

Coordination and Asymmetric Agreement in Welsh

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1 Introduction

We explore a set of morphosyntactic feature asymmetries in coordinate structures in Welsh in the light of the theories of agreement and coordination in LFG, and draw out some consequences for the theory of agreement in LFG.¹ In classic LFG, a very simple view is taken of agreement phenomena such as person, number and gender agreement between finite verbs and their subjects, NP-internal concordial agreement between determiners, adjectives and nominals in number, gender and case, and similar phenomena. Agreement is generally modelled by means of constraints stated over the grammatical features PER, NUM, GEN, CASE of the controller argument: a unitary, f-structure based view is taken of agreement and concord. It is well known that agreement with coordinate structures may require some computation of controller agreement features and Dalrymple and Kaplan (2000) show how the LFG formalism may be straightforwardly extended to express such feature resolution principles, again treating agreement at f-structure. In this paper the main focus is on a different pattern of agreement under coordination, that of single conjunct agreement, and we consider the consequences of this pattern for the treatment of Welsh coordination and agreement in LFG. A crucial fact about the Welsh data is the availability under coordination of both resolved and unresolved agreement features as controllers of grammatical processes. We argue that these data suggest the need for a more sophisticated view of agreement and propose a separation between AGR features and INDEXical agreement features. We conclude with some discussion of the nature of the AGR features.

The paper is organised as follows. Section 2 introduces various agreement phenomena in Welsh and their co-occurrence with coordinate structures as agreement controllers, exemplifying head agreement patterns (verb-subject agreement, agreement of prepositional heads with their arguments and agreement of nominal heads with possessor arguments), pronominal anaphora and the agreement of predicate nominals. The purpose of Section 3 is to place the Welsh coordinate structure agreement data in the wider crosslinguistic context by showing that head agreement with just one conjunct is quite widely attested, although the factors determining the occurrence and distribution of asymmetric agreement are not the same in all these cases. We do not claim that the proposals made for Welsh in this paper extend to all these cases of single conjunct agreement, though it is likely that some of these cases are amenable to a similar treatment. Section 4 reviews the theories of coordination and agreement in LFG. In Section 5 we consider the alternative of treating Welsh coordinate structures as head - adjunct structures at f-structure and present evidence of

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various sorts that supports the standard LFG set-based analysis over alternatives. Finally, Section 6 explores several approaches to the agreement puzzle and argues in favour of positing an additional set of agreement features for the features of the first conjunct. Section 7 then concludes.

2 Welsh Agreement Patterns

Welsh is a rigidly head initial language with a relatively rich agreement system in which arguments control person and number agreement on finite verbal heads, and person, number and gender agreement on non-finite verbs, nominal and prepositional heads.² Only pronominal arguments are agreement controllers, however: heads do not agree with their non-pronominal arguments, but appear in the default 3S form.³

Thus finite verbs agree with pronominal subjects in person and number, and take the unmarked third person singular form with all non-pronominal subjects, as illustrated in the examples (1)-(2) below.

- | | |
|--|--|
| <p>(1) Daeth y dynion.
Came-3S the men
'The men came.'</p> | <p>(2) Daethan (nhw).
came-3PL (they)
'They came.'</p> |
|--|--|

As (2) shows, a form inflected for the person, number and (sometimes) gender of a (pronominal) argument, such as *darllenasant* 'read-3PL', *arnoch* 'on-2PL' or *dy dŷ* '2S house' is in fact ambiguous between a pure *agreement* and a *pronominal incorporating* interpretation. That is, agreement with a pronominal argument is obligatory in Welsh and the pronominal argument itself is optional. This last statement finesses the situation very slightly, and in a manner which is orthogonal to the present discussion — in fact, finite verbs do not obligatorily agree with their pronominal objects, although they may take agreeing/incorporating forms in the presence of a set of lexically specified presentential particles.

Under coordination, finite verbal heads exhibit an 'asymmetrical' agreement pattern, agreeing with the first conjunct of a coordinate subject, so long as it is pronominal. The examples below illustrate. In (3a) and (3b) the verb appears in the 'unmarked' 3rd singular form with a plural coordinate subject where the first conjunct is non-pronominal, while in (3c) it agrees with the pronominal first conjunct. Precisely the same pattern is illustrated in (4a) and (4b).⁴

²We do not exemplify object agreement on non-finite verb forms here, but it is parallel to the cases we do discuss, and identical in form to possessor agreement.

³That is, there is no agreement marker associated with non-finite verbs and nominal and prepositional heads in this case, and the finite verb appears in the default or unmarked third singular form with all non-pronominal subjects.

⁴The form *minnau* (with variants *innau*, *finnau*) is an extended form of the pronoun used (in place of a 'simple' pronoun) to provide contrastive, balancing or emphatic effect. The 'simple' first person singular pronoun is *i* (with variants *fi*, *mi*: of these, *i*, *fi* are often interchangeable, but *fi* is always selected after a conjunction. The distribution of *mi* is very restricted.

- (3) a. Daeth Siôn ac Efyfyn.
came-3S Siôn and Efyfyn
'Siôn and Efyfyn came.'
- b. Daeth Siôn a minnau.
came-3S Siôn and 1S
'Siôn and I came.'
- c. Daethost ti a minnau/Siôn.
came-2S 2S and 1S/Siôn
'You and I/Siôn came.'
- (4) a. Roedd Mair a fi i briodi.
was-3S Mair and 1S to marry
'Mair and I were to marry.'
- b. Roeddwn i a Mair i briodi.
was-1S 1S and Mair to marry
'I and Mair were to marry.'

An identical agreement pattern shows up in nominal structures containing possessor phrases. In Welsh, nominal heads take a proclitic agreeing with pronominal (but not non-pronominal) possessors (the canonical position for possessors is post-head). This is illustrated in (5). If the possessor phrase is a coordinate structure, the nominal head agrees with the first conjunct, just in case it is pronominal (6).⁵

- (5) a. brawd Siôn
brother Siôn
'Siôn's brother'
- b. dy frawd (ti)
2S brother 2S
'your brother'
- (6) a. brawd Siôn a Mair
brother Siôn and Mair
'Siôn and Mair's brother'
- b. dy frawd ti a Mair
2S brother 2S and Mair
'your and Mair's brother'

The majority of prepositions in the language have a full inflectional paradigm, and inflect to agree with their pronominal (but not non-pronominal) objects. Again, where there is a coordinate argument, the preposition inflects to agree with the first (closest) argument, if it is pronominal, as illustrated below for the inflecting preposition *am* 'about'.

- (7) a. Roedd Wyn yn siarad amdanat ti a Siôn.
was.3S Wyn PROG speak about-2S 2S and Siôn
'Wyn was talking about you and Siôn.'
- b. Roedd Wyn yn siarad am Siôn a thithau.
was.3S Wyn PROG speak about Siôn and 2S
'Wyn was talking about Siôn and you.'
- c. Roedd Wyn yn siarad amdanom ni a nhw.
was.3S Wyn PROG speak about-1PL 1PL and 3PL
'Wyn was talking about us and them.'

Recalling our earlier remark about 'agreement morphology' alternating between an agreement reading and a pronominal incorporation, with the 'doubling pronoun' being optional, we should

⁵The alternative reading of (6b) "your brother and Mair" is not of concern here.

note that there is one significant difference between the agreement pattern found in coordinate structures and that found with simple arguments. With coordinate structures, the pronominal argument must always be independently expressed, despite the presence of agreement morphology on the head, that is, the head inflection cannot have the status of an incorporated pronominal.

To summarise, the data above shows that in Welsh, an agreeing head is subject to a single conjunct agreement pattern when the controller is a coordinate structure. However other agreement processes in Welsh access the resolved features of a coordinate structure. For example, if a coordinate structure is the antecedent for a pronominal, the pronoun agrees with the resolved features of the antecedent:

- (8) a. Fe a fi, aethon ni ddim yno.
 him and me, went-1PL we not there
 ‘Him and me, we did not go there.’
- b. Pan glywodd Math a Gwydion yr hanes, roedden nhw’n drist iawn.
 when heard-3s Math and Gwydion the story, were-3PL they-PT sad very
 ‘When Math and Gwydion heard the story, they were very sad.’

