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A NOTE ON NUMBER

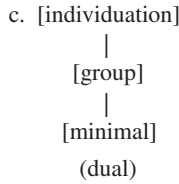
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1 The Problem

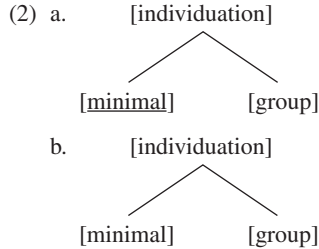
It has been widely observed (Greenberg 1963, Harley and Ritter 2002, Corbett 2000) that the presence of distinctive dual number in a given language entails the presence of distinctive plural number. The feature-geometric approach to person and number taken by Harley (1994), Ritter (1997), and Ritter and Harley (1998) is especially well suited to capturing such dependencies. The implicational relation between dual and plural is reflected in (1) by the fact that [minimal] is a dependent of [group], which in turn is a dependent of [individuation].

- | | |
|------------------------|--------------------|
| (1) a. [individuation] | b. [individuation] |
| | |
| | [group] |
| (singular) | (plural) |

An earlier version of this squib was presented as a poster at NELS 34, and I am grateful to those who gave me valuable feedback there, in particular Heidi Harley. I am also grateful to Susana Béjar, Daniel Currie Hall, Betsy Ritter, and the members of the University of Toronto Syntax Project for useful comments and discussion.



In their study of person and number in pronouns in over 100 languages, however, Harley and Ritter (2002) take a different approach, illustrated in (2).



In a two-way number system, illustrated in (2a), [minimal] is the default interpretation of a bare [individuation] node, and plurals are characterized by [group]. The default status of [minimal] is indicated by underlining. In a three-way number system, a bare [individuation] node has no interpretation. Singulars carry the feature [minimal], plurals the feature [group], and duals both [group] and [minimal]. The feature [minimal] thus functions in one of two ways in their system: in some languages, it is the unmarked, or default, interpretation of a bare [individuation] node; in others, it is an active, marked feature in both the singular and the dual. Trials and paucals are characterized by [augmented], a dependent of [minimal].

The system in (1) is to be preferred on formal grounds, other things being equal. It is simpler, in that features are used in a crosslinguistically consistent way. In addition, and more important, it has two desirable properties that the second system lacks. First, every possible combination of the features used in a given language is interpretable in that language. Thus, a bare [individuation] node is interpretable whether the language has a two-way or a three-way number system, or even if it lacks grammatical number altogether.¹ This contrasts with the system in (2), in which a bare [individuation] node is uninterpretable in languages with a contrastive dual.

Second, in (1) all the possible number systems permitted by the features are, in fact, attested. Using the features in (2), we might expect to find a language that uses [minimal] contrastively, but not [group]. No such languages are reported by Harley and Ritter, although it is

¹ Harley and Ritter suggest that [individuation] may be inactive in languages without grammatical number; another possibility is that it marks count (vs. mass) nominals.

possible to imagine one. In such a language, singulars would be marked with respect to plurals, and the default interpretation of a bare [individuation] node would be [group], rather than [minimal].² Ideally, this distributional gap should follow from the dependency relations among the features, as it does with the system in (1).

If (2) is to be adopted, then, the grounds must be empirical, not formal. And for Harley and Ritter (2002), they are. Their reason for adopting (2) rather than (1) is the existence of the “constructed” dual (Corbett 2002) in Hopi and in Zuni, illustrated in (3) and (4). In these languages, nouns and verbs have singular and plural forms, but no distinctive dual forms. A dual interpretation arises when a plural noun appears as the subject of a singular verb.³ For Harley and Ritter, the plural subject contributes the feature [group], while the singular verb contributes [minimal], giving the dual interpretation. They do not discuss the details of how distinct feature structures on the subject and the verb are ultimately interpreted as a single feature structure, but any number of formal tools are available to accomplish this, depending on one’s specific theoretical assumptions.

(3) *Hopi* (Corbett 2000:169)

a. pam wari
that.SG run.PERFV.SG
‘He/She ran.’

b. puma yúutu
that.PL run.PERFV.PL
‘They (pl.) ran.’

c. puma wari
that.PL run.PERFV.SG
‘They (two) ran.’

