Pronominal Suppletion: Case and Number[*]

Peter W. Smith, Beata Moskal, Ting Xu, Jungmin Kang, and Jonathan D. Bobaljik

University of Connecticut, Washington University in St. Louis

1.   Introduction

Bobaljik (2012) shows that patterns of suppletion can be used as a diagnostic of morphological structure. Specifically, we can see evidence that certain heads are located inside other heads in complex categories. Bobaljik shows this with a thorough study into suppletion patterns in adjective-comparative-superlative triples, showing that the comparative is universally contained within the superlative as in (1), below (see section 2 for further details). In this paper, we present the results of a survey into pronominal suppletion patterns found with case and number, and show that cross-linguistically robust patterns provide evidence for each category being internally complex.

For case, following the same logic as in Bobaljik (2012), we argue that the representation of oblique cases contains the representation of the 'dependent' cases (in the sense of Marantz 1991, i.e. accusative and ergative), and the dependent cases in turn contain the unmarked (nominative, absolutive) cases (cf. Caha 2009). In other words, we may represent the relation among cases on a pronominal base as in (2), paralleling Bobaljik's proposal for adjectival gradation in (1):[1]

(1)   SUPERLATIVE   (2)

                COMPARATIVE   OBLIQUE

     BASE   DEPENDENT

                             BASE
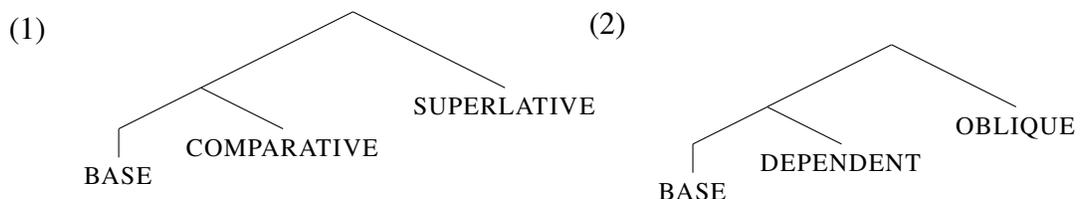
With regard to number, we see that the suppletive patterns in pronouns are consistent with positing containment relations that structurally instantiate a markedness hierarchy,

---

[1]These are represented as structural containment for now, however later on in section 3 an alternative in terms of featural containment will also be considered. For expository convenience, we treat the unmarked case (nominative) in these representations as a bare pronominal base.

but that the choice of representation is more complex when we include lexical nouns in the discussion (section 4).

We argue for these representations of case and number in pronouns based on the following generalizations, drawn from our survey.

(3) If a pronoun shows suppletion for the dependent case, then the pronominal base in the oblique will also be suppletive relative to the unmarked base. (*ABA)

(4) Pronominal suppletion for number shows either (i) plural and dual patterning together, or (ii) plural and dual each having distinct suppletive bases.

(5) If a pronoun shows a suppletive base in the plural, then the dual is also suppletive with respect to the singular base. (*ABA)

Put more abstractly, we see that in accordance with Bobaljik (2012), ABA patterns of suppletion are universally disallowed for both case and number. The rest of this paper is organized as follows. In section 2, we briefly survey the findings of Bobaljik (2012) and how this relates to the theory of suppletion in Distributed Morphology (Halle & Marantz 1993). In section 3, we present the results of our survey of case suppletion patterns in pronouns, showing that similar observations to the adjectival domain are made there. In section 4, we present the results of our number survey, showing that although ABA patterns are again unattested, we see a curious difference between lexical nouns and pronouns. Finally, in section 5, we conclude the paper.