The personal passive in Welsh is expressed analytically by means of the verb *cael* as a passive auxiliary combined with the main verb in non-finite (verbnoun) form. The non-finite main verb is obligatorily preceded by an anaphoric pronominal form agreeing with the subject. Crucially, it is the resolved features of a coordinate subject which are relevant:

- (9) Ni chaffodd e a’i milwyr eu lladd yma.
 NEG got-3S he and-3SM soldiers 3PL kill there
 ‘He and his soldiers were not killed there.’

Likewise, predicate nominals agree with the resolved features of a coordinate structure. In example (10) below, the predicate *ysgrifenywyr* (‘writers’, singular *ysgrifennwr*) is plural, in agreement with the resolved NUM feature of the coordinate subject.

- (10) Roeddwn i ac Emyr yn ysgrifenywyr rhagorol.
 was-1S 1S and Emyr PT writers excellent
 ‘Emyr and I were excellent writers.’

Reflexive anaphors also agree with the resolved features of a coordinated antecedent:⁶

- (11) a. Gwelais i a’ m brawd ein hunain.
 saw-1S 1S and-1S brother 1PL self
 ‘I and my brother saw ourselves.’

⁶I am grateful to Bob Borsley for reminding me of this data.

- b. Gwelaist ti a'th frawd eich hunain.
 saw-2S 2S and-2S brother 2PL self
 'You and your brother saw yourselves.'
- c. Gwelodd e a'i frawd eu hunain.
 saw-3S 3S and-3S brother 3PL self
 'He and his brother saw themselves.'

Of course, the coordinate structure may be controller or antecedent for a number of different agreement processes at one and the same time. In the example above, the agreement features of the first conjunct control verbal agreement and the resolved number of the coordinate structure controls predicate nominal agreement. Example (12) shows the combination of single conjunct verbal agreement and resolved features controlling pronominal anaphora:

- (12) Dw i a Gwenllian heb gael ein talu.
 am.1S 1S and Gwenllian without get 1PL pay
 'Gwenllian and I have not been paid.'

3 Single Conjunct Agreement

In this section we show that there is robust evidence for the existence of SCA in a range of typologically distinct languages.

Starting with the Celtic languages, a very similar pattern of asymmetrical agreement is found in Irish Gaelic. The following data is taken from McCloskey (1986). The head agreement pattern is similar to that in Welsh: the finite verb agrees with a leftmost (i.e. closest) pronominal within a coordinate subject, (13), a preposition with a leftmost pronominal within a coordinate object (14), and a nominal with a leftmost pronominal within a coordinate possessor (15).⁷

- (13) Bhíos féin agus Tomás ag caint le chéile.
 be(PAST S1) EMPH and Thomas talk(PROG) with each other
 'Thomas and I were talking to one another.' (Irish Gaelic)
- (14) liom féin agus Eoghan
 with(S1) EMPH and Owen
 'with me and Owen'

⁷The general agreement pattern in Irish differs systematically from that in Welsh in one respect however. Whereas in Welsh, as we have seen in (1b) and (5b), agreement morphology and proclitics may be optionally doubled by overt pronominals, in Irish such overt (doubling) pronominals are not possible, although emphatic or contrastive nominal particles may occur in the relevant argument position. In similar fashion, just as in Welsh the doubling pronominals are *required* under coordination, so too the doubling emphatic or contrastive particles are *required* under coordination in Irish (while the leftmost pronominal itself is obligatorily absent if the head is marked with full agreement).

- (15) mo ghabháltas féin agus mo mháthar
 S1 holding EMPH and my mother
 ‘my own and my mother’s holding’

Notice that if the leftmost conjunct is not pronominal the head does not bear agreement features, and as in Welsh, a full pronominal may occur as the non-initial conjunct.

- (16) Labhair sé le hEoghan agus mé féin.
 spoke he with Owen and me EMPH
 ‘He spoke to Owen and me.’

Though not as common crosslinguistically as resolved agreement under coordination, asymmetrical agreement patterns are found in other languages outside the Celtic family.

While the determinant of subject verb agreement in English is semantic in general, the following contrast suggests that other principles are also at work (see Morgan(1972) and Peterson (1986) for some discussion).

- (17) There were two girls and a boy in the room.
 There was a boy and two girls in the room.

Morgan notes that English speakers may also use a closest conjunct principle in disjunct agreement (Morgan 1972 cited in Peterson 1986):

- (18) (Either) Harry or his parents *is/are coming.
 (Either) Harry’s parents or his wife ?is/*are coming.
 There was (either) a bee or two flies in the room.
 There were (either) two flies or a bee in the room.

A crucial observation about the English data, however, and a way in which it differs from the Welsh data, is that once a particular set of feature values has been associated with the coordinate NP as a whole, all agreement processes access these same values:

- (19) Either Fred or Bill is shaving himself/*themselves.
 Either Fred or Bill are shaving themselves/*himself. (Peterson 1986:233)

Asymmetries may also be found in the domain of case in coordinate subject NPs in English, where instead of the expected nominative forms of pronouns, we frequently find accusative pronominals as non-initial conjuncts (see (20 a)). While accusative case on non-initial conjuncts appears entirely acceptable, many speakers find (20 b), in which the nominative case requirement is violated across the board, unacceptable.

- (20) a. She and him/he will drive to the movies.
 She and I/me took the train.

- b. Me and him/Him and me will be going there tomorrow.

Swahili has a variety of strategies for determining the form of noun class agreement morphology on the verb in the presence of a coordinate subject (see Marten (2000) for discussion). These include resolved agreement, that is, using the corresponding plural noun class marker (in the case where the nouns are in the same (singular) noun class), resorting to a default class (either class 8 or class 10) and agreeing with just one conjunct. First conjunct agreement may occur only when the verb precedes the subject and last conjunct agreement may occur only when the subject precedes the verb. Additionally, Marten reports that last conjunct agreement is the more common asymmetric pattern (although it cannot be used with human (class 1) referents, where the corresponding plural class 2 is used). Two single conjunct agreement patterns are illustrated in (21) (for last conjunct agreement) and (22) (for first conjunct agreement) respectively.⁸

- (21) Mguu wa meza na kiti ki-mevunjika.
3.leg of table and 7.chair 7-be broken
'The leg of the table and the chair are broken.' (Swahili) (Marten 2000 from Bokamba 1985)
- (22) A-l-kuja Haroub na Naila.
SC1-PAST-come Haroub and Naila
'Haroub and Naila came.' (Marten 2000)

There is also evidence of first conjunct agreement in (various dialects of) Arabic. In Standard Arabic verbs agree in person, number and gender with non-coordinated subjects in SV sentences, but take a third singular (masculine or feminine) form with non-coordinated non-pronominal subjects irrespective of their plurality in VS sentences. Verbs agree with the resolved features of coordinated subjects in SV sentences, but first conjunct agreement patterns are found in VS sentences. Thus the gender marking on the verb indicates first conjunct agreement in the following examples (SA = Standard Arabic):

- (23) ja:ʔ-at hindun wa zaydun.
came-FEM Hind.FEM and Zayd.MASC
'Hind and Zayd came.' (Standard Arabic: Fassi Fehri 1988: 134)
- (24) ja:ʔ-a zaydun was hindun.
came-MASC Zayd.MASC and Hind.FEM
'Zayd and Hind came.' (SA: Fassi Fehri 1988:134)
- (25) tuhibbu hiya wa axuuhaa ba'dhahu-maa.
love.3FEM.SG she and brother-her each other
'She and her brother love each other.' (SA: Munn 1999:648)

Other dialects of Arabic such as the Moroccan Arabic (MA) and Lebanese Arabic (LA) discussed by Aoun et al. (1994, 1999) and Munn (1999) differ minimally from SA in also permitting full

⁸Unlike second or last conjunct agreement, first conjunct agreement is also possible with class 1 human referents.

agreement in VS order (so that 3rd plural subjects may control 3rd plural agreement in VS order). First conjunct agreement is also attested in VS structures in these dialects of Arabic, as evidenced by the following examples (note the contrast between (26) and (27)):

