

Same difference? Contrast in syntax and contrast in phonology

Daniel Currie Hall
Saint Mary's University
& University of Toronto

Workshop on Contrast in Syntax
in honour of Elizabeth Cowper
University of Toronto, 24 April 2015

1 Why contrast matters

The arch:¹

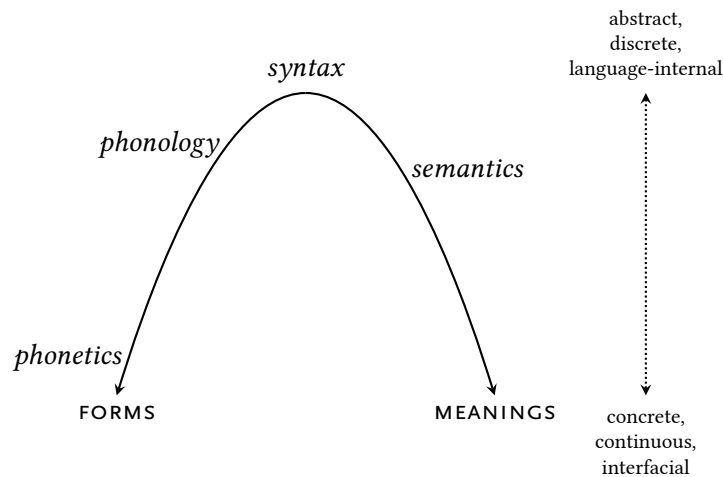


Figure 1: Linguistics as an arch from sounds to ideas

- The formal computational systems of language do not deal with all of the ways in which forms or meanings can potentially differ from one another.
 - Some grammatical number systems distinguish plural from paucal, but none distinguish 39 from 38.
 - Phonological tone systems distinguish multiple pitch levels, but not as many as the chromatic scale.
- Formal representations distill the arbitrarily fine-grained worlds of sound and meaning into discrete primitives (features).
- The representational richness of the features partially determines the computational power and complexity of the grammar.
- Contrast sets a lower bound on how much information is featurally encoded.
- Methodologically, it's useful to start from this lower bound, enriching our representations only when it is demonstrably necessary, an approach elegantly summed up as

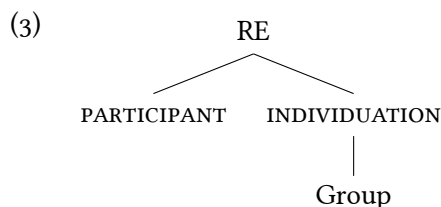
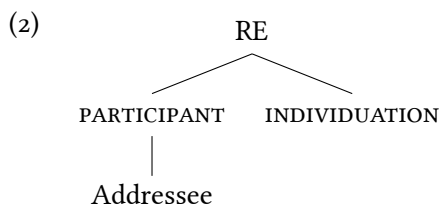
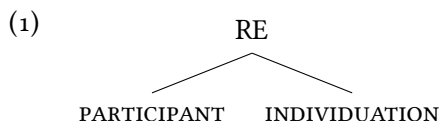
“retreat from perfection in the face of data”

—E. Cowper, *passim*

1. Not the stones (Dresher 2013).

- Two key properties of representations based on contrast:

1. The presence of complex structures in a system implies the presence of simpler ones.
2. The interpretation of any representation depends not only on its own content but also on what it contrasts with. For example, in the feature system of Harley & Ritter (2002), (1) is interpreted as ‘first person singular’ if it stands in opposition to the representations in (2) and (3):



...but if it does not, as in the pronoun system of Winnebago (Hocąk), then it means ‘any number of discourse participants’:

- (4) Winnebago pronouns (Noyer 1992: 151; Harley & Ritter 2002: 512; Harbour 2014: 134–135)
- | | |
|------------|------------------------|
| <i>nee</i> | ‘I’/‘you’/‘we’ |
| <i>?ee</i> | ‘she’/‘he’/‘it’/‘they’ |

(See Cowper & Hall 2013a, 2014a for further discussion and examples.)

2 Contrast and features in phonology

- In phonology, we know that the phonemes of the underlying inventory must be featurally distinct from one another.²
- Minimal contrastive feature specifications can be assigned in a couple of different ways.

