

NUMERALS, NOUNS AND NUMBER IN WELSH NPS

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Abstract

Agreement mismatches in number, gender or case present an interesting challenge to any grammatical theory. We consider two styles of analysis for a number mismatch in Welsh, which arises when nouns are modified by cardinal numbers. In this construction, the nominal must be singular. One analysis pursues the idea that the nominal is an argument of the numeral, with some elements agreeing with the numeral and some with the noun. The other adopts the distinction between INDEX and CONCORD features, together with the proposal that in this construction it is the numeral which determines the plurality of the INDEX.¹

1 Introduction

Agreement mismatches in number, gender or case present an interesting challenge to any grammatical theory. We consider two styles of analysis for a number mismatch within NP arising when nouns are modified by cardinal numbers in Welsh. The paper is organised as follows. Section 2 lays out the data concerning noun phrase internal agreement including structures in which the head noun is modified by a numeral. Section 3 explores two possible analyses. The first of these, in section 3.1, treats the noun as an argument of the numeral (somewhat akin to a partitive construction). Section 3.2 then presents an alternative which makes use of the distinction between INDEX and CONCORD features. In section 4 we consider what further grounds there are for deciding between these alternative analyses for the Welsh data.

2 NP Internal Agreement

2.1 Basic Facts

Welsh distinguishes two grammatical genders (FEM, MASC) and two numbers (SG, PL). Number is inflectionally marked on the noun: plurals are formed by the addition of a suffix (of which there are several) and/or stem vowel modifications. Some illustrative examples are given in (1).²

¹The work reported on here was carried out in the project Verb Initial Grammars: a Multilingual, Parallel Approach: see <http://users.ox.ac.uk/~cpg10015/pargram/index.html>. We are grateful for the financial support of the ESRC (research grant RES-000-23-0505, to Dalrymple and Sadler) and also for comments and feedback from participants at LFG05, and in particular to Mary Dalrymple and Tracy Holloway King.

²Some Welsh nouns form the singular by suffixation from the plural: for example, PL *moch* ‘pigs’, SG *mochyn* ‘pig’. Such nouns mostly denote animals or plants typically occurring in large groups. The plural in these cases often has a collective meaning, with the singular denoting a unit of the collective: PL, COLL *glaswellt* ‘grass’, SG, UNIT *glaswelltyn* ‘blade of grass’. See (Thomas, 1996; King, 1993) for further details.

	SG	PL	
(1)	<i>afal</i> (M)	<i>afalau</i>	apple(s)
	<i>ceg</i> (F)	<i>cegau</i>	mouth(s)
	<i>ci</i> (M)	<i>cŵn</i>	dog(s)
	<i>cath</i> (F)	<i>cathod</i>	cat(s)

Although some adjectives do still have plural forms in the modern language, as shown in (2), plural forms are most often found in fixed phrases (*mwyar duon* berry.PL black.PL ‘blackberries’). Beyond such phrases, the use of plural forms for adjectives, where they exist in the modern language, is not obligatory. The examples in (3) show the plural noun occurring with both plural and singular forms of the adjective *bychan* ‘small’.³

	SG	PL	
(2)	<i>bychan</i>	<i>bychain</i>	‘small’
	<i>ifanc</i>	<i>ifainc</i>	‘young’

- (3) a. *Gall busnesau bychain achosi llygredd am nifer o resymau.*
 can business.PL small.PL cause pollution for number from reasons
 Small businesses can cause pollution for a number of reasons.
- b. *Mae gwerthu digon i gynnal y busnes yn broblem fawr i fusnesau bychan*
 is sell enough to maintain the business PT problem big to
 business.PL small.SG
 Selling enough to maintain the business is a big problem for small businesses.

One exception is the adjective *arall* (pl. *eraill*) ‘other’ where the use of a plural form in agreement with a plural noun is obligatory.

- | | |
|--|--|
| (4) <i>merch arall</i>
girl.F.SG other.SG
another girl | (5) <i>merched eraill</i>
girl.F.PL other.PL
other girls |
|--|--|

The vast majority of adjectives are not marked for gender, and only a very limited number of adjectives have distinct FEM forms. A representative selection of these is provided in (6).

	MASC	FEM		MASC	FEM	
(6)	<i>gwyn</i>	<i>gwen</i>	white	<i>cryf</i>	<i>cref</i>	strong
	<i>melyn</i>	<i>melen</i>	yellow	<i>trwm</i>	<i>trom</i>	heavy
	<i>bychan</i>	<i>bechan</i>	small	<i>byr</i>	<i>ber</i>	short

³Similarly, Google results for *fffermwyr ifainc/ifanc* (farmer.M.PL young.PL/SG) ‘young farmers’ shows that both occur quite regularly.

In addition, the use of these feminine forms is mostly optional and the “masculine” forms may appear with feminine nouns even when those particular adjectives have feminine forms.