(4) *Zuni* (Corbett 2000:170)

a. ?a:w-akcek(?i) ?a:-kya
PL-boy go-PAST
‘Two boys went.’

b. hon ?a:-kya
1PL.NOM go-PAST
‘We (two) went.’

This squib proposes a new feature geometry for number systems, providing a straightforward account of the Zuni and Hopi data given above. In addition, it accounts without further stipulation for the Zuni

² This raises another question that space does not permit a proper account of: the status of default specification rules in a theory that uses monovalent features. Ideally, there should be no such rules, and the default interpretation of a given feature should essentially be the complement of the interpretation(s) of any marked dependents that feature may have in the language in question.

³ The reverse situation, with a singular subject and a plural verb, is apparently simply ungrammatical in both languages. This fact is unexplained under any of the approaches discussed here, but see Bliss 2004 for an attempt to capture it.

Table 1
Three-vowel system

i	u [back]
a [low]	

Table 2
Five-vowel system

i [high]	u [back, high]
e	o [back]
a [low]	

pronoun system, as described by Newman (1965), Nichols (1997), and Corbett (2000). The analysis avoids the formal disadvantages of the feature system proposed by Harley and Ritter (2002) and in addition accounts for the observed syncretisms in the pronoun system.

2 Theoretical Context and Assumptions

I adopt the Minimalist Program (Chomsky 2000) and the theory of Distributed Morphology (Halle and Marantz 1993), whereby the insertion of Vocabulary items (VIs) takes place at the end of syntactic computation. At the point of Vocabulary Insertion, the VI bearing the greatest subset of the features being spelled out is inserted. It is therefore possible that some features are active in syntactic computation without being overtly spelled out by VIs.

Finally, I assume (Trubetzkoy 1939, 1969, Dresher 1998, 2002) that the interpretation of an element bearing a given feature or set of features depends on the contrasts in which that element participates. In phonology, this situation can easily be seen in the vowel inventories given in tables 1 and 2.

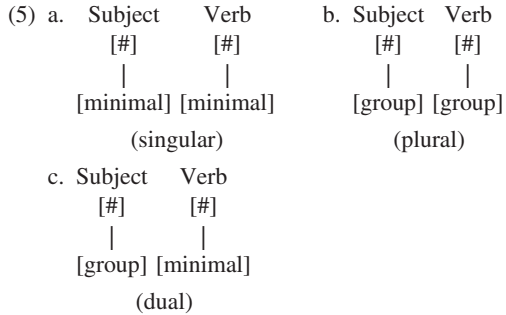
In a three-vowel system using the features [low] and [back], /i/ is completely underspecified, while in a five-vowel system that also uses [high], /i/ is specified as [high], and the fully underspecified vowel shows up as /e/. The feature [back] is realized as /u/ in the three-vowel system, and as /o/ in the five-vowel system.

Corbett (2000:41) informally notes a similar phenomenon in number systems: ‘[T]he meaning of ‘plural’ will vary according to the

system of which it is a part.’’ If a language uses only singular and plural, then plural includes groups as small as two. In contrast, if a language also has a dual, then plural includes groups no smaller than three. Thus, the interpretation of a plural nominal will depend on how many grammatical numbers the language makes use of. The analysis proposed here makes crucial use of the fact that the interpretation of a given feature depends on the contrasts in which it participates.

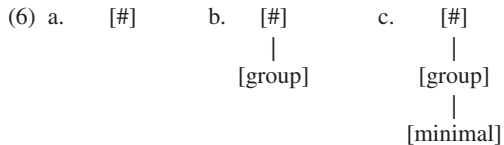
3 Two Analyses of the Constructed Dual

Harley and Ritter’s analysis of the constructed dual is shown in (5).⁴



It is crucial in this system that [minimal] be a marked feature, since that is what makes the dual in (5c) featurally distinct from the plural in (5b).

The traditional feature-geometric view of a three-way number system (Harley 1994, Béjar 1998, Béjar and Hall 1999), given in (1), is repeated here as (6).



