherent to themselves, rather than just being morphological reflections of a peculiarity located somewhere else, such as for example the multiply-starred ‘little v’s’ of Sigurðsson (2009a), or the ‘merely stated’ case-frames of Barðdal (2001, 2006, 2008) and much other work, which one might describe as a ‘Plain Structure Hypothesis’, whereby the case-marking and behavior of Quirky NPs is supposed to be explained by things that are external to them. Distinguishing between the QSH in some form, and its Plain Structure alternative, is the most general goal of this paper.

Before continuing to develop the two-level idea, I will briefly discuss how it can be formulated in a tree-based theory, such as late TG or GB, or perhaps even Minimalism. This is that the Quirky NPs have an extra head sitting top of them, filled by an entity representing the quirky case:



The intervening K would then somehow block higher elements from agreeing with the noun itself, perhaps by carrying features that would intervene (the fact that Minimalist agreement is inherently ‘smarter’ than LFG agreement, probes having some capacity to search for goals, makes it harder to work out what is really necessary to deliver the results we want).

1.3. QUIRKY STRUCTURAL BEHAVIOR

An important fact is that passive participles appear obligatorily in the accusative case under certain circumstances, especially when they have a non-Quirky surface subject that is appearing in the accusative position of an ‘*accusativum cum infinitivo*’ (ACI) construction, a.k.a. derived object position of an SOR verb a.k.a. ECM construction (the Icelanders seem to prefer the ACI terminology, perhaps because it doesn’t prejudice the rather difficult issue

of what the analysis of these things in Icelandic really is (Thráinsson 2007, pp. 452-458)). Some examples are:

- (9) a. Fólk telur hana hafa verið ríka
 People believe her(Acc.Fem.Sg) to have been rich(Acc.Fem.Sg)
 People believe here to have been rich
- b. Hún er talin hafa verið rík
 She(Nom) is believed(Nom.Fem.Sg) to have been rich(Nom.Fem.Sg)
 She is believed to have been rich
- c. Ég álít hana vera talda hafa verið ríka
 I think her(Acc.Fem.Sg) to be believed(Acc.Fem.Sg) to have been rich(Acc.Fem.Sg)
 I think that she is believed to have been rich.

These examples illustrate how the passive participle in the intermediary clause (and also the predicate adjective in its complement) changes case to agree with whatever case its ‘understood subject’ is showing in the overt structure.⁹

Andrews (1982) observed (p. 469) that if the bottommost verb in a structure like this was one that took a Quirky accusative object, then the agreement with an accusative became optional. To test this, I included some sentences of this form in a questionnaire distributed at the University of Iceland in 1983, including these examples:

- (10) a. Þeir segja hana vera talda elska Svein
 They say her(Acc.Fem.Sg) to be believed(Acc.Fem.Sg) to love Svein(Acc)
 They say that she is believed to love Svein
- b. Þeir segja hana vera talið elska Svein
 They say her(Acc.Fem.Sg) to be believed(Nom.Net.Sg) to love Svein(Acc)
- c. Þeir segja hana vera talda vanta peninga
 They say her(Acc.Fem.Sg) to be believed(Acc.Fem.Sg) to lack money(Acc)
 They say that she is believed to lack money
- d. Þeir segja hana vera talið vanta peninga
 They say her(Acc.Fem.Sg) to be believed(Nom.Net.Sg) to lack money(Acc)

This questionnaire was returned by seven respondents, who scored it as follows, where the top two grades can be regarded as ‘OK’, the middle two as ‘doubtful’, and the bottom two as ‘bad’ (see Andrews (1990a) for discussion of the scale and its characterization in the questionnaire; the low usage of the lowest acceptability grade was probably due to a design error):

(11)	✓	?	??	?*	*	**
a.	5	1	1	0	0	0
b.	0	0	0	0	7	0
c.	5	2	0	0	0	0
d.	1	3	0	1	2	0

⁹ This collection of examples is extended somewhat to make this point in Thráinsson (2007, p. 438).

Agreement of the intermediate passive participle was accepted by all respondents for both examples, but non-agreement was only possible (though not for everybody) when the complement verb took a Quirky accusative subject (agreement of the participle with a Quirky accusative in finite subject position is completely impossible).

The acceptability of agreement for all respondents can be explained on the basis that most of the possible choices for material that would come after the participle would in fact require agreement: there are only a small number of verbs that take Quirky accusative subjects, and the verb doesn't appear until after the participle. By contrast, when the Quirky accusative appears in finite subject position, it's appearing in a place where nominative is normally expected, and so its Quirky nature is evident before agreement with it has to be manifested. It would be good if this were tested on a larger scale (and compared with results for genitive and dative Quirky subjects), but the motivation for including some sort of special property in the internal structure of the Quirky NP would seem evident.

In particular, proposals such as that of Sigurðsson (2009a) to implement Quirky case in terms of "little v's" with extra *'s doesn't seem sufficient. The 'enhanced little v' would sit on top of the lowest verb, but somehow has to interfere with the agreement of a higher one with its moved complement:

(12) [NP V_{pass} ... [v* NP ...]]

This doesn't show that the enhanced little v account of Quirky case-marking is necessarily wrong, but only that it is not sufficient: there would appear to need to be some special material in the Quirky NP itself. In an appropriate framework, a special kind of verbal projection might be involved in checking it, or putting it there.

There are various possible ideas about what the special material might be, the simplest of which is that the Quirky accusative is a different feature-value than the normal one, which is spelled differently on predicate modifiers than on nominals (and their attributive adjectives). But phenomena of agreement of secondary predicates and similar items, investigated extensively by Sigurðsson (1991, 2002, 2008) shows that this won't work either:

- (13) a. Strákana rak þyrsta og svanga á land
 the boys(A.PL.M) drifted(SG) thirsty(A.PL.M) and hungry(A.PL.M) to shore
- b. Strákana vantaði alla í skólann
 the boys(A.PL.M) lacked(SG) all(A.PL.M) in school
 The boys were all absent from school

The morphology of these accusative secondary predicates modifying Quirky accusatives is identical to that of normal accusatives and predicates of all kinds agreeing with them, so merely adding on a different feature is completely unmotivated. The contrast with predicate adjectives as opposed to passive participles is shown by the fact that (apparent) agreement of predicate adjectives with their own quirky subjects is bad:

- (14) Mér er kalt
 me(Dat) is cold(Neut.Nom.Sg)
 I am (feel) cold

From the point of view of learning and acquisition, this is a much less serious problem than the optionality of agreement in (10), because the facts are very evident in the Primary Linguistic Data. If a language learner can tell the difference between a secondary predicate and a primary

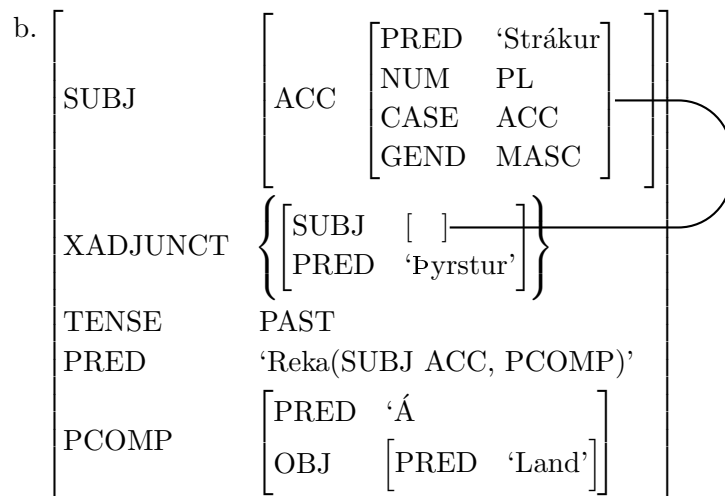
predicate that is selecting for a Quirky argument, they can presumably learn that the former does agree with its argument and the latter doesn't.

But from a generative point of view at least there is still a question of what the mechanism is, and the two-layer version of the QSH provides quite a clean answer, although the issue is muddled by the question of exactly what the nature is of the control relation between secondary predicates and their 'understood subjects'. In LFG, the secondary predicates would be standardly analysed as 'XADJUNCTS' with functional control, meaning that, in f-structure, they have subjects that are identical to the controllers that they agree with. This predicts that they will agree obligatorily with a Quirky controller if they can be controlled by them at all.

The reason is that, in LFG, the semantic linking of the arguments of a predicate to the grammatical relations expressing them is 'dumb' in exactly the same way as agreement is. If a predicate says that its argument is to be found as value of its SUBJ attribute (or, more precisely, the SUBJ-value of its f-structure correspondent), it will look there, and if it finds nothing, it will complain. So an XADJUNCT can only be interpreted if its control equation identifies the inner layer of the controller NP with the SUBJ-value of the XADJUNCT, which means that agreement will work in the same way with a Quirky controller as with a normal one.

We illustrate this with the f-structure for a simplified example:¹⁰

- (15) a. Strákana rak þyrsta á land
the boys(A.PL.M) drifted(SG) thirsty(A.PL.M) to shore



The agreement restrictions on the secondary predicate will have to be satisfied by the controller, regardless of whether it is Quirky or not.

Unfortunately for this analysis, Sigurðsson (2002, p. 710) shows some examples where a secondary predicate can appear in the nominative rather than the expected case:

- (16) a. Henni leið illa sem presti/prestur
Her(Dat) went badly as priest(Dat/Nom)
She was unhappy as a priest

¹⁰ More discussion of how this kind of analysis works can be found in Haug (2008b).

- b. Henni verður kalt svona fáklæddri/fáklædd
 Her(Dat) will be cold so scantily dressed(Dat/?Nom)
 She will be cold so scantily dressed

The nominative in (b) is a bit questionable, but nowhere near as bad as non-agreement.

The possible appearance of nominatives in these constructions strongly suggests, in pretty well any framework, that these secondary predicates at least sometimes have the equivalent of a ‘PRO’ subject, that is, an unpronounced component in the abstract structure of the sentence that is distinct from the controller but shares many properties with it, including, sometimes but not always, case. In Icelandic, where nominative is the ‘default case’, the appearance of nominative instead of the case of the controller is not unexpected. I’m not aware that anything of great importance hinges on the choice between anaphoric and functional control for these constructions, but under the PRO analysis, it would be natural for the nominative to be more acceptable for Quirky controllers than non-Quirky ones, on the basis that the extra layer of structure might inhibit the ‘case attraction’ effect (Quicoli, 1982) whereby controllers sometimes impose their case on things that would normally agree with something in the grammatical position occupied by PRO. But many other accounts of Quirky case are probably consistent with this effect.

A similar situation arises with certain predicates that impose Quirky case on an argument which they also set as controller/understood subject of an adjectival complement (Andrews, 1990a):

- (17) a. Þeir lýstu glæpamanninum sem stórhættulegum
 They described the criminal(Dat.Masc.Sg) as very dangerous(Dat.Masc.Sg)
 b. Hann heldur tönnunum sínum hvítum og hreinum
 He keeps teeth his(Dat.Pl) white(Dat.Pl) and clean(Dat.Pl)

In LFG, these would appear to be functional control constructions,¹¹ requiring a control equation that sets that inner layer of the dative object NP as the SUBJ-value of the complement.¹²

This leads to a rather interesting prediction, which is that Quirky subjects, even dative ones, will not be able to appear in the complement. This appears to be the case:¹³

- (18) a. Glæpamanninum var (mjög) hlýtt til fjölskyldunnar
 criminal-the(Dat) was (very) warm towards the family
 The criminal was (very) warm towards his family
 b. *Þeir lýstu glæpamanninum sem (mjög) hlýtt til fjölskyldunnar
 They described criminal-the(Dat) as (very) warm towards the family
 They described the criminal as (very) warm towards his family

(a) illustrates a dative subject adjective, (b) that it can’t be complement of a dative-controller verb.

¹¹ Which predicts that nominative in the complement should be impossible; I don’t know whether this is actually the case.

¹² Note that, under the QSH, the situation here is similar to that with predicates taking ‘Raising into prepositional object position’ in Modern Irish, as described by McCloskey (1983).

¹³ Of nine respondents to a questionnaire distributed for me in 1986 by Höskuldur Práinsson, 7 found (b) completely ungrammatical, one a bit unnatural, and one doubtful. Other similar examples making the same point produced similar results.

As well as being hard to understand on a non-QSH account of Quirky case, this phenomenon is problematic for various versions of the QSH other than the two-level one. Obviously, for example, if Quirkiness consists in having a particular value for some feature, we don't expect a problem when this feature is required on both the controller and the controllee, but we have such a problem (especially in a language where Quirky NPs can both control and be controlled). A more sophisticated account that has a problem is the HPSG analysis of Sag et al. (1992). Here, 'Quirkiness' consists in having non-equated values for two features, CASE, which is morphologically spelled out, and DCASE (default/'structural') case, which is not (unless it is equated to CASE). There is no reason why lacking an equation between these attributes should cause a unification to fail, so this analysis doesn't explain (18) (and also makes no attempt to deal with any of the effects of Quirkiness on agreement).

At the time, Andrews (p. 210) didn't draw strong conclusions from the phenomenon of (18), on the basis that he wasn't really sure that the expressions were actually AP that would be generated as complements in these constructions. But in retrospect, this would appear to be an excessively tentative conclusion: 20 years have gone by during which these constructions have been written about by many people, especially Sigurðsson, and nobody has ever suggested that they are anything but adjectives that take Quirky subjects. And furthermore, even if someone were to say that they were, for example, adverbs rather than adjectives, this would still leave unexplained why the construction hasn't generalized to include adverbs, since there would not appear to be any problem with the semantics or any other aspect of doing this.

A final issue I will consider is the phenomenon of 'case-attraction' with anaphoric control/binding of PRO. Much of the interest of Icelandic Quirky NPs has come from the fact that they are subject to the obligatorily subject ellipsis found with Icelandic infinitives, being controlled by a nominative NP while having a secondary predicate in their own clause agree with them, manifesting the case that an overt subject would have (example from Sigurðsson (2008)):

- (19) Ólafur hafði ekki gaman af að leiðast einum í veislunni
 Olafur(N) had not pleasure from to be bored alone(D) at the party
 Olaf didn't enjoy being bored at the party alone

Leiðast is a verb taking a dative Quirky subject, which is here non-overt or moved, as required for all Icelandic infinitives. But its underlying presence and dative case has since Andrews (1976) been taken to be evidenced by the dative case on a secondary/semi- predicate modifying it.¹⁴ In general, secondary predicates modifying PRO-subjects of infinitive can either remain in the case appropriate to their role in the infinitival, or 'attract' into the case of their controller. The conditions under which this happens are very variable across speakers, but one regularity is that attraction doesn't work very well for modifiers of PRO Quirky subjects, so that a nominative in (19) would be bad.

This can doubtless be explained in a variety of ways, for example the proposal of Svenonius (2010) that 'structural' case is associated with higher, 'inherent' with lower licensors clearly has potential, since a lower licensor could be reasonably assumed to have a stronger protective effect. But the QSH as presented here would certainly also seem to be a decent candidate, due to the extra layer of structure (which, later, will be in effect construed as providing a very close licensor).

¹⁴ An interesting exception is the analysis in Kac (1992), which proceeds from very different assumptions than most other grammatical frameworks, whose consequences don't appear to me to have been fully developed. I think one can also argue that a distinct 'underlying subject' for the infinitive is present in Kac's structure (as a set of words), although not in the same way that one is present in more conventional generative theories.

However, a surface-based frequency-driven account might not do so well. Since nominative subjects are the commonest options, which should they be so much more prone to attraction? The commonest thing is usually the strongest, but here it seems to be weakest.