(7) a. *cadair drom*
 chair.F.SG heavy.F.SG
 a heavy chair

b. *wythnos drwm*
 week.F.SG heavy.M.SG
 a heavy (busy) week

(8) a. *merch fer*
 girl.F.SG short.F.SG
 a short girl

b. *merch gryf*
 girl.F.SG strong.M.SG
 a strong girl

Demonstratives agree in GEN and NUM and follow any postnominal adjectives. As the examples below show, demonstratives require the presence of the definite article.

(9)

	PROX	DIST
M.SG	<i>hwn</i>	<i>hwennw</i>
F.SG	<i>hon</i>	<i>honno</i>
PL	<i>hyn</i>	<i>hynny</i>

(10) *y ci hwn*
 the dog.M.SG this.M.SG
 this dog

(11) *y cathod hynny*
 the cat.F.PL that.PL
 those cats

Finally, most numerals are invariant, but the lower numerals (sometimes referred to as paucal numbers) have distinct FEM, MASC forms, as shown below:

(12)

MASC	FEM	
<i>dau</i>	<i>dwy</i>	2
<i>tri</i>	<i>tair</i>	3
<i>pedwar</i>	<i>pedair</i>	4

A particularly salient feature of Welsh and the other Celtic languages is the system of initial consonant mutations, or phonological alternations of the initial phoneme of a word. Welsh has three sets of mutations (see the table in (15)) in addition to the citation or radical form. Mutations are triggered by a variety of lexical and syntactic triggering environments. One such is that adjectives following a F.SG noun appear in soft mutated form. In (13), the adjective (which is not itself a feminine form) has undergone soft mutation (*mawr* → *fawr*) after the F.SG noun:

mawr in (14) is not mutated because the noun is plural rather than singular.⁴ The radical form is used after all other nouns.

- (13) *torth fawr (< mawr)*
 loaf.F.SG big.SG
 a big loaf
- (14) *torthau mawr*
 loaf.F.PL big.SG
 big loaves

	Radical	Soft Mut.	Nasal Mut.	Aspirate Mut
	c	g	ngh	ch
	p	b	mh	ph
	t	d	nh	th
(15)	g	∅	ng	[= <i>Rad</i>]
	b	f	m	[= <i>Rad</i>]
	d	dd	n	[= <i>Rad</i>]
	m	f	[= <i>Rad</i>]	[= <i>Rad</i>]
	ll	l	[= <i>Rad</i>]	[= <i>Rad</i>]
	rh	r	[= <i>Rad</i>]	[= <i>Rad</i>]

In a series of adjectives, each one undergoes soft mutation (SM). Note also that although both adjectives in (16) (*byr* ‘short’, *tywyll* ‘dark’) have feminine forms (*ber*, *tywell*), only the first of them occurs in this form, the second occurring in the (generalised) masculine form.⁵

- (16) *merch fer, dywyll (ber, tywyll)*
 girl.F.SG short.F.SG dark.M
 a short dark girl (Thorne: 134)
- (17) *cyfres fer flasus (ber, blasus)*
 series.F.SG short.F.SG interesting
 a short interesting series

Feminine singular nouns are also distinguished by the fact that they appear in soft-mutated form immediately following the definite article *y*⁶:

(18)	<i>bardd</i> (m)	<i>y bardd</i> (m)	bard, poet
	<i>baner</i> (f)	<i>y faner</i> (f)	flag
	<i>ci</i> (m)	<i>y ci</i> (m)	dog
	<i>cath</i> (f)	<i>y gath</i> (f)	cat
	<i>cŵn</i> (m)	<i>y cŵn</i> (m)	dogs
	<i>cathod</i> (f)	<i>y cathod</i> (f)	cats

⁴*mawr*, *fawr* are glossed as SG because a plural form, *mawrion* does exist, though its use is infrequent.

⁵Again, the glossing reflects that fact that *byr/ber* has a plural form while *tywyll/tywell* does not.

⁶The definite article *y* has the (purely positional) variants *yr* and *'r*. It does not itself distinguish either number or gender.

In terms of basic agreement facts, then, the Welsh NP appears to be quite straightforward, with demonstratives, nouns and adjectives co-specifying constraints over the GEN and NUM features of the f-structure of the NP. For example, FEM.PL forms of adjectives (where they exist) require the f-structure of the NP to be specified as feminine plural:

- (19) *Adj_{fem}* ((ADJ ∈ ↑) GEND) =_c FEM
 ((ADJ ∈ ↑) NUM) =_c PL

2.2 Combining Numeral and Noun

The situation is more complex when nouns are modified by a cardinal numeral. Nouns following a numeral are obligatorily singular:

- (20) *pum ci*
 five dog.M.SG
 five dogs

- (21) *tair cath*
 three.F cat.F.SG
 three cats

Moreover adjectives agree with the noun in number, so that, for example, *arall* ‘other’, an adjective that obligatorily agrees with a nominal in number, must be singular in the presence of a numeral. Hence we see the following contrast:

- (22) *cŵn eraill*
 dog.M.PL other.PL
 other dogs

- (23) *pum ci arall*
 five dog.M.SG other.SG
 five other dogs

By contrast, demonstratives are always plural in the presence of a noun with a numeral premodifier, as illustrated by the examples below. Note that in these examples, though the head noun is singular in both, the demonstrative is singular in (24) and plural in (25).