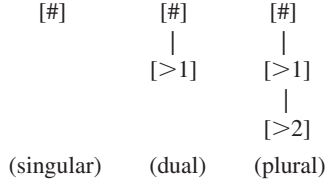
This system cannot account for the constructed dual. What is required is that the so-called singular verb forms in (3) and (4) actually be syncretic VIs spelling out (6a) and (6c) but not (6b), with the so-called plural pronouns being syncretic VIs spelling out (6b) and (6c) but not (6a). The first of these syncretisms is impossible to capture. A VI spelling out [minimal] would be inserted only for (6c), one spelling out [group] would be inserted for both (6b) and (6c) if nothing better were available, and one spelling out [#] would be inserted only for

⁴ *Individuation* is replaced by the symbol #, for brevity and economy of presentation. # may also be identified with Ritter’s (1992) syntactic category # (see Cowper and Hall 2002).

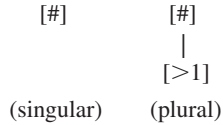
(6a) if there were another VI spelling out (6b). There is no possible set of features that a VI could spell out so as to be inserted in the plural, but not in either the singular or the dual.

This is the main reason that Harley and Ritter adopt the structure in (2) over that in (1). There is, however, another possibility. Suppose that the features underlying grammatical number systems are as shown in (7). (7a) shows a three-way number system, and (7b) a two-way system.

(7) a. *Three-way number system*



b. *Two-way number system*



The system in (7) embodies Corbett's (2000:41) comment that the meaning of the plural varies depending on how many number values the system contains. The feature specification of the dual in (7a) is identical to that of the plural in (7b). The narrower semantic range of the dual in (7a) arises from the fact that the [>1] feature in that system may have a dependent, [>2]. In both systems, the feature [>1] separates singulars (not [>1]) from nonsingulars ([>1]). In (7a), nonsingulars are further divided into plurals ([>2]) and duals ([>1] but not [>2]). This system can be extended to account for languages with a distinctive trial by adding the feature [>3] as a dependent of [>2], and for languages with a paucal by adding something like [$>few$] as a dependent of [>2].⁵

In all three of these analyses, a two-way number system uses a proper subset of the features required for a three-way system, thus capturing Greenberg's observation that three-way systems are crosslinguistically marked with respect to two-way systems. The crucial differ-

⁵ A reviewer points out that this is slightly more elegant than the feature [augmented] required in either of the other two systems, in that the additional features are of the same sort as the ones already present for simpler number systems, but that the approach seems to predict an unattested richness of number systems, including features up to [>6], [>7], and possibly even higher. I assume, with most generative grammarians, that grammars are not generally able to count beyond the very smallest integers except at great cost, and that number systems increase significantly in markedness with each additional feature.

ence between the systems using [group] and [minimal] and the system using [>1] and [>2] is the language-internal status of the dual. In (6), the dual is more marked than the plural, whereas in (7), the plural is more marked than the dual. While it is unclear which is to be preferred on the basis of the inherent properties of the dual and the plural, evidence from syncretic forms like the constructed dual support (7) over (6). The features in (7), unlike the ones in (6), permit both singular-dual syncretisms excluding the plural, and dual-plural syncretisms excluding the singular. This is shown in tables 3 and 4.

As shown by the boxed features in table 3, a system using [group] and [minimal] cannot account for languages with syncretic singular/dual forms distinguished from plurals, while a system using [>1] and [>2] cannot account for languages with syncretic singular/plural forms distinguished from duals. Both systems can handle languages with syncretic dual/plural forms distinguished from singulars. A second, less testable difference is that the dual carries more features in the first of these systems, while the plural is more highly specified in the second. The constructed dual in Hopi and Zuni is therefore compatible with table 4, but not with table 3, and has the representation shown in (8), with the features spelled out by the various VIs boxed.

Table 3

<div style="border: 1px solid black; padding: 2px; display: inline-block;">[#]</div>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">[#]</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">[group]</div> </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">[#]</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">[group]</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">[minimal]</div> </div> </div> <p style="text-align: center;">Plural/Dual: VI spells out [group]</p>
<div style="border: 1px solid black; padding: 2px; display: inline-block;">[#]</div>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">[#]</div> [group] </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">[#]</div> [group] <div style="border: 1px solid black; padding: 2px; display: inline-block;">[minimal]</div> </div> </div> <p style="text-align: center;">Singular/Plural: VI spells out [#]</p> <p style="text-align: center;">Dual: VI spells out [minimal]</p>