2.   Suppletion for complex categories

Bobaljik (2012) conducts a wide cross-linguistic survey into adjectival suppletion in the context of comparative and superlative morphology. His findings show that some patterns which are *a priori* conceivable are not attested. The attested patterns of suppletion are: (i) AAA, where the positive, comparative and superlative all share the same base (*smart-smarter-smartest*); (ii) ABB, where the comparative and superlative are suppletive with respect to the positive (*good-better-best*); and (iii) ABC, where the comparative and superlative are suppletive with respect both to the positive, and to each other (Latin *bonus-melior-optimus*):

(6)

		POS	COMP	SPRL	Pattern
a.	English	smart	smart-er	smart-est	AAA
b.	English	good	bett-er	be-st	ABB
c.	Kildin Saami	š'ig'	per'a-mp	pɛr'-mus	ABB
d.	Latin	bon-us	mel-ior	opt-imus	ABC
e.	Welsh	da	gwell	gor-au	ABC

Strikingly, there are no clear ABA or AAB instances (see Bobaljik 2012 for qualifications). ABA would hypothetically be *good-better-goodest*. AAB would be *good-gooder-best*. The generalization that emerges from this is a two-way correlation in adjectival suppletion: when the comparative is suppletive with respect to the positive, so is the superlative, and vice versa. Even though ABA and AAB patterns are certainly conceivable, the fact that they are universally unattested suggests that the grammar cannot generate them.

In order to capture these findings, Bobaljik proposes the Containment Hypothesis, which states that the representation of the superlative properly contains that of the comparative (as schematized in (1) above). This hypothesis has the effect of ensuring that ABA patterns cannot be generated.[2] The reasoning is as follows: Suppletion in DM is modeled as contextual allomorphy. Lexical items (including roots) are abstract morphemes (indicated as: $\sqrt{\text{ROOT}}$) which receive their phonological form via Vocabulary Insertion (VI, i.e., rules of exponence), as in (7). Where more than one rule may apply to a single abstract morpheme, the competition among rules is resolved by the Elsewhere Condition (Kiparsky 1973), whereby the most specific rule consistent with the actual context wins.

(7)   a. $\sqrt{\text{GOOD}}$ $\rightarrow$ be(tt)   / __] CMPR
      b. $\sqrt{\text{GOOD}}$ $\rightarrow$ good

Under the Containment Hypothesis, with rules like (7), the suppletive allomorph that is specified to apply in the context of the comparative will apply in the superlative as well, bleeding the elsewhere allomorph, since the representation of the superlative properly contains that of the comparative. Unless this rule is further blocked by an even more specific VI rule (as in (8) yielding an ABC pattern)[3], the comparative and superlative forms will share the same suppletive root. Thus, ABA patterns are not possible.

(8)   a. $\sqrt{\text{GOOD}}$ $\rightarrow$ opt   / __] CMPR] SPRL
      b. $\sqrt{\text{GOOD}}$ $\rightarrow$ mel   / __] CMPR
      c. $\sqrt{\text{GOOD}}$ $\rightarrow$ bon

There are various pieces of evidence that support the Containment Hypothesis; e.g., certain languages transparently show the comparative morpheme within the superlative:

(9)

		POS	COMP	SPRL	Gloss
a.	Persian	kam	kam-tar	kam-tar-in	'little'
b.	Czech	mlad-ý	mlad-ši	nej-mlad-ši	'young'
c.	Hungarian	nagy	nagy-obb	leg-nagy-obb	'big'
d.	Ubykh	nüsᵒə	ç'a-nüsᵒə	a-ç'a-nüsᵒə	'pretty'

The structure in (1) not only derives the *ABA generalization about suppletion, but thus finds independent morphological support. The structure also directly reflects markedness hierarchies ranging over inventories (if a language has a superlative, then it also has a comparative grade).

3.   Suppletion for case

Rather than being limited to adjectival suppletion patterns, the same logic should apply to all complex structures where we see evidence for nesting of one head inside another. In this

---

[2]Save for when they are generated via accidental homophony; Bobaljik (2012) suggests that an anti-homophony bias in acquisition will exclude this.

[3]On the formal representation of the superlative context in (8a) see Bobaljik (2012), Moskal & Smith (2015).