- (24) *y gath hon*
 the cat.F.SG this.F.SG
 this cat

- (25) *y tair cath hyn*
 the three cat.F.SG this.PL
 these three cats

In (24) *cath* is soft-mutated (to *gath*) after the definite article because the article is followed by a F.SG NP. In contrast, *tair* in (25) does not show soft mutation (which would give the form *dair*). Recall that the definite article causes soft mutation of the following word only when the NP is feminine singular: the lack of soft mutation in (25) therefore indicates that an NP following the article qualifies as PL, from the perspective of the definite determiner! To recap so far: when a noun is premodified by a numeral, the noun and any adjectives are singular, but the demonstrative and determiner are plural.

Externally, the NP behaves as a plural in terms of other agreement processes which it controls, for example, pronominal anaphora.⁷

- (26) *Roedd y pum dyn yn gweld eu hunain yn y drych.*
 be.IMPERF.3S the five man.M.SG PT see 3PL self in the mirror
 The five men saw/were seeing themselves in the mirror.

- (27) *Cafodd y pum ci eu curo.*
 get.IMPERF.3S the five dog.M.SG 3PL beat
 The five dogs were beaten.

3 Analysis

3.1 Two-Tier F-structure

One possible approach to the agreement data illustrated in section 2.2 above involves taking the numeral as the head of the construction. On this view, the numeral sub-categorises for a singular nominal complement: adjectives are in construction with this complement and show singular agreement. Demonstratives and determiners, on the other hand, are in construction with the numeral phrase and agree with the (inherent plurality of) the numeral.

A sentence such as (28) would have the f-structure shown in (29): *y* and *hynny* contribute features to the SPEC function of the numeral while the AP provides an ADJ function to the f-structure of the nominal (for present purposes, we take the single argument of the numeral to be an OBJ without further discussion).

- (28) *y tair cath ddu hynny*
 the.PL three.F cat.F.SG black.SG that.PL
 those three black cats

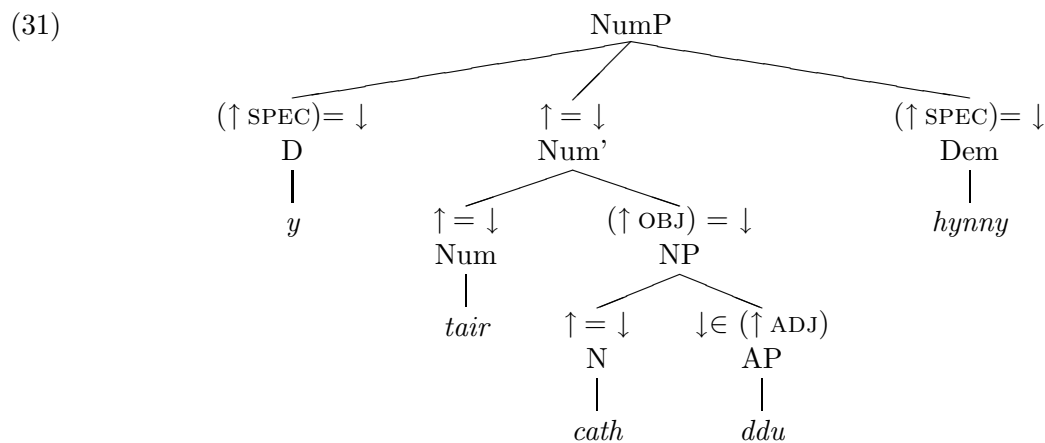
⁷In the personal passive construction illustrated in (27) a clitic pronoun occurs before the non-finite main verb (*curo*) coding the passive subject. This pronoun is plural, in agreement with *y pum ci* ‘the five dogs’.

$$(29) \left[\begin{array}{l} \text{PRED} \quad \text{'THREE}\langle\text{OBJ}\rangle \\ \text{NUM} \quad \text{PL} \\ \text{SPEC} \quad \left[\begin{array}{ll} \text{DEIX} & \text{DIST} \\ \text{DEF} & + \end{array} \right] \\ \text{OBJ} \quad \left[\begin{array}{ll} \text{PRED} & \text{CAT} \\ \text{NUM} & \text{SG} \\ \text{GEN} & \text{FEM} \\ \text{ADJ} & \{ [\text{PRED} \quad \text{'BLACK'}] \} \end{array} \right] \end{array} \right]$$