Table 4

<p style="text-align: center;">[#]</p> <p>Singular: VI spells out [#]</p>	<p style="text-align: center;">[#] [>1]</p>	<p style="text-align: center;">[#] [>1] [>2]</p> <p>Dual/Plural: VI spells out [>1]</p>
<p style="text-align: center;">[#]</p> <p>Singular/Dual: VI spells out [#]</p>	<p style="text-align: center;">[#] [>1]</p>	<p style="text-align: center;">[#] [>1] [>2]</p> <p>Plural: VI spells out [>2]</p>

(8) a. *Singular*

Subject	Verb
[#]	[#]

b. *Dual*

Subject	Verb
[#]	[#]
[>1]	[>1]

c. *Plural*

Subject	Verb
[#]	[#]
[>1]	[>1]
[>2]	[>2]

However, the revised treatment in Harley and Ritter 2002 can also account for the constructed dual, as in (5). While it is at least arguable that the system in (7) is formally superior to Harley and Ritter's, empirical evidence should decide between them.

4 Zuni Pronouns

The pronominal system of Zuni provides further evidence for the view of number just presented. Zuni pronouns mark person, number, and case. In addition, pronouns have different forms depending on whether they appear in sentence-medial or sentence-final position. However, there are several syncretisms in the system. The pronouns of Zuni, as described by Newman (1965:60), are given in table 5. The lack of final forms for object pronouns is due simply to the fact that object pronouns never appear in final position (Newman 1965:61).

One revision must be made to this paradigm before I turn to the feature specifications of the pronouns. The form *ʔa:či*, which Newman takes to be a third person nominative dual pronoun, is not, in fact, a pronoun, as the data in (9), from Corbett 2000, indicate.

- (9) a. i. hon ʔa:či ʔa:-kya
 1PL.NOM DUAL GO-PAST
 ‘We (two) went.’
 ii. hon ʔa:-kya
 1PL.NOM GO-PAST
 ‘We (two) went.’
 b. i. ʔa:w-akcek(ʔi) ʔa:či ʔa:-kya
 PL-boy DUAL GO-PAST
 ‘Two boys went.’
 ii. ʔa:w-akcek(ʔi) ʔa:-kya
 PL-boy GO-PAST
 ‘Two boys went.’

It is clear from (9) that *ʔa:či* optionally appears in the dual, regardless of the person of the subject. In fact, Corbett (2000:169) states that “no pronoun is found in the third person.” I therefore propose that *ʔa:či* should be taken to be a modifier of some sort, with nonfeatural

Table 5

		Subject		Object	Possessive	
		Medial	Final	Medial	Medial	Final
Sg	1	hoʔ	ho:ʔo	hom	hom	homma
	2	toʔ	to:ʔo	tom	tom	tomma
	3	—		ʔan	ʔan	ʔa:ni
Du	1	hon	hoʔno	hoʔnaʔ	hoʔnaʔ	
	2	ton	toʔno	toʔnaʔ	toʔnaʔ	
	3	ʔa:či		ʔa:čiyaʔ	ʔa:čiyaʔ	
Pl	1	hon	hoʔno	hoʔnaʔ	hoʔnʔa:wan	
	2	ton	toʔno	toʔnaʔ	toʔnʔa:wan	
	3	—		ʔa:wan		

Table 6

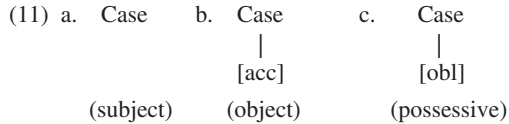
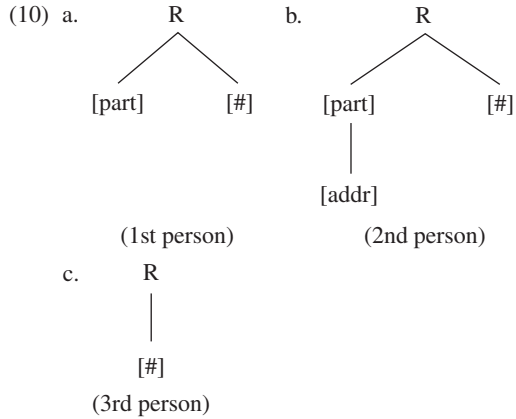
		Subject		Object	Possessive	
		Medial	Final	Medial	Medial	Final
1st	Sg	hoʔ	ho:ʔo	hom		homma
	Du	hon	hoʔno	hoʔnaʔ	hoʔnʔa:wan	
	Pl					
2nd	Sg	toʔ	to:ʔo	tom		tomma
	Du	ton	toʔno	toʔnaʔ	toʔnʔa:wan	
	Pl					
3rd	Sg	—		ʔan		ʔa:ni
	Du			ʔa:čiyaʔ		
	Pl			ʔa:wan		