- (26) tlaqitu ntuma w ana qəddam l-žamiʕa.
 met.2PL you.PL and I in front of the-university
 ‘You and I met in front of the university.’ (MA:Munn 1999:650)
- (27) ntuma w ana tlaqina.
 you.2PL and I met.1PL
 ‘You and I met’ (MA: ibid: 651)
- (28) qrat ʕalya w ʕomar nəfs lə-ktab.
 read.3FS alia and Omar same the-book
 ‘Alia and Omar read the same book.’ (MA: Aoun et al 1999:675)

As pointed out by Munn (1999), although Brazilian Portuguese (BP) shows conjunct resolution when the subject precedes the verb, it shows first conjunct agreement in VS word order:

- (29) As meninas e eu saímos/*saíram.
 the girls and I left.1PL/*left.3PL
 ‘The girls and I left.’ (BP: Munn 1999: 655)
- (30) Foram as meninas e eu que compramos as flores
 were.3PL the girls and I who bought.1PL the flowers
 ‘It was the girls and I who bought the flowers.’ (BP: ibid: 655)
- (31) Fui eu e as meninas que compramos as flores.
 was.1SG I and the girls who bought.1PL the flowers
 ‘It was me and the girls who bought the flowers.’ (BP: ibid: 655)

This Brazilian Portuguese data shows the same combination of SCA and resolution as the Welsh data. That is, the verb agrees with a single conjunct (in each case, the nearest), but there is clear evidence from anaphoric relations elsewhere in the sentence that the resolved features of the coordinate structure are present (*compramos* is 1PL, as expected if the antecedent is the (resolved) coordinate NP).

A variety of different subject-verb agreement patterns occur with coordinate subjects in the Slavonic languages (Corbett 1983, Corbett 1988). For example, in addition to patterns involving feature resolution, agreement with the nearest (normally first) conjunct is also possible in Russian (32), and Czech (33) also has nearest conjunct agreement.

- (32) byla v nej i skromnost', i izjaščestvo, i dostoinstvo.
 was.FEM.SG in her and modesty.FEM.SG and elegance.NEUT.SG and dignity.NEUT.SG
 ‘She was modest, elegant and dignified.’ (Russian) (Corbett 1988: 26)

- (33) Půjdu tam já a ty.
will-go(1SG) there I and you
'I and you will go there.' (Czech) (Corbett 1983:179)

In a survey of agreement patterns, Corbett (1983) reviews data for a range of languages in which one single conjunct controls person, number and gender agreement and observes that nearest conjunct agreement is more common when the predicate precedes the subject than when the subject precedes the predicate. The essentially free word order language Latin provides examples of the latter circumstance:

- (34) et ego et Cicero meus flagitabit.
and I and Cicero my will-demand(3SG)
'Both my Cicero and I will demand it.' (Latin) (Corbett 1983:179 from Gildersleeve and Lodge 1948)

Although less frequent crosslinguistically, agreement may also be controlled by the most distant conjunct (Corbett 1983). This occurs in Latin, in Serbo-Croat and in the following examples from Slovene:

- (35) Groza in strah je prevzela vso vas.
horror(FEM.SG) and fear(MASC.SG) has seized(FEM.SG) the-whole village
'Horror and fear have seized the whole village.' (Slovene) (Corbett 1983: 180)
- (36) knjige in peresa so se poražile.
book.FEM.PL and pen.NEUT.PL are selves got dear.FEM.PL
'Books and pens have become more expensive.' (Corbett 1988: 26)

The distribution of resolution strategies is sometimes influenced by the status of the nominals as animate or human (see above for an animacy-based class restriction on resolution patterns in Swahili). For example, Corbett (citing Edith Moravcsik, pc) reports that in Hungarian the verb is singular for conjoined inanimate singular subject conjuncts, but either singular or plural (preferred) for animates:

- (37) A könyv és a kommentár megékezett/*megérkezt-ek.
ART book and ART commentary arrived.SG/arrived.PL
'The book and the commentary arrived.'
- (38) John és Jill megérkezt-ek/megérkezett.
John and Jill arrived.PL/arrived.SG
'John and Jill arrived.' (Corbett 2001:20)

To summarise, there is robust crosslinguistic data illustrating the phenomenon of single conjunct agreement. The more common asymmetrical pattern appears to be that in which the closest conjunct to the head controls agreement (but distant agreement is also attested), and this pattern is

itself more common where the predicate (agreeing head) precedes the coordinate argument. In many languages, the distribution of different agreement strategies is subject to various syntactic, semantic or discourse conditions. In Welsh there is just one, simple, grammatical pattern for head - argument agreement: finite verbs precede their clause-internal subjects and agree asymmetrically with pronominal first conjuncts, nominal and prepositional heads precede and agree with their arguments in similar fashion. Crucially, however, other agreement processes involve the resolved features of coordinate structures.

4 Agreement and Coordination in LFG

In this section we briefly review the theory of constituent coordination and in particular the approach to noun phrase coordination in LFG — for extensive motivation and discussion of this approach Kaplan and Maxwell (1988), Dalrymple and Kaplan (2001) and Dalrymple (2001) .

At the level of c-structure, constituent coordination is analysed by means of phrasal expansions along the lines of the one shown in (40). A coordinate structure (which may in principle have any number of conjuncts) projects a set at f-structure, the members of which are the individual conjuncts, as in (42).

(39) John likes pears and hates apples.

(40)
$$\begin{array}{cccc} \text{VP} & \rightarrow & \text{VP}^+ & \text{Conj} & \text{VP} \\ & & \downarrow \in \uparrow & & \downarrow \in \uparrow \end{array}$$

Shared elements such as *John* in the example above satisfy the completeness and coherence requirements of the verb in each conjunct, and are distributed into the members of the set: the governable grammatical functions (such as SUBJ) are *distributive features* for which the following extension of function-application to sets holds:

(41) If α is a *distributive* feature and s is a set of f-structures, then $(s \alpha) = v$ holds if and only if $(f \alpha) = v$ for all f-structures f that are members of the set s (Dalrymple 2001:365)

$$(42) \left[\begin{array}{l} \left[\begin{array}{l} \text{SUBJ} \quad [1][\text{PRED} \quad \text{'JOHN'}] \\ \text{PRED} \quad \text{'LIKE} \langle (\uparrow \text{SUBJ}) (\uparrow \text{OBJ}) \rangle \\ \text{TENSE} \quad \text{PRES} \\ \text{OBJ} \quad \left[\begin{array}{l} \text{PRED} \quad \text{'PEAR'} \\ \text{NUM} \quad \text{PLUR} \end{array} \right] \end{array} \right] \\ \left[\begin{array}{l} \text{SUBJ} \quad [1] \\ \text{PRED} \quad \text{'HATE} \langle (\uparrow \text{SUBJ}) (\uparrow \text{OBJ}) \rangle \\ \text{TENSE} \quad \text{PRES} \\ \text{OBJ} \quad \left[\begin{array}{l} \text{PRED} \quad \text{'APPLE'} \\ \text{NUM} \quad \text{PLUR} \end{array} \right] \end{array} \right] \end{array} \right]$$

Although a coordinate structure is a set at f-structure, it may also have some properties distinct from those of its members. These can only be *non-distributive* features (for otherwise, if they held of the set, they would, by definition, hold of the elements in the set). Dalrymple (2001) proposes PRECONJ (the attribute associated with English *either* and *but*) and CONJ (associated with English *or* and *and*) as non-distributive features and thus as attributes of the hybrid structure corresponding to a coordinate structure:

$$(43) \text{ both Lee and Eve} \quad \left[\begin{array}{l} \text{CONJ} \quad \text{AND} \\ \text{PRECONJ} \quad \text{BOTH} \\ \left\{ \left[\begin{array}{l} \text{PRED} \quad \text{'LEE'} \end{array} \right] \right\} \\ \left\{ \left[\begin{array}{l} \text{PRED} \quad \text{'EVE'} \end{array} \right] \right\} \end{array} \right]$$

(44) If α is a *nondistributive* feature, then $(f a) = v$ holds if and only if the pair $\langle a, v \rangle \in f$ (Dalrymple 2001:367)

This distinction between distributive and non-distributive features introduces a further degree of rudimentary feature typing into LFG. Dalrymple and Kaplan *appear* to suggest that agreement features (such as NUM, CASE, NCLASS, PER) are universally typed as distributive or non-distributive, but it seems likely that this is too strong a position. For example, they take CASE to be a distributive feature, but this cannot be true for all languages. Case mismatches in coordinate structures in English are illustrated in (20a) above, and McCloskey (1986) argues that in Irish, the leftmost conjunct in a coordinated subject is in the nominative case and other conjuncts are in the (default) accusative (in the examples below *sé* is a nominative form and *'e* the default form - the lexical

noun in these examples does not show an overt case distinction).⁹

- (45) Chuaigh sé féin agus Eoghan 'na bhaile.
 went he EMPH and Owen home.
 'He and Owen went home.'
- (46) Chuaigh Eoghan agus *sé/é féin 'na bhaile.
 went Owen and he/him EMPH home.
 'Owen and he went home.' (McCloskey 1986:265)

The phenomenon of agreement feature resolution shows that the PNG agreement features are non-distributive: that is, in a sentence such as *John and Mary aren't happy* the verb takes 3PL form in agreement with the PN features of the set/coordinate structure as a whole, and not with the features of the elements of the SUBJ f-structure.