Peter W. Smith, Beata Moskal, Ting Xu, Jungmin Kang, and Jonathan D. Bobaljik

paper we extend this hypothesis to morphological case and number, with a particular focus on pronouns. Pronouns are known to show suppletion for both case and number cross-linguistically (Moskal 2015, in progress). In addition, there are well-studied markedness hierarchies that could be represented as containment structures of the kind that would yield predictions about possible and impossible patterns of suppletion. The general hypothesis is of the form: given a structure in which three (or more) categories stand in a containment relation [[[X] Y] Z], if X suppletes for Y, it will also supplete in the context of Z - there will be no ABA pattern. Working backwards, we may then take the absence of ABA patterns in domains rich with suppletion to constitute evidence of nested structure.

3.1 The complex nature of case

Morphological case has been argued to involve the same kind of structural containment structures Bobaljik argues for in adjectives. Specifically, Caha (2009) argues that there is a universal case sequence, given in (10). This case sequence is encoded structurally, with cases containing all cases to their left on the sequence. For instance, dative case contains genitive, accusative and nominative. Caha's representation of COMITATIVE case is in (11).

(10) NOM − ACC − GEN − DAT − INS − COM

(11) $[_{\text{ComP}} \text{Com}^0 [_{\text{InstrP}} \text{Instr}^0 [_{\text{DatP}} \text{Dat}^0 [_{\text{GenP}} \text{Gen}^0 [_{\text{AccP}} \text{Acc}^0 [_{\text{NomP}} \text{Nom}^0 [\text{NP}]]]]]]]$

Caha motivates such a containment structure by arguing that syncretism among cases always targets contiguous regions on the case sequence. Syncretism is modelled as under-specification, and the Elsewhere Condition ensures that the next 'closest' case morphology will be used whenever a specific contrast is lacking. In addition, Caha claims that the structure in (11) reflects inventory universals, just as (1) does in the adjectival domain.

3.2 Suppletion patterns in Case

If case is represented in containment structures, we expect to find similar suppletion patterns as in adjectival suppletion. Most specifically, we expect to find the signature *ABA gap in suppletion, which is the direct consequence of the Elsewhere Condition. For the purposes of cross-linguistic commensurability, we considered a simplified version of the Case Hierarchy: in general, for the languages investigated, we considered (i) the unmarked case (the case of canonical intransitive subjects, either nominative or absolutive), (ii) the corresponding dependent case (accusative or ergative), and (iii) a representative oblique case, typically dative. Considerations of markedness, Caha-style syncretic patterning, and what little evidence there is for transparent morphological containment point to the representation in (2): [[[BASE/UNMARKED] DEPENDENT] OBLIQUE] – relative to which we can investigate the attested and unattested patterns of suppletion.[4]

---

[4]Throughout the study, we set aside the genitive case, in part since available sources do not consistently distinguish a genitive case (relevant to the case hierarchy) from possessive pronouns (which are not part of the hierarchy). See also Harðarson (2014) for evidence that the position of the genitive relative to the dative is not universally stable on Caha's hierarchy.

Our primary sample consisted of 160 languages. Of these roughly half were irrelevant to the study, having either no suppletion, or too few case distinctions to be informative (a language with a two-way case distinction lacks *ABA patterns trivially). Among the languages that were relevant, we counted cognate triples of pronouns: German 1SG *ich – mich – mir*, Russian *ja – menja – mne*, and other Indo-European pronouns on this pattern are all cognate with one another (Katz 1998) and thus represent a single data-point in what follows - a single instance of an ABB pattern.