meaning, rather than a pronoun whose meaning is specified in terms of grammatical features of number. Given that in the dual, the verb is unmarked for number and is thus identical to the singular, and that third person nominative pronouns are null, we might expect *ʔa:či* to be used more often than not in a third person dual construction with no overt subject. In such a case, *ʔa:či* would be the only overt element distinguishing the singular construction from the dual.

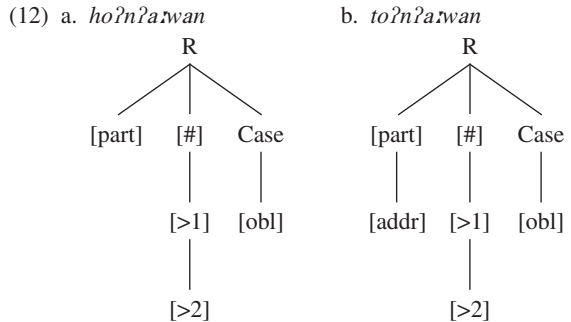
Removing *ʔa:či* from the paradigm and reorganizing so as to make the syncretisms more salient, the pronominal system of Zuni is as shown in table 6.

I adopt the person features proposed by Harley and Ritter (2002). They use the feature [participant], with a dependent [addressee]. A bare [participant] feature thus characterizes first person, while second person consists of [participant + addressee].⁶ Third person is characterized by the absence of person features. For Case, I adopt a simplification of the system proposed for Old Church Slavonic by Béjar and Hall (1999). Subject case is the least marked, with object case involving a dependent feature [accusative] and possessive case a dependent feature [oblique]. The person and case structures are given in (10) and (11). *R* is Harley and Ritter's notation for *Referring Expression*, the root node for pronouns.

⁶ Harley and Ritter thus take [speaker] to be the default interpretation of a bare [participant] node. In addition, in languages that distinguish inclusive from exclusive first person forms, [speaker] functions as a marked value. Since Zuni lacks this distinction, the feature [speaker] is unnecessary. See also Cowper and Hall 2004 for a discussion of person features based on Harley and Ritter's proposals.



Putting the features of person and Case together with the number features from (7), we have the representation in (12) for the first and second person plural possessive pronouns *hoʔnʔa:wan* and *toʔnʔa:wan*.

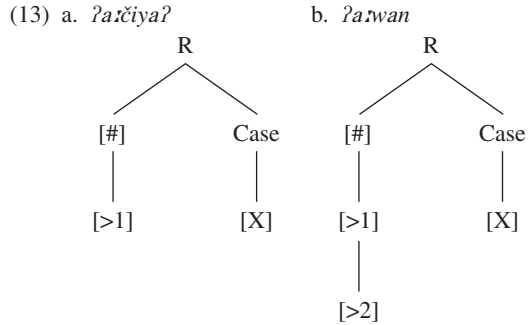


For completeness, I also assume a feature [final] to distinguish final from medial forms. This is not to be taken as a proposed account of positional variation in Zuni; rather, it simply permits an account of all the pronoun forms.

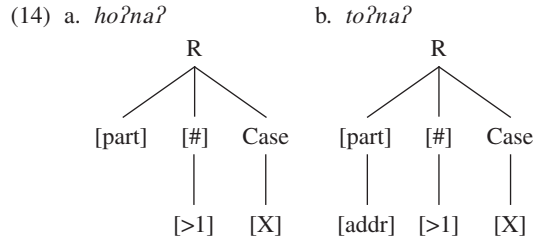
The VIs *hoʔnʔa:wan* and *toʔnʔa:wan*, shown in (12), are syncretic for position and will therefore spell out structures either with or without the feature [final].