In LFG agreement relations such as subject-verb agreement or case and gender concord within noun phrases are captured at f-structure. That is, the features PERS, GEND, NUM and CASE are f-structure attributes. On the standard view, an agreement controller has values for the relevant grammatical features and agreeing elements are associated with equations also providing values for these same features of the agreement controller. Thus one structure (the f-structure of the controller) must be compatible with constraints introduced by two different elements. For example, the 3rd singular form of the present tense verb *likes* would be associated with the following information concerning the agreement features of the SUBJECT (see Bresnan 2001:57):

- likes: (↑SUBJ) = ↓
 (47) (↓NUM) = SG
 (↓PER) = 3

In this example, both the subject and the finite verb, are associated with *defining* equations over the same f-structure. In some analyses, agreement targets introduce instead non-monotonic *constraining* equations over the values of the controller's agreement features - these are interpreted as filters over the minimal f-structure solution. This captures the intuition that the agreement relationship is

⁹One further detail concerns features which are distributive but vague: in this case a somewhat indeterminate feature is checked against *each and every conjunct*, exemplified in (1). Intuitively, this example is grammatical because the wordform *kogo* is indeterminate enough to be able to satisfy both the requirement that it is ACC (imposed by *lubi*) and the requirement that it is GEN (imposed by *nienawidzi*).

- (1) Kogo Janek lubi a Jerzy nienawidzi.
 who.ACC,GEN Janek likes and Jerzy hates
 'Who does Janek like and Jerzy hate? (Polish)

To accommodate indeterminacy in feature values, the LFG f-description notation is extended to include *set designation* (giving an exhaustive enumeration of the set in question), so that a feature value for a given wordform may be a set (and 'case checking' constraints check for set membership, not equality). The treatment of indeterminacy in feature values is not relevant to our concerns here.

asymmetric, and builds in a distinction between realizing a feature and requiring a feature. For example, Andrews (1982) provides the following entry for the 2nd person plural form of the present tense of the Icelandic verb *elska* ‘to love’:

- (48) *elsku*: (↑SUBJ PERS) =_c 2
 (↑SUBJ NUM) =_c PL

The differences between these approaches are not relevant here, though they can be rather significant in practice (for some very thought-provoking discussion see Johnson (1997)). What they have in common are that both model agreement in terms of constraints over (the f-structure of) one element, the controller.¹⁰

Returning to agreement resolution under coordination, Dalrymple and Kaplan (2000) represent the NP subject in (49) as in (50) below: the representation of the coordination is a hybrid structure in which the agreement features of the structure as a whole are derived by simple computation from the agreement features of the conjuncts. The verb specifies (or constrains) the agreement features of the coordinate structure as a whole.

- (49) José y yo hablamos.
 José and I speak-1PL
 ‘José and I are speaking.’ (Spanish)

- (50)
$$\left[\begin{array}{l} \left[\begin{array}{l} \text{PER} \quad 1 \\ \text{NUM} \quad \text{PL} \end{array} \right] \\ \left\{ \left[\begin{array}{l} \left[\begin{array}{l} \text{PRED} \quad \text{'PEDRO'} \end{array} \right] \\ \left[\begin{array}{l} \text{PER} \quad 3 \\ \text{NUM} \quad \text{SG} \end{array} \right] \end{array} \right\} \\ \left\{ \left[\begin{array}{l} \left[\begin{array}{l} \text{PRED} \quad \text{'PRO'} \end{array} \right] \\ \left[\begin{array}{l} \text{PER} \quad 1 \\ \text{NUM} \quad \text{SG} \end{array} \right] \end{array} \right\} \end{array} \right]$$

¹⁰Within the morphology, on the other hand, both target and controller are specified for an inherent set of person, number and gender features. In some languages, similarity of *form* between target and controller (agreement) inflections, as in (1) may indicate that the same realizational rules apply to stems of more than one category.

- (1) a. **Kikpau** **kikubwa** **kimoja** **kilianguka**.
 7.basket 7.large 7.one 7.fell
 ‘One large basket fell.’
 b. **Vikpau** **vikubwa** **vitatu** **vilianguka**.
 8.basket 8.large 8.three 8.fell
 ‘Three large baskets fell.’ (Swahili) (Corbett 1991:43)

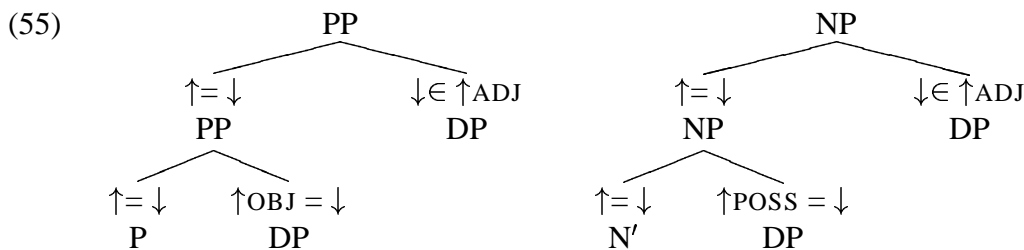
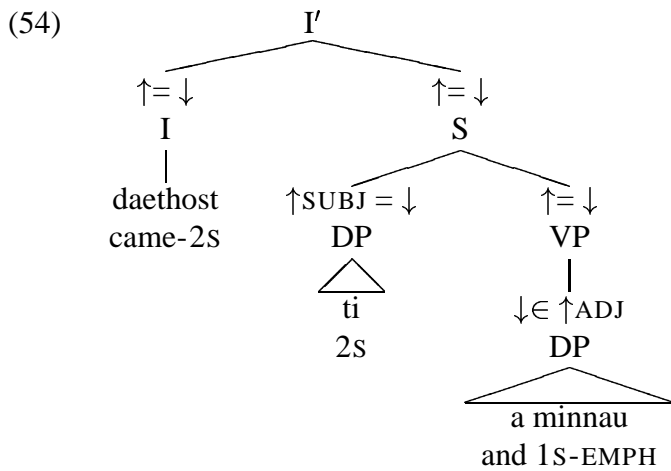
orthogonal to our concerns, we do not discuss them further.¹²

Maintaining the treatment of agreement constant, the question which then arises is whether these (coordinate) constructions in Welsh might correspond not to a set f-structures but to some sort of head - dependent structure, with the first “conjunct” bearing the grammatical function governed by the dominating predicate and the rest of the coordinate structure having some sort of adjunctival status. There are two logical possibilities, depending on what the “remainder” of the coordinate structure is a dependent of. The first is some sort of conjunct union analysis (Hale 1975, Aissen 1985) in which the rest of the coordinate structure (that is, the non-initial conjunct(s)) is an adjunct to the governing predicate, as shown below for (3c):

$$(53) \left[\begin{array}{l} \text{PRED} \quad \text{'CAME } \langle (\uparrow \text{SUBJ}) \rangle \\ \text{SUBJ} \quad \left[\begin{array}{l} \text{PRED} \quad \text{'PRO'} \\ \text{PER} \quad 2 \\ \text{NUM} \quad \text{SG} \end{array} \right] \\ \text{ADJ} \quad \left\{ \left[\begin{array}{l} \text{CONJ} \quad \text{AND} \\ \text{PRED} \quad \text{'PRO'} \\ \text{PER} \quad 1 \\ \text{NUM} \quad \text{SG} \end{array} \right] \right\} \end{array} \right]$$

This leads to quite odd structural assumptions. For “coordinate” subjects, the trailing conjunct might be left-adjoined under the VP (the extended head of which is the I: see Bresnan (2001) for the extended head analysis and Sadler (1997, 1998) for discussion of Welsh within this model), as in (54). On the other hand, the trailing conjunct(s) must be right-adjoined to PP in cases of NP coordination under PP, and in cases of coordinated possessors, the trailing conjunct(s) must be right-adjoined to the dominating NP.