The results of our survey are summarized here:[5]

(12)

Pattern	Prediction	Attested	Cog. *n*-tuples	Representative Languages
AAA	✔	✔	many	Lezgian, W. Greenlandic, etc.
ABB	✔	✔	42	Indo-European, Evenki, Xakass
ABC	✔	✔	1	Khinalug
ABA	✘	✘	(1?)	(Archi?)
AAB	?	✔	9	Krongo, Hunzib, Wardaman

We briefly illustrate the attested patterns here. AAA patterns involve no suppletion – pronouns have a clearly identifiable, consistent person and number formative (even if there are some challenges to total segmentation). These are pervasive, as in e.g. Lezgian (Haspelmath 1993):

(13)

Form	Absolutive	Ergative	Dative	Adessive	Inessive
1sg	zun	za	zaz	zaw	za
2sg	wun	wuna	waz	waw	wa
1pl	čun	čna	čaz	čaw	ča

The ABB pattern is typical of Indo-European first person singular pronouns, with an *m-* base in all the non-nominative cases. An additional ABB pattern is seen in e.g. Classical Armenian (Kozintseva 1995):

(14)

Form	Nominative	Dative	Ablative	Locative	Instrumental
1sg	es	inj	inj(a)nic	inj(a)num	inj(a)nov
2sg	du	k'ez	k'ez(a)nic	k'ez(a)num	kez(a)nov
2pl	duk'	jez	jez(a)nic	jez(a)num	jez(a)nov

As in adjectival suppletion, the ABC pattern is rare, relative to the other attested patterns. The best example we have identified is the 1SG pronoun in Khinalug, a Nakh-Daghestanian language (Kibrik & Kodzasov 1990):

(15)

Form	Absolutive	Ergative	Dative
1sg	zɨ	jä	as(ir)

Notably missing from our survey is a clear example of an ABA pattern, as predicted. One potential ABA pattern is the Archi 2PL pronoun, however it appears to us that this may actually contain a consistent formative and thus be an AAA pattern. See Moskal (in progress) for discussion.

---

[5]Although the numbers reported reflect the original 160-language sample, we have added additional examples following up on references suggested to us at NELS. We are particularly grateful to Nina Radkevich for pointing us to Kibrik & Kodzasov (1990).

3.3 AAB

In contrast to adjectival suppletion, we also find AAB patterns in pronominal suppletion for case. These come in two types. The first type is where there is a complete syncretism between the first two (or more) cases, as seen in e.g. Krongo (Reh 1985):

(16)

Form	Subject	Object	Dative	Ablative	Locative
1sg	àʔàŋ	àʔàŋ	àʔàŋ	nkàtí	kàtí
2sg	ùʔùŋ	ùʔùŋ	ùʔùŋ	nkòtú	kòtú
1ex	óow	óow	óow	nkòtíg	kòtíg

Total syncretism of this sort is arguably better modelled as a complete neutralization of contrast among the cases (e.g., via impoverishment or other means). Rather than presenting Krongo as AAABB, one may think of the first three columns as representing, say, an undifferentiated 'argumental' case: relative to the case distinctions ARGUMENT − ABLATIVE − LOCATIVE, Krongo pronouns are the more regular ABB pattern. For a convergent conclusion from stem alternations, see McFadden (2014).

A different type of AAB pattern comes from Wardaman (Merlan 1994), and similar true ABB patterns are found in Nakh-Daghestanian languages:

(17)

Form	Absolutive	Ergative	Dative/oblique
3sg	narnaj	narnaj-(j)i	gunga
3pl	narnaj-bulu	narnaj-bulu-yi	wurrugu

In (17), we see that the absolutive and ergative forms share the root *narnaj*, and there is a suppletive root in the dative/oblique case. However, we can see that there is a clearly identifiable ergative case suffix *y/ji*, which is present in the ergative but absent in the absolutive. Since there is a case suffix distinguishing the two, absolutive and ergative are not completely syncretic, and therefore the AAB pattern is a true one.

Why should case differ from adjectival gradation in permitting AAB patterns? Bobaljik (2012) argues that structural locality excludes the AAB pattern – the superlative is too far away from the root to be able to condition root suppletion. From this perspective, there are two ways in which case may be different that would permit AAB patterns in case, while leaving the *ABA result intact. On the one hand, we may simply stipulate that the comparative head in (1) is an intervener (e.g., as a cyclic node), but that intermediate case nodes are not. Alternatively, we could represent the containment among case features in terms of featural containment as opposed to the structural containment of Caha. In the following representations, [K$_1$,K$_2$] represents a dependent case – it contains the representation of the unmarked case [K$_1$] and is contained in the representation of the oblique.

