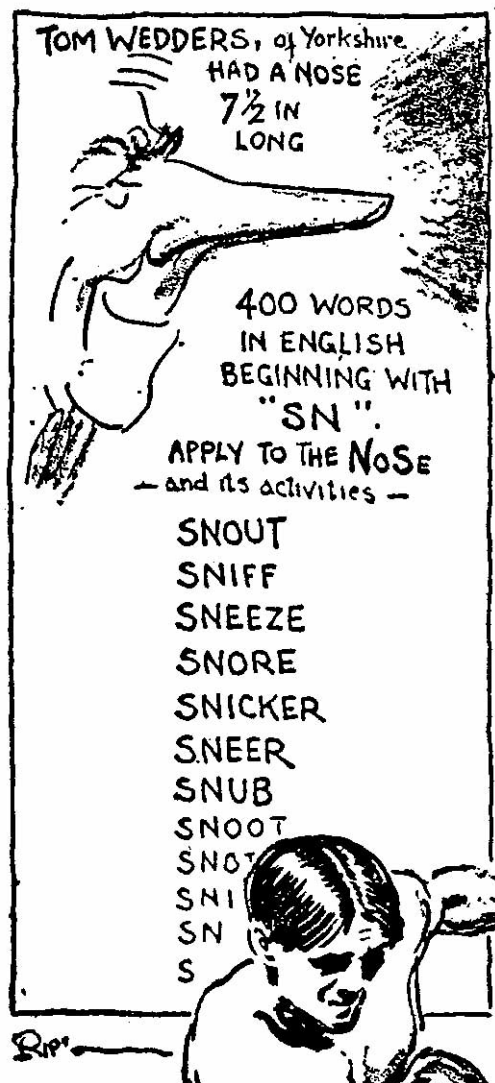


## I. Introduction

This paper is another installment in an ongoing linguistic detective serial. Its roots, like Dorothy Sayers' *Gaudy Night*, lie in academic England in the first third of the last century; and like that estimable novel, it has no corpse, but plenty of mystery, and even the odd poem. Also, like the Sayers novel *Thrones, Dominations* recently completed posthumously, investigation of this mystery is multigenerational, and seems to proceed in spasms; about once every decade or so there are a few more facts brought to light, and a few more theories adduced, but somehow, like any good serial, the whole thing remains quite mysterious.

Like any good detective story, the object of investigation is a real phenomenon, something that is demonstrable but unexplainable. And like any linguistic detective – especially one whose hero, Jim McCawley, declared himself quite satisfied to be described as a ‘data fetishist’ – what I’m interested in is data on the extent of the phenomenon, some explanation about how it works, and – *insha'allah* – some way to relate it to the rest of the linguistic world.



The mysterious phenomenon I’m concerned with here goes under the general rubric of *Sound Symbolism*, and in particular is often referred to with the term *Phonestheme*, a term due to J. R. Firth, and a fairly natural outgrowth of the concepts of the *Phoneme*, the principal unit of **sound** in a language, and the *Morpheme*, the principal unit of lexical **meaning**. The number of phonemes in any language is usually on the order of a thousand times as small as the number of morphemes. Three orders of magnitude is a **big** conceptual gap, in which the phonestheme was intended to be the major unit.

Kepler, and later Bode, remarked on the odd gap in the solar system between the orbits of Mars and Jupiter, which was unfilled until the discovery of the first asteroid, Ceres, by Piazzi in 1800. Like a linguistic Piazzi, Firth filled a conceptual gap by discovering something unexpected in it. And, like the study of the minor planets, the scientific study of these minor word parts and their symbolism has lurched along spasmodically ever since.

However, the phonestheme is part of folk linguistics at least as much as it is of academic: the first published clue, in fact, is to be found in the syndicated graphic strip *Ripley's Believe It Or Not*, which (some time before the publication of Firth's paper) trumpeted the fact that “400 words in English beginning with ‘SN’ apply to the nose – and its activities”.<sup>1</sup>

<sup>1</sup> From Ripley (1941; first published 1929), a collection of daily strips.

Dwight Bolinger next focussed attention on the phenomenon in his 1950 article, in which he came regretfully to the conclusion that the problem was not susceptible to analysis under the then-current understanding of how language (and especially meaning) worked. In the process, however, he did establish the standard terminology, distinguishing between a syllable's *Assonance* (word- or syllable-initial consonant cluster), and its *Rime* (concatenated vocalic nucleus and final consonant cluster); thus in the word *stump*, for instance, the assonance is *st-* and the rime is *-ump*. Bolinger's use of terminology that is derived from (though not quite identical in meaning to) terms of widespread use in poetic analysis signalled, of course, that this phenomenon was not exactly unknown to poets, whether or not linguists might be able to make anything of it.

Rich Rhodes and I were responsible for the next spasm, in our 1981 CLS paper (hereinafter RL81), in which we first made the claim that is perhaps best put as **Phonesthemes Form A Classifier System**. Specifically, we showed that (at least) most initial bi- and triconsonantal cluster assonances in English monosyllables were semantically coherent – in the same senses that classifier systems are – to a degree (typically 70%) **far** beyond chance, and that rimes were also coherent, though to a lesser degree. We also proposed a theory for how this surprising state of affairs could have come to pass, and for how it could maintain its stability over millennia of language history. Several years later, our joint student, Keith McCune, showed in his dissertation (McCune 1983) that the same phenomenon was common in Indonesian (and well-known in Indonesian folk linguistic traditions).

In doing this, we generated the first version of the Lawler/Rhodes database of English *Simplex Words*,<sup>2</sup> parsed by assonance and rime, from which we continue to draw in our later studies; indeed, this kind of investigation has come to be known as *assonance-rime analysis*, to distinguish it from the more fine-grained phonosemantic theories advanced by Margaret Magnus (1998, 1999, 2001). For example, Rhodes (1994) is a cognitive study on the aural images that are rampant in this material, and Lawler (1990, 2003) are detailed image-schematic analyses of various related assonances.

This study, dipped from the same spring, is a continuation and refinement of earlier preliminary works (Lawler 1999, 2000, Hoover 2000) on rimes. *Rime*, in the sense I use the term here, is homophonous, as Bolinger no doubt intended, with the word *rhyme*, and indeed in monosyllables the two terms are synonymous and therefore indistinguishable; in disyllabic simplex words, however, *rime* refers more narrowly only to the nucleus and coda of the first (stressed) syllable. Thus the rime (as well as the rhyme) of *crepe* and *shape* is */-ep/*, while in disyllables like *paper* and *staple*, the rime is also */-ep/*, though the rhymes are different.