2.1 Division

- Modified Contrastive Specification³ (Dresher et al. 1994) proceeds by using features to divide the inventory:

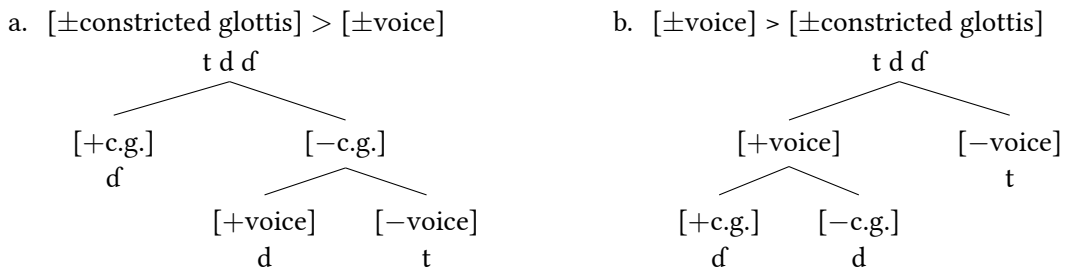
- (5) Successive Division Algorithm (Dresher 2009: 16)
- a. Begin with *no* feature specifications: assume all sounds are allophones of a single undifferentiated phoneme.
 - b. If the set is found to consist of more than one contrasting member, select a feature and divide the set into as many subsets as the feature allows for.
 - c. Repeat step (b) in each subset: keep dividing up the inventory into sets, applying successive features in turn, until every set has only one member.

2. There may also be other contrastive phonological information that distinguishes the UR of one lexical item from that of another, such as moras or prosodic boundaries.

3. So named by Paradis & Prunet (1991) to distinguish it from versions of Contrastive Specification proposed by Steriade (1987) and Clements (1988).

- No feature is assigned unless it serves to mark some phonemic contrast, although some features may appear to be predictable from others in retrospect.
- The relative scope of contrasts, expressed in the sequence of divisions, is crucial. For example, suppose you are dividing an inventory that includes (voiced) implosives and both voiced and voiceless plain stops. This three-way contrast can be represented using two binary features, $[\pm\text{constricted glottis}]$ and $[\pm\text{voice}]$. Because they don't fully cross-classify, one feature will be unspecified on one class of stops:

(6) Two hierarchical orderings of laryngeal features (Mackenzie 2013: 300)



- (6a) captures the intuition that if we know that a segment is $[\text{+c.g.}]$, its voicing is predictable; (6b) captures the intuition that if we know that a segment is $[\text{-voice}]$, it is predictably not implosive.
- We might further reduce the number of specified features by taking advantage of both of these redundancies at once, specifying implosive /d/ only as $[\text{+c.g.}]$ and voiceless /t/ only as $[\text{-voice}]$. But then there would be no explicit indication at all of how these two segments differ from each other (cf. Halle 1959: 32). And, as Archangeli (1988) and Dresher (2009: §2.5) have shown, there are many circumstances in which leaving out any feature value that can be predicted from some other feature value results in representations from which the missing features cannot even be recovered at all.

2.2 Addition

- The Parallel Structures Model of feature geometry (Morén 2003, 2006a,b) also incorporates the idea that complexity of representations is driven by contrast, but in a way that suggests a different approach to assigning specifications.
- In the PSM, for every feature used in a given system, there is one segment specified *only* with that feature. This principle is similar to the Autonomous Interpretation Hypothesis in Element Theory (Harris & Lindsey 1995).
- Hall (2012) proposes an algorithm for building representations based on this principle; unlike the Successive Division Algorithm in (5), it starts with an empty inventory and proceeds by adding segments and features:

(7) Building parallel structures (Hall 2012)

- Start with no segments, and no features.
- To add a segment to the inventory, do either of the following:
 - Create a new **primitive** segment by introducing a new feature F (or by placing an existing feature F under a different node), *or*
 - Create a new **complex** segment by combining the features of any existing segment with the sole feature F of any existing primitive segment.