(18)

```
        x
      /   \
     y    [ K₁ ]
     |
    BASE
```

(19)

```
        x
      /   \
     y    [ K₁ ]
     |     [ K₂ ]
    BASE
```

(20)

```
        x
      /   \
     y    [ K₁ ]
     |     [ K₂ ]
    BASE   [ K₃ ]
```
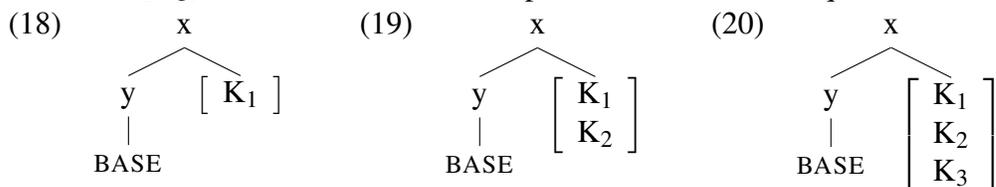
The featural-containment representation of case has two effects. Firstly, it ensures that ABA patterns of suppletion are not possible in the same way the structural decomposi-

tion ensured this. If there is a rule that will give a suppletive variant in a dependent case (/__ $[K_2]$), then this rule will also apply for the oblique cases. Since oblique case contains dependent case, the context for insertion will be met and the suppletive form will be inserted instead of the elsewhere form, resulting in an ABB pattern.

The second effect of representing the containment with featural, as opposed to structural containment, is that it allows AAB patterns to arise, even under a strong version of locality (see Bobaljik 2012, 158-163). Unlike in (2), all case features in these trees are structurally equally local to the pronominal base. We can formulate VI rules along the lines in (21) for Wardaman roots, that result in the AAB pattern, with no violation of locality.

(21)   a. [3.PL.PRON] → wurrugu / __ $[K_3]$
    b. [3.PRON] → gunga / __ $[K_3]$
    c. [3.PRON] → narnaj

4.   Suppletion for number

Turning to number, we see that number offers another testing ground for how suppletion relates to containment and morphological structure. In order to assess the suppletion patterns properly here, we need to look at languages that make at least a three way distinction for number. Therefore, we look at languages with a singular-plural-dual number contrast.

4.1   The complex nature of number

Similar to adjectives and case, number again provides evidence of a containment structure. For instance, there are universal implicational statements that can be made regarding the relationship between dual and plural, suggesting [[[BASE] PLURAL] DUAL]:

(22)   No language has a trial number unless it has a dual. No language has a dual unless it has a plural. (Universal 34, Greenberg 1963, Corbett 2000)

In various languages, we can see that there is a transparent containment relationship between plural and dual. Certain languages build the dual form from the plural form, such as in the following, from Manam (Lichtenberk 1983):[6]

(23)   áine ŋára   áine ŋára-di   áine ŋara-dí-a-ru
    woman that-SG   woman that-PL   woman that-PL-LINKER-DL
    'that woman'   'those women'   'those two women'

4.2   Suppletion patterns in number

4.2.1   Pronouns

For pronominal number suppletion we looked at a sample of 80 languages. Few had both three values for number and suppletion. Among those that do, we find ABB and (rarely)

---

[6] In other languages, the plural is built from the dual, see Corbett (2000), Harbour (2007).