1.4. ISSUES OF STIPULATION

So we have a reasonable collection of phenomena for which a two-level version of QSH seems to offer a better account than various alternatives, but the A82/90 analysis nevertheless faces a number of problems of excess stipulation. One of these we have already mentioned, the need for person/number features to be specified with constraining rather than defining equations, to keep them from being dumped freely into the upper layers of the Quirky NPs.

Another problem arises with anaphoric control/PRO. A82 relied on Bresnan's 1982 rule of 'anaphoric control' to produce the f-structure for the non-overt subject here, but there is a problem in that the structure of a Quirky NP is reasonably complicated, involving a substructure whose attribute is the same as the value of CASE in its value, and with gender and number values to boot. In order to produce these structures, Andrews needed an ad-hoc elaboration of either the anaphoric control rule, or the rules producing *að* infinitives; neither approach is fully satisfactory.¹⁵ What we actually want is something that can produce these structures automatically, but also give them the somewhat degraded acceptability that they seem to have (see Andrews (1990a) for one study; Barðdal (2006) for much more extensive investigations).

A more general issue is the complexity of the rules that A82/90 uses to produce the Quirky NP structures, and the deeper explanatory problem of why Icelandic doesn't just use specifications of the form (\uparrow SUBJ CASE)=DAT, etc, similar to those used by Simpson (1991) to manage lexically specified case in Warlpiri. The essential difference between Warlpiri and Icelandic, is that in Warlpiri, the lexically controlled case-marking on subjects and objects has no effect whatsoever on the agreement of subjects, and a very minimal effect on the agreement of objects. This can be illustrated by the behavior of intransitive and the two main types of transitive verbs in Warlpiri, following Hale (1973).

In the intransitive, the sole participant is usually absolutive, and the auxiliary shows agreement with it in person and number. In transitive verbs that are understood as describing events where the Agent has an effect on a Patient (verbs meaning 'see' tend to conform to this pattern, with Seer behaving like Agent, Seen like Patient, although not always), The Agent is ergative, and the auxiliary agrees with it by means of the same affixes as are used for agreement with sole participant of an intransitive, while the Patient is absolutive, and shows agreement with a different set of affixes. Certain other transitive verbs have the more active argument in the absolutive, the less active one in the dative, but the identical agreement pattern as the Erg-Abs verbs, except for third person singular, which is normally null, but takes the form *-rla* to cross-reference a dative 'object'.

- (20) a. Ngaju ka-rna purla-mi
 I(ABS) PRES-I(SUBJ) shout-NONPAST
 I am shouting
- b. Ngajulu-rlu ka-rna-ngku nyuntu nya-nyi
 I-ERG PRES-I(SUBJ)-II(OBJ) you(ABS) see-NONPAST
 I see you

¹⁵ Note that the elaborations required to produce the agreement features will be required for many more languages than Icelandic, such as, for example, Ancient Greek (Andrews 1971, Quicoli 1982).

c. Ngatyu ka-rna-nkgu nyuntu-ku wangka-mi
 I(ABS) PRES-I(SUBJ)-II(OBJ) you-DAT see-NONPAST
 I am talking to you

Representing these patterns simply by attaching different CASE-values to the (f-structures of) different NPs seems to be the easiest way to accommodate their agreement behavior, but doing this creates the issue of why Icelandic doesn't work that way. Something that is particularly relevant to this is the recently discovered fact that agreement with dative objects is becoming quite acceptable in Faroese (Jónsson and Eythórsson 2005, Jónsson 2010), and can in fact be found on the web in Icelandic (Árnadóttir and Sigurðsson, 2008).

Therefore, later, I will suggest that Faroese is changing from an Icelandic-style 'Quirky' system that uses a more complex NP which interferes with agreement to a different kind of system, also found in Warlpiri, that doesn't.

Summarizing, we have three main issues:

- (21) a. How do the two-level structures of non-overt QC NPs get constructed?
- b. Why can't agreement rules dump features randomly into the f-structure?
- c. What causes learners of Icelandic but not Warlpiri to adopt the two level structure rather than something else, such as just letting lexical specifications deposit case-markers directly onto the bearers of certain GF's?

In the next subsection, I will introduce a version of LFG's 'glue semantics', along lines developed in Andrews (2007a, 2008b), albeit with certain modifications, which will attempt to address these issues.

2 A version of LFG+glue

In this section we introduce the main features of the approach to LFG+glue that is used here.

2.1. CO-GENERATIVE GLUE

LFG is traditionally presented as a theory in which phrase-structure rules function as the 'generative' level, while the more abstract structures are 'interpretive', which makes it reasonably sensible (although perhaps not entirely correct) for Pullum and Scholz (2001) to describe it as 'model theoretic' rather than 'generative enumerative' (especially because phrase-structure is naturally construed as a completely constraint-based framework, with which it is easy but not necessary to produce enumerations).

This surface-driven view is awkward when we find some reason to supply at a more abstract level of structure something that is missing from the overt form, for the reason that we are likely to have to postulate two mechanisms to build the abstract structure, one for the case where the usual surface support is present, the other for when it isn't. This is exactly what happens in Andrews (1982) for anaphoric control versus an overt NP.

Glue has a potential to fix this problem because it is based on a notion of linear logic proof (able to appear in a number of different looking guises) that satisfies some reasonably strong constraints of its own, and is therefore able to function as an independently 'generative' level, leading to the idea that there can be grammatical theories in which overt and covert form are

both ‘generative’, but constrained by a requirement that their operations be compatible.¹⁶ Conventional glue makes no explicit use of this possibility (especially in the versions where the proposal of Kuhn (2001) to retire the Completeness and Coherence constraint is not adopted), but Andrews (2007a, 2008b) proposes (in somewhat different forms) a variant glue architecture that does.

The motivation behind Andrews (2007a) was to find a variant of glue semantics that would work for OT-LFG, which seemed to be conceptualized as a system of principles for choosing between alternative expressions of some f-structure, which was taken to represent the meaning (Kuhn, 2003). But it wasn’t at all clear how any such thing could actually work in concert with traditional glue, where the meaning is constructed on the basis of ‘meaning-constructors’ introduced by the overt form. The proposed modification was to have the f-structure be the main basis on which the meaning-constructors were introduced, by means of a ‘Semantic Lexicon’ that would pair descriptions of (pieces of) f-structures with pieces of meaning. An f-structure with appropriately assembled meaning could then provide a basis for OT-LFG to use as an input.¹⁷ This treatment turned out to have some desirable properties missing from the standard one, especially in explaining the fact that most grammatical features do one of the following two things (or either, in different circumstances):

- (22) a. Take one of a number of interpretations provided by the grammar, on their own (e.g. NUM PL signifying semantic plurality, or GEND FEM on a pronoun, signaling female sex).
- b. Take an ‘idiomatic’ interpretation jointly with a specific lexical item (*pluralia tantum*, grammatical gender with most common nouns).

Although conceived to support OT-LFG, the notion of a Semantic Lexicon producing pairings of a semantic assembly and an f-structure¹⁸ can also function in an otherwise conventional LFG architecture, where c-structure rules and a second lexicon, which we can call the ‘Morphological Lexicon’, produce an f-structure in essentially the usual manner, although with significant differences in the details of what is produced, due to the difference in environment, especially the changed role of PRED-features. A full sentence structure then consists of a c-structure and a semantic assembly, each with their associated f-structure, subject to the requirement that the two f-structures match ‘closely enough’ (whatever this turns out to amount to). This version of the idea is presented in Andrews (2008b), and is close to what will be used here.

Understanding glue appears to be a somewhat daunting enterprise for many people, so here I will try to make it easier by providing a somewhat different form of explanation that what is normally provided.¹⁹ We start with a notion of ‘free semantic assembly’ that glue provides, which is essentially the ‘Type Driven’ assembly of Klein and Sag (1985).²⁰ We begin with the idea familiar from basic formal semantics of a semantic type system generated from some basic types, usually two, one for entities (*e*) and another for propositions, usually symbolized

¹⁶ Conceptually, this is the opposite (perhaps, ‘dual’) of the conception behind Minimalism, where the ‘Computation’ assemble a syntactic structure that is sent to two interfaces.

¹⁷ Unbeknownst to Andrews at the time, the glue implementation in the XLE LFG system also worked directly off f-structure, but for pragmatic rather than theoretically motivated reasons (Richard Crouch, p.c.).

¹⁸ Or, more generally, an f-description perhaps also including some constraints applying to c-structure via the ‘inverse projection’ concept of Kaplan (1995).

¹⁹ Andrews (2009) presents many of these ideas at a somewhat slower pace, although it is a nonstandard presentation of standard glue rather than the present alternative version.

²⁰ For a more extended and leisurely presentation of the approach I take here, see Andrews (2009).

as t (alluding to the notion of a truth-value), but here represented as p . It is then common to entertain more basic types (paths, events, locations, manners, outcomes, ...).²¹

The next step is to in essence follow Frege, and suppose that from the basic types can be derived ‘functional types’. For example, a type $e \rightarrow p$ of things such that, if you feed them an entity as an argument, you get a proposition as a result. That is, a one-place predicate. ‘ \rightarrow ’ here is the ‘implicational type constructor’, usually represented as angle-brackets in introductory formal semantics. The type of a negation operator, or an epistemic adverb such as *obviously*, would then be expected to be $p \rightarrow p$ (feed a proposition in, get one back). For multi-place predicates, the standard trick is ‘currying’:²² a 2-place predicate such as *Like* is treated as being of type $e \rightarrow (e \rightarrow p)$. That is, something of a type such that, if you feed it an entity, you get back a value such that, if you feed that a entity, you get back a proposition. The system of types can be interpreted in at least two ways, either as a system of ontological categories that existing things fall into, or as a system of grammatical categories for expressions in a formal language for expressing meanings. The latter interpretation is what we want here.

In introductory formal semantics, people usually stop with the implicational type constructor, but in glue (and sometimes in Type Logical Grammar) it is useful go a bit further and add a ‘product’ constructor ‘ \times ’, such that something of type $e \times e$ is something whose type is a pair of things of type e . We won’t need this in the main body of the text, but we will need it in the more developed analysis of PRO presented in the appendix. (Note that when there is more than one type-constructor, a connective such as \rightarrow becomes more convenient than angle-brackets.) For multi-place predicates, it is useful to follow a convention of omitting rightmost parentheses, so that $p \rightarrow e \rightarrow p$ might be the type of a ‘propositional attitude’ verb such as *believe*, $p \rightarrow e \rightarrow e \rightarrow p$ of a ‘communication verb’ such as *tell*.

Which leads to the problem of connecting actual semantic roles to argument positions in the semantic types: for *believe*, should we feed in the proposition first, or the supposed believer? (In which latter case the type would be $e \rightarrow p \rightarrow p$.) There does not appear to be a truly settled convention on this, but I think there’s a lot to be said in favor of following the general guidance of Marantz (1984) and Jackendoff (1973), and supplying the ‘least active’ participants first, since, in various ways, they tend to act as if they were more tightly bonded to the verbal meaning.

Here is a typical collection of ‘typed meanings’; what can we do with it?

- (23) *Like* : $e \rightarrow e \rightarrow p$
 Bert : e
 Ernie : e

One useful activity would be to put them together into a coherent proposition, which, intuitively, can be done in two different ways, which can be expressed as in (23) in the usual parenthesis-based notation $f(a)$ for applying a function f to an argument a , with understood grouping to the left:

- (24) a. *Like*(*Bert*)(*Ernie*)
 b. *Like*(*Ernie*)(*Bert*)

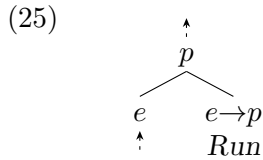
²¹ But we should not forget that there might be only one (Partee, 2006).

²² Or ‘Schönfinkelization’; Schönfinkel appears to have been the original discoverer, while Curry did a lot of the work that made it important.

But something a bit more solid than just intuition is needed for complex cases involving quantifiers, control predicates, etc.

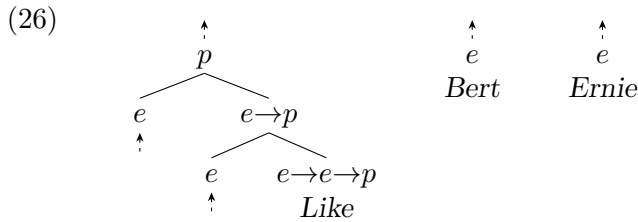
The presentation I'll follow here is to first expand the typed meanings into pieces of the structures that the meanings would fit into (including the meanings), following some rules presented in the appendix (the results for the simple cases considered here are hopefully self-explanatory) and then apply some further rules to assemble those pieces. This is really a variant presentation of proof-nets from linear logic.²³ Since the structures may look like a somewhat arbitrary symbolic representation, it's worth emphasizing that this is actually not the case, due to the well-explored system of mathematical equivalences that they fit into (linear lambda terms, proof-nets, linear natural deduction proofs in normal form, arrows in symmetric monoidal closed categories ...). It should not be necessary to understand much about all the stuff, or indeed anything about most of it, to get a practical idea of how glue works, but all of it and more is in the background.

So, if something is of type $e \rightarrow p$, we want it to produce a piece of tree structure into which we are prepared to plug in something of type e and get out something of type p . We could notate that like this (with the meaningful element as the right daughter, which seems to be the most convenient way to arrange these things):



The idea being that since *Run* is of type $e \rightarrow p$, we are going to use it in structures where something of type e is stuck together with it to produce something of type p , the inbound arrows representing places where an argument is to be plugged in, the outbound ones places where the structure is supposed plug into something else.²⁴ Rules for expanding a typed meaning to a structure are given in the appendix.

For the example (23) with a two-place predicate, the structures will be:



To assemble, we plug output arrows into input ones, subject to these rules:

- (27) a. Compatibility: an input arrow can only be connected to an output arrow of the same semantic type.
- b. Monogamy: an input arrow can be connected to only one output arrow and vice-versa.
- c. Completeness: every input arrow must be connected to an output arrow.

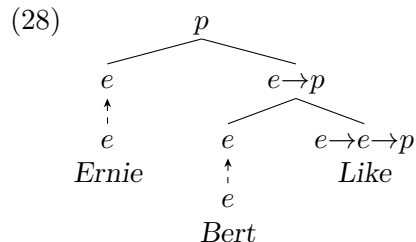
²³ See Andrews (2008a, 2009) for a full discussion; the source of the ideas is de Groote (1999), which draws heavily on Lamarche (1994).

²⁴ Technically the inbound and outbound arrows are the positive and negative polarities, respectively, of the theory of proof-nets.

- d. Coherence (Only one left over): every output arrow but one must be connected to an input arrow.
- e. Correctness: the structure must be connected.

(e) needs to be reformulated when the structures get more sophisticated, but this oversimplified version will do for now. (c,d) are named after the LFG principles that they subsume/replace.

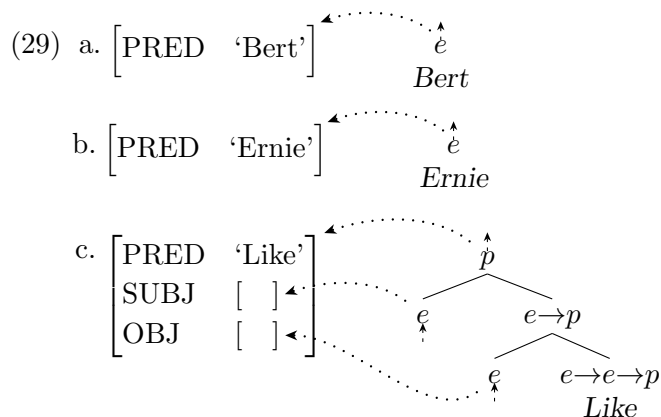
One possible result is:



It should be obvious what the other is.