Now consider the third person dual and plural forms *ʔa:ʔiyaʔ* (dual) and *ʔa:wan* (plural). These forms are syncretic both for position and for object and possessive case. Following Béjar and Hall (1999), I assume that it is possible for a VI to spell out, not only specific features, but also degrees of markedness. These VIs thus spell out

marked ([acc] or [obl]) as opposed to unmarked Case. Their feature specifications are given in (13), where [X] is a variable ranging over all nonnull dependents of Case.

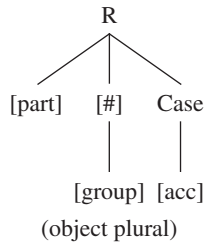
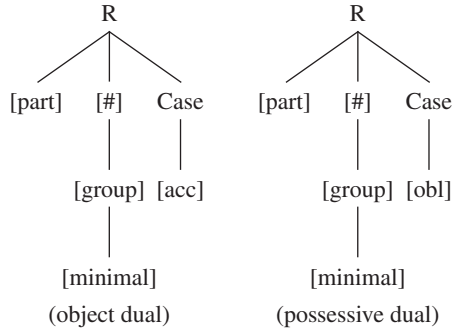
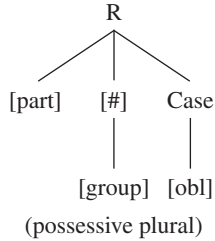


I now turn to the forms *hoʔnaʔ* and *toʔnaʔ*, which spell out dual and plural object case, as well as dual possessive. Under the system being proposed here, this three-way syncretism can readily be captured with the feature specifications shown in (14).

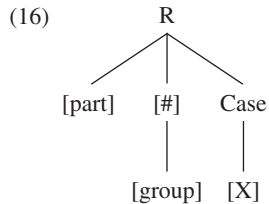


This representation is compatible with the three contexts in which the forms appear. It is also compatible with the context in which *hoʔnʔaʔwan* and *toʔnʔaʔwan* appear, but is blocked there by the closer match ([>2], [obl]) provided by those VIs.

The syncretic forms *hoʔnaʔ* and *toʔnaʔ* provide evidence for the view of dual and plural presented here, and against either of the earlier approaches using the features [group] and [minimal]. The relevant representations using the features in (1) are given in (15). Since the first and second person forms are entirely parallel, only the first person representations are given.

(15) a. *ho?na?*b. *ho?na?arwan*

Let us therefore assume that the VI *ho?na?arwan* has the fully specified representation in (15b) and that *ho?na?* has the most specific representation compatible with all three structures in (15a), that is, (16).



The problem with this analysis arises when the two VIs compete for insertion in the possessive dual. The structure in (15b) matches

the structure of the possessive dual more closely than does the structure in (16), and the analysis thus wrongly predicts that *ho?n?awwan* should be inserted. There is no representation for the possessive plural that is incompatible with the possessive dual in a system in which the dual is more marked than the plural. Under this analysis, the only solution is to claim that there are two homophonous VIs *ho?na?* (and analogously, two homophonous VIs *to?na?*), one spelling out the accusative dual/plural, and the other spelling out the possessive dual.

The revised system in (6) fares no better in accounting for the Zuni pronoun syncretisms. The VIs *ho?n?awwan* and *ho?na?* have the same representations here as they do in the earlier system, since the only difference between the two systems is the position of [minimal] and [minimal] does not appear in these VIs. The same problem therefore arises when the two forms compete for insertion in the possessive dual. As before, *ho?n?awwan* is a better match for the features of the possessive dual, and is wrongly predicted to win over *ho?na?*. Only a feature system in which the plural is more marked than the dual can account for the distribution of these two forms in the Zuni pronoun paradigm. While Harley and Ritter's (2002) revision of their feature geometry does permit an account of the Zuni constructed dual, it falls short of a full account of the pronominal system.

On this basis, I conclude that the features [>1] and [>2] permit a more elegant account of the Zuni pronoun system, and of Corbett's constructed dual, than do the features [group] and [minimal], regardless of how they are organized in the feature geometry. In addition, since the analysis presented here eliminates the crosslinguistic variation in the use of [minimal], it is to be preferred to the approach of Harley and Ritter (2002).

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