ABC patterns, but ABA and AAB are unattested. As a point of departure, we take the markedness asymmetry in (22) to indicate that the dual contains the plural (which in turn contains the morphologically unmarked, i.e., singular, number).[7] AAA patterns are attested, for instance in Dumi (van Driem 1993):

(24)

	SINGULAR	PLURAL	DUAL
1excl	aŋ	antsɨ	aŋkɨ
2nd	ani	antsi	ani

ABB patterns are also attested, as in Kayardild (25) from (Evans 1995), and Yimas presents an ABC pattern in (26) (Foley 1991):[8]

(25)

	SG	PL	DU
2nd	nyinka	kilda	kirra
3rd	niya	bilda	birra

(26)

	SG	PL	DU
1st	ama	ipa	kapa
2nd	mi	ipwa	kapwa

The range of attested patterns are fully consistent with our predictions, if plural and dual stand in a containment relation rather than being alternative values for a number feature.

4.2.2 Number suppletion in lexical nouns

The survey into case suppletion only took into account data from pronouns. This was by necessity, since, as argued by Moskal (2015, in progress), lexical nouns do not normally show case suppletion. However, as discussed by Moskal, lexical nouns do show suppletion for number, and so we include here suppletion data from lexical nouns. The data are sparse, and in our search, we find only isolated instances of, fully described at least, suppletive paradigms in languages with a three-way number contrast.

Four examples show patterns in which the plural is built on a suppletive root, relative to the singular and dual. We found no examples of the pattern in which the dual is suppletive, with singular and plural grouping together.[9] This can be described as AAB patterns attested, and ABA unattested, if the order of the columns in lexical nouns is as in (27):

(27)

Language	Singular	Dual	Plural	Gloss
Hopi	wùuti	wùutit	momoyam	'woman'
Lavukaleve	vo'vou	vo'voul	tulav	'boy'
Yimas	panmal	panmalc-rm	pay-um	'man'
Slovenian	člóvek	člóvek-a	ljudj-e	'person'

One might wonder whether these are correctly characterized as AAB patterns, or whether these are ABA. If the patterns in (27) are AAB patterns, then it must be the case that the

---

[7]We take no stand here on how to reconcile the morphological markedness pattern with arguments that the singular is marked relative to the plural semantically; see Bale et al. (2011).

[8]Kham possessive pronouns are another ABC example, brought to our attention by Kenyon Branan.

[9]In Slovenian, the dual patterns with the plural in the genitive and locative, but this is part of a language-wide pattern of syncretism: the genitive and locative systematically draw only a singular/non-singular distinction and have no distinct dual.

dual is contained within the plural, as opposed to plural within the dual. Indeed, there is clear cross-linguistic variation in the transparent morphology on this point (even within the pronouns, see fn. 6). Moreover, Hopi nominal morphology, to the extent it is transparent, provides evidence that the plural does indeed contain the dual:

(28)

	Singular	Dual	Plural
'person'	sino	sino-t	sino-m
'donkey'	mooro	mooro-t	moo-moro-t
'child'	tsay	tsaayo-m	tsaa-tsayo-m
'woman'	wùuti	wùuti-t	momoyam

In some Hopi nominals, the dual and plural are formed by suffixes, *-t* and *-m*, respectively. One class of nominals (including some deadjectival forms) mark the dual with one of these suffixes, and the plural with the dual form plus reduplication. In these nominals, including the forms for 'donkey' and 'child' in (28), it is clear that the plural contains the representation of the dual.

Our theoretical proposal is that structure determines possibilities for suppletion. Although we leave for a longer paper an account of the variation between [[[BASE] PLURAL] DUAL] (as in Manam) and [[[BASE] DUAL] PLURAL] formations (as in Hopi), the suppletive patterns are consistent with the structures motivated by overt segmentation. By far the most common suppletive pattern is ABB, which is consistent with both containment structures. If we accept that the nouns in (27) are reflections of an underlying [[[BASE] DUAL] PLURAL] configuration (as in Hopi), then we find that in the domain of number, like the other domains previously investigated, ABA patterns systematically do not arise.

