Analogical Contamination in the Procedural Grammar of OE Declensions

The premise that grammatical competence is embodied in a task-specific procedural memory has been previously motivated on the basis of psycholinguistic and neurolinguistic evidence (cf., Ullman (2001), Paradis (2009), etc.). These memories are inaccessible to consciousness, so they must treat all data that appears in the pertinent format in a uniform manner. Therefore the OE declensions must be a single cognitive system. There is *prima facie* support for this. First, given 2 numbers, 3 genders and 5 cases there should be 30 contrasting specifications, yet every declension is limited to a subset of the 15 contrasts in Table 1. Second, the forms of inflection align with the stem forms across the declensions (cf. Table 2).

I represent grammatical properties as privative features (PLURAL, FEMININE, etc.). One neural network organizes these features hierarchically and links them to the forms of inflection. A second network aligns these forms with the various stem forms of the declensions. Derivations involve the activation of paths in these networks.

Procedural memories are learned "*by associative strengthening, typically over a number of trials, as in operant conditioning...*" (Mandler 2004: 54). Crucially, "*No meaning is required for this sort of learning – only pattern generalization*" (ibid: 275). Thus I assume that the specification of an affix of inflection includes all and only those features that are found in every position where that affix appears. Surprisingly, the application of this algorithm to Table 1 provides exactly two features for each contrast (i.e., the two pertinent features highest on the hierarchy.) I propose a cognitive constraint: the activation of two features automatically activates the link between grammatical specification and phonological form, completing this part of the derivation. This is why there are so few contrasts in Table 1

There are still many distinct specifications that have homophonous forms (cf., the columns of Table 2). Yet most of this homophony can be attributed to the process of Analogical Contamination, as observed in Taxonomic accounts of language change. This process affects *"...closely knit semantic fields as those involving numerals and kinship terms. ...only those forms that are separated by a single semantic feature are involved...*[for example*]...kinship terms items such as 'brother' and 'sister', but not 'brother' and 'mother'...*" (Bynon, 1979: 42). It turns out that a large majority of the homophonous forms in Table 2 have one grammatical feature in common, while their distinct features are adjacent on the feature hierarchy. The hierarchical propinquity that defines the phenomenon in general suggests that Analogical Contamination may be related to the approximate nature of neural activation.

that		**ADJ.**		**WK. A./N.**	
this		**3rd**		**NOUN**	

Table 1

	singular		
	neut	***masc***	***fem***
Nominative	1	2	4
Accusative		3	5
Genitive	6		7
Instr.	8		10
Dative	9		
	plural		
Nom.&.Acc	11	12	13
Genitive	14		
Instr.&Dat.	15		

Table 2 ---->	**s**	**h**	**þ s**	**þ**	**hǣ**	**hi**		**þiss**		
15					m	m	um	um	um	um
1					t	t	ø	ø	ø	e
6					s	s	es	es	es	an
9					m	m	um	um	e	an
14					ra	ra	ra	a	a	ena
10					re	re	re	e	e	an
7					re	re	re	e	e	an
3				one		ne	ne	ne	ø	an
8			ȳ	ȳ		m	e		e	an
5		īe	ā	ā			e		e	an
12		īe	ā	ā			e		as	an
13		īe	ā	ā			e		a	an
11		īe	ā	ā			u		u	an
4	ēo	ēo	ēo				u		u	e
2	ē	ē	ē				ø		ø	a