This system of structures and assembly rules, when completed properly, is equivalent to the deductive linear logic normally used for presenting glue semantics, but might be more immediately comprehensible for at least some linguists, I believe. So we have now put together (part of) a system of type driven semantic assembly whereby, given a collection of typed meanings, we can produce the various assembled meanings that these might yield. The next step is to connect these to f-structures.

This is what the Semantic Lexicon is for. It works by pairing pieces of meaning, as described above, with pieces of f-structure or descriptions of such pieces (a distinction which is conceptually important in LFG, but which one can often get away with ignoring). Such a combination of a typed meaning and a partial f-structure is an Semantic Lexicon Entry (SLE), which I'll illustrate with examples:



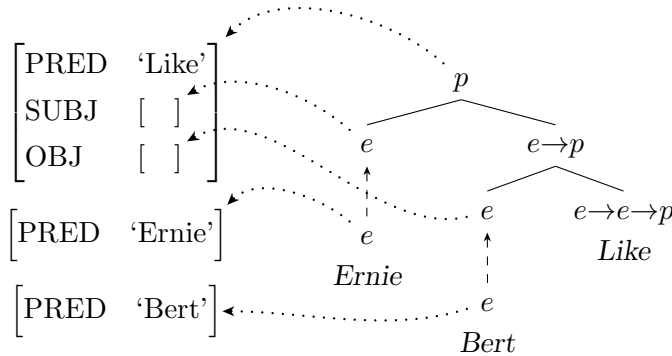
You can see that some of the substructures correspond to argument nodes, while the entire structure tends to correspond to the top 'output' node in the semantic structure. A variety of possible constraints on SLEs are discussed in Andrews (2008b). People familiar with standard glue will note that the SLEs combine the information provided by 'meaning-constructors' (the grammatical functions associated with the arguments) with other information provided by the lexical entry a meaning-constructor appears in (the grammatical feature-values, especially

PRED). People familiar with Construction Grammar might also observe that the f-structure side is very similar in appearance to a lexical construction.

To effect assembly, what we’re going to do is take a collection of SLEs, taking multiple copies of any that we want to use more than once, and then assemble their typed meanings, if possible. This assembly will then determine an f-structure/description, which will be the semantically generated f-structure. There may of course be no legitimate assembly (in which one might say that the attempted ‘semantic computation’ crashes), or more than one, yielding ambiguity of the kind often found with quantifiers scope, where there doesn’t appear to be an ambiguity of conventionally motivated syntactic structure. The selection step would appear to be essentially the same thing as forming a Numeration in the MP.

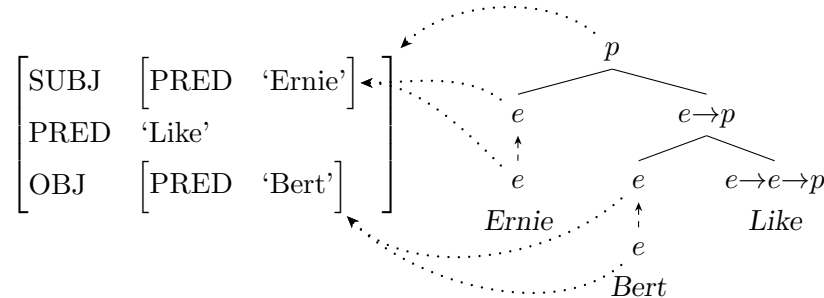
The assembly step however is not very much like the Minimalist computation, because it is much simpler, since most of the work that is done by the Minimalist computation gets done by other components in the present approach. These steps produce a structure where there is an assembled meaning, plus various pieces of f- structure connected to that meaning:

(30)



Suppose now that the semantic nodes connected by the dashed arrows are to be regarded as actually the same node, and that the relationship designated by the dotted lines has to be a function, that is, single-valued on the pairs of nodes connected by the dashed lines. Then the destinations of the dotted arrows will have to be merged, and the result will be the assembly of the pieces into a single f-structure:²⁵

(31)



This is conceptually very similar to how an annotated phrase-structure grammar associates an f-structure with a tree, and the similarity is especially apparent if we formulate the f-structural specifications as f-descriptions.

²⁵ Andrews (2007a) gives a clumsier description of what this process is supposed to achieve, while Andrews (2008b, 2010) describes a reverse version, which starts with the f-structure and using SLE’s to build the semantic structure. It would be good to have a proof that both define the same association between meaning assemblies and f-structures, for a given collection of SLEs, but this isn’t necessary for a basic understanding of the present proposal.

But there is a very important difference in detail, which is that in building the meaning-driven f-structure, feature-values cannot be allowed to merge. The necessity for this can be seen by considering what could be done with an SLE like this (leaving the semantic specification in its ‘unexpanded’ form, as a semantic type expression with a symbol representing its actual meaning):

$$(32) \left[\text{POLARITY} \quad \text{NEG} \right] \Leftrightarrow \text{Not} : p \rightarrow p$$

The problem is that if merger of feature-values was allowed, we could choose this twice somewhere where both POLARITY-values would appear at a single level of the f-structure, and thereby produce a single f-structure with one negative feature, but two instances of the operator in the semantics, an undesired effect (it would, for example, allow confessions to be packaged as denials). This can be blocked by not allowing feature-values to merge when an f-structure is being produced.

Another constraint on the production of the f-structure is that its topmost structure must correspond to the unconnected (‘final output’) node of the semantic assembly. This might be plausibly connected to some kind of principle of hierarchical compatibility between the f-structure and the semantic assembly, but I don’t presently have any specific proposal about that. As an exercise in the ‘logic of assembly’, you can try to work out what kind of assembly is blocked by (27e) (Correctness) but not the others, once SLEs like (32) appear in the collection to be assembled.

We now have a notion of well-formed pairing of f-structures with meanings relative to a collection of SLEs, delivering the concept we need of a semantically generated (or interpreted) f-structure. To get a full sentence structure, we first use a regular LFG to connect a c-structure to an f-structure, thereby producing a c-structurally generated f-structure. The final step is to decide how closely the two f-structures need to match.

Two criteria are rather plausible:

- (33) a. The two f-structures should not disagree on the value of any attribute
- b. The c-structurally generated f-structure should not provide a value for any ‘interpretable’ attribute that semantically generated one doesn’t (more on ‘uninterpretable’ features such as, in particular, CASE, later).

The motivation for these principles is for example that if the c-structure and lexical items put, say, a plural feature on the f-structure of an NP, that feature will also have to be interpreted in the semantics.

These principles prevent the c-structurally generated phrase-structure from producing material not provided by the semantically generated one, but so far impose no constraints in the other direction. Doing this would be equivalent to allowing any amount of semantically produced structure to associate with an given amount of overt structure, which would clearly be going too far (in effect, no ‘recoverability of deletion’). A reasonable first proposal would be an adaptation of Panini’s blocking principle to the general effect that a pairing of c-structure and semantically produced f-structures is blocked if the grammar provides another one that whose c-structurally produced f-structure matches more of the semantically produced one. This would be equivalent to an OT-style application of a MAX-constraint.

But languages plausibly differ in what kinds of features they allow to be unexpressed. In Ancient Greek, for example, one can make a case that the finite irrealis moods (subjunctive and optative) require their mood features to be expressed overtly in the morphology:

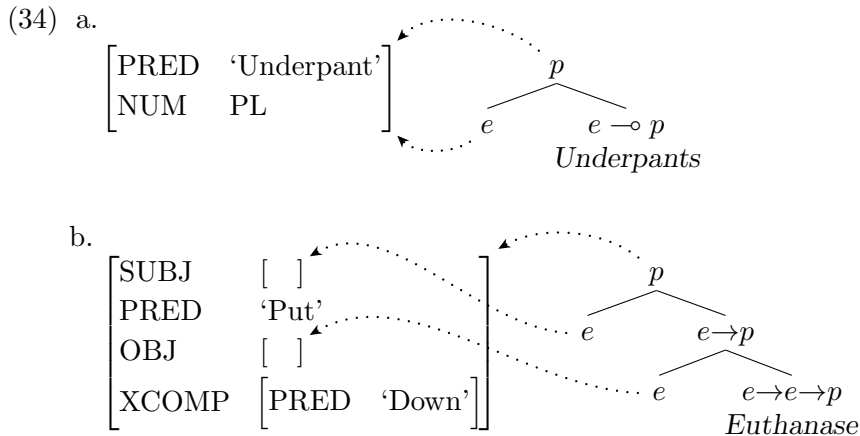
the person-marked perfect passive-middle forms, in which the position in which the irrealis markers occur is absent from the morphological template, cannot be used in these irrealis moods, and a periphrastic construction consisting of a participle and irrealis finite copula must be used instead. In effect, something seems to make the ‘externalization’ of the mood marker obligatory here. Similarly, Barðdal (2006) cites evidence by Bayer et al. (2001) that dative case must be morphologically expressed in German.

Variations in the kinds of PRO- and Pro- drop’ that are allowed in different languages can therefore be treated as variations in what kinds of pronominal and other features need to be expressed in the syntactically generated f-structure, and under what circumstances. In principle, constraints governing this could be combined with standard LFG’s rule of Anaphoric Control, but the present approach gives us a more uniform mechanism, and furthermore one in which it is more natural to think about properties involving the entire structure.

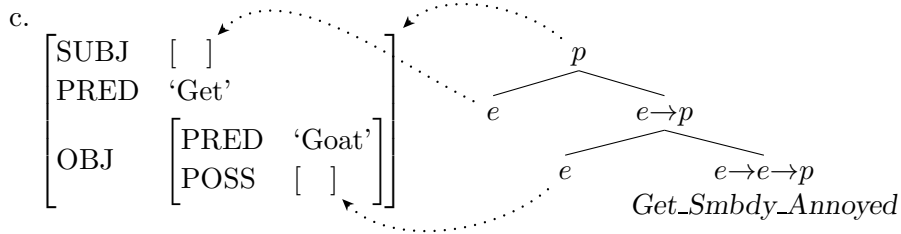
2.2. THE ROLE OF PRED

Although this modified architecture is, I think, similar enough to the original LFG to count as a version of LFG, the introduction of glue, especially in the way done here, motivates some substantial changes, especially in the treatment of PRED-features. In Classic LFG, these were where meanings of open-class lexical items were encoded (and perhaps meanings of some closed-class items as well, such as prepositions), and also where subcategorization was expressed, by means of ‘argument-lists’ of ‘governed grammatical functions’.²⁶ But once meaning-constructors are available, the role of PRED- features becomes less clear, especially because, as first discussed by Kuhn (2001), the glue assembly principles do the basic work of the ‘Completeness’ and ‘Coherence’ constraints that implement subcategorization in conjunction with the argument-lists of the PRED- features. This makes it sensible to wonder whether the PRED-features should be dispensed with. Andrews (2008b) considers this question, and concludes that they should be retained, and proposes a variety of constraints, which tend to have the effect of requiring PRED-features to appear in various places.

One important idea is that SLE’s aren’t restricted to mentioning a single feature-value, but can introduce/mention as many as the like, subject to constraints to the general effect that they be ‘close enough’ to each other, as defined in Andrews (2008b). Here, for example, are SLE’s for a typical *pluralia tantum*, verb-particle combination and verb-possessor idiom:

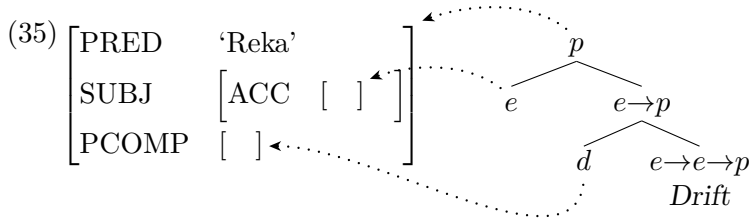


²⁶ Technically, lists of f-structure designators specified in terms of governable grammatical functions.



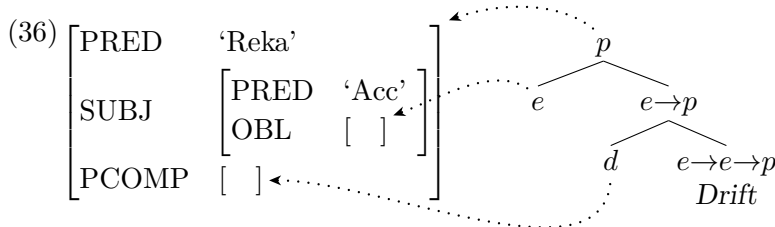
(c) is of particular interest in the sequel, because we will be claiming that the SLEs for Quirky case verbs involve an ‘idiomatic’ (and closed class) PRED-feature internal to their grammatical function values. These PREDs will then trigger the introduction of CASE-values.

The A82/90 form for Quirky NP structures can be produced by SLEs like this, where I have introduced a type *d* for ‘direction’ for the directional complement of *reka* ‘drift’:



This will assemble with nominal meaning constructors in the usual way, but producing f-structures where the SUBJ argument has the two-layer structure.

However, there is an issue of detail to consider here. A82/90 used CASE-values as GF attributes, in emulation of the analysis of ‘idiomatic’/oblique argument PPs presented in Kaplan and Bresnan (1982). But this has not proved to be one of the more popular features of LFG, and some issues we will consider below are problematic for it. Furthermore, Andrews (2008b) motivates a constraint to the effect that every layer of structure (at least those that lead to substructures with PRED-features) must have a PRED-feature. This suggests that the Quirky NPs should have a PRED-feature whose values trigger the appearance of the appropriate CASE-value on the inner NP. Using the case name in quotes for the PRED-value, (35) will then be revised to:



Observe that we are *not* using the lexical entry to specify the CASE-value of the inner layer, because doing this would be inconsistent with the explanation we will eventually propose for why Icelandic learners adopt the two-layer hypothesis. We will discuss where the CASE-values come from below.

So our proposal about Quirky arguments of verbs is that the verbs have SLEs which specify an extra layer of structure in their f-structures, as illustrated in (36). Exactly why this happens is something we will take up later; what we do next is show how the modified version of LFG+Glue addresses issues (a) and (b) in (21).

3 Applying Glue

We apply the present version of glue to the problems of producing the ‘PRO’ subjects for infinitives, avoiding the dumping by agreement morphology of random features into f-structures, and redeeming some promissory notes.

3.1. CONSTRUCTING PRO

In ‘lexicalist’ treatments since Jackendoff (1972), ‘PRO’ has been treated essentially as a pronoun subject to some special binding conditions, similar to those imposed on reflexives. Adapting this idea to the present context, pronouns will have SLEs of some kind. There appear to be two kinds of PRO, those with and without overt antecedents:²⁷

- (37) a. Það væri hryllileg að vera stungið saklausum í steininn
 It would be horrible to be put without cause(Masc/Pl.Dat) in jail.
 It would be horrible to be put in jail for no reason.
- b. Ég vonast til að vera ekki stungið í steininn
 I hope toward to be not put in jail
 I hope to not be put in jail.

The *-um* ending on the adjective in (a) could either be masculine singular, or any gender in the plural (but only dative in case).

In the present framework, for (a), the absolute minimum that the entry for PRO might be able to get away with doing is introduce some PRED-value in the f-structure, and provide type *e* output in the semantics:

- (38) $\left[\text{PRED 'PRO'} \right] \Leftrightarrow PRO : e$

PRO here is a convenient representation of the meaning of uncontrolled ‘PRO’, whatever that happens to be. But in fact, we seem to need a bit more than this.

One of these meanings is the ‘unspecified person’ meaning of *on* in French, *man* in German, and various so-called ‘autonomous’ constructions. In such cases, the SLE would also appear to have to introduce a masculine gender feature, since a feminine or neuter form would lack the arbitrary interpretation (Halldór Sigurðsson, pc).