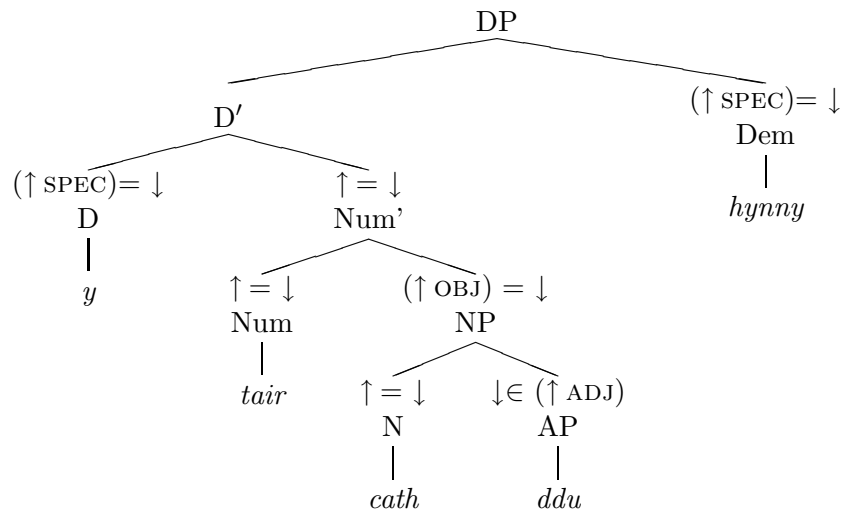
The numeral would define the number of its f-structure as plural, and require its argument, here taken to be an object, to be singular in number. As shown in (30), the lower numbers, that is, those which distinguish gender, also require their argument to be in the same gender as they themselves are.

$$(30) \begin{array}{l} \text{tair} \quad (\uparrow \text{PRED}) = \text{'THREE}\langle\text{OBJ}\rangle \\ (\uparrow \text{NUM}) = \text{PL} \\ (\uparrow \text{OBJ GEN}) =_c \text{FEM} \\ (\uparrow \text{OBJ NUM}) =_c \text{SG} \end{array}$$

Determining the precise c-structure is not our main concern here (see Sadler (2003); Willis (to appear) for discussion of the structure of Welsh NPs). The data discussed here might motivate a c-structure along the lines of (31) or (32), in which D is a projecting (functional) category, and the demonstrative is a structural specifier of the D head.



(32)



This analysis captures the agreement facts adequately. It essentially equates the construction in (20)-(25) with some sort of partitive. Welsh does in fact also have a partitive numeral construction, as shown in (33), but it is not clear whether the existence of this construction has any bearing on the plausibility of the two-tier analysis for the bare numeral-noun construction under discussion here. Note that in the partitive construction the nominal is plural. In many contexts, there seems to be little semantic difference between the numeral-noun and the partitive numeral construction.

(33) *y tri o ddynion*
the three.M of man.M.PL
the three men

3.2 Index vs. Concord

3.2.1 Index and Concord Agreement

Various constraint-based approaches to syntactic agreement propose a distinction between two sets of agreement features within the NP. In HPSG Wechsler and Zlatić (2000) distinguish between a set of CONCORD features and a set of INDEX features, the former being more closely related to morphological (inflectional) classes and the latter to the semantics (and see also Kathol (1999) for an earlier and related proposal). For Wechsler and Zlatić, CONCORD features are typically relevant for NP-internal concord (between nouns, determiners and adjectives), while INDEX features are typically relevant to subject-verb agreement and for pronominal anaphora. In LFG, King and Dalrymple (2004) make a related but nonetheless distinct proposal to distinguish between CONCORD and INDEX features associated with nominal f-structures. The key difference for King and Dalrymple is that INDEX is a non-distributive feature while CONCORD is a distributive feature. Given an f-structure which is a set (for example, in the case of a coordinate structure), a distributive

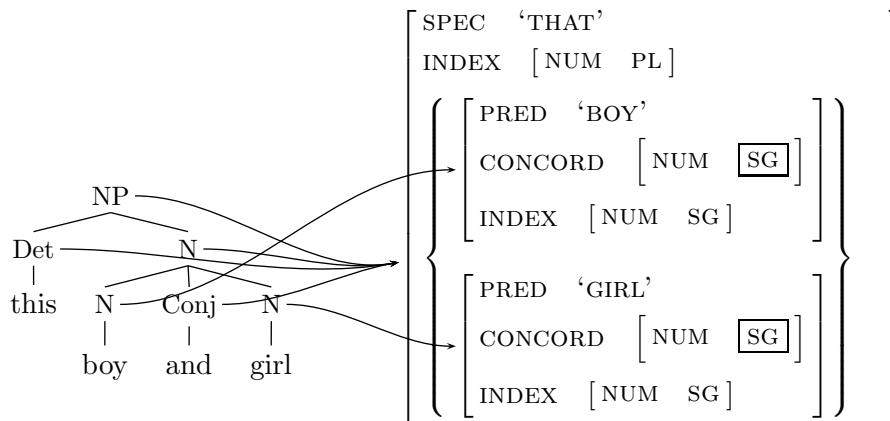
feature holding of this set will hold for every member of the set, whereas a non-distributive feature will hold of the set as a whole.