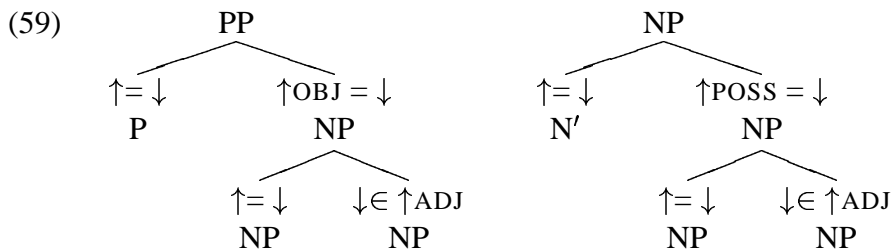
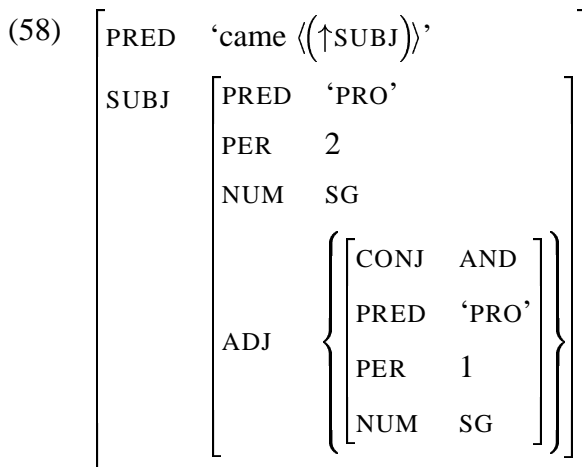
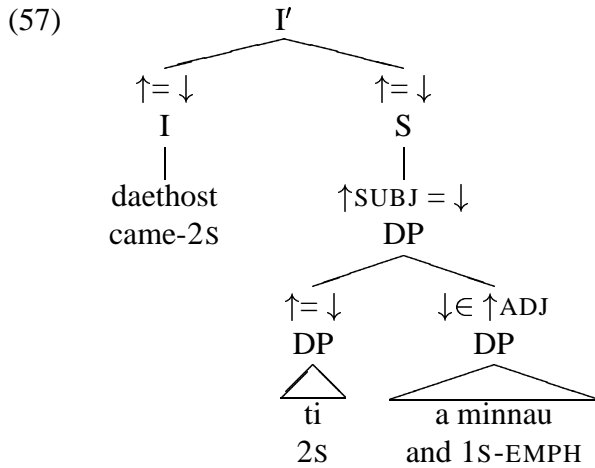
¹²But note that the existence of both SCA and resolved agreement in Welsh coordinate structures does of course undermine any attempt to motivate a single constituent structure on the basis of agreement facts.



Crucially, the interpolation of other material (such as adverbials, negative markers in the case of attachment to VP) between initial and non-initial conjuncts is absolutely excluded, yet this restriction is very difficult to account for with these structures. For example, the order of elements within NPs with possessor phrases is N - (Adj) - possessor phrase - other dependents. Sadler (1998) proposes a structure in which the possessor phrase is a specifier of NP and other dependents are adjoined to NP for these noun phrases. The “adjunct” analysis of trailing conjuncts would require us to somehow ensure that the conjunct(s) adjoin to NP *lower* than the other dependents adjoin, and it is not even clear how such a stipulation could be formulated under standard assumptions. Similarly, where NP objects are coordinated in periphrastic constructions (within canonical V_{nonfin} NP PP word order in the VP) then we would have to ensure adjunction of the trailing conjunct lower (or closer) than the PP dependent.

- (56) Yr oedd yn fy ngweld i ac Emrys yn y stryd.
 PT was.3S PT 1S see 1S and Emrys in the street
 ‘He saw me and Emrys in the street.’

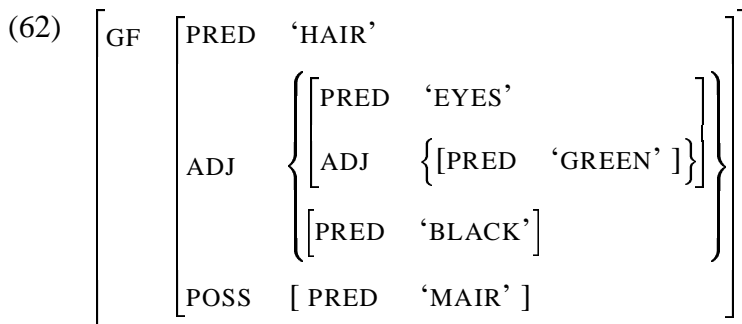
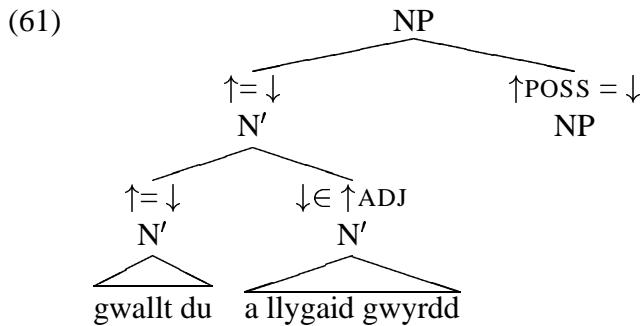
The second possibility is an analysis under which the non-initial “conjuncts” are adjuncts to the grammatical function associated with the initial “conjunct”. The external coherence of the initial and non-initial portion follows more straightforwardly on this analysis (in each case, the non-initial conjunct phrase must be immediately right head-adjacent). Note that although more straightforward, of course special rules are needed to generate the structures with the conjuncts in just the right contexts. Again we illustrate with the tree and f-structure for (3c), and provide tree-structures for NP coordination under PP and coordinated possessors.



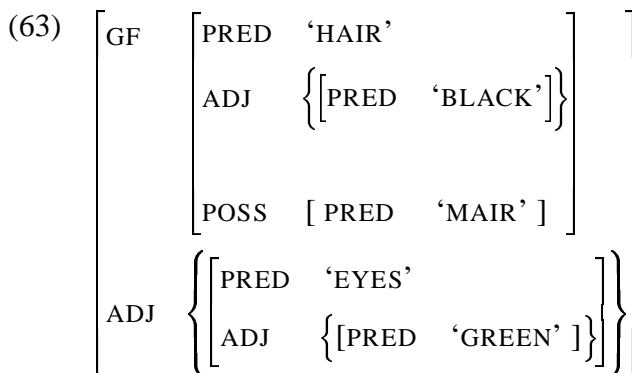
What these proposals have in common is that they treat non-initial conjuncts as adjuncts. But as we will see, the non-initial conjunct instead has the properties of the grammatical function it would instantiate as a member of a set of f-structures under the coordinate structure analysis rather than those of an adjunct. Consider a case of coordination within possessive constructions, such as (60).

- (60) gwallt du a llygaid gwyRDD Mair
 hair black and eyes green Mair
 ‘Mair’s black hair and green eyes’

If the second conjunct *a llygiad gwyrdd* was an adjunct to the first conjunct, as shown in (61), then the f-structure (62) would result (with the grammatical function of the entire NP represented simply as GF). The interpretation under which the property of having *green eyes* is associated with *hair* is simply incoherent, and is certainly not the interpretation associated with (60), but this is the sort of interpretation that we would expect for the sort of f-structure illustrated in (62).



Similarly, the f-structure (63) in which the second conjunct is treated as an adjunct to the dominating (presumably verbal) predicate also fails to provide the correct input for the semantics. Moreover the case of \bar{N} coordination in (60) actually demonstrates the impossibility of the first of the two conjunct raising analyses: we need to attach the second conjunct outside the NP, but since the NP also contains the possessor phrase this is impossible without also raising the possessor, for which there is no motivation at all.