On the other hand it would be possible for a woman to say (39), thinking of herself, and perhaps even for a man to say it to his girlfriend, thinking of her as the potential arrestee:

- (39) Það væri hryllileg að vera stungið saklausri í steininn
 It would be horrible to be put without cause(Fem.Dat) in jail.
 It would be horrible to be put in jail for no reason.

There is clearly interesting work to be done on properties of uncontrolled PRO in Icelandic.

For controlled PRO, we need to include some treatment of anaphora, such as the ‘tensor’-based analysis of Asudeh (2004). For this, see the appendix. For the present, one can think of (3.1) as being a ‘core’ that expands in two ways, one including a [GEND MASC] feature

²⁷ I am indebted to Halldór Sigurðsson for help with these examples.

and having the arbitrary/autonomous meaning, and the with a regular pronominal meaning, and whatever it takes to get the gender right, an issue that I don't think we need to solve here in order to demonstrate the viability of the general approach.

The SLEs and semantic assembly principles will then be able to produce f-structures like this (meaning omitted):

$$(40) \left[\begin{array}{cc} & \left[\begin{array}{cc} \text{PRED} & \text{'Dat'} \\ & \left[\begin{array}{cc} \text{PRED} & \text{'PRO'} \\ \text{CASE} & \text{DAT} \\ \text{GEND} & \text{X} \\ (\text{NUM} & \text{PL}) \end{array} \end{array} \right] \\ \text{SUBJ} & \text{OBL} \end{array} \right] \\ \text{PRED} & \text{'Stungið}_{Pass} \\ \text{PCOMP} & [\dots] \end{array} \right]$$

Gender and number are here left open, so as to suit the various interpretative possibilities, while the CASE-value in the inner layer of the subject has not yet been accounted for.

But in order to be used in a full sentence-structure, it has to be possible for various of these features to not be matched by anything in the c-structurally produced f-structure, especially the PRED-values 'Dat' and 'PRO' (non-realization of ordinary grammatical feature values seems on the whole to be less of a problem, although it is not always possible). In any given structure, these will come from two different SLEs, the case PRED from one for the verb, and the 'PRO' one from a pronominal SLE, and there may well be more than one of the latter to chose from (probably at least two, one for the case where there is an overt antecedent, another for the case where there isn't). Since it is reasonable for these to differ in how tolerant they might be of a PRED-value they use not to be overtly realized, and under what circumstances, this gives a lot of opportunities for complexities of the kind found by Barðdal (2006) to get into the data, so this approach is not immediately embarrassed by the fact that the facts don't appear to be simple. It remains to be seen how good an account of the details of the complexities can be gotten out of this treatment.

And a pleasant side-effect of this approach is that the c-structure rules for Quirky NP can also be simplified. All we need to do as add to the regular NP rule this additional expansion:

$$(41) \text{ NP} \rightarrow \text{ NP} \\ (\uparrow \text{OBL}) = \downarrow$$

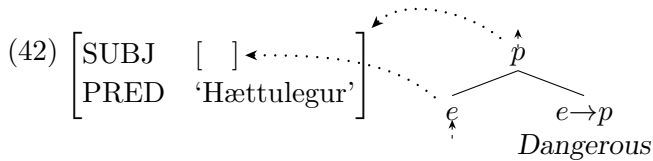
We don't need the extra bar level found in A82/90, since the semantic f-structure generation will prevent (41) from effectively recursing, and we especially don't need the unpopular $(\uparrow(\downarrow \text{CASE})) = \downarrow$ annotation, since the SLEs for the Quirky verbs can introduce the PRED-values for the extra layer, without requiring any involvement of the c-structure rules. The proposals about CASE to be made later will allow this rule to also be used for semantically case-marked NPs, including, modulo issues of XBAR-level, in Warlpiri as analysed by Simpson (1991). In addition to being simpler, this treatment is much more compatible with the reduction of phrase-structure annotations to general principles that is developed in Bresnan (2001).

A problem that this approach does not address is to explain why nonfinite subjects are such a popular locus for unexpressed pronouns. The classic explanation for this in GB was the 'PRO-theorem', but nobody has ever managed to make this work out for Icelandic,

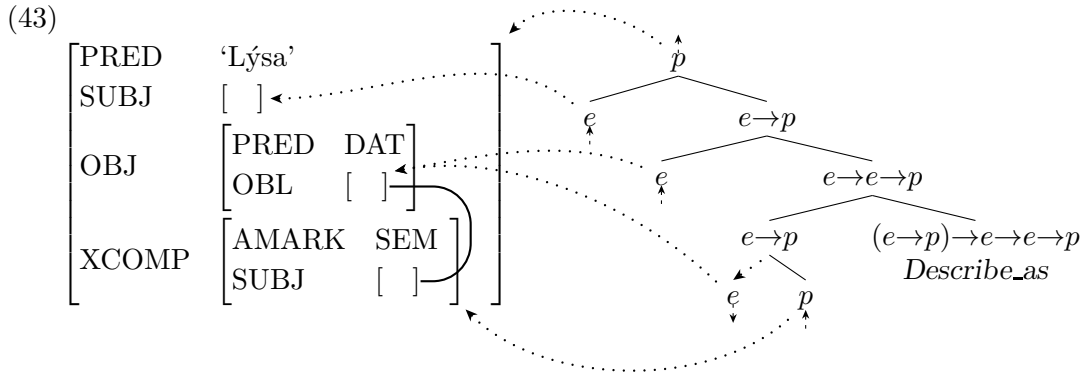
including in treatments such as Jónsson (1996), where the Case Filter is used with a reasonable degree of success to control movement. We will therefore have to leave this as an unsolved problem, suggesting that it has something to do with the prominence relations between the core grammatical functions, whereby SUBJ is most highly ranked.

3.2. REDEEMING PROMISSORY NOTES

Now it's time to redeem the promissory notes issued in earlier years about using semantics to explain why agreement works in some places but not others. We start with the Quirky NP-controlled complements that we've already introduced. The complements with which these constructions occur are ordinary NPs, taking non-Quirky subjects, whose SLEs would therefore take input from the upper layer of a subject's NP's f-structure:



A verb such as *lýsa sem* on the other hand would probably best be treated as involving functional control by a theta-role bearer, as analysed by Asudeh (2005):



This constructor involves a semantic configuration we haven't seen before, a 'complex argument' of type $e \rightarrow p$. The expansion of such arguments is discussed in the appendix; note that the left daughter has a (downward pointing) output arrow and a dotted line connecting to its mother, the right daughter an input arrow. The Quirky object's inner layer and the complement subject are equated by functional control, so it doesn't matter which of these two the associated e 's in the semantic structure get connected to. There are some surprises in the treatment of this kind of structure, discussed in Andrews (2007b), but they're not relevant here.

To assemble (43) and (42), we need to feed the subordinate output e of (43) into the input e of (42), and the output p of the latter into the input p of (43), producing this:

On such an approach, the obvious thing to do with plurals is to follow Link (1998) and treat their number features as introducing operators that convert a property $e \rightarrow p$ of singular count entities into a property of type $e \rightarrow p$ of ‘plural’ entities (non-atomic *i*-sums). That is, *boy* is a predicate that is true or false of individual entities, *boys* of certain kinds of collections of entities (*i*-sums, in Link’s terminology). SLE’s for a plural feature and a noun would then look more or less like this:

$$(46) \quad \begin{array}{l} \text{a. } \left[\begin{array}{cc} \text{NUM} & \text{PL} \end{array} \right] \Leftrightarrow Pl : (e \rightarrow p) \rightarrow e \rightarrow p \\ \text{b. } \left[\begin{array}{cc} \text{PRED} & \text{'Boy'} \end{array} \right] \Leftrightarrow Pl : e \rightarrow p \end{array}$$

(Since all the semantics-f-structure links go to the same place, they are omitted here.) SLEs like these can happily assemble to produce results like this (see the appendix for details on how this kind of assembly works):

$$(47) \quad \left[\begin{array}{cc} \text{PRED} & \text{'Boy'} \\ \text{NUM} & \text{PL} \end{array} \right] \quad PL(Boy) : e \rightarrow p$$

But assembly won’t produce acceptable results if PL-values are dumped into the upper-levels of Quirky NPs, since, in such places, their meanings can’t integrate properly with anything else. Therefore, unless something special happens, principle (33b) will therefore block agreement from dumping features into these positions, since such features won’t be matched by the semantically generated structure.

We can tell a similar story for gender, but with the difference is that gender is normally ‘co-introduced’ with the PRED-value (especially in Icelandic, where the connection between grammatical gender and real world sex appears to be unusually weak for a European language), by SLEs that look more or less like this:

$$(48) \quad \left[\begin{array}{cc} \text{PRED} & \text{'Strákur'} \\ \text{GEND} & \text{MASC} \end{array} \right] \Leftrightarrow Boy : e \rightarrow p$$

As with number, a randomly dumped gender feature won’t wind up matching anything produced by the semantics, under normal circumstances, and so will be blocked by (33b).

There is of course one kind of feature-value for which this kind of story won’t work at all, namely, structural case, since this is a kind of feature which appears to have no semantic interpretation, but rather appears to be a relatively pure reflection of the syntax. We clearly have to say something about case before we can push on to our attempt to explain why two-level structures are required, so we do this in the next section.

4 Case Marking Rules

Now we finally deal with the case-marking principles themselves. Given the extent to which analysis of languages with rich case-marking systems has provided motivation for LFG, it is surprising how difficult it has been to come up with a stable and widely agreed on account of how structural case works (for examples of early work, compare the rather different treatments of Icelandic (Andrews, 1982), Russian (Neidle, 1982), Malayalam (Mohan, 1982) and Warlpiri (Simpson, 1991)). In the first subsection we will propose an account of ‘structural’

case, based largely on Nordlinger (1998). In the second, we will extend it to ‘Quirky’ and ‘Semantic’ case.

4.1. STRUCTURAL CASE

‘Structural’ case is generally viewed as being case assigned according to some kind of general rule depending on grammatical structure, such as ‘subjects are nominative’, or ‘objects are accusative’. In current LFG, the most widely accepted account of it is probably Nordlinger (1998). But this has a substantial problem in that, given how it works, case features are not conceptually necessary, but apparently present anyway.

This is because Nordlinger uses standard LFG architecture, supplemented by the idea of ‘inside-out functional uncertainty’ (iofu), whereby grammatical items can carry constraints on things found on paths leading up from their f-structure correspondent’s location (inside-out), rather than only down (standard outside-in). So for example an ergative case form can carry the specification ((SUBJ↑) OBJ), which is supposed to mean ‘↑ (my f-structure location) is the value of SUBJ in a structure that also has an OBJ-value’.

The problem is that in standard LFG architecture, there’s no reason at all why the lexical items of morphological forms shouldn’t just introduce the equations without the CASE-values which they are traditionally supposed to be associated with. For example, why shouldn’t an ergatively case-marked nominal just carry the specification (a), rather than (a) together with the CASE-setting equation (b):

(49) a. ((SUBJ↑) OBJ)

b. (↑CASE) = ERG

If there was no evidence that CASE-features existed, this would not be a problem: we could just drop them.

But there is such evidence. One indication is the kinds of interactions that sometimes occur between case and agreement. In Hindi, for example, verbs can only agree with a ‘nominative’ NP that arguably just lacks any case-value (preferably with the subject unless this is ergative, in which case the object is the next choice, unless this is accusative, in which case, no agreement). It is hard to see why the presence or absence of an iofu annotation like (49a), on one item, would affect the agreement possibilities for another item. But presence of a CASE-value, as either an inhibitor (Hindi) or facilitator (Maithili, as discussed in Butt and Sadler (2003)) is straightforward (to describe; the typology of such effects seems to be extremely variable, so that there is perhaps no real scope for explanation).

A more subtle indication can be gotten from the well-known fact that the usage of the traditional case forms in languages is quite varied, in spite of the tendency to re-use names such as ‘nominative’, ‘ergative’, ‘dative’, etc. across different languages. Furthermore, single traditional case-forms, such as ‘accusative’, tend to have multiple traditionally recognized uses. So Icelandic accusative forms can be structural, quirky, or to a limited extent, semantic (see Sigurðsson (2003) for a very extensive survey of uses of Icelandic case forms).

Suppose then that there were no CASE-features, but only statements similar to (49a) directly connecting the morphological forms to their conditions of use. We then might expect to find different parts of speech, such as Noun, Adjective and Determiner, making radically different choices as to what kinds of distinctions their case-forms marked, since they would require different iofu paths (those for adjectives starting with (ADJUNCTS ε↑), for example), and so

might perfectly well specify different circumstances overall. But this isn't what normally happens: if agreement happens at all, one typically finds either the full inventory of distinctions, or a substantial reduction (along the lines of 'direct' vs. 'oblique'), but not something just different. What we find is just what we expect if agreement is marking or recapitulation of the value of a feature such as CASE, with a limited range of values.²⁹

We can implement this idea by allowing certain attributes, such as in particular CASE, to not require (or perhaps even allow) semantic interpretation, as long as they are licensed by a separate mechanism, for which Nordlinger's use of iofu constraints is an important ingredient which we will borrow. In a language where nominative case really is strongly associated with finite verbs (such as Greek, Latin, English or Irish), we might for example have a constraint like this:³⁰

$$(50) \left[\text{CASE} \quad \text{NOM} \right] : ((\text{SUBJ} \uparrow) \text{TENSE})$$

This is supposed to apply to the results of the semantically driven f-structure production, and tack on the specified CASE-values whenever the stated conditions are met. '↑' on the right designates the f-substructure matching the material in brackets on the left. Rules such as (50) are to be seen as constituting a small but special 'case-marking component', formally characterized in the architecture of the theory as conditions that license feature-values that don't have to be semantically interpreted.

If one interprets (50) as a rule for adding additional features to an f-structure, it falls into the class of 'Schönfinkel-Bernays' conditionals described by Johnson (1991), which have a somewhat degrading effect on computational complexity, but don't render LFG-type grammars undecidable, because the rules merely tack on additional structures chosen from a finite number of possibilities onto a predetermined and finite number of locations, without producing the possibility of infinitely iterative application. We can use such rules to add some CASE-features to the semantically generated f-structure, and then try to match this up with a c-structurally driven one in the usual way.

Talking of 'rules' is likely to seem problematic to many syntacticians, since replacing 'rules' by 'principles' (perhaps with parameters) has been a major project since Chomsky (1973). The classic example of the problem with rules is the transformational Passive rule, which is a wildly implausible proposal about what children have to learn in order to acquire the English Passive construction, because it recapitulates a great deal of the material that one would put into a thumbnail sketch of English syntax. Chomsky's (1973) solution to this problem was to subsume the transformational operations of the passive under a much more general 'move NP' rule, which was highly regulated by general conditions on its application, and eventually replaced by a general principle of Movement, in the Government-Binding Theory. Other generative frameworks took different approaches. LFG for example retained a passive rule as an operation on lexical items, but the way in which LFG uses grammatical relations permitted a drastically simplified formulation, since the passive rule itself can be formulated in terms of grammatical relations, and therefore didn't have to say anything about how these were externalized, thereby eliminating the redundant specification of this information. Given the typological diversity of so-called passive constructions, the LFG formulation is a plausible,

²⁹ A limited kind of partial exception is 'mixed ergativity', where some kinds of nominals mark ergative case, others accusative (and often, some both). Under the well-motivated analysis of Goddard (1982), this involves different realization patterns for features that are always present.