- In this approach, too, no feature is specified unless it marks a contrast. For example, it is not possible to introduce a segment specified as $[F, G, H]$ unless there are already segments $[F]$, $[G]$, and $[H]$, plus at least one of $[F, G]$, $[G, H]$, or $[H, F]$.
- The SDA lends itself to contrastive hierarchies like the ones in (6), in which inventories branch into progressively smaller natural classes identified by progressively larger sets of features. (Such diagrams have been used at least since Cherry et al. (1953).)
- The procedure in (7) suggests instead a diagram like Figure 2, in which simple properties combine to produce more marked segments and representations.
- How we think of contrast depends, in part, on how we think of features.

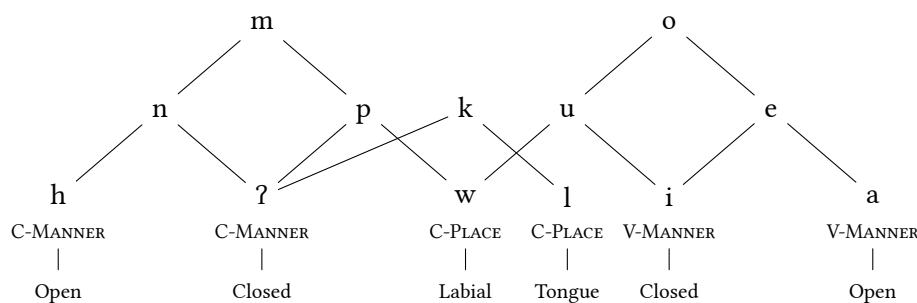


Figure 2: Morén’s (2006b) specifications for Hawaiian consonants and vowels, represented as a semilattice

3 Inventories in phonology and syntax

3.1 Phonemic inventories

- In phonology, contrast is determined relative to an inventory of phonemes—e.g., the Hawaiian consonant inventory in Table 1.

	LABIAL	CORONAL	DORSAL	GLOTTAL
STOP	p		k	ʔ
FRICATIVE				h
NASAL	m	n		
APPROXIMANT	w	l		

Table 1: Consonant inventory of Hawaiian

- We know that the grammar needs to be able to encode the difference between one phoneme in another at least for the sake of representing contrasting lexical underlying forms, since phonemes are (by definition) unpredictable. Some of us (e.g., Hall 2007; Dresher 2009) hypothesize that the same features that serve this minimal function are also all that are needed to account for their phonological behaviour.
- Phonological inventories can be seen as collections of points (or, more realistically, regions) in multidimensional phonetic space.
- Inventories frequently have idiosyncratic gaps. In Hawaiian, for example, there is no phonemic coronal stop $/t/$, nor a phonemic dorsal nasal $/ŋ/$, but even in much larger inventories, the phonetic space is seldom uniformly filled with phonemes.

- Such gaps, both systematic (e.g., the absence of voiced obstruents in Hawaiian) and seemingly accidental (e.g., the absence of /t/ or /ŋ/), are crucial to cross-linguistic variation in the contrastiveness of features.
 - If we add a series of ejectives (represented by /ʔ/) to the systems in (6), then there would be full cross-classification of the features [\pm voice] and [\pm constricted glottis], and neither would be unspecified, regardless of the order of divisions.
 - If Hawaiian did not have /ʔ/, then the representation [C-MANNER: Closed] might be used for /k/ instead. Or, if Hawaiian had a phonemic contrast between /k/ and /t/, then some additional place feature would need to enter the system to distinguish them.
- Phonemes may also be distinct phonologically without being distinct phonetically. For example, Compton & Drescher (2011) argue that Northern Alaskan Iñupiaq has a phonemic contrast between a ‘strong [i]’ that triggers palatalization of a following consonant and a ‘weak [i]’ that does not:

- (8) Strong and weak [i] in Northern Alaskan Iñupiaq (Compton & Drescher 2011: 206)
- | | | | | | | |
|----|--------|---------|-----------|---------------|------------|--------------------|
| a. | [iki] | ‘wound’ | [iki-lu] | ‘and a wound’ | [iki-nik] | ‘wounds’ (oblique) |
| b. | [ini] | ‘place’ | [ini-lu] | ‘and a place’ | [ini-nik] | ‘places’ (oblique) |
| c. | [iylu] | ‘house’ | [iylu-lu] | ‘and a house’ | [iylu-nik] | ‘houses’ (oblique) |

- The idea that items may be grammatically distinct without being phonetically distinct has been rather more controversial in phonology than it is in syntax.
- E.g., a C head that identifies a clause as a wh-question can do so either by being itself audible or by having a wh-phrase move to its specifier (Cheng 1991). What’s going on in (8) is essentially the same thing—different phonemes can contribute to distinguishing lexical items either by sounding different or by having different effects on their surroundings.