Crucially, the possessor *Mair* is in fact interpreted as a semantic argument of both *hair* and *eyes*, precisely as one would expect if the f-structure were a set, with the possessor distributed over the members of the set, that is, if the f-structure representation of (60) were indeed that of a coordinate structure.

One might consider weakening the adjunctival analysis to hold only of coordinations with pronominal initial conjuncts (so that cases such as (60), which do not involve a pronominal conjunct, above would be treated as standard coordinate structures). But as we will now see, there is no evidence at all of any interpretational or syntactic motivation at all for distinguishing in this way between pronominal and non-pronominal cases.

First, note that irrespective of whether the coordination contains an initial pronominal, the coordinate structure as a whole (that is, the set of f-structures) serves as controller in the examples (3 d,e) repeated here for convenience:

- (64) a. Roedd Mair a fi i briodi.
 was-3S Mair and 1S to marry
 ‘Mair and I were to marry.’
 b. Roeddwn i a Mair i briodi.
 was-1S 1S and Mair to marry
 ‘I and Mair were to marry.’

Second, the *a/ac phrase* in all coordinate structures fails to have the sort of mobility we associate with adjuncts, but appears in an absolutely fixed position adjacent to the first conjunct (whether pronominal or not). Interestingly, there *is* a subordinating use of the conjunction *a/ac*, introducing absolute clauses, and the adverbial clause so introduced can precede, interrupt or follow the clause which it modifies (examples from Thorne (1993):382-383).

- (65) *Ac yntau heb waith*, ni fedrai ffordio iro llaw y swyddogion.
 And 3SM without work, NEG was.able.3S afford grease hand the officers
 ‘And being unemployed, he could not afford to grease the palm of the officers.’
- (66) Nid hawdd fu hi i JWH, *ac yntau’n heddychwr*, foddhau ei eglwys yn St Albans.
 NEG easy was 3SF for JWH and 3SM-PT pacifist, please 3SM church in St Albans
 ‘It wasn’t easy for JWH, being a pacifist, to please his church in St Albans.’
- (67) Yr oeddwn eisoes yn hen wŷr, *a minnau’n blentyn*.
 PT was-1S already PT old man, and 1S-PT child
 ‘I was already an old man, when I was a child.’

Third, note that pronominal coordinate structures (that is, those showing asymmetric or initial conjunct agreement, for which we are currently considering (the implausibility of) a head-adjunct f-structure representation) do not differ from non-pronominal coordinate structures in terms of

their interaction with other syntactic phenomena. Anaphoric pronouns and pronominal clitics show precisely the same pattern of concord with an asymmetric (pronominal initial) coordinate structure as with other coordinate structures. This can be seen in the Welsh personal passive construction, which involves an obligatory agreement marker doubling the (passive) SUBJ. As the example (9), repeated here as (68), and (69) show, the agreement marker agrees with the coordinate structure *as a whole*, irrespective of whether or not that subject has an pronominal initial conjunct.

- (68) Ni chaffodd e a'i milwyr eu lladd yma.
 NEG got-3S he and-3SM soldiers 3PL kill there
 'He and his soldiers were not killed there.'
- (69) Ni chaffodd Pwyll a'i milwyr eu lladd yma.
 NEG got-3S Pwyll and-3SM soldiers 3PL kill there
 'He and his soldiers were not killed there.'

Fourth, McCloskey 1986 notes an incorrect prediction of the conjunct union analysis, under which the first conjunct *is* the SUBJ or OBJ, and so on, while the other conjunct takes on an ADJ function. He observes that the initial (subject) conjunct does not behave like a SUBJECT. In Irish, a relative clause formed on the immediately dominated subject position obligatorily involves a gap on subject position, rather than a (null) pronominal, the presence of the latter being signalled by verb agreement. This restriction does not extend to coordinate subjects, and in particular to those which are pronominal initial, thus (71) is grammatical. This suggests that the pronominal conjunct is not itself the SUBJECT (in our terms, it is a member of the set of f-structures which together provide the SUBJECT function).

- (70) *na tithe a rabhadar ceannaithe againn
 the houses COMP be(PAST P3) bought by-us
 'the houses that had been bought by us' (McCloskey 1986:260)
- (71) na daoine a rabhadar féin agus a gelann mhac ábalta ar iascach.
 the people COMP be(PAST P3) EMPH and their family sons(GEN) able on fishing
 'the people that they and their sons were capable of fishing' (ibid)

An analogous argument may be made for Welsh. A relative clause on a prepositional object requires the use of agreement morphology on inflecting prepositions and in literary Welsh the absence of the pronominal itself - the latter condition is suspended in the case of a coordinate object:

- (72) y dyn y soniais amdano *ef
 the man that spoke-1S with-3S him
 'the man who I spoke to him'
- (73) y dyn y soniais amdano ef ac Ann
 the man that spoke-1S with-3S him and Ann
 'the man who I spoke to him and Ann'

Finally, the nature of agreement patterns themselves constitute counterevidence to the argument that the SCA agreement pattern in coordination structures motivates an asymmetrical f-structure representation in which non-initial conjuncts are ADJUNCTS. Recall that pronominal and reflexive anaphora (as in (8) and (11)) and passive agreement (for example, (69)) involve the resolved features of an antecedent coordinate structure, and the same is true of predicate nominals, which reflect the resolved number of a coordinate NP, as shown in (74) and (75). Crucially, of course, the SCA agreement pattern for head agreement sometimes co-occurs with the resolved agreement pattern for other agreement phenomena (as in (68) and (74)), a circumstance which would appear to be fatal for the proposal to accommodate asymmetrical agreement in terms of either asymmetrical c-structure or asymmetrical f-structure representations.

- (74) Roeddwn i ac Emyr yn ysgrifenyddion rhagorol.
 was-1S 1S and Emyr PT writers excellent
 ‘Emyr and I were excellent writers.’
- (75) Mae Siôn ac Emyr yn ysgrifenyddion rhagorol.
 is Siôn and Emyr PT writers excellent
 ‘Siôn and Emyr are excellent writers.’

We conclude, therefore, that the existence of a SCA pattern for head agreement with Welsh coordinate structures does not constitute evidence for an asymmetrical representation of coordinate structures. All coordinate structures in Welsh, whether they have pronominal conjuncts or not, are represented as sets at f-structure and involve multiply-headed c-structures.

Coordinate structures with a pronominal initial conjunct differ from other coordinate structures *only* as far as the head-argument agreement between a finite verb and a subject, or a prepositional head and its object, or a nominal head and its possessor, is concerned. The puzzle that pronominal coordinate structures represent is as follows. Head-argument agreement suggests that the coordinate structure bears the agreement features associated with an initial, pronominal conjunct, but evidence from anaphora and predicate agreement suggests that the coordinate structure bears semantically resolved person and number agreement features.

6 An Analysis of Asymmetric Agreement in Coordination

If the argumentation in the previous section is correct, the solution to the dilemma posed by asymmetrical agreement under coordination must require a change to the theory of agreement in LFG.

Maintaining the partitioning of features into distributive and non-distributive, we might adapt the Dalrymple and Kaplan (2001) proposal by taking the resolved features of the coordinate structure to be essentially those of the first conjunct. For PER and GEND this amounts to dropping the assumption that resolution is by set union, and for NUM this amounts to dropping the assumption that resolution is essentially semantically based. Instead, in Welsh, the coordinate c-structure

schema would explicitly equate the value of the PER, NUM and GEND features of the mother with those of the first daughter.¹³

$$(76) \quad \begin{array}{ccc} \text{NP} & \rightarrow & \text{NP} \quad \text{Conj} \quad \text{NP} \\ & & \downarrow \in \uparrow \quad \downarrow \in \uparrow \\ & & (\downarrow \text{PER}) = (\uparrow \text{PER}) \\ & & (\downarrow \text{NUM}) = (\uparrow \text{NUM}) \\ & & (\downarrow \text{GEND}) = (\uparrow \text{GEND}) \end{array}$$

Under this analysis, the AGR features of the coordinate structure would simply match those of the first conjunct, illustrated below with the f-structure for the PP in (7a) repeated here as (77).