- (34) For any *distributive* property P and set s , $P(s)$ iff $\forall f \in s.P(f)$.
 For any *nondistributive* property P and set s , $P(s)$ iff P holds of s itself.
 Dalrymple and Kaplan (2000)

King and Dalrymple observe that languages differ as to whether they permit singular and/or plural determiners to combine with a coordination of singular nouns. The English demonstrative, for example, occurs in the singular with a coordination of singular nouns, indicating CONCORD agreement, as shown in (36), whereas subject-verb agreement in English accesses the INDEX feature (which in the case of a coordinate structure represents the resolution of the INDEX features of the coordinate daughters).

- (35) a. *that/*those boy and girl*
 b. *That boy and girl *is/are my friends.*

- (36) that: (\uparrow CONCORD NUM) = SG



In Russian, on the other hand, the plural determiner *éti* appears to require a plural INDEX and so can co-occur with a plural noun, a coordination of plural nouns, and, crucially, a coordination of singular nouns (37). It is this latter case which indicates that what is at issue here is INDEX agreement.

- (37) *éti mužčina i ženščina*
 these-PL man-M.SG and woman-F.SG
 this man and woman (Russian: King and Dalrymple 2004:95)

3.2.2 Numerals and Nouns: An Index/Concord Mismatch

The distinction between INDEX and CONCORD offers an alternative approach to the Welsh data, in which the f-structure of the entire phrase is headed not by the numeral but by the noun, and the numeral is treated as a modifier of the head noun. Under this analysis the f-structures of an adjectivally modified nominal phrase and a numerally modified nominal phrase will be (structurally) similar, differing only in their agreement features.

The fundamental idea is that numeral-noun combinations in Welsh project an f-structure (for the NP) with an INDEX-CONCORD mismatch: the numeral modifier contributes the INDEX NUM and the noun contributes the CONCORD NUM.

Consider first the f-structure of a simple NP such as (38).⁸

(38)	<i>hen ddyn</i>	old man.M.SG	an old man	[PRED	‘MAN’]
					INDEX	[NUM SG]	
					CONC	[NUM SG]	
					ADJ	{ [PRED ‘OLD’] }	

Here the noun specifies a SG number value for INDEX and CONCORD and the (invariant) adjective *hen* places no GENDER or NUMBER restrictions. The contribution of the SG noun in this context is:

(39)	N.SG	CONCORD NUM	SG
		INDEX NUM	SG

Similarly, a plural noun will specify a PL value for INDEX and CONCORD.

(40)	N.PL	CONCORD NUM	PL
		INDEX NUM	PL

The f-structure of an NP containing a numeral modifier will be structurally similar, but we assume that it will differ in the values for INDEX and CONCORD NUM (see (41)). Recall that cardinal numerals occur with (obligatorily) singular nouns, but we know that the INDEX of the NP overall is PL. This is shown by the plural pronominal anaphors in (26) and (27) above.

(41)	<i>tri dyn</i>	three.M man.M.SG	three men	[PRED	‘MAN’]
					INDEX	[NUM PL]	
					CONC	[NUM SG]	
					ADJ	{ [PRED ‘THREE’] }	

The respective contributions of the SG noun and the numeral in this context are as follows:

⁸The form *ddyn* in (38) is the soft mutated form of *dyn*. The mutation is triggered by the preceding adjective *hen* ‘old’, which belongs to a limited number of adjectives regularly occurring in prenominal position, most of which cause soft-mutation of the following noun.

(42)

N.SG	CONC NUM	SG
Num	IND NUM	PL

Thus, numerals assign a (plural) INDEX NUM value to the containing f-structure, and singular forms of nouns assign a (singular) CONCORD NUM value.⁹ At the same time, numerals also require this CONCORD NUM value to be SG (because numerals must be followed by singular nouns). For a singular noun form this means that while its CONCORD NUM value is fixed to SG, the INDEX NUM value is SG only by default. This is captured by the lexical entries along the following lines for cardinal numerals and (singular and plural) nouns:¹⁰