3.2 Morphosyntactic inventories?

- In (morpho)syntax, is there an analogue to phonemic inventories that we can use to determine what features must be contrastive in a given language?
- Inflectional paradigms look a bit like phonological inventories—sets of linguistic objects arrayed in a multi-dimensional space, often with idiosyncratic asymmetries.
- For example, consider the suffixes of the Old Church Slavonic ‘twofold’ noun declension, shown in Table 2 (based on Lunt 1959: 54).⁴

	SINGULAR			DUAL			PLURAL		
	MASC.	NEUT.	FEM.	MASC.	NEUT.	FEM.	MASC.	NEUT.	FEM.
NOM.	-Ъ, -Ь	-О, -Е	-а	-а	-Ѣ, -И		-И	-а	-Ы, -А
ACC.			-Ж				-Ы, -А		
GEN.	-а		-Ы, -А	-оу			-Ъ, -Ь		
LOC.	-Ѣ, -И						-ѢХЪ, -ИХЪ		-аХЪ
DAT.	-оу			-ома, -ема		-ама	-омЪ, -емЪ		-амЪ
INST.	-омЪ, -емЪ		-оѢа, -еѢа				-Ы, -И		-ами

Table 2: Suffixes marking number, gender, and case on nouns and indefinite adjectives in Old Church Slavonic

4. Paired forms occupying the same cell are in phonologically predictable distribution, the form on the right appearing on stems ending in ‘soft’ (palatal) consonants and the form on the left elsewhere.

- Number, gender, and case define a three-dimensional grammatical space, analogous to the phonetic space defined by place and manner in Table 1.
- But in Table 2, when a contrast is absent, this shows up not as a gap, but as a syncretism. For example:
 - In the dual, there is no contrast between nominative and accusative, or between genitive and locative, or between dative and instrumental.
 - The form -a is highly ambiguous, showing up variously as

* feminine nominative singular	* masculine nominative/accusative dual
* masculine/neuter genitive singular	* neuter nominative/accusative plural
- There is no **distinct** form for, e.g., feminine genitive dual. But this doesn't mean that there is no feminine genitive dual in OCS; it just means that it shares its form with various other gender/number/case combinations, such as masculine dative singular.
- How different is this from phonological inventories?
- Hawaiian does not have a **phonemic** /t/ that contrasts with /k/, but that does not mean that there is no phonetic [t]. Rather, we might say that the phoneme /k/ represents a 'syncretism' between dorsal and coronal—or, using more conventionally phonological terms, [t] occurs as an allophone of /k/.

(9) Interchangeability of [t] and [k] in Hawaiian (Schütz 1995: 77–78)

- a. [kanaka] ~ [tanata] 'people'
- b. [ko] ~ [to] 'sugar cane'
- c. [tabetee] ~ [kabekee] 'cabbage'

- Likewise, /n/ encompasses [n] and [ŋ]; /w/ encompasses [w] and [v]; and /l/ encompasses [l] and [r].
- Are there real gaps in morphosyntactic inventories?
 - In OCS, there is also a vocative case, which appears only on masculine and feminine singulars. So perhaps the absence of neuter and non-singular vocatives is a gap, although it's not clear to me whether such forms simply don't exist, or whether they're merely syncretic with the nominative (or both!).
 - In various other languages, we find phenomena such as Person–Case Constraint (PCC) effects and the *Amn't* Ban (on both of which see, e.g., Nevins 2008). But these don't call out to be explained as gaps in inventories—rather, they seem amenable to mechanisms such as impoverishment, or relativized probes, or (in the case of **amn't*) perhaps even phonotactic filters.
 - Languages in general do not have singular inclusive pronouns or agreement, but this seems as if it follows straightforwardly from the semantic contradiction involved in referring to a singular person including both speaker and hearer. (Interestingly, some languages have a first-person inclusive **dual** that occupies a paradigm slot parallel to the other singular forms; Harbour (2008) uses this to argue for the feature [±augmented].)