- (77) amdanat ti a Siôn
 about-2S 2S and Siôn
 ‘about you and Siôn’

$$(78) \quad \left[\begin{array}{l} \text{PRED 'AM } \langle (\uparrow \text{OBJ}) \rangle \\ \text{OBJ } \left[\begin{array}{l} \text{PER } 2 \\ \text{NUM } \text{SG} \\ \left\{ \begin{array}{l} \text{PRED 'SIÔN'} \\ \text{PER } 3 \\ \text{NUM } \text{SG} \end{array} \right\} \\ \left\{ \begin{array}{l} \text{PRED 'PRO'} \\ \text{PER } 2 \\ \text{NUM } \text{SG} \end{array} \right\} \end{array} \right] \end{array} \right]$$

This approach has several problems however. The intuition that the target really does agree with the first conjunct is captured by means of the feature passing mechanism, but the approach is perversely at odds with the intent of the Dalrymple and Kaplan proposal which permits the grammar to express what is essentially semantic resolution in a syntactic agreement environment. Crucially, the agreement features associated with the coordinate structure as a whole are precisely *not* those required for more “semantic” agreement in other agreement contexts. As already noted, the obligatory agreement marker associated with the nonfinite verb in the personal passive construction agrees with the resolved features of a coordinate subject (see (68) and (69)), and the same is true

¹³Gender is not relevant to subject-verb or preposition-object agreement in Welsh, but it is relevant to the 3S agreement marker coding objects of non-finite verbs and the possessor within noun phrases: the 3S form *ei* differs in its mutation effect according to gender (the FEM causes aspirate mutation of the following element (the non-finite verb or head noun)), the MASC causes soft mutation.

of agreement between coordinate subjects and predicate nominals/adjectives (shown in (74) and (75)) above, and for pronominal anaphora (see (8)).

Since there is very good evidence that the *resolved* agreement features of Welsh coordinate structures are in fact precisely those which would follow from the proposal of Dalrymple and Kaplan, without further stipulation, we do not consider further the approach briefly sketched above.

In the rest of this paper, we explore the possibility that the coordinate structure itself is associated with two distinct sets of agreement features, one resolved, and one not. The resolved set of agreement features is relevant to the choice of subsequent pronouns and reflexive anaphors, and the form of predicate adjectives and nominals, while the unresolved set (equivalent to those of the first conjunct) is relevant to head agreement.¹⁴ We begin by giving a general sketch of the “two feature bundle” approach, and then consider further the nature of the two feature bundles in question.

To do this, we invest the f-structure of the coordinate structure with two sets of (non-distributive) agreement features. As value of the feature IND we represent the agreement features resulting from feature resolution, and we group under AGR those agreement features resulting from feature passing from the distinguished conjunct (in the Welsh case, this is always the initial conjunct).

- (79) Daethost ti a minnau.
 came-2S 2S and 1S
 ‘You and I came.’

$$(80) \left[\begin{array}{l} \text{AGR [1][...]} \\ \text{IND } \left[\begin{array}{ll} \text{PER} & 1 \text{ [S,H]} \\ \text{NUM} & \text{PL} \end{array} \right] \\ \left\{ \left[\begin{array}{l} \left[\text{IND [1] } \left[\begin{array}{ll} \text{PER} & 2 \text{ [H]} \\ \text{NUM} & \text{SG} \end{array} \right] \right] \right] \right\} \\ \left\{ \left[\begin{array}{l} \left[\text{IND [2] } \left[\begin{array}{ll} \text{PER} & 1 \text{ [S]} \\ \text{NUM} & \text{SG} \end{array} \right] \right] \right] \right\} \end{array} \right]$$

The rule for coordination would both copy and resolve agreement features. This can be thought of as a sort of selective liberation (the whole structure of the first conjunct is not made available, only the agreement features), reminiscent of the use of domain features to liberate elements in HPSG.

¹⁴An alternative might be to reformulate the statement of head agreement so that the agreement target *directly* constrains the features of the first conjunct (that is, by constraining that member of the set of f-structures which linearly precedes in c-structure the other members of the set). For some discussion of the approach, and some issues it raises, see Sadler (1999).

$$(81) \quad \begin{array}{ccc} \text{NP} & \rightarrow & \text{NP} & \text{Conj} & \text{NP} \\ & & \downarrow \in \uparrow & & \downarrow \in \uparrow \\ & & (\downarrow \text{IND}) = (\uparrow \text{AGR}) & & \\ & & (\downarrow \text{IND PER}) \subseteq (\uparrow \text{IND PER}) & & (\downarrow \text{IND PER}) \subseteq (\uparrow \text{IND PER}) \end{array}$$

The majority of agreement processes, including head agreement with non-coordinate controllers, involve the IND features of the controller. However head agreement with coordinate structures involves the AGR features of a coordinate structure. A straightforward way to capture head agreement is to postulate the existence of both IND and AGR features on nominal feature structures, and to lexically specify the values as token identical, as shown in (82). The verb then uniformly places constraints on the AGR features of the subject, and similarly for cases of prepositional agreement, and so forth.

$$(82) \quad \left[\begin{array}{cc} \text{AGR} & [1] \\ \text{DAGR} & [1] \end{array} \right] \quad \begin{array}{l} \text{Constraint on Nominal Lexemes:} \\ (\uparrow \text{IND}) = (\uparrow \text{AGR}) \end{array}$$

$$(83) \quad \begin{array}{l} \textit{daethost}: (\uparrow \text{SUBJ AGR PERS} = 2) \\ (\uparrow \text{SUBJ AGR NUM} = \text{SG}) \end{array}$$

Recall that in Welsh, pronouns (which are the only nominal elements which determine full PN(G) agreement) may themselves be optionally dropped in agreement contexts, suggesting that the verbal inflection involves pronominal incorporation and thus introduces a PRED value for the argument in question. Coordinate structures are exceptional, in that a pronominal conjunct with which the agreement target agrees is not permitted to be dropped. This is consistent with the generalization made by Corbett (to appear), which states that agreement with coordinate structures requires canonical controllers, that is, controllers which are overt. Corbett relates this to his Principle 1 which states that canonical agreement is redundant rather than informative. It is not immediately apparent in what domain an explanation for the obligatory presence of pronominal conjuncts should be sought. It is possible that it is required for balance within the coordinate structure, for without the pronoun the left conjunct would contain no lexical material. But note, however, how the (relevant part of the) f-description associated with pronominal verbal inflection interacts with the theory of coordination:

$$(84) \quad \begin{array}{l} (\uparrow \text{SUBJ}) = \downarrow \\ (\downarrow \text{AGR PERS}) = 2 \\ (\downarrow \text{AGR NUM}) = \text{SG} \\ ((\downarrow \text{PRED}) = \text{PRO}) \end{array}$$

The equation $(\downarrow \text{PRED}) = \text{PRO}$ is of course optional, as overt pronominals may (generally) appear in head agreement contexts. In the case of coordinate structures, only the disjunct without the PRED equation provides a consistent f-structure. As the PRED feature is distributive, like the governable grammatical functions, the $\text{PRED} = \text{PRO}$ would be distributed to every member of the set (\downarrow) of

f-structures, at least one of which would then end up with two values for the PRED feature. The non-distributive AGR features would of course (correctly) be contributed to the f-structure as a whole. Thus the observed ungrammaticality of prodrop in coordinate structures follows from the current treatment of constituent coordination and pronominal incorporation.¹⁵

The question which now arises concerns the nature of the feature AGR which controls subject-verb agreement, and head agreement processes more generally in Welsh. In the rest of this section we consider the not-unrelated questions of whether the AGR feature should be taken to be a purely concordial feature and whether it should be more properly considered to be part of m-structure rather than f-structure.

6.1 The status of AGR

One possibility is that the distinction between these two feature sets corresponds to the distinction between agreement *ad formam*, or purely morphosyntactic agreement, and the more semantically-based agreement *ad sensum*. If this were the case, head agreement in Welsh would be a form of purely morphosyntactic agreement, while the other agreement processes in Welsh that we have illustrated (such as pronominal and reflexive binding) would involve a set of features more closely related to the semantics.