Previous work (RL81, Lawler 1990, 2003) had concentrated more closely on assonances, of which there are relatively few (only 67, compared to the 483 rimes), and which are far more obviously coherent phonosemantically. Rimes, being the cross-product of all the possible syllabic nuclei and codas, naturally offer far more possibilities for variation than assonances do, so that there are far more of them, with the result that, for instance, there are more than 80 rimes that occur only once in the database, and more than 40 that occur only twice. There is no significance to, say, the fact that all simplex words with the rime */-ɔlf/* are coherent semantically if *golf* is the only such word in the database.<sup>3</sup>

<sup>2</sup> A *Simplex Word* is one that is either a monosyllable, or a disyllable ending with one of the following unstressed suffixes: */-ər, -əl, -ən, -ət, -əs, -əʃ, -əm, -əd, -əŋ, -əb, -ək, -əz, -əns, -ə, -i, -o, -li/*. Proper nouns are excluded.

<sup>3</sup> The Lawler/Rhodes Simplex Word Database (<http://www.umich.edu/~jlawler/monosyl.zip>) contains all 5411 English simplex words. The 96 vigesimal rimes in this study comprise 2962 words, or 55% of all simplex words.

## II. Caveant

Thus, somewhat arbitrarily, I have limited consideration in this study to the 96 rimes with 20 or more occurrences in the database, which I will call *Vigesimal* rimes. These rimes, while comprising only 20% of the existing 483, nevertheless represent more than half of all simplex words in English, so this is not too onerous a restriction. In fact, though I include summaries, with examples, for all 62 vigesimal rimes in which I have been able to find signs of significant phonosemantic coherence (see Appendix A), I will concentrate in this paper on only a few of the most coherent. While there is very likely great regularity lurking also in the remaining 387 sub-vigesimal rimes (see Appendix B), I will not report on it here.

First, however, a word is in order about what I mean by *coherence* in this context, and an example will probably illustrate that better than a definition. The rime **-əmp**,<sup>4</sup> in my judgement, displays considerable coherence; it ranks fourth in the list of 62 coherent vigesimal rimes. Of the 26 words in the database that contain **-əmp**, 22 fall into one of two semantic groupings. The largest grouping was noted in RL81 to have a 3-dimensional (3D) sense; this set consists of the 15 words *bump*, *clump*, *dump*, *plump*, *hump*, *slump*, *jump*, *stump*, *lump*, *rumple*, *rump*, *crumple*, *stump*, and *mump*. (Note that even though *mumps* is never used in the singular, the root *mump* is entered in the database because no inflections or productive derivations are allowed.)

The other coherent category is a pejorative one, divided into two subsenses – unpleasant people (*chump*, *frump*, *grump*) and unpleasant sounds (*crump*, *thump*, *trumpet*), plus one word (*rumpus*) that overlaps both, for a total of 7 words in this sense, and 22 for the rime as a whole. The residue of 4 words that belong to neither of these classes comprises *pump*, *trump*, *compass*, and *crumpet*. 22 of 26 words amounts to a coherence level of 85%.<sup>5</sup> Both of these senses are fairly ordinary ones. Pejoration is extremely common, especially in monosyllables; and dimensionality of one sort or another is equally normal in phonosemantic terms. We will see plenty of other examples of both below.

By contrast, let us compare this coherent rime set with some other sets of the same size. First, three non-coherent vigesimal rime sets: **-ət**, **-ən**, and **-ek**, each of which also occur 26 times in the database. Respectively, these sets are:

*fret jet net nettle sweat wet bet debt fete get whet let pet set stet  
threat vet yet fettle kettle metal mettle petal settle fetter ghetto*

*glen fen pen kennel den wren hen then when bren wen ken ten yen  
zen henna fennel denim venom menace rennet senate tenet penny steno*

*shake break flake quake fracas drake hake lake ache bake brake fake jake  
cake make rake sake slake snake steak stake take wake naked bacon acre*

While it is of course impossible to prove a universal negative, I am unable to find much semantic coherence in these sets, and thus I have grouped them among the 34 non-coherent vigesimal rimes. *Wet* and *sweat* are both liquid, *nettle*, *threat*, and *ghetto* might be considered pejorative, but that's only 5 and that's all for **-ət**. *Glen*, *fen*, *pen*, *kennel*, and *den* have rural associations of field and animals, and *wren* and *hen* are birds, but any coherence in **-ən** stops there, at 7. Finally, *shake*, *break*, *flake*, *quake*, and *fracas* have associations with forceful disturbance, while *drake*

<sup>4</sup> All of the rimes I discuss here are cited in phonemic notation, using standard symbols but not delimited by slashes.

<sup>5</sup> Actually, the level is 84.6153846153...%. However, this cannot be accurate to more than two significant digits, and therefore all percentages reported here have been rounded to this level of accuracy.

(a waterbird), *hake* (a fish), and *lake* display some coherence, but altogether **-ek** can be no better than 8. These sets are roughly equal in level of coherence, with a grand total of 20 coherent rimes out of 78, for a mean rime coherence level of 26%, with the individual sets ranging between 19% and 31%; one is tempted to wonder whether that is the expected level of coherence in a word set.

To test this hypothesis, let us consider three more sets of 26 words, in this case sets selected from the database randomly (randomly, at least, within the limitations of TurboPascal's random function). These are:

*sock pomp gout hep jay plate sprig till gear kiss eave ode gnome tune zero  
rumble rather proper lecher rhesus nanny gully cubby tawny ditto double*

*tough valve eh quake frail pitch scrim mere sieve B scene beet or froth veggie  
wobble magic dapper rhombus prelate tickle flinder nipple privet newel boll*

*curd bassnock dire self steppe safe skid trick nil dint tier fuse muggy futter  
cackle rancor skanky bounty tousle textile craven razor primer limpet soggy*

Not much can be done with these semantically, I fear. In the first set, *lecher*, *gnome*, and *nanny* refer to humans, and the first two are pejorative; in the second set, *tough* and *frail* are antonyms of durability, while *nipple* and *newel* are 3D diminutive; in the third set, *muggy* and *soggy* have unpleasant liquid associations and *craven*, *skanky*, and *cackle* are pejorative terms for human attributes. That's a grand total of only 12 out of 78 words, for a mean rime coherence level of 15%, with the sets ranging individually from 12% to 19%; in addition, all the coherent subsets are small, on the order of two or three.

I therefore feel licensed to consider as *prima facie* insignificant any rime coherence level below 20%, and to remark on levels below 30% only in cases of particular interest. By contrast, I consider the level of 85% displayed by **-æmp**, comprised of two large coherent subsets (of 15 and 7), to be obviously significant and well outside the possible bounds of random variation.