(10) Singular/plural vs. minimal/augmented (Harbour 2008: 4)

a. Upper Svan person/number agreement

	SINGULAR	PLURAL
1 INCL.	—	l- ... -d
1 EXCL.	xw-	xw- ... -d
2	x-	x- ... -d
3	(various)	-x

b. Winnebago person/number agreement

	MINIMAL	AUGMENTED
1 INCL.	hin-	hin- ... -wi
1 EXCL.	ha-	ha- ... -wi
2	ra-	ra- ... -wi
3	∅	-ire

4 What do we need to distinguish?

“Two things that have no basis for comparison, that do not have a single property in common, as, for example, an inkpot and free will, do not form an opposition.”

Trubetzkoy (1969: 68)⁵

- The problem with treating paradigms as inventories is that they are merely inventories of **vocabulary items**—the surface realizations of abstract grammatical categories, not the grammatical categories themselves.
- In the case of phonological inventories, the phonemes are the grammatical categories, and their surface realizations are allophones.

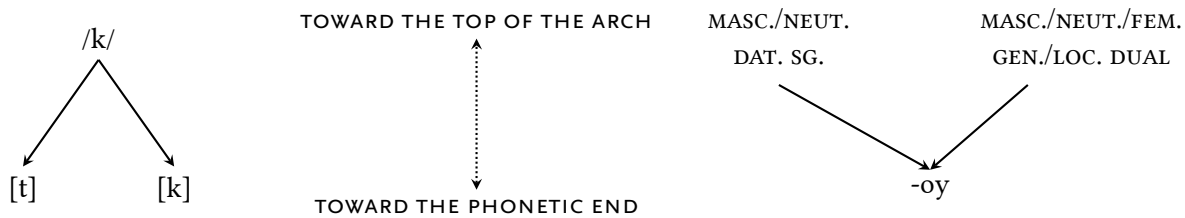


Figure 3: Allophony vs. syncretism

- Does the phonology need to be able to distinguish allophones?
 - If they are genuinely in free variation (or conditioned by something outside the phonology itself), then they may not need distinct phonological representations at all.
 - If they are in phonologically conditioned complementary distribution, then the phonology needs to supply the features that distinguish them. (The Contrastivist Hypothesis predicts that these features should always come from segments on which they are contrastive, e.g. by spreading.)
- In morphosyntax, it’s pretty clear that we need to be able to distinguish things that are realized syncretically. Suppose we have a noun in OCS that appears with the suffix -oy.
 - Although the suffix does not tell us the gender of the noun, the same noun in other contexts will appear with different suffixes according to its gender.
 - Although the suffix does not tell us whether the number is singular or plural, a coindexed pronoun in a different syntactic position may need to mark this distinction.
 - Although the suffix does not tell us the case (unless we independently know that the noun is singular), different cases are assigned by different syntactic heads—the grammar cannot simply be agnostic as to whether this form is dative or genitive or locative.
- Cowper & Hall (2014b) propose that the relevant inventories in morphosyntax consist of “functional lexical items (LIs), considering only the Lexicon in the narrow sense and not the Encyclopedia (Marantz 1996).”
- Here, I’d like to suggest a small amendment to that proposal.

5. In the original German: “Zwei Dinge, die gar keine Vergleichungsgrundlage, d. i. keine einzige gemeinsame Eigenschaft besitzen (z. B. ein Tintenfaß und die Willensfreiheit) bilden keinen Gegensatz” (Trubetzkoy 1939: 60–61).

- A single functional head may contain multiple features, as argued by Bobaljik & Thráinsson (1998) and Cowper & Hall (to appear, 2013b), *contra* Cinque & Rizzi (2008).
- But even in such cases, features marking different kinds of morphosyntactic/semantic properties generally cross-classify fully.
- For example, Cowper & Hall (2013b) posit that Early Modern English had a single Voice/Aspect head. Voice could be PASSIVE or unmarked (active); aspect could be PROCESS, RESULT, or unmarked.
- Any of the three aspects could combine with either of the two voices; the fact that they were bundled on a single head accounts for (among other things) the fact that when both PROCESS and PASSIVE were present, they were spelled out by a form that was not distinct from the corresponding active form, as in the (relatively late) example in (11), whereas Present-Day English spells out voice and aspect on separate heads, as in (12).