5.   Conclusions

In this paper we have investigated the range of pronominal suppletion patterns seen in morphological case and number. We have shown that, similar to adjectival suppletion, pronominal suppletion can be used as a diagnostic of morphological structure. This has been shown through the universal absence of ABA patterns in case and number, mirroring findings from the adjectival domain. One point of contrast to adjectival suppletion is that AAB patterns are found in both case and number suppletion. These facts have been explained by assuming that both case and number show containment relations, but that the considerations of locality that block AAB in the adjectival domain do not obtain with case and number, either because the comparative is special in being a cyclic node (and thus an intervening node for locality purposes) or because case and number containment is featural as opposed to structural in the manner described in section (3.3).

References

Bale, Alan, Michael Gagnon, & Hrayr Khanjian (2011) On the relationship between morphological and semantic markedness. *Morphology* **21**(2): 197–221.

Bobaljik, Jonathan D. (2012) *Universals in Comparative Morphology*. Cambridge, MA: MIT Press.

Caha, Pavel (2009) *The nanosyntax of case*. Ph.D. thesis, University of Tromsø.

Corbett, Greville (2000) *Number*. Cambridge: Cambridge University Press.

van Driem, George (1993) *A Grammar of Dumi*. Berlin: Mouton de Gruyter.

Evans, Nicholas D. (1995) *A Grammar of Kayardild*. Berlin: Mouton de Gruyter.

Foley, William A. (1991) *The Yimas Language of Papua New Guinea*. Stanford: Stanford University Press.

Greenberg, Joseph H. (1963) Some universals of grammar with particular reference to the order of meaningful elements. In *Universals of language*, Joseph H. Greenberg, ed., Cambridge, MA: MIT Press, 73–113.

Halle, Morris & Alec Marantz (1993) Distributed Morphology and the Pieces of Inflection. In *The View from Building 20*, Ken Hale & Samuel Jay Keyser, eds., Cambridge, MA: MIT Press, 111–176.

Harðarson, Gisli Runar (2014) Against the strong Case Contiguity hypothesis. Unpublished ms. University of Connecticut.

Harbour, Daniel (2007) *Morphosemantic number: From Kiowa noun classes to UG number features*. Springer.

Haspelmath, Matin (1993) *A Grammar of Lezgian*. Berlin: Mouton de Gruyter.

Katz, Joshua (1998) *Topics in Indo-European Personal Pronouns*. Ph.D. thesis, Harvard University.

Kibrik, A. E. & S. V. Kodzasov (1990) *Sopostavitel'noe izuhenie dagestanskix jazykov. Imja. Fonetika.* Moscow: Moscow University Press.

Kiparsky, Paul (1973) "Elsewhere" in phonology. In *A Festschrift for Morris Halle*, New York: Holt, Reinhart and Winston, 93–106.

Kozintseva, Natalia (1995) *Modern Eastern Armenian*. Lanugages of the World/Materials, Lincom Europa.

Lichtenberk, Frantisek (1983) *A Grammar of Manam*. Honolulu: University of Hawaii Press.

Marantz, Alec (1991) Case and Licensing. In *Proceedings of ESCOL '91*, G. Westphal, B. Ao, & Hee-Rahk Chae, eds., Cornell Linguistics Club, 243–253.

McFadden, Thomas (2014) Why nominative is special: stem-allomorphy and case structures. Talk given at GLOW 37, Brussels.

Merlan, Francesca C. (1994) *A Grammar of Wardaman, a language of the Northern Territory of Australia*. Berlin: Mouton de Gruyter.

Moskal, Beata (2015) Limits on allomorphy: A case-study in nominal suppletion. *Linguistic Inquiry* **46**(2): 363–375.

Moskal, Beata (in progress) *Domains on the border: Between Morphology and Phonology*. Ph.D. thesis, University of Connecticut, Storrs, CT.

Moskal, Beata & Peter W. Smith (2015) Towards a theory without linearity: Hypercontextual VI-rules. Unpublished ms. University of Connecticut.

Reh, Mechthild (1985) *Die Krongo-Sprache (Nìinò Mó-Dì)*. Berlin: Dietrich Reimer Verlag.