**-æmp** is the most obvious and clearest case of a high-coherence rime, and in preliminary versions of this study it was ranked highest in coherence. However, in this final version it has – somewhat surprisingly, and only just barely – been superseded by three other rimes and now ranks 4<sup>th</sup> by coherence level. I propose to take up these three rimes here, since they display versions of coherence that are different from the clear case of **-æmp**; more specifically, they are not orthogonal.

### III. Non-orthogonal rime sets: **-ap**, **-ɔl**, and **-əb**

The first thing to note about **-ap** is that it's spelled <OP>, and is not to be confused with **-æp**, which is of course spelled <AP>. Besides the 13-word '2D' sense noted in RL81 (*chap dap frap whap cap clap wrap slap strap flap lap map dapple*), **-æp** also has a 16-word 'contact' sense that overlaps with 9 of the 13 2D words (*clap frap slap strap cap dap whap wrap chap gap rap scrap snap tap trap grapple*), and a 10-word residue (*crap nap sap yap rapid vapid apple scrap-ple happen dapper*); this makes coherence 20 out of 30, with two well-formed non-orthogonal classes, for a coherence level of 66%, ranking 14<sup>th</sup>.

While I have little further to say about **-æp** here, it serves nicely as an example of what I mean by *non-orthogonal* in speaking of semantic categories. The two categories mentioned here for **-æp**, '2D' and 'contact', have a great deal in common semantically; they are not independently motivated. That is, physical contact of any sort must be contact between two or more objects, both of which possess dimensionality, which may be salient. Thus it is not surprising that

the two categories overlap as much as they do. I say the two categories of **-æp** are *non-orthogonal*. By contrast, the two categories for **-əmp**, '3D' and 'pejorative', are *orthogonal*, since pejoration and dimensionality have no intrinsic semantic connection; dimensionality is a physical property of all objects, while pejoration is a social property, usually focussed on humans and their actions. Thus it is not surprising that the semantic groupings for **-əmp** (see Appendix D) are effectively disjoint.

The first three rimes in order of coherence level, **-ap** (31 rimes, 27 coherent, 87%), **-ɔl** (28 rimes, 24 coherent, 86%), and **-əb** (34 rimes, 29 coherent, 85%), are detailed in Appendix C, in matrix form. The next three in rank, **-əmp** (26 rimes, 22 coherent, 85%), **-əŋk** (22 rimes, 18 coherent, 82%), and **-ip** (41 rimes, 32 coherent, 78%), are detailed in Appendix D, in graphic form. One of the many interesting things about these rimes is that the radial classes of these two groups have different topologies: the first three have many non-orthogonal and multiply-overlapping semantic categories, best presented with a matrix; while the second group of three have fewer categories, largely orthogonal, which overlap considerably less, and are best presented as Venn diagrams.

I analyze **-ap** as having 8 categories, of which the first 5 are dependent, in fact closely allied, comprising together an image of physical activity. These 5 categories are:

1. 'abrupt cessation of motion' (a category noted in RL81) 16 words:  
*chop lop drop topple plop clop pop strop bop whop flop hop top crop cop stop swap*
2. 'ballistic motion' (cited in RL81 as 'move out of control') 14 words:  
*chop lop drop topple plop clop pop strop bop whop flop hop top sop slop*
3. 'separate/cut' 14 words:  
*chop lop drop topple plop clop pop strop top crop prop sop slop cop stop*
4. 'impact' 14 words:  
*chop lop drop topple plop clop pop strop bop whop flop hop slop hopper stop*
5. 'vertical orientation' 12 words:  
*chop lop drop topple plop hop top crop prop mop hopper stop*

It seems clear enough that these categories are not independent, and so their details and number are largely a matter of judgement; one could easily add more or combine several of these, depending on one's theoretical lexical-semantic bent. These are the ones that *I* find convenient, nothing more.

However, they **do** pick out a fairly coherent image: an action involving ballistic motion either starting from or ending with a vertical orientation, terminating suddenly with an impact that involves separating something, probably best exemplified by the prototypic word *chop* which fits in all 5 of these categories. This does not appear to be an embodied image, except in that acts of chopping, lopping, etc. require an active human agent to accomplish.

The remaining three categories are ordinary enough. Pejoration is, as noted, unremarkable; the four words that are **only** pejorative (*wop, fop, op, copper*) are terms for people – the last two for people with security-related duties. As usual, there is also an acoustic sense available, and it refers (again as usual) to noises made by the kind of activity referenced by the physical category – chopping, dropping, etc. Next, somehow, *sop, mop, and glop* seem to have absorbed a 'fluid' sense. This sense is also present in *slop* and *drop*, but there at least it can be attributed to the **sl<sub>l</sub>-** (Liquid/Solid Interface: *slush, sleet, slather, slime*) and **dr-** assonances (Liquid: *drink, drip, drool, dry*). I would not like to have to say that this is a case of leakage from *slop* and *drop*, but this category in **-ap** is otherwise inexplicable. Finally, there is the residue: *shop, proper, topic, and tropic*.

Probably a great deal more can be said about the words in the *chop* rime class; I have not investigated their etymologies, nor the PIE roots they come from, not the variety of senses they have. However, I have five more rimes to consider here, and the data are available for anyone to make their own analyses and form their own opinions.

**-ɔl** represents a very interesting and curiously similar echo of **-ap**, in that it also has a number of non-orthogonal senses that converge on a single image involving motion, contact, and dimensionality. However, the dimension in the case of **-ɔl** is 2, not 1 (i.e. planar, not linear), and the orientation is horizontal, not vertical. The motion is deliberate and, if anything, slow, certainly not ballistic; and the contact is not of the sort that causes separation of pieces. The prototypic word for this image is probably *crawl* or *sprawl*; either one can be considered embodied. The particular categories are:

1. 'contact' 16 words:  
*crawl scrawl sprawl trawl squall haul spall maul shawl wall pall awl brawl pawl fall gall*
2. '2-Dimensional' 15 words:  
*crawl scrawl sprawl trawl squall haul spall maul shawl wall pall awl yawl hall mall*
3. 'motion' 13 words:  
*crawl scrawl sprawl trawl squall haul spall maul brawl pawl fall yawl ball*
4. 'expanse' 12 words:  
*crawl scrawl sprawl trawl squall shawl wall pall brawl hall mall all*
5. 'horizontal orientation' 8 words:  
*crawl scrawl sprawl trawl haul pall hall mall*

In addition, there is an aural sense, strictly vocal – indeed, linguistic – this time: *call, bawl, drawl*. The residue is *small, stall, tall, and thrall*. One gets an image of a baby, crawling and bawling.