(11) *Our Garden is putting in order, by a Man who bears a remarkably good Character...*
(J. Austen, letter of 8 Feb. 1807, quoted in Denison 1998)

(12) *Our garden is being put in order.*

- The surface conflation of active and passive, though, is partly due to the absence of any specifically passive vocabulary items spelling out this head—it's not that there are any gaps or syncretisms in the set of combinations of features that can appear on the head itself.
- The connection between voice and aspect here is simply that they occupy the same syntactic projection, rather than each appearing on its own head. There is no sense in which one of them is predictable given the other, or in which one of them is contrastive only in the context of a specific value of the other.
- So we don't need to think of, for example, the [PROCESS, PASSIVE] VAsp head as an item in our inventory that needs to be distinguished from each other possible VAsp head, let alone from pronouns or tenses or whatever other functional heads there are.
- Rather than thinking of *an* inventory of distinctive morphosyntactic LIs analogous to phonemes, we should say that morphosyntax deals with multiple inventories, one for each morphosemantic dimension. There's an inventory of persons, an inventory of numbers, an inventory of tenses, and so on.
- Within each of these inventories, we find asymmetries and gaps that can be explained in terms of contrasts and their relative scope—e.g., in the number inventory, languages can differ in the relative scope of the features that distinguish mass, singular, and plural, or in the D inventory, DEICTIC and DISTAL may be contrastive only in the context of DEFINITE.
- The abstract, discrete computational system at and near the top of the arch in Figure 1 operates on inventories of contrasting combinations of distinctive features.
- The phonemic inventory is one such inventory, built out of features that are abstractions of phonetic properties.
- The morphosyntax, on the other hand, comprises several such inventories, some built with features that have identifiable interpretations on the conceptual end of the arch (such as person or number), and some with features that seem to be purely internal to the grammar (such as case or noun class).
- Summation:
 - Grammars run on contrastive features.
 - Phonology is the grammar of sounds.
 - Morphosyntax is the grammar of grammars.