³⁰ There are other possible notations that one might use here, such as putting CASE on the right in the iofu path, instead of on the left in square brackets; the reason for the present choice is my judgement of intuitive accessibility.

if not necessarily correct, hypothesis about what children have to learn in order to acquire the constructions traditionally known as passives in the languages where they occur (expressing myself in the roundabout way in order to avoid any appearance of commitment that ‘passive’ constitutes some sort of universal category).

So the issue between rules and principles is basically one of complexity: a rule can be regarded as an extremely complex parameter to a very general ‘principle’ (traditional ‘component’), such as ‘move stuff around in one of the ways describable by the following notation: ...), while a parameter can be regarded as a ‘rule’ in a very limited ‘component’ (i.e. principle). The proposed case-marking rules are intermediate in complexity between a traditional transformational rule and a traditional parameter, and not, I think, implausible as an account of something that children have to learn. Whether they turn out to be a better approach than a conventional parameter-based view such as for example Legate (2008) depends on how rich the typology turns out to be. My impression is that it’s beginning to look fairly rich.

So now we can proceed to propose a rule for the accusative. A82 proposed that being an object or second object of something that had a PRED-value for SUBJ was the condition for the Icelandic accusative, and the proposal of A90 can be regarded as a variant of this. Such a formulation accounts for the fact that verbs with dative subjects have nominative objects, although not for the absence of verbs with accusative subjects and nominative objects (functioning semantically as arguments, rather than complex predicates, as discussed above). That statement suggests a formulation like this:

$$(51) \left[\text{CASE} \quad \text{ACC} \right] : ((\text{OBJ}/\text{OBJ2} \uparrow) \text{SUBJ PRED})$$

But this won’t work under our present proposal, because the outer layer of Quirky NPs does have a PRED. A reasonable reformulation of (51) would be to require that the SUBJ have other property of a ‘full NP’, such as perhaps a referential index:

$$(52) \left[\text{CASE} \quad \text{ACC} \right] : ((\text{OBJ}/\text{OBJ2} \uparrow) \text{SUBJ REF})$$

This characterization is very similar to the ‘Burzio’s Generalization’ account, where accusative is put on the less prominent NP when there is a more prominent one with a nominative case, but we can’t formulate it this way, since we don’t assume that there is any actual CASE-value representing nominative. An obvious plausible modification would be to use some feature-based characterization such as [+OBJ] instead of a disjunctive list of object GFs, but doing this would require developing some more theoretical infrastructure.

There is another conceptual point whereby this account diverges from the kind of thinking behind Burzio’s Generalization: we are not assuming that labels such as ‘accusative’ and ‘nominative’ have any particular status in the theory, beyond being convenient taxonomic labels for aspects of case-marking that tend to recur in languages, perhaps for functional reasons such as distinguishing between participants in an economical way. So we don’t expect (52) or any refinements we propose for it to behave identically to things called ‘accusative’ in other languages. This is an important difference between the present approach and a more ‘principle-based’ one such as that of Legate (2008).

On the other hand, it is in certain respects not so different to the idea presented in Sigurðsson (2009b) that case features aren’t really part of syntax, but rather ‘phonology’, and that they don’t involve any real ‘principles’. The kinds of variation that are currently being discovered in the behavior of cases in the Scandinavian languages that still have them would seem to be tending to provide support for this general position.

Generalities aside, (52) provides a clean account of the active-passive relationship of ditransitive verbs with dative Recipient and accusative Theme which allow either to become subject under Passive:

- (53) a. Peir gáfu honum peningana
 They(N) gave him(D.SG) the money(A.PL)
- b. Honum voru gefnir peningarnir
 him(D) were(PL) given(N.PL) the money(N.PL)
- c. Peningarnir voru gefnir honum
 the money(N.PL) were(PL) given(N.PL) him(D)

Whichever of the two objects becomes subject, the conditions for (52) cease to be satisfied, and the accusative comes nominative. We also of course have the peculiar agreement of the verbs with the nominative object in (b), which we discuss below.

(52) gives a reasonable first approximation (but refinements are needed) to an account of the case-marking of ‘regularly’ case-marked NPs, but what about the Quirky ones? We have alluded to principles presented in Andrews (2008b) requiring their outer layer to have a PRED-value, but, for agreement, etc. to work out, we want their inner layer to wind up having a CASE-attribute that interfaces with the morphology in the same general manner as the structural accusative case, and in *exactly* the same manner in the case of the Quirky Accusative, where all the morphological forms are exactly the same. If we are determined to avoid notational ‘cleverness’, we might propose something like this, where there are three rules that assign a case feature depending on which PRED-feature is present:

- (54) a. $\left[\text{CASE} \quad \text{ACC} \right] : ((\text{OBL} \uparrow) \text{PRED} \text{ ‘Acc’})$
- b. $\left[\text{CASE} \quad \text{DAT} \right] : ((\text{OBL} \uparrow) \text{PRED} \text{ ‘Dat’})$
- c. $\left[\text{CASE} \quad \text{GEN} \right] : ((\text{OBL} \uparrow) \text{PRED} \text{ ‘Gen’})$

However this kind of approach becomes problematic in languages with a large number of CASE-values, such as the 23 (plus an unmarked nominative) that Round (2009) finds in Kayardild.³¹

This suggests the desirability of a more ‘clever’ formulation such as (55), where the upper PRED-value gets copied as the lower CASE-value:

- (55) $\left[\text{CASE} \quad X \right] : ((\text{OBL} \uparrow) \text{PRED}) = X$

In order to work properly, this requires that the ‘OBL’ grammatical function has a very limited distribution, to only inner layers of NPs, and also certain PRED-values be exempt

³¹ But not that these are ‘semantic’ rather than ‘structural’ cases, which participate only in NP-internal ‘concord’ (albeit very exuberantly), rather than subject-predicate agreement. So it is likely but not 100% established that they need to involve a feature rather. 24 might well be a world maximum number of distinct CASE-values, since in the North Caucasian languages with traditionally more than 30, they are clearly resolvable into ‘case’ and ‘localization’ properties, which don’t participate in concord (Kibrik, 1979). The Kayardild cases lack any such clean division; their number has been swelled by the co-option of quite a number of verb stems to take on the role of adverbial cases, including concordial behavior.

from ‘predicate indexing’, so that they can unify. This latter is argued for on independent grounds in Andrews (1990b). This version of the rule is still Schönfinkel-Bernays.

A useful side-effect of the ‘clever’ approach is that even though the NP rules don’t explicitly introduce the Quirky case values, they nevertheless count as externalized, via their realization as CASE-values. This gives us a basis for accounting for the somewhat degraded acceptability of Quirky PRO on the basis of externalization of the case PRED, which we wouldn’t get from the unclever formulation (54).

But we’ll close this section by showing how (55) lets us improve on the treatment of ‘semantic case’ given in Andrews (1990a) and Simpson (1991). There are several different things that might be called ‘semantic case’, here we will consider only cases that seem to function similarly to prepositions to mark adjuncts. Another variety is what appear morphologically to be cases that mark higher properties of the clause, such as tense, mood, aspect, polarity, etc. The present treatment is consistent with the proposal of Sigurðsson (2002) that these are morphological spellings of feature-values sensitive to the presence of operators above the predicates of which the NPs are arguments, but we won’t look into this here.

In Simpson’s treatment of what we might call ‘relational semantic case’, because it marks the relationship of the argument itself to some surrounding structure, the semantically case-marked NP has two layers of structure, an outer one with a PRED-value representing the relationship, and an inner one containing the PRED-value of the NP’s nominal and other associated material:

$$(56) \left[\begin{array}{cc} \text{PRED} & \text{LOC} \\ \text{OBL} & \left[\begin{array}{cc} \text{PRED} & \text{'Creek'} \\ \text{CASE} & \text{LOC} \end{array} \right] \end{array} \right]$$

In Simpson’s version of the treatment, the upper PRED needs to have an argument list, but in ours, it doesn’t, because it will have an independently interested meaning-constructor (or several of them) introducing the various ‘argument-taking-meanings’ of the case predicate. The absence of the quote-marks from the PRED-value can be taken as an indication of the non-application of predicate-indexing. An issue we can afford to be vague about is whether the two LOC-values are one object, requiring only one interpretation via the semantics, or two, one licensed by the semantics, the other, the case-marking rule.³² The same kind of treatment will work for the few remaining cases of relational semantic case in Icelandic reviewed in Thráinsson (2007).

4.2. FORCING THE TWO-LAYER STRUCTURE

We have already noted that the two-layer structure for non-adjunct (in the conventional sense) NPs, while perhaps somewhat exotic, is not unique to Icelandic, appearing quite overtly in various Bantu languages. But in Icelandic, there is no overt marking, and the putative outer layer is semantically empty and inert for agreement, with the possible exception of the dative-nominative verbs (where the features aren’t semantically interpreted in that location, but might be involved in agreement, as will be briefly discussed later).

So what is supposed to drive language-learners to the two-layer analysis of Icelandic? A possible answer would be ‘case-marking that appears to be lexically governed’, but, unfortunately, this appears to be untenable in general. We have already noted that Warlpiri seems

³² The phenomenon of ‘argument-relating case’ (Simpson 1991, p. 194-195) suggests that the former interpretation will be ultimately required.

to have some lexical government of case, in that some two-argument verbs take ergative and absolutive, while other stake nominative and dative. Furthermore, although dative on the less active argument appears to only occur when this argument could not be reasonably described as strongly affected, there are pairs where it is hard to see any difference in meaning, such as the two verbs meaning ‘covet’ discussed by Simpson (1991, p. 103). And the actual situation is a bit more complex than we’ve indicated so far.

One problem is that there are a small number of ‘verbs of bodily function’ that take ergative case on their subjects, even though they are intransitive (Hale, 1982):

- (57) Ngarrka-ngku ka ngungkurru-pangi-rni
 man-ERG PRES snore-dig-NONPAST
 The man is snoring

As discussed by Hale, some apparently intransitive constructions with ergative subjects can be plausibly argued to really be transitive, but not these, even though they are plausibly derived diachronically from transitive constructions. So we seem to need some verbs that are specified for taking ergative subjects even though they lack objects. One might hope that dative on the object (if there is one) would be predictable from absolutive on the subject, but this isn’t possible either, due to the existence of a few verbs with meanings such as ‘seek’, which take an ergative subject and a dative object:

- (58) Ngarrka-ngku ka-rla karli-ki warri-rni
 man-ERG PRES-3.OBJ.D boomerang-DAT seek-NONPAST
 The man is looking for a boomerang.

As discussed by Hale, various other verbs that normally take ergative subject and absolutive object can take a dative object instead with a related meaning, such as ‘see’ versus ‘hunt around for’. And there is also a derivational process, first described in Hale (1973), whereby transitive verbs are modified to express unsuccessful action, with their absolutive objects converted to dative, but the subject remaining ergative. A variety of analysis of this material have appeared over the years, Bittner and Hale (1996) being one of the more comprehensive ones.

But within LFG, it is hard to escape the conclusion that the lexical entries of the verbs themselves must somehow just state what cases appear on which grammatical relations. Simpson (1991) for example does this by means of linking rules sensitive to semantic roles that attach specifications such as (\uparrow SUBJ CASE) = ERG. An alternative would be to follow Construction Grammar and use an inheritance hierarchy, although at present I have no insight into what the substantive differences between these approaches might be.³³ But Simpson’s implementation faces a problem in the fact that the subjects of certain ‘simultaneous action’ nominalizations, marked the affix *-rlarni* after the infinitival marker, can appear in the dative instead of the ergative for verbs with ergative subjects, and must so appear for verbs with absolutive subjects (Legate, 2008), drawing on Laughren (1989) and Simpson (1991).³⁴

- (59) a. Kurdu-lpa manyukarri-ja [ngati-nyanu*(-ku) jarda-nguna-nja-rlarni]
 child-PAST.IMPERF play-PAST mother-POSS*(-DAT) sleep-lie-INF-RLARNI
 The child was playing while his mother was asleep.

³³ Or, indeed, how different it would be from the Minimalist treatment of Sigurðsson (2009a), once one accepts the need for ‘idiomatic interpretation’ of main+light verb combinations.

³⁴ There are some examples similar to (a) with absolutive instead of dative, but they are rare, and followup work by Laughren and Legate indicates that the dative really is obligatory here.

- b. Kurdu-lpa manyukarri-ja [ngati-nyanu-rlu karla-nja-rlarni]
 child-PAST.IMPERF play-PAST mother-POSS-ERG dig-INF-RLARNI
 The child was playing while his mother was digging (for something).
- c. Nyalali-rli ka warlu yarrpi-rni, [karnta-ku kurdu-ku miyi
 girl-ERG PRES fire build-NONPAST woman-DAT child-DAT food
 yi-nja-rlarni]
 give-INF-RLARNI
 The girl is building a fire while the woman is giving food to the baby.

On Simpson’s account, we have an (unresolved) problem that the [CASE ERG/ABS] specification on the verbs will conflict with whatever it is that’s putting dative case on the subjects here.

But in the present approach, we can get a solution, by supposing that the ergative case-value is being placed by a rule similar in general nature to the ‘non-clever’ rules of (54), but sensitive to the PRED of the clause belonging to a somewhat but not entirely arbitrarily stipulated class that we can represent as [+Erg] (using conventional binary feature notation to indicate that this is not a piece of the f-structure, but a property of the PRED-value, perhaps just a convenient notation for membership in a list). The dative with *rlarni* is on the other hand licensed by a rule sensitive to what we’ll treat as a ‘OBV(iation)’ value, roughly following the glosses used by Legate.³⁵ This gives us two rules:

- (60) a. [CASE ERG] : ((SUBJ ↑) PRED [+Erg])
- b. [CASE DAT] : ((SUBJ ↑) OBV RLARNI)

We can now deal with the case of the subjects of transitive *rlarni*-constructions by saying that when there are two conflicting rules that can apply, some principle adjudicates the conflict; here what seems to happen is that either can apply (from our general knowledge of variation, we would expect that there would be a stable statistic about which one was more frequent, which the grammar should capture somehow with a stochastic component).

What about the absolutive? If we treat the absolutive as either no CASE-value at all, or as some kind of default value, then the obligatoriness of the dative for intransitive verbs will be predicted, because a case rule with no competitor would be expected to just apply (Simpson seems to me to assume a concept of absolutive as default, without being entirely clear about how it is to work formally).

For dative objects, we can propose the same idea, except that there isn’t any conflicting possibility for verbs that take dative objects:

- (61) [CASE DAT] : ((OBJ ↑) PRED [+Dat])

The verb types we have seen so far show all combinations except for one of the two features we have supposed, although only three of them are common, the missing possibility being double-absolutive. One could rule this out by making the rules a bit more complicated, but I don’t think this would be worth doing without making a very careful study of the Warlpiri lexicon.

³⁵ RLARNI being the obviation value used when the subject of the subordinate clause is distinct from all core arguments of the matrix.

There is however one more situation we have to deal with, three-place predicates such as *yi-* ‘give’, where the ‘Recipient’-like argument (which can also be a Loser, and various other things) obligatorily gets the dative, the other the absolutive. This could be handled in various ways, which we won’t explore here (but note Simpson’s discussion of cognate objects). In particular, since these verbs have only one case-marking pattern, we could set up a scheme to attach their case-markers with no diacritics at all, although for the present analysis they would all be specified as [+Erg+Dat]. This might seem like a problem, but if we assume that the diacritics are largely being controlled by the semantics of the verbs, it isn’t a real one.