Finally in this group, the most common category instantiated by **-əb** is 'pejorative'. Pejoration is especially common with rimes that contain /ə/ (**-əb, -əmp, -əg, -əŋk, -ərɪk, -əɪm**). There is also a dimensional category ('1D thick') and a fairly common 'diminutive' category. Pejoration is frequently related to diminution – people and things that are small can be disrespected with impunity by those that are bigger. However, dimensionality is not by itself linked semantically with pejoration, so the large overlap between the 1-D category and the others needs an explanation. The categories are:

1. 'pejorative' 21 words:  
*shrub drub grub stubble chub dub snub tubby cub rubble blubber  
bub flub grubby hubba lubber rub rubbish scrub trouble tub*
2. '1-Dimensional thick' 13 words:  
*shrub drub grub stubble chub dub snub tubby stub club hub nub slub*
3. 'diminutive' 11 words:  
*shrub drub grub stubble chub cub rubble stub bubble cubby hubby*

The residue is *double, glub, pub, rubber, and sub*. I think *shrub* is likely the prototype word for this set (cf. Ivins 2000<sup>6</sup>); this might account for the large 1-D overlap with the pejorative/diminutive complex, since a plant image would be naturally 1-D, like the **br<sub>1</sub>**-assonance (1-D Connected: *brush, branch, briar, bramble*, etc; see Lawler 1990), and a shrub is a diminutive plant.

<sup>6</sup> For the sake of completeness, I mention that the rime **-ʊf** is sub-vigesimal, occurring only five times in the database, and therefore not discussed here. The words with this rime are *bush, whoosh, cushion, push, and tush*.

#### IV. Orthogonal rime sets: **-əmp**, **-əŋk**, and **-ɪp**

I will not repeat here the listings given above for **-əmp**; it is, as noted, one of the clearest cases of a coherent rime. I will, however, repeat here the observation that **-əmp**, being 3D, **ought** to be naturally contrary to a 1D sense, and therefore *stump*, with its 1D rigid **st-** assonance (see Lawler 2003) and its 3D **-əmp** rime, presents a conundrum – or would, if the language had not resolved it. A **stump** is something that once was one-dimensional but currently has three salient dimensions; i.e, the **st-** has been truncated, leaving behind an **-əmp**. This is the perfect phonosemantic interpretation for this word, and its perfection continues to delight me; to use Sapir's stirring phrases, it's an example of the high quality of the 'mountainous and anonymous work of unconscious generations' that fashion language, 'the most massive and inclusive art we know'.

Like **-əb**, the largest category exemplified in **-əŋk** is 'pejorative', with 12 words. There are also 4 words that refer to humans, plus *monkey*, for a 'human(oid)' category of 5; two of them are pejorative, which is to be expected with such a category. In addition, there is an aural category, all of which refer to low-frequency unmelodious noises produced by large objects in collision; two of these are pejorative, as well, which is equally expectable. There is also a small disjoint orthogonal category 'piece', consisting of *hunk* and *chunk*, and a residue of 4 words: *bunker*, *dunk*, *hunker*, and *trunk*. The categories are:

1. 'pejorative' 12 words:  
*bunco funk lunk bunk junk punk drunk skunk spunk flunk clunk thunk*
2. 'human(oid)' 5 words:  
*lunk punk monk monkey uncle*
3. 'noise' 3 words:  
*clunk thunk plunk*
4. 'piece' 2 words:  
*hunk chunk*

The size of the category sets in **-əŋk** is rather small; it ranks as high as it does in coherence level only because there are only 22 words in the whole rime set. The overlap is relatively small, and if it were not for the large pejorative set, comprising over 50% of the words, the coherence level would be at or below the chance threshold. Quite probably the shwa nucleus is responsible for the pejoration, as noted above, and there appears not to be a great deal more of interest here, except possibly for the details of the aural image and their potential iconicity, about which I have nothing more to say.

By contrast, **-ɪp** is a larger set, with 32 words, of which 28 are in one large binary dimensional category that needs some explication. In RL81 **-ɪp** was cited as 'BE slightly off a surface', but there is more involved than that. This category is complex; I cite it as '2D ± 3D', by which I mean that it refers to phenomena occurring at a surface (2D), involving **either** convex extensions (+3D) upwards from that surface, or concave depressions (-3D) downwards in that surface. The 'slightly off a surface' sense from RL81 noted only the +3D variety. Prototypes of the +3D convex sense include *lip* and *nipple*; of the -3D concave sense, prototypes are *nip*, *rip*, and *dip*. These extensions or depressions are often small in comparison to the surface they occur on, and therefore some of them express a 'diminutive' category that overlaps both 3D subcategories, and also includes several words not in a 3D category. Finally, there is a residue of 9 words: *whip*, *hippie*, *yippee*, *ship*, *triple*, *gyp*, *tipple*, *chipper*, and *skipper*.

The categories are:

1. '2D ± 3D' 28 words:
  - a. '2D + 3D; convex/up' 18 words:  
*lip nipple pip stipple hip grip trip cripple clip blip flip drip zip skip zipper tip ripple slip*
  - b. '2D – 3D; concave/down' 10 words:  
*nip dip strip chip scrip slipper snip sip rip snippet*
2. 'diminutive' 13 words:  
*tip ripple slip scrip slipper snip sip rip snippet nipper yip kipper quip*

The size and internal semantic consistency of the 3D **-ip** category are both remarkable. The fact that this rime ranks below the unremarkable **-əŋk** (even though just barely) is, to me, a good argument against using a simple percentage ranking, as I have done here. Clearly, more is at issue than the percentage of coherent words in the set; however, with judgements as subjective as the ones on offer here, I have not felt that a more sophisticated statistical treatment was justifiable. Readers are, of course, at liberty to make their own judgements and perform their own analyses; I offer here only data, lightly sorted and gently seasoned. Heavy cooking is up to the consumer.

## V. Conclusion

For the data fetishists who constitute my prospective audience, I have included here four appendices, with examples of 62 of the 96 vigesimal rimes, and full particulars for the top 6 that I have discussed here. In addition, a list of all non-vigesimal rimes appears in Appendix B. That leaves only those 34 vigesimal rimes that I do not consider to have any significant phonosemantic coherence. I provide below a list of these, with their size.