References

- Archangeli, Diana. 1988. Underspecification in phonology. *Phonology* 5.2: 183–207.
- Bobaljik, Jonathan David & Höskuldur Thráinsson. 1998. Two heads aren't always better than one. *Syntax* 1.1: 37–71.
- Cheng, Lisa Lai-Shen. 1991. *On the typology of Wh-questions*. Ph.D. thesis, Massachusetts Institute of Technology.
- Cherry, E. Colin, Morris Halle & Roman Jakobson. 1953. Toward the logical description of languages in their phonemic aspect. *Language* 29.1: 34–46.
- Cinque, Guglielmo & Luigi Rizzi. 2008. The cartography of syntactic structures. *CISCL Working Papers* 2: 42–58.
- Clements, G. N. 1988. Towards a substantive theory of feature specification. *NELS* 18: 79–93.
- Compton, Richard & B. Elan Dresher. 2011. Palatalization and “strong *i*” across Inuit dialects. *Canadian Journal of Linguistics* 56.2: 203–228.
- Cowper, Elizabeth & Daniel Currie Hall. 2013a. *Reductiō ad discrīmen*: Where features come from. Presented at Features in Phonology, Morphology, Syntax and Semantics, Universitetet i Tromsø, October 2013. To appear in *Nordlyd*.
- Cowper, Elizabeth & Daniel Currie Hall. 2013b. Syntactic change and the cartography of syntactic structures. In Stefan Keine & Shayne Sloggett (eds.), *NELS 42: Proceedings of the forty-second annual meeting of the North East Linguistic Society*, 129–140. Amherst, MA: GLSA.
- Cowper, Elizabeth & Daniel Currie Hall. 2014a. The features and exponence of nominal number. *Lingue e Linguaggio* 13.1: 63–82.
- Cowper, Elizabeth & Daniel Currie Hall. 2014b. Morphosyntactic features and the scope of contrast. Presented at the 38th meeting of the Atlantic Provinces Linguistic Association (APLA 38), University of New Brunswick, Fredericton, November 2014.
- Cowper, Elizabeth & Daniel Currie Hall. to appear. The rise of contrastive modality in English: A neoparametric account. To appear in *Linguistic Variation*.
- Denison, David. 1998. Syntax. In Suzanne Romaine (ed.), *The Cambridge history of the English language, vol. 4: 1776–1997*, 92–329. Cambridge: Cambridge University Press.
- Dresher, B. Elan. 2009. *The contrastive hierarchy in phonology*. Cambridge: Cambridge University Press.
- Dresher, B. Elan. 2013. The arch not the stones: Universal feature theory without universal features. Presented at Features in Phonology, Morphology, Syntax, and Semantics, Universitetet i Tromsø, October 2013.
- Dresher, B. Elan, Glyne L. Piggott & Keren D. Rice. 1994. Contrast in phonology: Overview. *Toronto Working Papers in Linguistics* 13: iii–xvii.
- Hall, Daniel Currie. 2007. *The role and representation of contrast in phonological theory*. Ph.D. thesis, University of Toronto.
- Hall, Daniel Currie. 2012. Building parallel structures. Presented at the CASTL Decennium, Universitetet i Tromsø, September 2012.
- Halle, Morris. 1959. *The sound pattern of Russian: A linguistic and acoustical investigation*. The Hague: Mouton.
- Harbour, Daniel. 2008. Mass, non-singularity, and augmentation. *MIT Working Papers in Linguistics* 49: 239–266.
- Harbour, Daniel. 2014. Poor pronoun systems and what they teach us. *Nordlyd* 41.1: 125–143.
- Harley, Heidi & Elizabeth Ritter. 2002. Person and number in pronouns: A feature-geometric analysis. *Language* 78.3: 482–526.
- Harris, John & Geoff Lindsey. 1995. The elements of phonological representation. In Jacques Durand & Francis Katamba (eds.), *Frontiers of phonology*, 34–79. Harlow: Longman.
- Lunt, Horace Gray. 1959. *Old Church Slavonic grammar*. The Hague: Mouton.
- Mackenzie, Sara. 2013. Laryngeal co-occurrence restrictions in Aymara: Contrastive representations and constraint interaction. *Phonology* 30.2: 297–345.
- Marantz, Alec. 1996. ‘Cat’ as a phrasal idiom: Consequences of late insertion in distributed morphology. Ms., MIT.
- Morén, Bruce. 2003. The Parallel Structures Model of feature geometry. *Working Papers of the Cornell Phonetics Laboratory* 15: 194–270.
- Morén, Bruce. 2006a. Consonant–vowel interactions in Serbian: Features, representations and constraint interac-

- tions. *Lingua* 116: 1198–1244.
- Morén, Bruce. 2006b. The division of labor between segment-internal structure and violable constraints. In Sylvia Blaho, Patrik Bye & Martin Krämer (eds.), *Freedom of analysis?*, 313–344. The Hague: Mouton.
- Nevins, Andrew. 2008. Cross-modular parallels in the study of phon and phi. In Daniel Harbour, David Adger & Susana Béjar (eds.), *Phi-theory: Phi-features across modules and interfaces*, 329–367. Oxford: Oxford University Press.
- Noyer, Robert Rolph. 1992. *Features, positions and affixes in autonomous morphological structure*. Ph.D. thesis, Massachusetts Institute of Technology.
- Paradis, Carole & Jean-François Prunet. 1991. Introduction: Asymmetry and visibility in consonant articulations. In Carole Paradis & Jean-François Prunet (eds.), *The special status of coronals: Internal and external evidence*, vol. 2, Phonetics and Phonology, 1–28. San Diego: Academic Press.
- Schütz, Albert J. 1995. *The voices of Eden: A history of Hawaiian language studies*. Honolulu: University of Hawai'i Press.
- Steriade, Donca. 1987. Redundant values. *CLS* 23.2: 339–362.
- Trubetzkoy, N. S. 1969. *Principles of phonology*. Berkeley and Los Angeles: University of California Press. Translated by Christiane A. M. Baltaxe from Trubetzkoy (1939).
- Trubetzkoy, Nikolai S. 1939. Grundzüge der Phonologie. *Travaux du cercle linguistique de Prague* 7.