We have now covered structural and relational semantic case in Warlpiri; there is one more, rather rare type, the use of what are normally semantic cases to mark what appear to be arguments:

- (62) Ngarrka-patu ka-lu karti-ngka manyu-karri-mi
 man-PL PRES-SUBJ.3PL card-LOC play-stand-NONPAST
 The men are playing at cards

There the locative case is used to mark the ‘game played’ apparent argument of the verb. However, not only does Hale (1982) note that these are rare, but it is also very difficult to be sure about the argument-adjunct distinction for prepositionally marked NPs in English, and far more so for their semantically case-marked counterparts in Warlpiri, a language about which so much less is known. If we follow Simpson in supposing that these are arguments bearing an OBLIQUE GF to their clause, then we apply to them the treatment we are giving to Quirky NPs in Icelandic (modulo the use of OBLIQUE rather than a core GF). They will then have the same internal f-structures as semantically-case-marked NPs, but their PRED-values would be interpreted jointly with the verb instead of independently.

We have now set up a fair amount of machinery for dealing with Warlpiri, in a different manner than Icelandic, on the basis that lexically-governed case-marking has a profound inhibitory effect on agreement in Icelandic, but only a very slight (and, indeed, enhancing effect in Warlpiri). This generates the question of how language-learners can tell which type to use. What I suggest is the following:

- (63) A Warlpiri-type lexically controlled case-system is the correct analysis when there are few (ideally, only two) alternative CASE-values for each grammatical relation that has them, an Icelandic (Quirky) style case-system is correct when there are many.

The basis for this is that, on the whole, non-agreement with arguably Quirky case-marked arguments appears to be quite a robust phenomenon, especially if one accepts the arguments of Eythórsson and Bardhdal (2005) that non-nominative subjects are much more widely distributed in Germanic languages than has previously been supposed. But an important apparent exception seems to be emerging in Faroese, where dative subjects that would be Quirky in Icelandic are beginning to show a very high rate of acceptance of person-number agreement with the verb.

In Faroese, the lexically governed case-marking system has changed from one essentially like Icelandic, to one with the following properties:

- (64) a. Subjects are usually nominative, but a few verbs take dative ones, and a very few, accusative. None take genitive.
 b. Sole objects are usually accusative, with some possibility to be dative, except for the possibility of being nominative for some verbs when the subject is dative (accusative is also in general possible).

- c. With ditransitives, the Recipient (linearly first) object is dative, the Theme, accusative.

If it were not for the accusative subjects, this would conform to the requirement proposed in (63) for a language to have a ‘Warlpiri-type’ case-system, where the NPs have a simple f-structure, with the CASE-values triggered by features on the verb.

In spite of not quite fitting the requirement stated in (63), Faroese appears to be moving towards a Warlpiri-style agreement system. Jónsson and Eythórsson (2005) and Jónsson (2010) find an impressively large number of informants who accept (number) agreement with dative subjects in examples like this:³⁶

- (65) Nógvum kvinnum dámar/dáma mannfólk við eitt sindur av búki
 many women(DAT) like(3SG/3PL) men(ACC) with a bit of belly

Indeed, only 24.4% accepted the nonagreeing version, as opposed to 48.8% the agreeing (the favored version had a nominative subject, with agreement (92.7%)).

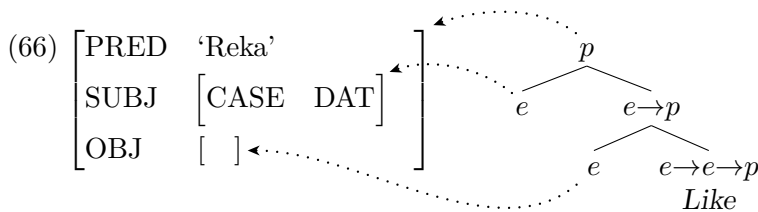
One issue is exactly what the current status of accusative subjects is in Faroese. Thráinsson et al. (2004) present them as a real part of the language, although occurring with only a small number of verbs (more, however, than seem to take genitive subjects in Icelandic, at least if passives are excluded), while Eythórsson and Jónsson describe them as ‘virtually outdated’. It would certainly be interesting to know whether there are Faroese speakers who accept both accusative subjects and agreement with dative subjects, and, if there are, whether any of them accept agreement with the accusative subjects. If there aren’t, we could treat the remaining accusative subjects as the last holdout of the Quirky representation, otherwise, we would need an additional feature to control case-marking on subjects, an a presumably fairly short-lived violation of the requirements of (63).

A way to have some flexibility in adherence to (63) would be to use the infamous ‘complexity-based evaluation metric’ in conjunction with the clever formulation of Quirky case-marking. The more different features you need to control verb agreement in a Warlpiri style analysis, the more complex the case-marking rules have to be. On the other hand, once one has adopted the clever formulation of (55), this one rule manages all the Quirky instances, so that Icelandic on the present analysis requires only two rules, whereas you’d probably need about 10 to handle all of Icelandic otherwise. The complexity-based evaluation metric has been a popular object of derision for decades, but it is important to keep in mind that there are areas in grammar where it cannot be done away with, such as morphology. There is for example no reasonable alternative for preferring a single affix that doesn’t care about gender for the dative plural in Icelandic over three, one for each gender value, all identical.

Either complexity, or a somewhat flexible adherence to (63) might be the right way to exclude case-marking rules sensitive to verbal features, but there is a further possibility that needs to be ruled out, which is Neidle’s (1982, 1988) proposal to simply add an equation specifying a CASE-value for the Quirky arguments of a verb.³⁷ For Icelandic, this would result in having lexical entries like (66) below, instead of the two-level ones:

³⁶ Faroese verb inflection doesn’t distinguish person in the plural, so the issue of person-agreement doesn’t arise.

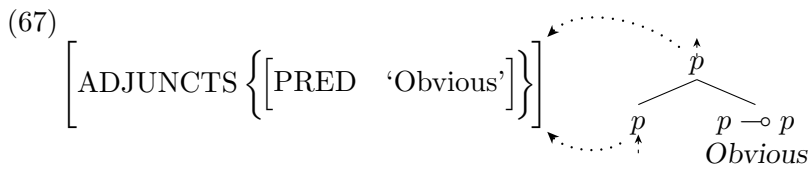
³⁷ Very similar to Simpson, but Neidle restricts it to ‘idiosyncratic’ case.



On a descriptive level, we can just reject (66) on the basis that it doesn't work out in the end, but to move towards explanation, we need principles that will prevent language learners from entertaining it at all.

For various reasons, Andrews (2008b) proposes a constraint that rules this out, which depends on the concept of 'adjunct' position in a meaning-constructor defined in Gupta and Lamping (1998), which is unfortunately substantially different from the notion of 'adjunct' in the theory of grammatical relations.

Informally, a Gupta-Lamping 'glue adjunct position' is one of a pair of positions in a meaning-constructor that are of the same type, and connect to the same f-structure position, but cannot be linked directly to each other without violating the Correctness Criterion. The connection between this notion of 'adjunct' and the standard grammatical one is that the meaning-constructors of grammatical adjuncts always contain a pair of Gupta-Lamping adjunct positions, which enable them to apply as operators on something that contains them, for example as in this SLE for the adverb *obviously*:



Connecting the output p to the input p here would produce a 'loop' that would prevent the meaning-constructor from being integrated into a wider assembly, rendering these two p 's adjunct positions.

Andrews (2008b) proposes the following constraint:

- (68) An SLE can't connect a semantic argument (i.e. non-adjunct) position to an f-substructure for which it specifies the value of an attribute.

This constraint will for example rule out SLEs whereby an idiom could specify the grammatical number of an argument, but leave other properties of the argument free to vary:

- (69) John galked the dogs
meaning: 'John walked the dog'

This seems like an extremely unlikely kind of idiom, so the constraint would appear to have some plausibility. The absence of verbs in IE languages imposing 'quirky gender' on their arguments is further evidence for this constraint (but, selection for animacy in the (un)accusative arguments of verbs in Algonkian languages is a *prima facie* problem).

On the other hand, verbs taking 'control complements' of type $e \rightarrow p$ often seem to specify 'verbal form' features for these complements on a fairly arbitrary basis. But the forms of complements of type p seem to be considerably more tied to the semantics. So I'll suggest that (68) only applies to basic types, not functional ones.

Given (69), SLEs such as (66) are excluded, and we need a two-layer structure, which further principles of Andrews (2008b) will require to have a PRED in the outer layer. Somehow, language learners will have to be ‘smart enough’ to figure out that lexically selecting a case-PRED in an upper layer will let them get lots of case-markings on various GRs in spite of (63). How this happens is something for the future, but the alternative to working it out is to come up with an alternative account of the material reviewed in subsection 1.3.

Before moving on to the next topic, I will say a bit more about what our account actually produces. From a strictly synchronic point of view, we get an account of why certain items don’t agree with Quirky NPs, while others do. Is it really an explanation? Arguably not, on the basis that once upon a time, the Quirky subjects weren’t subjects, and so the relevant kinds of subject agreement processes didn’t apply to them (Ancient Greek might be a good representative of this kind of situation). So, one can then say, the history is the real explanation, and the Quirky representation is only part of a synchronic account, as far as the basic facts are concerned, although the claims to provide an explanation are rather better for the subtleties discussed in subsection 1.3.

If Icelandic was the only language for which Quirky NP behavior existed, we would probably be able to go no further than this, but in fact it appears to be much more widely distributed in Germanic languages than previously thought, as discussed in Eypórsson and Barðdal (2005), which adds Modern German and most of the older Germanic languages to the previously known cases of Faroese and Old English (Allen, 1995). And this makes it quite pertinent that nonagreement with Quirky Subjects appears to be quite robust until the case system has been quite substantially eroded. It is for example very rare in 13th century Middle English, but seems to become more common in the 14th century (Allen 1995, pp 235-6, 263-4). So the two-level QSH might be an explanation for the stability of non-agreement with Quirky subjects. The obvious alternative is frequency: perhaps verbs start agreeing with formerly Quirky subjects when the constructions get rare enough so that children no longer really learn not to agree with them.

A language form to test this would be one in which there arose some kind of high-frequency non-nominative subject, without the range of choices that exist in Icelandic and the other Germanic languages that arguably have them. If such languages easily develop agreement with the nonnominative subject, then the Quirky hypothesis would be supported, otherwise, the frequency-based one. South Asian languages might provide some potential examples.

4.3. NOMINATIVE OBJECTS

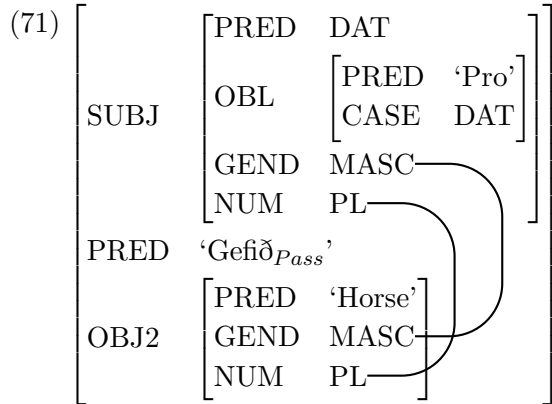
The final topic I will discuss is nominative objects, and the peculiar form of agreement they appear to participate in, recently investigated extensively by Sigurðsson and Holmberg (2008). Such agreement occurs not only between passive verbs with dative (derived) subjects and nominative (apparent) objects, as already illustrated in (53), but, if the dative subject is raised, even between the matrix verb and complement nominative object:

- (70) Honum eru sagðir hafa verið gefnir
 him(Dat.Sg) are(3.Pl) said(Nom.Masc.Pl) to have been given(Nom.Masc.Pl)
 peningarnir
 the money(Nom.Masc.Pl)
 He is said to have been given the money

Sigurðsson and Holmberg analyse this kind of example by implementing agreement as probes (in higher positions) that conduct a somewhat intelligent search for goals (in lower ones), capa-

ble of crossing clause boundaries under certain circumstances (although obeying intervention constraints).

Long distance agreement of this kind does not appear to be consistent with LFG, so A82 proposed a different kind of solution, whereby items triggering this kind of agreement shared gender and number values between their nominative objects and the upper layer of their dative subjects, producing results like this:



The sharing (obligatory, optional or dispreferred depending on the verb and speaker) was implemented by specifications like this on the verb's lexical entry (obligatory for passive participles, for everybody):

- (72) a. $(\uparrow \text{SUBJ NUM}) = (\uparrow \text{OBJ2 NUM})$
 b. $(\uparrow \text{SUBJ GEND}) = (\uparrow \text{OBJ2 GEND})$

The result is that if the dative subject is functionally controlled by a traditional 'Subject-to-Subject Raising' verb, then that verb will show the number agreement.

One problem, extensively discussed by Sigurðsson and Holmberg, is that the sharing breaks down if the object has person features: something like 'I was given you (as a slave)' are just grammatically bad, whether or not the main verb is second person. A more technical problem is that it is theoretically undesirable to need the two specifications of (72) rather than just one. In the specification formats used in the LFG literature, two specifications are hard to avoid, because proposals to explicitly structure features ('feature geometry') are rarely if ever made. But they are supported quite extensively in the computational XLE formalism (Crouch et al., 2007), and we could plausibly propose that GEND and NUM are subcomponents of a more general feature-bundle, so that (72) could be replaced by:

- (73) $(\uparrow \text{SUBJ AGR}) = (\uparrow \text{OBJ2 AGR})$

This account of agreement of verbs with nominative objects strikes most people as rather exotic and implausible.

But it does provide an account of a rather exotic case-marking phenomenon, which is that for some speakers, nominative objects can become accusative if the constructions are embedded in ACI constructions:

- (74) 'Eg tel honum hafa verið gefna peningana
 I believe him(Dat) to have been given(Acc.Masc.Pl) the money(Acc.Masc.Pl)
 I believe him to have been given the money

In the same survey as discussed above in connection with the examples of (10), the above was scored as indicated in the Acc row below, the nominative version with *gefnir peningarnir* as indicated in the Nom row:

(75)		✓	?	??	?*	*	**
	Nom:	5	1	1	0	0	0
	Acc:	1	1	3	0	2	0

Another, slightly larger, survey, produced the results in (77) for the sentences in (76):

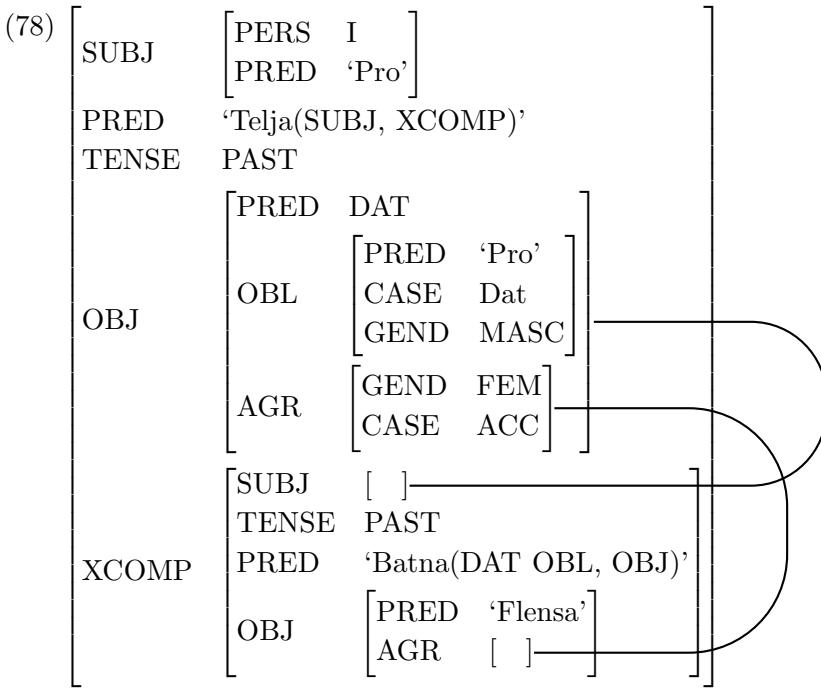
- (76) a. Ég taldi Höskuldi hafa batnað flensan
 I believed Hoskuld(Dat) to have recovered from the flu(Nom)
- b. Ég taldi Höskuldi hafa batnað flensuna
 I believed Hoskuld(Dat) to have recovered from the flu(Acc)

I believe Hoskuldur to have recovered from the flu

(77)		✓	?	??	?*	*	**
	Nom:	9	1	3	0	0	0
	Acc:	1	4	2	0	5	1

Sigurðsson (1993) also reports limited acceptability for the accusative here, which is quite mysterious in the absence of some kind of bidirectional feature-sharing between the subject and nominative positions.