<b>-er</b> 76	<b>-et</b> 37	<b>-ig</b> 30	<b>-et</b> 26	<b>-ərn</b> 22	<b>-ev</b> 20
<b>-or</b> 53	<b>-ik</b> 34	<b>-in</b> 29	<b>-æł</b> 26	<b>-art</b> 22	<b>-ayr</b> 20
<b>-ay</b> 45	<b>-ak</b> 32	<b>-el</b> 29	<b>-en</b> 26	<b>-est</b> 22	<b>-ed</b> 20
<b>-ey</b> 44	<b>-aw</b> 31	<b>-id</b> 28	<b>-ek</b> 26	<b>-ayd</b> 21	<b>-id</b> 20
<b>-ok</b> 40	<b>-in</b> 31	<b>-al</b> 28	<b>-ev</b> 25	<b>-æs</b> 21	
<b>-el</b> 37	<b>-ut</b> 31	<b>-ən</b> 27	<b>-iz</b> 24	<b>-un</b> 21	

All of the data for these and for the rimes in Appendix A were extracted from the database in the first instance. Semantic coding, however, is not part of the database; therefore, I am making the coded data available in a collection of 96 ASCII files, one for each vigesimal rime, archived on the Web at <http://www.umich.edu/~jlawler/rimes.zip>. I encourage anyone interested in this phenomenon, and their students, to download the database, and these data files, and second-guess me.

This kind of activity is especially interesting, I have found, for students, and it makes a splendid student project that can, if done carefully, provide significant information and generalizations. There are many, many more phenomena left to investigate here; and each one demonstrates what I consider the best-kept secret in America – that linguistics is fun.

Ypsilanti, November 28, 2003.

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# Appendix A Vigesimal Rimes in Simplex Words, by Phonosemantic Coherence

Rime	Size	Coherence			Examples
		Num	Pct	Rank	
62 Coherent Rimes, with examples (often overlapping)					
-ap	31	27	87%	1	RL81 <b>Ab Cess</b> chop drop <b>Ballistic</b> topple hop <b>Sep</b> chop crop <b>Impact</b> plop bop
-al	28	24	86	2	<b>2D</b> shawl sprawl wall <b>Motion</b> crawl brawl haul fall <b>Contact</b> maul trawl spall awl
-əb	34	29	85	3	<b>1D Thick</b> slub club chub stubble <b>Dim</b> shrub stub cub <b>Pej</b> flub lubber rubble
-əmp	26	22	85	4	RL81 <b>3D</b> rump hump lump clump stump <b>Pej</b> frump grump chump rumpus
-əŋk	22	18	82	5	<b>Pej</b> junk flunk bunk skunk drunk <b>Hum</b> punk lunk monk <b>Aural</b> clunk thunk plunk
-ip	41	32	78	6	<b>2D+3D</b> pip lip grip flip blip <b>2D-3D</b> nip chip snip dip <b>Dim</b> sip yip tip ripple
-əg	31	24	77	7	<b>Pej</b> ugh ugly lug slug thug mug <b>Fluid</b> glug jug chug <b>3D Dim</b> nugget snug
-iz	21	16	76	8	<b>Separated/Dispersed/Multiple</b> fizz drizzle schism sizzle dizzy <b>Fluid</b> jism chrism
-iŋk	34	25	74	9	<b>Dim</b> slink trinket tinker wink shrink dinky <b>Dim Aural</b> chink dink plink tinkle
-æk	47	33	70	10	<b>2D Connected</b> plaque stack bracket tacky <b>Aural</b> crack clack quack yack
-æg	39	27	69	11	<b>Crooked/Broken</b> snag zag crag sag rag <b>2D</b> drag rag wagon swagger flag
-æf	25	17	68	12	RL81 <b>Violent Contact</b> bash trash crash thrash slash gash
-æŋ	27	18	67	13	<b>1D Connected</b> hang angle dangle tangle <b>Aural</b> jangle twang bang clang
-æp	30	20	66	14	RL81 <b>2D</b> flap clap lap map wrap <b>Contact</b> slap strap chap rap tap
-iŋ	32	21	66	15	RL81 <b>Dir Force</b> sling sting spring ring <b>Dim Aural</b> ping ding jingle lingo
-il	23	15	65	16	<b>2D Motion</b> peel feel wheel keel kneel seal heel
-es	20	13	65	17	<b>1D Crossed</b> fess wrestle trestle press chess wrestle trestle
-æt	53	34	64	18	(Tongue) <b>2D</b> pat slat mat spatter flat <b>Speech</b> blat chatter spat prattle
-əf	31	19	61	19	<b>2D Friction</b> scuff snuff shuffle ruffle rough <b>Indist Sens</b> fluff muffle gruff
-int	20	12	60	20	<b>Dim Multiple</b> splinter glint hint lint sinter stint <b>Visual/Eye</b> glint squint
-æmp	22	13	59	21	<b>2D Contact</b> clamp cramp tamp damper ramp trample champ stamp scamper
-ab	34	20	59	22	<b>3D Extrusion</b> knob fob glob bobbin cobble gob cob blob
-it	47	27	57	23	<b>Dim</b> spit whittle little kitten bit grit twitter ditty jitter critter
-ik	48	27	56	24	<b>Dim 3D: Concave</b> nick crick tick click flick hickey <b>Convex</b> prick wick tickle
-æb	34	20	56	25	<b>Pej</b> rabble drab shabby crab <b>Speech</b> blabber jabber babble gabble
-æm	35	19	54	26	<b>2D Contact</b> slam hammer flam clam cam <b>Aural</b> bam blam clamor stammer
-um	24	13	54	27	<b>3D Interior/Expansion</b> room womb tomb bloom tumor
-ez	26	14	54	28	<b>2D Contact</b> graze glaze blaze braze raze <b>Indist Sens</b> daze haze craze
-end	21	11	52	29	<b>1D Non-Linear</b> bend wend fend <b>Mix/Fluid</b> mend render blend
-ænd	31	16	52	30	<b>1D+2D</b> stand strand sandal band hand <b>Pej</b> bland vandal pander scandal
-ət	37	19	51%	31	<b>3D Concave/Closure</b> gut shut rut butt hut rut glut gutter putty shutter stutter