(43) *tri* (↑ PRED) = ‘THREE’
 ((ADJ ∈ ↑) IND NUM) = PL
 ((ADJ ∈ ↑) CONC NUM) =_c SG

(44) *dyn* (↑ PRED) = ‘MAN’
 (↑ CONC NUM) = SG
 {(↑ IND NUM) = SG | (↑ IND NUM) =_c PL}

(45) *dynion* (↑ PRED) = ‘MAN’
 (↑ CONC NUM) = PL
 (↑ IND NUM) = PL

3.2.3 NP Internal Agreement

Turning now to NP internal agreement, recall that determiners and demonstratives are plural (thus appearing to agree with the inherent plurality of the numeral) while adjectives are obligatorily singular in this construction, and hence appear to agree with the noun. This now has a straightforward explanation: determiners and demonstratives show INDEX agreement while adjectives show CONCORD agreement. This agreement type selection, one may be justified to assume, not only holds in the presence of a numeral, but quite generally. However, since ordinarily CONCORD NUM and INDEX NUM have the same values, the difference in agreement controllers is usually unnoticeable and becomes visible only where an NP contains a numeral. (46) will further illustrate the various constraints in operation.

(46) *y tair cath ddu arall hynny*
 the.PL three.F cat.F.SG black.SG other.SG that.PL
 those other three black cats

⁹The numeral *un* ‘one’ of course assigns both singular CONCORD NUM and INDEX NUM.

¹⁰Additionally, the numerals 2, 3 and 4, but not other numerals, specify GEN constraints.

The combination of the numeral and the noun will together ensure that the f-structure of the NP (headed by *cath*) has the following agreement features:

$$(47) \left[\begin{array}{l} \text{PRED} \quad \text{'CAT'} \\ \text{INDEX} \quad [\text{NUM} \quad \text{PL}] \\ \text{CONC} \quad [\text{NUM} \quad \text{SG}] \end{array} \right]$$

This NP f-structure, with mismatched NUM values, only ever arises in the presence of a numeral.

The demonstrative shows INDEX agreement, and thus only a plural form is grammatical when a numeral is present:¹¹

$$(48) \quad y \quad \textit{tair} \quad \textit{cath} \quad \textit{*honno/hynny}$$

the.PL three.F cat.F.SG that.F.SG/that.PL

those three cats

$$(49) \quad \textit{hynny} \quad (\uparrow \text{ DEIX}) = \text{DIST}$$

$$\quad \quad \quad ((\text{SPEC } \uparrow) \text{ INDEX NUM}) =_c \text{ PL}$$

The determiner *y* also selects INDEX NUM agreement. Recall that although the determiner *y* itself is invariant (apart from its positional variants *yr*, *'r*), it requires the next word to be soft mutated if the NP is F.SG, and is followed by the radical if the NP is M.SG or (M or F) PL.¹² The fact that *tair* is not mutated (to *dair*) in (46) indicates that from the perspective of the determiner, the NP is not F.SG but PL (since it cannot be M.SG, *cath* being feminine). The *y* which is followed by the radical has the following entry:

$$(50) \quad y \quad (\uparrow \text{ DEF}) = +$$

$$\quad \quad \quad \{ ((\text{SPEC } \uparrow) \text{ INDEX NUM}) =_c \text{ PL} \mid$$

$$\quad \quad \quad ((\text{SPEC } \uparrow) \text{ INDEX NUM}) =_c \text{ SG}$$

$$\quad \quad \quad ((\text{SPEC } \uparrow) \text{ INDEX GEN}) =_c \text{ M} \}$$

Turning now to adjectives, recall that only the adjective *arall* (plural *eraill*) ‘other’ obligatorily shows number agreement. Most other adjectives lack plural forms and even where such forms do exist, their use (in plural contexts) is not obligatory.¹³ The numeral and adjectives in (46) have the following lexical descriptions.¹⁴ The

¹¹For concreteness, we assume both Dem and Det nodes in the f-structure are annotated $(\uparrow \text{SPEC}) = \downarrow$, and thus demonstratives and determiners specify constraints over the containing f-structure (that of the NP) by means of inside-out equations.

¹²As may be clear from the data in this paper, there is virtually no gender distinction in the plural in Welsh.

¹³Plural forms are, of course, restricted to plural contexts. A similar distributional pattern is found for existing FEM gender forms.

¹⁴The adjective *ddu* ‘black’ in (46) is in soft mutated form ($d \rightarrow dd$) following a F.SG noun.

entry (53) defines the INDEX NUM value for the f-structure of the NP to be PL and constrains the CONCORD NUM value to be SG (and thus combines only with a (feminine) singular noun).