Without the two-layer version of the QSH, it is rather unclear how anything of this nature would be possible, due to clash between the (Quirky) dative on the ‘raised complement subject’ and the (structural) accusative assigned by the verb. With the two layers, however, the issue becomes exactly how the accusative rule is to be formulated. For most speakers, it doesn’t seem to manage to deposit a CASE-value in the outer layer of a Quirky object NP, but for some speakers, it does, albeit usually rather marginally. Transmission of the case to the object position will then be achieved if CASE belongs to the ‘AGR’ substructure, along with NUM and GEND, providing for a structure like this for the (b) version of (76) (argument-lists of PRED-features provided as a reminder of what the associated SLE’s do):



It's also worth observing that these examples provide good support for the proposal of Jónsson (1996) that Quirky NPs can bear both Quirky and structural case, although at this point we are not claiming, as Jónsson does, that this happens with nominatives.

By contrast with Quirky NPs, downwards transmission of accusative case is obligatory with what are generally regarded as expletive constructions, where an indefinite object of a passive can remain in object position, but share properties with a presumed expletive (often unpronounced) in subject position (Jónsson 1996, pg. 184):

- (79) a. Padð voru settir þrír diskar á borðið
It were(PL) put(Masc.Nom.PL) three plates(Masc.Nom.Pl) on the table
Three plates were put on the table
- b. Hann taldi hafa verið setta þrjá diskka á borðið
He believed to have been put(Masc.Acc.Pl) three plates(Masc.Acc.Pl) on the table
He believed three plates to have been put on the table

No generative analysis of Icelandic has any problem with depositing an accusative case on an unpronounced expletive in (b), and sharing/transmitting it to the unpromoted object. What our treatment of agreement with nominative objects in the presence of a dative subject does is extend that idea to this case, by means of the two-level hypothesis.

5 Conclusion

In this paper I have been pursuing two basic ideas. One is that the best way to account for the agreement and certain other properties of Quirky NPs in Icelandic is to give them a two-layer structure. The other is that the most worked out implementation of this is essentially the A82/90 LFG analysis, with some modifications that are possible given a certain way of integrating formal semantics with LFG. The most striking intuitive feature of this architecture is that it has two ‘generative-enumerative’ levels, i.e. ‘computations’, whose results must be compatible, rather than just one.

In the course of this we have proposed three distinct kinds of case-marking, which could plausibly be called ‘structural’, ‘relational semantic’ and ‘Quirky’. The first is attachment of a CASE-attribute on the basis of the f-structural environment of an NP, the second is copying of an independently interpreted PRED-value into a CASE-attribute, and the third is structurally the same as the second, except that the PRED-value is not interpreted on its own, by jointly with the main verb (and perhaps other things).

One question that arises is ‘is that all’? The answer is probably not. There is for example what might be called ‘modal case’, where the case-marking on an NP seems to directly express a modal predicate applying to its verb.³⁸ The phenomenon of ‘differential object marking’, whereby animate and/or specific objects in many languages receive additional marking, also seems significantly different, and hard to integrate into LFG+glue.

This discussion raises the issue of whether or not there is a universal attribute CASE. There might be, but the present approach doesn’t require it. What it does require is that UG require attribute values to be licensed either by being interpreted, or being constrained by an iofu formula in the format we’ve used for structural case-marking rule. Mentioning a specific attribute CASE might turn out to be one of the requirements of this format, but not necessarily.

The final issue I want to discuss is whether or not this analysis is supporting an arguably false dichotomy between ‘structural’ and ‘lexical’ case (Barðdal, 2011). I claim that, contrary to possible appearances, it doesn’t. The reason is that all case on verbal arguments is ultimately determined by properties of their SLEs and associated PRED and other features, in a manner that is inherently lexical. The context (a) for ‘structural’ accusative on the object in (a) below is no more or less lexical than that for ‘lexical’ accusative on the subject in (b):

$$(80) \text{ a. } \begin{bmatrix} \text{SUBJ} & [\] \\ \text{PRED} & \text{‘Borða’} \\ \text{OBJ} & [\] \end{bmatrix}$$

$$\text{b. } \begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{ACC} \\ \text{OBL} & [\] \end{bmatrix} \\ \text{PRED} & \text{‘Reka’} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{ACC} \\ \text{OBL} & [\] \end{bmatrix} \end{bmatrix}$$

(Note that our current account requires the object in (b) to be Quirky as well as the subject.) In both cases, the verbal lexical entries can be regarded as constructions, which trigger the introduction of CASE-values by means of rules. Not including these values as such in the constructions can be seen as an attempt to solve an assortment of technical problems such as those discussed in this paper, which does not seem to me to preclude pursuing any of the important ideas of the approach.

³⁸ The term is inspired by Kayardild (Evans, 1995, Round, 2009), although much more widely distributed, for example Sigurðsson (2002) discusses what appears to be an instance in Russian.

Appendix

A The Glue Framework

In this section I will fill in some aspects of the glue framework that are not covered in the text. Although everything will in a sense be here, the presentation will at times be a bit brisk, so that readers without a basic familiarity with glue might want to consult more relaxed presentations such as Andrews (2010, 2009), as well as Asudeh (2004) for a very different kind of presentation.³⁹ Some other aspects of this approach are discussed in Andrews (2008a).

The first thing we need to do is give the rules for expanding a semantic type into a ‘prefab’ piece of structure. To describe this relationship with full generality, we need a notion of ‘polarity’, with two values, positive and negative. The polarity concept is derived from the interpretation of the semantic types as premises in a logical deduction, where the assumptions are negative, the conclusion positive. The result is that the entire semantic types are negative, with polarities then being assigned to subformulas by rules included in (81) below.

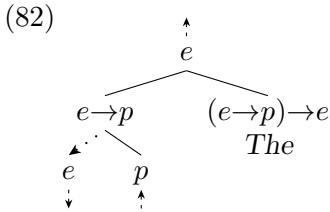
We start with a typed meaning, of negative polarity, with a type-label consisting of the semantic type, and then build a structure (in the simplest cases, a tree, but not a tree in general) whose nodes have polarities and semantic type labels derived as follows:

- (81) a. Starter: the starter node has negative polarity, its semantic type label is the semantic type of the typed meaning. It also has a semantic label, which is the meaning of the typed meaning.
- b. Atom: if the current (initially, starter) node has atomic semantic type, the construction is finished.
- c. Negative Implication: if the current node has negative polarity and semantic type $a \rightarrow b$, make it the right-daughter of new node of negative polarity and semantic type b , with a new left-daughter with positive polarity and semantic type a . Then repeat (b-c) with both the new mother and the new daughter as current (neither new node has a meaning label, although there is a way to assign meaning-labels to all nodes of fully assembled structures). This produces substructures representing function-application.
- d. Positive Implication: if the current node has positive polarity and semantic type $a \rightarrow b$, make it the mother of a new ‘left pseudo-daughter’ of negative polarity and semantic type a , and a new right-daughter with positive polarity and semantic type b . This creates a structure representing lambda-abstraction.

A notational point is that in linear logic, the symbol \multimap is often but not always used instead of \rightarrow for implication.

A result of the application of these rules is that a possible meaning-constructor for a definiteness (or generic) operator of type $(e \rightarrow p) \rightarrow e$ would be as in (82), where we’ve represented the polarities of atom-labelled nodes with in- and out-bound arrows (positive and negative, respectively, and left the others implicit. The left pseudo-daughter is connected to its mother by a dotted arrow, oriented downward:

³⁹ I suspect that glue is one of those things, which, if you don’t understand it in at least two rather different-looking ways, you actually don’t really understand it at all.



To effect assembly, we then plug inputs into outputs in accordance with the rules of (27), forming what are called ‘axiom links’ (represented by dashed arrows in the diagrams), except that, once the positive implication (abstraction) nodes are introduced, we need to revise Correctness. The revision requires a notion of ‘dynamic graph’ (due to Lamarche (1994) via de Groote (1999)), which can be defined as follows:

- (83) The dynamic graph consists of the axiom-links, oriented in the direction of their arrows, and the solid mother-daughter links (not the left-pseudo-daughter ones), oriented from daughter to mother (upward in the visual presentation).

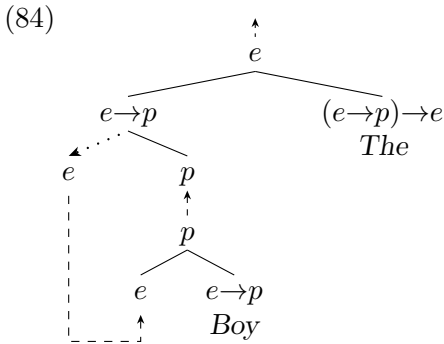
Then we revise (27e), and add an additional condition:

- (27) e'. The dynamic graph must be connected.

- f. From every target of a left pseudo-daughter link, there is a dynamic graph path to the source of that link.

This is one of many formulations of the so-called ‘Correctness Criterion’ of Proof-net theory. Andrews (2008a, 2009) discuss how the present notation is a modification of the standard notation for proof-nets (hopefully more intuitive for some linguists, but mathematically the same), with the latter providing substantial material on the relationships between deductive and proof-net based formulations. Moot (2002) provides a more general linguistically oriented introduction to proof-nets.

Given the rules, we can combine structures for *The* and *Boy* into an expression of type e , like this:



It should be somewhat evident from this how the positive implications function to represent lambda-abstraction (but of one and only one variable, making these lambdas ‘linear’). More complex assemblies involving plurals, adjectives etc. can be produced in a similar manner (see Andrews (2010) for some examples involving various kinds of adjectives).

This deals with the basic glue system, but we need one more thing to deal with most popular analyses of anaphora and related phenomena. This is ‘tensors’, extensively discussed in Asudeh (2004) (and various more recent work). The problem can be described this way.

Consider a sentence such as *John loves his mother*. In some sense we want *his* to ‘get its meaning’ from its antecedent *John*. But the one-to-one connection principles enforced by linear logic mean that we cannot as it were just run a link from *John* to *his* and expect that things will work, because if we use the subject meaning at the possessor-of-object location, it will be gone from the subject location and not available to do its job there.

The answer is an additional type-constructor called ‘tensor’ in linear logic, and usually symbolized as ‘ \otimes ’, but sometimes also symbolized as ‘ $*$ ’ (presumably because this what is used to symbolize the ‘fusion’ connective in relevant logic, which can be regarded as really being the same thing as tensor, from the point of view of the logical rules applying specifically to it). Explaining what tensoring really is and why it is called that would take us rather far afield,⁴⁰ so I’ll just present the rules and a bit of motivation. A formula $a \otimes b$ represents a and b taken together, in such a way that they can both be used (in different parts of your structure), but not in such a way that either can be erased, dropped or forgotten. The result is that a formula of the form $a \rightarrow b \otimes c$ means ‘if you give me an a , I can give you a b and a c , but you really have to keep and use both’.

The result is that $e \rightarrow e \otimes e$ (tensor bonding more tightly than implication) is the type of something that can solve our ‘resource deficit’ problem with anaphora: we can take something from the antecedent position, put something back there, and also put something into the pronoun position.

To work this into our system, we need new polarity and proof-net rules. For glue, the only polarity we need is negative, and the rule is that the components of a negative tensor are negative. The effect is that if the entire $e \rightarrow e \otimes e$ is negative, so will be the rightmost two e ’s, so, in the linkups, each of them will have an axiom-link coming out of them. We also turn out to have to make the Correctness Criterion a bit more elaborate, forbidding cycles in the dynamic graph (de Groote, 1999), which can be engineered into (27e) by stating that the dynamic graph must form a tree, with the links oriented towards the unconnected (Final Output) node.

So the general form of meaning-assembly we’re looking at for something such as:

- (85) Ég vonast til að reka á land
 I hope towards to drift to shore
 I hope to drift to shore

will be as below (recall that d is the proposed type for ‘direction’):

⁴⁰ People who would enjoy a scenic tour through seriously nonlinguistic territory might have a look at Baez and Stay (2008).

One big unsolved problem here is why PRO is restricted to subject position. We could engineer this into the formulation, but then it would have to be tweaked to allow for the two-layer QC structures, which would tend to contradict what this paper is trying to do.

A more serious consideration is that we would like to predict the tendency of PRO to be restricted to nonfinite subject position, which cannot be done by putting restrictions into an SLE. Rather there are some problems of principle here, which are actually quite difficult, especially when Icelandic is taken into consideration (Sigurðsson, 2008). In fact, the entire issue of the distribution of ‘covert NPs’ seems quite complicated, with even the basic typology not very well established, so I propose here to leave it as an unsolved problem.