**Diminutive, 2-Dimensional, 3-Dimensional, Indistinct Sensation, Pejorative, (Embodied Image)**

**Abrupt Cessation, Separate.** RL81 = Rhodes, R. and J. Lawler, 1981. "Athematic Metaphors", CLS 17

# Appendix A Vigesimal Rimes in Simplex Words, by Phonosemantic Coherence

Rime	Size	Coherence			Examples
		Num	Pct	Rank	
-əs	20	10	50%	32	<b>Clothing/Stricture(?)</b> <i>gusset hussy truss bustle muss gussy</i>
-i	41	20	49	33	<b>Alphabet B C D E Closed Class 3</b> <i>he she we be</i>
-æŋk	31	14	45	34	<b>Articulation/Body Part</b> <i>flank ankle shank hank spank yank crank wank</i>
-ərɪk	21	9	43	35	<b>Pej</b> <i>irk lurk murk turkey jerk shirk smirk</i>
-ɔ	21	9	43	35	<b>(Mouth/Tooth/Claw)</b> <i>craw paw claw chaw jaw maw gnaw</i>
-ɪv	21	9	43	35	<b>Dim Multiple</b> <i>shiver quiver sliver sieve divot privet rivet</i>
-ɪm	26	11	42	38	<b>2D</b> <i>shim brim rim scrim skim shimmer swim</i>
-aɪt	38	16	42	39	<b>Light</b> <i>light bright white sight</i> <b>Fight</b> <i>fight smite bite</i> <b>Up</b> <i>height kite</i>
-ɪp	24	10	42	40	<b>Vertical</b> <i>steep teepee leap heap deep</i> <b>Aural</b> <i>bleep cheep peep</i>
-əd	25	10	40	41	<b>Liquid</b> <i>flood blood mud crud puddle rudder udder</i>
-ɪl	47	18	38	42	<b>2D Concave</b> <i>fill drill gill rill</i> <b>2D Convex</b> <i>hill spill pillow frill billow quill</i>
-ək	26	10	38	43	<b>Out/Off/Remove</b> <i>shuck buck chuck duck pluck suck</i>
-o	44	16	36	44	<b>2D Contact</b> <i>bow blow flow floe grow hoe low mow sow sew snow loess</i>
-ər	39	14	36	45	<b>Ind Sens</b> <i>blur fur purr slurry slur scurry lurid</i>
-awt	23	8	35	46	<b>Aggressive Contact</b> <i>clout shout bout flout lout knout rout</i>
-ad	29	10	34	47	<b>Earth/Contact/Movement</b> <i>clod sod shod hod plod toddle dodder waddle</i>
-aɪn	30	10	33	48	<b>RL81 1D (Plant)</b> <i>twine vine bine pine cline line spline tine spine</i>
-en	42	14	33	49	<b>1D</b> <i>chain cane crane lane rein train vein</i> <b>2D</b> <i>vane pane plain plane blain</i>
-up	25	8	32	50	<b>RL81 Curve</b> <i>scoop droop group hoop loop stoop swoop</i>
-ɪm	22	7	32	51	<b>1D in 2/3D</b> <i>beam gleam cream ream seam stream femur</i>
-ol	38	12	32	52	<b>Round</b> <i>knoll roll roly poly hole whole thole bowl boll bole bolo bolus</i>
-æn	23	7	30	53	<b>2D</b> <i>fan flan pan scan span panel banner</i>
-at	33	10	30	54	<b>Dim Color</b> <i>dot blot spot knot clot mottle blotto dottle jot slot</i>
-ot	23	7	30	55	<b>2D Surface</b> <i>float boat bloat moat lotus (RL81 Water)</i> <i>stoat throat</i>
-æd	31	8	26	56	<b>2D Surface</b> <i>plaid brad clad pad paddle saddle straddle ladder</i>
-əm	34	9	26	57	<b>Pej</b> <i>scum slum bum dumb glum crumb numb</i>
-ed	27	6	22	58	<b>2D Contact</b> <i>spread bed lead sled tread pedal</i>
-on	23	5	22	59	<b>Noise</b> <i>tone phone drone groan moan</i>
-ɪr	43	9	21	60	<b>Face/Eye/Nose/Ear</b> <i>sneer smear clear leer peer blear jeer ear hear</i>
-it	34	7	21	61	<b>2D</b> <i>cleat pleat skeet sheet seat peat beetle</i>
-u	60	12	20%	62	<b>Liquid/Thick</b> <i>goo flue dew brew glue slough sprue spew stew fluid sewer</i>

**Diminutive, 2-Dimensional, 3-Dimensional, Indistinct Sensation, Pejorative, (Embodied Image)**  
**Abrupt Cessation, Separate.** RL81 = Rhodes, R. and J. Lawler, 1981. "Athematic Metaphors", CLS 17