- (51) *du* (\uparrow PRED) = ‘BLACK’
- (52) *arall* (\uparrow PRED) = ‘OTHER’
 ((ADJ \in \uparrow) CONCORD NUM) =_c SG
- (53) *tair* (\uparrow PRED) = ‘THREE’
 ((ADJ \in \uparrow) INDEX NUM) = PL
 ((ADJ \in \uparrow) CONCORD NUM) =_c SG
 ((ADJ \in \uparrow) CONCORD GEN) =_c FEM

These lexical entries, together with that for *cath* ‘cat.F.SG’, will define the following f-structure:

$$(54) \left[\begin{array}{l} \text{PRED} \quad \text{‘CAT’} \\ \text{INDEX} \quad [\text{NUM} \quad \text{PL}] \\ \text{CONC} \quad \left[\begin{array}{l} \text{NUM} \quad \text{SG} \\ \text{GEN} \quad \text{FEM} \end{array} \right] \\ \text{SPEC} \quad \left[\begin{array}{l} \text{DEIX} \quad \text{DIST} \\ \text{DEF} \quad + \end{array} \right] \\ \text{ADJ} \quad \left\{ \begin{array}{l} [\text{PRED} \quad \text{‘BLACK’}] \\ [\text{PRED} \quad \text{‘THREE’}] \end{array} \right\} \end{array} \right]$$

It should be clear that the treatment rules out the occurrence of plural adjectives with the numeral-noun combination: such adjectives constrain the CONCORD NUM feature of the f-structure of the NP to be PL, a constraint that is not satisfied in a structure such as (47).

4 Discussion

We have presented two different approaches to the number mismatch arising in Welsh NPs containing a numeral. Both analyses seem independently viable for this set of data, but they are based on quite different intuitions. The question is whether there are any reasons for preferring one style of analysis over the other.

4.1 Other Mismatches

The INDEX vs CONCORD analysis has the advantage that the distinction between these two sets of features may also be motivated by other number mismatches unconnected with the numerals problem and may therefore be independently needed

in the grammar. For example, it has some potential for capturing the behaviour of the exceptional, idiosyncratic noun *pobl*, which in both its meanings ‘people, nation’ and ‘group of people’ behaves partly as a singular and partly as a plural.

In terms of its morphology, *pobl* is a singular form – the plural form is *pobloedd*, and it is also idiosyncratic. In terms of syntax, the form *pobl* behaves partly as a singular form, and partly as a plural form. In (55), its singular behaviour can be seen in the fact that it has undergone soft mutation (*pobl* > *bobl*) after the definite article (this is characteristic of FEM.SG; its plural behaviour is signalled by the fact that it occurs with a plural demonstrative. The 3PL verb form in (56) (*gwelsant*) also indicates that the subject is plural from the perspective of pronominal anaphora.¹⁵

(55) *y bobl hyn*
 the.F.SG people this.PL
 these people

(56) *Cododd y bobl a gwelsant....*
 rose.3SG the people and saw.3PL
 The people rose up and saw

4.2 A Special Noun

The CONCORD/INDEX analysis treats singular nouns being associated with a SG INDEX only by default and posits a disjunction to capture this fact:

(57) $\{(\uparrow \text{IND NUM}) = \text{SG} \mid (\uparrow \text{IND NUM}) =_c \text{PL}\}$

The intuition that this seeks to capture is that SG nouns are singular except when they are in construction with numerals. The intuition behind the two-tier analysis is rather different, namely that the numeral-noun construction is rather like a partitive, with the noun corresponding to an argument of the numeral. On this analysis, the NUM of the f-structure of the nominal is SG and that of the numeral is PL.

It is interesting to note that there is one noun in Modern Welsh, *blwyddyn* ‘year’, which has not two number forms, but three: *blwyddyn*, *blynnyddoedd*, *blynedd*. The third form, *blynedd*, is a special form used only in combination with numerals (except ‘one’), while the singular *blwyddyn* is barred from this environment:

(58) *Mae'r grantiau ar gael am un flwyddyn yn unig....*
 is-the grants on get for one year only
 The grants are available for only one year.

¹⁵Finite verbs in Welsh show full agreement only with pronominal subjects (which can be dropped). Full lexical NPs occur with 3SG finite verbs - hence the verb *cododd* in (56) itself tells us nothing about the number of the subject.

(59) *am y tair neu bedair blynedd nesa*
 for the three.F or four.F year.F next
 for the next three or four years

(60) *y blynyddoedd cynnar yn yr ysgol*
 the years early in the school
 the early years in school

If we follow the CONCORD/INDEX analysis, these three forms must have the lexical descriptions in (61) - (63). Note that the first two correspond to the one disjunctive singular entry for ordinary nouns. The selection of the correct form in the presence or absence of a numeral simply falls out naturally on this view.