A series of recent papers in HPSG (Kathol 1999, Wechsler and Zlatic 2000, Zlatic and Wechsler 1997) have postulated the existence of a head feature (called CONCORD by Wechsler and Zlatic, and AGR by Kathol) for morphosyntactic agreement, alongside the semantic index INDEX feature relevant to pronominal and anaphoric binding.¹⁶ It should be noted that there are significant differences between these approaches and detailed discussion is beyond the scope of the present paper.¹⁷

The proposals of Wechsler and Zlatic essentially extend the treatment of morphosyntactic concord in HPSG beyond features such as CASE to include NUM and GEN. The language which they refer to in presenting their theory of agreement is Serbo-Croatian. Concordial features are head features which are structure-shared between heads and dependents: for example, (85) shows the HEAD agreement feature of the Serbo-Croatian possessive *moja* ‘my’, which will be structure-shared with the features of the head noun when it is used as the SPR of that noun.

¹⁵It should be noted, however, that it is possible to omit the pronoun and maintain only an emphatic pronominal particle in Irish Gaelic. This would only follow on the current account if *fein* itself can optionally contribute a PRED value. Alternatively, these facts might be interpreted as favouring the “direct” approach alluded to in footnote 14, under which the agreeing head directly constrains the initial conjunct itself. Under this view, the agreement and PRED = PRO features of the agreeing head are not defined over the set, but over a member of the set. We do not pursue this hypothesis further here, but leave the matter for further research.

¹⁶Note that this is distinct from agreement controlled by real-world anchoring conditions.

¹⁷See also King and Dalrymple (2002) for a recent LFG proposal to distinguish INDEX and CONCORD.

- (85)
$$\left[\begin{array}{l} \text{HEAD} \\ \\ \\ \end{array} \left[\begin{array}{l} \text{adj} \\ \\ \text{CONC} \left[\begin{array}{l} \text{CASE} \quad \textit{nom} \\ \text{NUM} \quad \textit{sg} \\ \text{GEN} \quad \textit{fem} \end{array} \right] \end{array} \right] \right]$$
- Wechsler and Zlatić 2000: 826)

The focus of their work is on cases of mixed agreement, and they discuss cases of mismatch between declension and concord (for example, nouns which have masculine grammatical properties and refer to males, but decline in the declension otherwise reserved for feminine nouns), mismatch between index and the actual properties of what the noun denotes (for example, a noun which governs masculine agreement even when referring to a female), and mismatch between concord and index, as for example with the Serbo-Croatian collective noun *deca* ‘children’ which controls feminine singular agreement on attributive modifiers and non-finite predicates, but neuter plural on coreferential pronouns:

- (86) Posmatrali smo ovu dobru decu_i. Ona_i su spavala.
 watched.1.PL AUX this.F.SG good.F.SG children.F.SG they.N.PL AUX.3PL slept.NT.PL
 ‘We watched those good children_i. They_i slept.’ (Wechsler and Zlatić 2000:816)

Wechsler and Zlatić posit the following lexical information for *deca*:

- (87)
$$\left[\begin{array}{l} \text{CONCORD} \quad \textit{fem.sg} \\ \text{INDEX} \quad \quad \textit{nt.pl} \end{array} \right]$$

For Serbo-Croatian, Wechsler and Zlatić argue that determiners, attributive adjectives and secondary predicates show concord agreement, while verb-subject agreement, primary predication and bound anaphora show index agreement, consistent with Corbett’s cross-linguistic Agreement Hierarchy generalization, which they show largely follows their theory of constraints on the relation between declensional class, concord, index and the semantics.¹⁸

- (88) The Agreement Hierarchy
 attributive < predicate < relative pronoun < personal pronoun
 As we move rightward along the hierarchy, the likelihood of semantic agreement will increase monotonically (Corbett 1991: 226)

Kathol’s proposals may also be seen as developing the theory of concord in HPSG. He proposes that selector categories such as verbs bearing their own intrinsic morphosyntactic agreement features as well as selecting those of their argument, as shown schematically for English *walks*:

¹⁸As they observe, their theory makes no predication as to whether CONCORD or INDEX controls predicate agreement, and indeed both are found in Serbo-Croatian.

- (89)
$$\left[\begin{array}{l} \text{CAT | HD | MORSYN | AGR} \\ \\ \text{CONT | WALKER} \end{array} \left[\begin{array}{l} \textit{finite} \\ \text{PER [1] 3RD} \\ \text{NUM [2] SG} \\ \\ \textit{index} \\ \text{PER [1]} \\ \text{NUM [2]} \\ \text{GEND} \end{array} \right] \right]$$
- (Kathol 1999:236)

Kathol posits two types of grammatical agreement, morphosyntactic and semantic, as follows, where \approx means “structure-shared in the relevant parts”:

- (90) morphosyntactic AGR(selector) \approx AGR(arg)
 semantic AGR(selector) \approx INDEX(arg)

Kathol’s approach attributes hybrid cases previously viewed in terms of a mismatch between INDEX and semantic anchoring conditions, to the operation of a combination of morphosyntactic and index agreement. Thus he treats the much-discussed hybrid case in (91) as involving *morphosyntactic* NUM agreement between verb and subject, *semantic* PERS agreement between verb and subject and semantic GEN and NUM agreement between the predicative adjective and the noun.

- (91) Vous êtes belle
 2.PL are.2.PL beautiful.SG.FEM
 ‘You are beautiful.’

The question, then, is whether the agreement features which we have represented as AGR are in fact equivalent to morphosyntactic CONCORD features. There are several crucial differences which suggest that this is not the case. Firstly, concord is generally conceived of as the circumstance in which various elements (co-)specify morphosyntactic features of their (shared) f-structure, whereas head agreement in Welsh involves the head specifying features of the argument. Secondly, it is otherwise at least extremely unusual for concord to involve PERS features, perhaps because such a feature is inherently indexical (or referential).¹⁹ More generally, the sort of head agreement we see in coordinate structures is formal (rather than meaningful) in a different sense — concord features are formal because they reflect agreement of purely morphosyntactic features (often related to morphological declensional class), but asymmetric agreement with coordinate structures is formal in the sense of failing to code the semantically relevant, resolved indexical features of the coordinate structure as a whole. For these reasons, it does not seem appropriate to equate the AGR introduced in this section with CONCORD.

¹⁹However, Wechsler and Zlatić do note (805:footnote 8) an isolated case of a Swahili modifier *-ote* ‘all’, which shows person agreement.

In common with a number of purely morphosyntactic features, the AGR feature is not relevant to semantic interpretation, and one possibility is that all such features might be factored out of the f-structure and represented at a different level of representation, such as the level of m-structure, which can be thought of as expressing those morphological features which are syntactically (but not semantically) relevant.²⁰ For example, in the architecture proposed in Frank and Zaenen (2002), shown in (92), the f-structure, but not the m-structure, might be relevant to semantic interpretation:

$$(92) \quad \text{c-structure} \xrightarrow{\phi} \text{f-structure} \xrightarrow{\mu} \text{m-structure}$$

It is a trivial matter to reformulate the treatment proposed in this section so that IND is an f-structure feature but AGR is an m-structure feature. but given that this does not have any material consequence, we do not pursue this possibility further.

7 Conclusion

This paper has focussed on one small set of data concerning agreement under coordination in Welsh. In these cases of coordination, the resolved features of the coordinate structure are relevant to some agreement processes, but the features of the first conjunct are relevant to cases of head agreement, that is, to verb-subject agreement, the agreement of a noun with a possessor argument and the agreement of a preposition with its object. The co-presence of both types of agreement process poses serious difficulties for any account of first conjunct agreement based on structural asymmetry. Despite the existence of asymmetric agreement patterns, we have presented evidence that coordination in Welsh is in fact correctly treated as a set at f-structure. We then consider the implications for the theory of agreement in LFG and explore several possibilities. We propose a distinction between IND (which expresses the resolved features of the coordinate structure) and AGR which expresses the features of the distinguished (i.e., first) conjunct. This in turn raises questions about the status of AGR, which we briefly consider.

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²⁰This level is first proposed in the context of work on the development of parallel grammars in what became the PARGRAM project and is developed in a number of papers (Butt et al. 1996, Frank and Zaenen 2002). A typical use of m-structure is to express morphosyntactic selection in analytic (auxiliated) verbal constructions, where the f-structure is flat.

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