## Appendix B

## Sub-Vigesimal Rime Sets, by size.

-ərl.....19	-og ..... 13	-etf ..... 10	-ayz ..... 7	-uv .....4	-uf.....3	-uð ..... 2	-enʃ ..... 1
-of.....19	-əp ..... 13	-əz ..... 10	-ars ..... 7	-elv .....4	-az .....3	-anʃ ..... 2	-olm ..... 1
-ark.....19	-eb ..... 13	-ʊk ..... 10	-uθ.....7	-ɔys .....4	-udʒ .....3	-ɪlf..... 2	-eʒ..... 1
-ərd.....19	-æv..... 13	-æz ..... 10	-endʒ.....7	-ɪŋks .....4	-ɔyt .....3	-awndʒ... 2	-əθ..... 1
-ar .....19	-elt ..... 13	-æks ..... 10	-əθ ..... 7	-af .....4	-oθ .....3	-emp ..... 2	-aynθ ..... 1
-ərt.....19	-ɔs ..... 13	-əntʃ ..... 10	-ərp ..... 7	-ɛlp .....4	-əlf.....3	-ust..... 2	-æmf ..... 1
-ep .....19	-ɔrd ..... 13	-ɪʃ ..... 10	-of ..... 6	-ayð .....4	-eð .....3	-ɔyz ..... 2	-əmpk ..... 1
-is .....19	-əmb ..... 13	-if ..... 10	-awnd.....6	-idʒ .....4	-ʊt .....3	-ərð ..... 1	-aynt ..... 1
-ɔrt.....19	-ɔy ..... 13	-ub ..... 10	-eg ..... 6	-uf.....4	-əltʃ.....3	-aft ..... 1	-ɪln ..... 1
-ayl.....18	-ɪlt ..... 13	-ɪns ..... 10	-ɔyst .....6	-əlk .....4	-ɪltʃ .....3	-əldʒ ..... 1	-aŋst ..... 1
-op .....18	-arn ..... 12	-is ..... 9	-ʊd ..... 6	-ɪð .....4	-eʃ .....3	-arθ ..... 1	-ʊs ..... 1
-uz .....18	-ens ..... 12	-ɔrm ..... 9	-əsk ..... 6	-ɔrdʒ .....4	-ɛld .....3	-əlb ..... 1	-ɪnθ ..... 1
-æst.....18	-ɔk ..... 12	-ɔrk ..... 9	-arp ..... 6	-ild.....4	-asp .....3	-etθ ..... 1	-ampt ..... 1
-ɪf.....18	-æf ..... 12	-arm ..... 9	-artʃ .....6	-ɔrg .....4	-aps .....2	-awdʒ..... 1	-ets ..... 1
-ɪmp.....18	-ag ..... 12	-a ..... 9	-ɛft ..... 6	-ɔrf .....4	-ɔls .....2	-ɛdθ ..... 1	-ɛpθ ..... 1
-ɪb.....18	-ɔn ..... 12	-ɪntʃ ..... 9	-ərst .....6	-ɪʃ ..... 4	-os .....2	-əlt ..... 1	-uʒ ..... 1
-ɪtʃ .....18	-ənt ..... 12	-æft ..... 9	-olt ..... 6	-ant .....4	-eθ ..... 2	-uz ..... 1	-ædz ..... 1
-aym .....18	-ard ..... 12	-aynd ..... 9	-əndʒ .....6	-ɪlk .....4	-æps .....2	-uy ..... 1	-alv ..... 1
-ayk .....18	-ayf ..... 12	-and ..... 9	-ɪks ..... 6	-ɔrb .....4	-ɪlθ .....2	-ændʒ..... 1	-ekʃ ..... 1
-ænt .....18	-ɪnd ..... 12	-aws ..... 9	-ɛpt ..... 6	-aŋk .....4	-ɪrs .....2	-æptʃ ..... 1	-æʒ ..... 1
-es.....18	-ɔyl ..... 12	-ig ..... 9	-ərg ..... 6	-ɪθ .....4	-aŋ ..... 2	-əlb ..... 1	-ɔlm ..... 1
-æns.....18	-ɔrs ..... 12	-ʊr ..... 9	-ɔz ..... 6	-ɪmb .....4	-ayst .....2	-ɔlk ..... 1	-oldʒ ..... 1
-am .....17	-old ..... 12	-ərtʃ ..... 9	-ʊl ..... 6	-ænθ ..... 3	-ərz ..... 2	-ɪmps ..... 1	-endʒ ..... 1
-əst.....17	-ɛp ..... 11	-ənd ..... 9	-ərf ..... 5	-əntʃ .....3	-əns .....2	-ɛrn ..... 1	-ers ..... 1
-ek .....17	-ɛdʒ ..... 11	-oʃ ..... 8	-ɛks ..... 5	-as .....3	-aθ ..... 2	-ɔlf ..... 1	-əmpʃ ..... 1
-ul .....17	-ərb ..... 11	-awns ..... 8	-ɛkt ..... 5	-empt .....3	-ɔrp .....2	-ɪfθ ..... 1	-ɪkt ..... 1
-ɪst .....17	-æmb ..... 11	-awn ..... 8	-æð ..... 5	-emb .....3	-ɛsp .....2	-ɔrps ..... 1	-ɔp ..... 1
-ɪdʒ .....17	-ɪsk ..... 11	-æsp ..... 8	-adʒ ..... 5	-æpt .....3	-əks .....2	-ənz ..... 1	-ad ..... 1
-ədz .....16	-entʃ ..... 11	-ækt ..... 8	-arv ..... 5	-awst .....3	-ɔyŋ .....2	-əts ..... 1	-arð ..... 1
-ud .....16	-ɔg ..... 11	-ətʃ ..... 8	-ɛθ ..... 5	-əlp .....3	-ɔynt .....2	-ɔyb ..... 1	-ərps ..... 1
-ent .....16	-aks ..... 11	-ɛʃ ..... 8	-awr ..... 5	-ɛlk .....3	-ɪʒ .....2	-ɪmz ..... 1	-ælk ..... 1
-ɪtʃ .....16	-om ..... 11	-ɔnt ..... 8	-ans ..... 5	-ɔft .....3	-ɪmf .....2	-ɔm ..... 1	-ayg ..... 1
-əʃ .....16	-an ..... 11	-awnt ..... 8	-ɛf ..... 5	-ɔld .....3	-anz .....2	-ɪlm ..... 1	-ælks ..... 1
-em .....15	-awd ..... 11	-arb ..... 8	-æθ ..... 5	-ɪld .....3	-əft .....2	-apt ..... 1	-eps ..... 1
-iv .....15	-oz ..... 11	-ərθ ..... 8	-ɔntʃ ..... 5	-ayld .....3	-awθ .....2	-ɪldʒ ..... 1	-ɪkst ..... 1
-əl .....15	-ɪft ..... 11	-ob ..... 8	-iθ ..... 5	-əlp .....3	-ɛŋθ .....2	-alm ..... 1	-ərʒ ..... 1
-ayv .....15	-ɔrn ..... 11	-ɛb ..... 8	-ɛf ..... 5	-ə ..... 3	-ɛltʃ .....2	-əkt ..... 1	-ælv ..... 1
-ays.....15	-aʃ ..... 11	-ost ..... 8	-ib ..... 5	-arf .....3	-ɛnθ .....2	-ayθ ..... 1	-ərlɪd ..... 1
-ɔŋ .....15	-əŋ ..... 11	-ið ..... 8	-otʃ ..... 5	-ɛsk .....3	-ɪpt .....2	-ɪkʃ ..... 1	-ɪdθ ..... 1
-us .....15	-atʃ ..... 11	-utʃ ..... 8	-ʊʃ ..... 5	-ʊf .....3	-ɪts .....2	-ug ..... 1	-ɔlts ..... 1
-ərdʒ .....15	-awl ..... 10	-ɪst ..... 8	-æks ..... 5	-ɛlθ .....3	-oð ..... 2	-əð ..... 1	-ɔrmθ ..... 1
-ayp .....14	-ɪndʒ ..... 10	-awtʃ ..... 8	-ɔst ..... 5	-ɔrθ .....3	-oks .....2	-eg ..... 1	-ʊlf ..... 1
-od .....14	-arl ..... 10	-uk ..... 7	-ɛlm ..... 5	-ɛkst .....3	-ɪsm .....2	-ɛtʃ ..... 1	-und ..... 1
-ov .....14	-edʒ ..... 10	-est ..... 7	-ug ..... 5	-amb .....3	-ɔyd .....2	-ɔnd ..... 1	-awndz ..... 1
-ərs .....14	-ɔt ..... 10	-æsk ..... 7	-ɔyn ..... 5	-ɔrtʃ .....3	-ɪrd .....2	-ɪnd ..... 1	
-ərm .....14	-ərv ..... 10	-ædz ..... 7	-arg ..... 4	-ɛʒ .....3	-av ..... 2	-əlkt ..... 1	
-əv .....14	-ɔd ..... 10	-ent ..... 7	-ardʒ .....4	-ast .....3	-ɔʃ .....2	-ənθ ..... 1	
-ætʃ .....14	-awz ..... 10	-ɔlt ..... 7	-ɛlf ..... 4	-enz .....3	-ɔb .....2	-ænʃ ..... 1	
-em .....13	-ayb ..... 10	-amp ..... 7	-arʃ ..... 4	-ɪsp .....3	-antʃ .....2	-əsp ..... 1	