(61) *blwyddyn* (↑ PRED) = ‘YEAR’
 (↑ CONC NUM) = SG
 (↑ IND NUM) = SG

(62) *blynedd* (↑ PRED) = ‘YEAR’
 (↑ CONC NUM) = SG
 (↑ IND NUM) =_c PL

(63) *blynyddoedd* (↑ PRED) = ‘YEAR’
 (↑ CONC NUM) = PL
 (↑ IND NUM) = PL

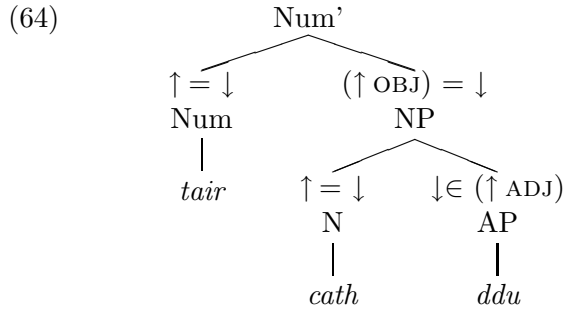
If we follow the two-tier analysis, both *blwyddyn* and *blynedd* would be singular forms. In order to prevent *blynedd* occurring without a numeral, and *blwyddyn* occurring with a numeral, it would be necessary to postulate an additional (book-keeping) feature in the f-structure of the numeral (for example, PRED-TYPE = NUMERAL), and add inside-out statements to the lexical descriptions of *blynedd* and *blwyddyn*, controlling for the presence (or absence) of that feature in the containing f-structure. Thus it seems that the INDEX/CONCORD analysis extends more gracefully to this additional data.

4.3 Further Nominal Structures

Although our main concern here is not with matters of c-structure, we note that some potential difficulties for the two-tier analysis might arise in more complex NPs.

The possible c-structures associated with the two-tier analysis in section 3.1 involved a constituent structure with the numeral as sister to the (possibly adjectivally modified) NP which corresponds to the OBJ of the numeral (see the relevant sub-tree, repeated in (64)). A crucial property of these structures was that the demonstrative was outside of the NP OBJ, consistent with the fact that it follows any adjectival

modifiers of the noun. This NP-external position crucially ensures that, when a numeral is present, the demonstrative contributes its agreement constraints to the f-structure of the numeral rather than to the f-structure of the noun:



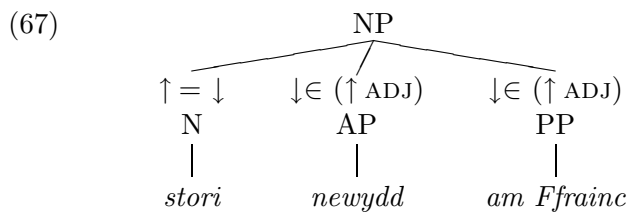
Postnominal adjectival modifiers in Welsh NPs intervene between the head N and any complements or adjuncts:

- (65) *stori newydd am Ffrainc*
 story new about France
 a new story about France

They also precede the NP possessor, which in turn precedes any complements or adjuncts:

- (66) *disgrifiad manwl y gyrrwr o'r ddamwain*
 description detailed the driver of-the accident
 the driver's description of the accident (Rouveret 1991: 193)

These can be accommodated by adopting either a hierarchical or a flat structure within NP:¹⁶



However, although the demonstrative always occurs after any postnominal adjectives, it is not always final in the NP. Willis (to appear) gives the order of elements within the NP as in (68).

- (68) Det - Num - N - Adj - Poss/Dem - Compl/Adjuncts

¹⁶For a treatment using a hierarchical approach to NP-internal structure, see Sadler (2003).

Crucially, the demonstrative may be followed by any complements or adjuncts of the head noun.

- (69) *y stori hon am Ffrainc*
the story.F.SG this.F.SG about France
this story about France
- (70) *y disgrifiad manwl hwn o'r ddamwain*
the description.M.SG careful this.M.SG of-the accident
this careful description of the accident
- (71) *yn y llythyr anghyflawn hwn o Ffrainc*
in the letter.M.SG incomplete this.M.SG from France
in this incomplete letter from France

Examples such as these appear quite problematic for the two-tier approach of section 3.1. Consider (71), where the demonstrative intervenes between AP and PP adjuncts. If this position is taken to indicate that a demonstrative attaches within NP, then the two-tier analysis, whereby the demonstrative agrees with the (plurality of the) numeral, founders, because the demonstrative would then (incorrectly) reflect the number of the noun (rather than the numeral). Alternatively, if this data is taken to indicate that complements and adjuncts of the noun are extraposed out of NP and under a higher projection (DP or NumP), then they will have to be associated with a disjunctive f-description to reflect the potential presence of the numeral. Neither of these routes is appealing.

4.4 Conclusion

While it seems clear that the two-tier analysis will certainly apply in a natural way to numeral-noun constructions in languages in which a numeral governs an object (or oblique) and assigns a case to it (genitive, for instance), our current view is that it is less appealing for the Welsh data which we have considered in this paper. In the PARGRAM Welsh grammar, we therefore currently implement the INDEX/CONCORD analysis of these constructions. In future work we hope to be able to provide a more substantial exposition of the role of the INDEX/CONCORD distinction in the grammar of Welsh.

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