References

- Allen, C. L.: 1995, *Case Marking and Reanalysis: Grammatical Relations from Old to Early Modern English*. Oxford University Press.
- Alsina, A.: 1996, *The Role of Argument Structure in Grammar*. Stanford, CA: CSLI Publications.
- Andrews, A. D.: 1971, 'Case Agreement of Predicate Modifiers in Ancient Greek'. *Linguistic Inquiry* **2**, 127–152.
- Andrews, A. D.: 1976, 'The VP Complement Analysis in Modern Icelandic'. In: *Montreal Working Papers in Linguistics*. reprinted in Maling and Zaenen (1990).
- Andrews, A. D.: 1982, 'The Representation of Case in Modern Icelandic'. In: J. W. Bresnan (ed.): *The Mental Representation of Grammatical Relations*. MIT Press, pp. 427–503.
- Andrews, A. D.: 1990a, 'Case-Structures and Control in Modern Icelandic'. In: *Modern Icelandic Syntax*. pp. 187–234.
- Andrews, A. D.: 1990b, 'Unification and Morphological Blocking'. *Natural Language and Linguistic Theory* **8**, 507–557.
- Andrews, A. D.: 2007a, 'Generating the Input in OT-LFG'. In: J. Grimshaw, J. Maling, C. Manning, and A. Zaenen (eds.): *Architectures, Rules, and Preferences: A Festschrift for Joan Bresnan*. Stanford CA: CSLI Publications, pp. 319–340. URL: <http://arts.anu.edu.au/linguistics/People/AveryAndrews/Papers>.
- Andrews, A. D.: 2007b, 'Glue Semantics for Clause-Union Complex Predicates'. In: M. Butt and T. H. King (eds.): *The Proceedings of the LFG '07 Conference*. Stanford CA: CSLI Publications, pp. 44–65. <http://cslipublications.stanford.edu/LFG/12/lfg07.html> (accessed Feb 19, 2010).
- Andrews, A. D.: 2008a, 'Propositional Glue and the Correspondence Architecture of LFG'. to appear in *Linguistics and Philosophy*. Draft uploaded to semantics archive; also <http://arts.anu.edu.au/linguistics/People/AveryAndrews/Papers>.
- Andrews, A. D.: 2008b, 'The Role of PRED in LFG+Glue'. In: M. Butt and T. H. King (eds.): *The Proceedings of the LFG '08 Conference*. Stanford CA: CSLI Publications, pp. 46–76. <http://cslipublications.stanford.edu/LFG/13/lfg08.html> (accessed 19 Feb 2010).
- Andrews, A. D.: 2009, 'Yet Another Attempt to Explain Glue'. <http://arts.anu.edu.au/linguistics/People/AveryAndrews/Papers>.
- Andrews, A. D.: 2010, 'Grammatical' vs. 'Lexical' Meaning Constructors for Glue Semantics'. In: Y. Treis and R. D. Busser (eds.): *Selected Papers from the 2009 Conference of the Australian Linguistic Society*. The Australian Linguistic Society. URL: <http://www.als.asn.au/proceedings/als2009.html>, also <http://arts.anu.edu.au/linguistics/People/AveryAndrews/Papers>.
- Árnadóttir, H. and E. F. Sigurðsson: 2008, 'The Glory on Non-Agreement: The Rise of a New Passive'. talk given at the Nordic Network for Intercultural Communication. URL: <http://einarfreyr.wordpress.com/handrit/>.
- Asudeh, A.: 2004, 'Resumption as Resource Management'. Ph.D. thesis, Stanford University, Stanford CA. <http://http-server.carleton.ca/~asudeh/> (accessed 19 Feb 2010).
- Asudeh, A.: 2005, 'Control and Resource Sensitivity'. *Journal of Linguistics* **41**, 465–511.
- Baez, J. and M. Stay: 2008, 'Physics, Topology, Logic and Computation: A Rosetta Stone'. URL: <http://math.ucr.edu/home/baez/rosetta.pdf>.
- Barðdal, J.: 2001, 'Case in Icelandic – A Synchronic, Diachronic and Comparative Approach'. Ph.D. thesis, Lund University.
- Barðdal, J.: 2006, 'Construction-specific Properties of Syntactic Subjects in Icelandic and German'. *Cognitive Linguistics* **17**, 39–106.
- Barðdal, J.: 2008, *Productivity: Evidence from Case and Argument Structure in Icelandic*. Benjamins.
- Barðdal, J.: 2011, 'Lexical vs. Structural Case: A False Dichotomy'. *Morphology* **11**. to appear in 2011. URL: <http://org.uib.no/iecastp/barddal/Lexical.vs.Structural.Case.Revised.pdf>.
- Bayer, J., M. Bader, and M. Meng: 2001, 'Morphological Underspecification Meets Oblique Case: Syntactic and Processing Effects in German'. *Lingua* **111**, 465–514.
- Bittner, M. and K. Hale: 1996, 'The Structural Determination of Case and Agreement'. *Linguistic Inquiry* **1**.
- Bresnan, J. W.: 1982, 'Control and Complementation'. *Linguistic Inquiry* **13**, 343–434. Also in Bresnan (1982), pp. 282–390.
- Bresnan, J. W.: 2001, *Lexical-Functional Syntax*. Blackwell.
- Bresnan, J. W. and S. Mchombo: 1995, 'The Lexical Integrity Principle: Evidence from Bantu'. *Natural Language and Linguistic Theory* **13**, 181–254.
- Butt, M. and L. Sadler: 2003, 'Verbal morphology and agreement in Urdu'. In: U. Junghanns and L. Szucsich (eds.): *Syntactic structures and morphological information*. Mouton, pp. 57–100.
- Chomsky, N.: 1973, 'Conditions on Transformations'. In: S. Anderson and P. Kiparsky (eds.): *A Festschrift for Morris Halle*. Prentice-Hall, pp. 232–296.

- Crouch, R., M. Dalrymple, R. Kaplan, T. King, and P. Newman: 2007, 'XLE Documentation'. URL: http://www2.parc.com/isl/groups/nltt/xle/doc/xle_toc.html.
- Dalrymple, M.: 2001, *Lexical Functional Grammar*. Academic Press.
- Dalrymple, M., R. M. Kaplan, J. T. Maxwell, and A. Zaenen (eds.): 1995, *Formal Issues in Lexical-Functional Grammar*. Stanford, CA: CSLI Publications. URL: <http://standish.stanford.edu/bin/detail?fileID=457314864>.
- Dalrymple, M. E.: 1993, *The Syntax of Anaphoric Binding*. Stanford CA: The Center for the Study of Language and Information.
- de Groote, P.: 1999, 'An Algebraic Correctness Criterion for Intuitionistic Multiplicative Proof-Nets.'. *Theoretical Computer Science* **224**, 115–134. <http://www.loria.fr/~degroote/bibliography.html> (accessed 19 Feb 2010).
- Evans, N.: 1995, *Kayardild: The Language of the Bentick Islanders, with Elements of a Grammar of Proto-Tangic*. Mouton.
- Eyþórsson, P. and J. Barðdal: 2005, 'Oblique Subjects: a Common Germanic Inheritance'. *Language* **81**, 824–81.
- Eyþórsson, T. and J. Bardhdal: 2005, 'Oblique Subjects: a Common Germanic Inheritance'. *Language* **81**, 824–81.
- Goddard, C.: 1982, 'Case Systems and Case Marking in Australian Languages: a New Interpretation'. *Australian Journal of Linguistics* **2**, 167–192.
- Gupta, V. and J. Lamping: 1998, 'Efficient Linear Logic Meaning Assembly'. In: *COLING/ACL 98*. Montréal: . URL: <http://acl.ldc.upenn.edu/P/P98/P98-1077.pdf>.
- Hale, K.: 1973, 'Person Marking in Warlpiri'. In: S. Anderson and P. Kiparsky (eds.): *A Festschrift for Morris Halle*. Holt, Rinehart and Winston, pp. 308–44.
- Hale, K.: 1982, 'Some Essential Features of Warlpiri Main Clauses'. In: S. Swartz (ed.): *Papers in Warlpiri grammar: in memory of Lothar Jagst*. Berrimah N.T.: Summer Institute of Linguistics: Australian Aboriginal Branch, pp. 217–315. *Work Papers of SIL-AAB*, Series A Volume 6.
- Haug, D.: 2008a, 'Information Structure and the Temporal Reference of Participial XADJs'. Talk given at LFG-08, University of Sydney.
- Haug, D.: 2008b, 'Tense and Aspect for Glue Semantics: The Case of Participial XADJs'. In: M. Butt and T. H. King (eds.): *The Proceedings of the LFG '08 Conference*. Stanford CA: CSLI Publications, pp. 46–76. <http://cslipublications.stanford.edu/LFG/13/lfg08.html> (accessed 17 Sept. 2010).
- Holmberg, A. and T. Hróarsdóttir: 2003, 'Agreement and Movement in Icelandic Raising Constructions'. *Lingua* **113**, 997–1019.
- Jackendoff, R. S.: 1972, *Semantic Interpretation in Generative Grammar*. MIT Press. extensive revision of 1969 MIT dissertation.
- Jackendoff, R. S.: 1973, 'The Base Rules for Prepositional Phrases'. In: S. R. Anderson and P. Kiparsky (eds.): *A Festschrift for Morris Halle*. Holt, Rinehart and Winston, pp. 345–357.
- Johnson, M.: 1991, 'Features and Formulae'. *Computational Linguistics* **17**, 131–151.
- Jónsson, J. G.: 1996, 'Clausal Architecture and Case in Icelandic'. Ph.D. thesis, University of Massachusetts, Amherst, MA. distributed by Umass GLSA.
- Jónsson, J. G.: 2003, 'Subject Case in Icelandic: not so Quirky'. In: E. Brandner and H. Zinsmeister (eds.): *New Perspectives in Case Theory*. Stanford, CA: CSLI Publications, pp. 127–164.
- Jónsson, J. G.: 2010, 'Covert Nominatives and Dative Subjects in Faroese'. *Nordlyd* **36**, 142–164. URL: <http://www.ub.uit.no/baser/septentrio/index.php/nordlyd/article/view/230>.
- Jónsson, J. G. and T. Eyþórsson: 2005, 'Variation in Subject Case Marking in Insular Scandinavian'. *Nordic Journal of Linguistics* **28**, 223–245.
- Kac, M. B.: 1992, *Grammars and Grammaticality*. Amsterdam and Philadelphia: Benjamins.
- Kaplan, R. and J. Bresnan: 1982, 'Lexical-Functional Grammar: a Formal System for Grammatical Representation'. In: J. Bresnan (ed.): *The Mental Representation of Grammatical Relations*. Also in Dalrymple *et al.* (eds) 1995 *Formal Issues in Lexical-Functional Grammar*, CSLI Publications; page number references to 1982 version.
- Kaplan, R. M.: 1995, 'The Formal Architecture of LFG'. In: M. Dalrymple, R. M. Kaplan, J. T. Maxwell, and A. Zaenen (eds.): *Formal Issues in Lexical-Functional Grammar*. CSLI Publications, pp. 7–27.
- Kibrik, A.: 1979, 'Canonical Ergativity in Daghestan Languages'. In: F. Plank (ed.): *Ergativity: Towards a Theory of Grammatical Relations*. London: Academic Press, pp. 61–78.
- Klein, E. and I. Sag: 1985, 'Type-Driven Translation'. *Linguistics and Philosophy* **8**, 163–201.
- Kuhn, J.: 2001, 'Resource Sensitivity in the Syntax-Semantics Interface and the German Split NP Construction'. In: W. D. Meurers and T. Kiss (eds.): *Constraint-Based Approaches to Germanic Syntax*. Stanford CA: CSLI Publications.

- Kuhn, J.: 2003, *Optimality-Theoretic Syntax—A Declarative Approach*. Stanford CA: CSLI Publications.
- Lamarche, F.: 1994, ‘Proof Nets for Intuitionistic Linear Logic 1: Essential Nets’. Technical Report, Imperial College London. <http://hal.inria.fr/docs/00/34/73/36/PDF/prfnet1.pdf> (viewed Feb 19 2010; apparently a 2008 reformatted version of the original).
- Laughren, M.: 1989, ‘The Configurationality Parameter and Warlpiri’. In: L. K. Maracz and P. Muysken (eds.): *Configurationality: The Typology of Asymmetries*. Dordrecht: Foris, pp. 319–353.
- Legate, J. A.: 2008, ‘Morphological and Abstract Case’. *Linguistic Inquiry* **39**, 55–101.
- Link, G.: 1998, *Algebraic Semantics in Language and Philosophy*. Stanford CA: CSLI Publications.
- Maling, J. and A. Zaenen: 1990, *Modern Icelandic Syntax*. Academic Press.
- Marantz, A.: 1984, *On the Nature of Grammatical Relations*. Cambridge MA: MIT Press.
- McCloskey, J.: 1983, ‘Raising, Subcategorization and Selection in Modern Irish’. *Natural Language and Linguistic Theory* **1**, 441–485.
- Mohanan, K. P.: 1982, ‘Grammatical Relations and Clause Structure in Malayalam’.
- Moot, R.: 2002, ‘Proof-Nets for Linguistic Analysis’. Ph.D. thesis, University of Utrecht. URL: <http://www.labri.fr/perso/moot/> (viewed June 2008), also <http://igitur-archive.library.uu.nl/dissertations/1980438/full.pdf>.
- Neidle, C.: 1982, ‘Case Agreement in Russian’. In: J. W. Bresnan (ed.): *The Mental Representation of Grammatical Relations*. MIT Press.
- Neidle, C.: 1988, *The Role of Case in Russian Syntax*. Kluwer.
- Nordlinger, R.: 1998, *Constructive Case*. Stanford CA: CSLI Publications.
- Partee, B. H.: 2006, ‘Do we Need Two Basic Types’. URL: <http://people.umass.edu/partee/docs/>.
- Pullum, G. K. and B. C. Scholz: 2001, ‘On the Distinction between Model-Theoretic and Generative-Enumerative Syntactic Frameworks’. In: *LACL*. pp. 17–43. URL: <http://link.springer.de/link/service/series/0558/bibs/2099/20990017.htm>.
- Quicoli, C. A.: 1982, *The Structure of Complementation*. Ghent: Story-Scientia.
- Round, E.: 2009, ‘Kayardild morphology, phonology and morphosyntax’. Ph.D. thesis, Yale. URL: http://www.ling.yale.edu/~erich/Home_files/Round2009PhDDissertation.pdf.
- Sag, I., L. Karttunen, and J. Goldberg: 1992, ‘A Lexical Analysis of Icelandic Case’. In: I. Sag and A. Szabolcsi (eds.): *Lexical Matters*. CSLI Publications, pp. 301–318.
- Siegel, D. C.: 1974, ‘Topics in English Morphology’. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge MA.
- Sigurðsson, H. A.: 1989, ‘Verbal Syntax and Case in Icelandic’. Ph.D. thesis, University of Lund.
- Sigurðsson, H. A.: 1991, ‘Beygingarsamræmi’. *Íslenskt Mál og Almenn Málfræði* **12-13**, 31–77.
- Sigurðsson, H. A.: 1993, ‘Agreement as head visible feature government’. *Studia Linguistica* **47**, 32–56.
- Sigurðsson, H. A.: 2002, ‘To be an Oblique Subject: Icelandic vs. Russian’. *Natural Language and Linguistic Theory* **20**.
- Sigurðsson, H. A.: 2003, ‘Case: Abstract vs. Morphological’. In: E. Brandner and H. Zinsmeister (eds.): *New Perspectives in Case Theory*. Stanford, CA: CSLI Publications, pp. 223–268.
- Sigurðsson, H. A.: 2004, ‘Non-Nominative Subjects: Facts and Implications’. In: P. Bhaskararao and K. Subbarao (eds.): *Non-nominative Subjects*, Vol. 2. pp. 137–159.
- Sigurðsson, H. A.: 2008, ‘The Case of PRO’. *Natural Language and Linguistic Theory* **26**, 403–450.
- Sigurðsson, H. A.: 2009a, ‘Minimalist C/Case’. URL: <http://ling.auf.net/lingbuzz>.
- Sigurðsson, H. A.: 2009b, ‘The No-Case Generalization’. In: A. Alexiadou, J. Hankamer, T. McFadden, J. Nüger, and F. Schäfer (eds.): *Advances in Comparative Germanic Syntax*. Amsterdam & Philadelphia: Benjamins, pp. 249–279.
- Sigurðsson, H. A. and A. Holmberg: 2008, ‘Icelandic Dative Intervention: Person and Number are Separate Probes’. URL: <http://ling.auf.net/lingbuzz/@zdVxqlpSbDxoPPuM/jUFyAZYA>.
- Simpson, J. H.: 1991, *Warlpiri Morpho-Syntax*. Kluwer Academic.
- Svenonius, P.: 2002, ‘Icelandic Case and the Structure of Events’. *Journal of Comparative Germanic Linguistics* **5**, 197–225.
- Svenonius, P.: 2006, ‘Case Alternations and the Icelandic Passive and Middle’. URL: <http://ling.auf.net/lingBuzz/000124>.
- Svenonius, P.: 2010, ‘Case in Layers: Boom and Bust in North Germanic Datives’. handout for talk delivered at the 4th European Dialect Syntax Meeting. URL: <http://basdisyn.net/en/EDSM04/EDSM04-Svenonius.pdf> (viewed Sept 2010).
- Thráinsson, H.: 1979, *On Complementation in Icelandic*. Garland Press.
- Thráinsson, H.: 2007, *The Syntax of Icelandic*. Cambridge University Press.
- Thráinsson, H., H. P. Petersen, J. í Lon Jacobsen, and Z. S. Hansen: 2004, *Faroese: An Overview and Reference Grammar*. Tórsavn: Føroya Fróðskaparfelag.

van Valin, R.: 1991, 'Another Look at Icelandic Case Marking and Grammatical Relations'. *Natural Language and Linguistic Theory* **9**, 145–194.