Data from Lawler-Rhodes Simplex Word Database <http://www.umich.edu/~jlawler/monosyl.zip>

# Appendix C

# Snapshots of the 3 Most Coherent Rime Sets

-ap 31 words    27 coherent    Coherence Level 87%    Rank 1

Category	<b>1</b>	abrupt cessation of motion (RL81)	16	<i>stop drop flop chop</i>
	<b>2</b>	ballistic motion (RL81)	14	<i>drop chop bop flop</i>
	<b>3</b>	separate/cut	14	<i>crop chop lop topple</i>
	<b>4</b>	impact	14	<i>whop plop clop bop</i>
	<b>5</b>	vertical orientation	12	<i>drop hop top prop</i>
	<b>6</b>	pejorative	9	<i>wop fop slop glop</i>
	<b>7</b>	acoustic image	4	<i>clop bop pop whop</i>
	<b>8</b>	fluid	5	<i>drop slop mop glop sop</i>

Word	Ass	Rime	Suf	1	2	3	4	5	6	7	8
<i>chop</i>	tʃ	ap		√	√	√	√	√			
<i>lop</i>	l	ap		√	√	√	√	√			
<i>drop</i>	dr	ap		√	√	√	√	√			√
<i>topple</i>	t	ap	-əl	√	√	√	√	√			
<i>plop</i>	pl	ap		√	√	√	√	√	√		
<i>clop</i>	kl	ap		√	√	√	√			√	
<i>pop</i>	p	ap		√	√	√	√			√	
<i>strop</i>	str	ap		√	√	√	√				
<i>bop</i>	b	ap		√	√		√			√	
<i>whop</i>	hw	ap		√	√		√			√	
<i>flop</i>	fl	ap		√	√		√		√		
<i>hop</i>	h	ap		√	√		√	√			
<i>top</i>	t	ap		√	√	√		√			
<i>crop</i>	kr	ap		√		√		√			
<i>prop</i>	pr	ap				√		√			
<i>sop</i>	s	ap			√	√			√		√
<i>slop</i>	sl	ap			√	√	√		√		√
<i>mop</i>	m	ap						√			√
<i>glop</i>	gl	ap							√		√
<i>hopper</i>	h	ap	-ər				√	√			
<i>cop</i>	k	ap		√		√					
<i>stop</i>	st	ap		√		√	√	√			
<i>swap</i>	sw	ap		√							
<i>wop</i>	w	ap							√		
<i>fop</i>	f	ap							√		
<i>op</i>		ap							√		
<i>copper</i>	k	ap	-ər						√		
<i>shop</i>	ʃ	ap									
<i>proper</i>	pr	ap	-ər								
<i>topic</i>	t	ap	-ək								
<i>tropic</i>	tr	ap	-ək								

# Appendix C

# Snapshots of the 3 Most Coherent Rime Sets

-ɔl 28 words 24 coherent Coherence Level 86% Rank 2

Category	<b>1</b>	contact	16	<i>crawl spall brawl maul</i>
	<b>2</b>	2-Dimensional	15	<i>scrawl trawl shawl wall</i>
	<b>3</b>	motion	13	<i>squall trawl haul fall</i>
	<b>4</b>	expanse	12	<i>sprawl mall hall all</i>
	<b>5</b>	horizontal orientation	8	<i>trawl haul hall sprawl</i>
	<b>6</b>	vocal image	3	<i>call bawl drawl</i>

Word	Ass	Rime	Suf	1	2	3	4	5	6
<i>crawl</i>	kr	ɔl		√	√	√	√	√	
<i>scrawl</i>	skr	ɔl		√	√	√	√	√	
<i>sprawl</i>	spr	ɔl		√	√	√	√	√	
<i>trawl</i>	tr	ɔl		√	√	√	√	√	
<i>squall</i>	skw	ɔl		√	√	√	√		
<i>haul</i>	h	ɔl		√	√	√		√	
<i>spall</i>	sp	ɔl		√	√	√			
<i>maul</i>	m	ɔl		√	√	√			
<i>shawl</i>	ʃ	ɔl		√	√		√		
<i>wall</i>	w	ɔl		√	√		√		
<i>pall</i>	p	ɔl		√	√		√	√	
<i>awl</i>		ɔl		√	√				
<i>brawl</i>	br	ɔl		√		√	√		
<i>pawl</i>	p	ɔl		√		√			
<i>fall</i>	f	ɔl		√		√			
<i>gall</i>	g	ɔl		√					
<i>yawl</i>	y	ɔl			√	√			
<i>hall</i>	h	ɔl			√		√	√	
<i>mall</i>	m	ɔl			√		√	√	
<i>ball</i>	b	ɔl				√			
<i>all</i>		ɔl					√		
<i>call</i>	k	ɔl							√
<i>bawl</i>	b	ɔl							√
<i>drawl</i>	dr	ɔl							√
<i>small</i>	sm	ɔl							
<i>stall</i>	st	ɔl							
<i>tall</i>	t	ɔl							
<i>thrall</i>	pr	ɔl							

## Appendix C

## Snapshots of the 3 Most Coherent Rime Sets

-əb 34 words 29 coherent Coherence Level 85% Rank 3

Category 1 pejorative 21 *bub glub lubber rubbish stubble*  
 2 1D thick 13 *snub stub slub nub club tubby*  
 3 diminutive 11 *shrub cub stub hubby cubby*

Word	Ass	Rime	Suf	1	2	3
<i>shrub</i>	ʃr	əb		√	√	√
<i>drub</i>	dr	əb		√	√	√
<i>grub</i>	gr	əb		√	√	√
<i>stubble</i>	st	əb	-əl	√	√	√
<i>chub</i>	tʃ	əb		√	√	√
<i>dub</i>	d	əb		√	√	
<i>snub</i>	sn	əb		√	√	
<i>tubby</i>	t	əb	-i	√	√	
<i>cub</i>	k	əb		√		√
<i>rubble</i>	r	əb	-əl	√		√
<i>stub</i>	st	əb			√	√
<i>blubber</i>	bl	əb	-ər	√		
<i>bub</i>	b	əb		√		
<i>flub</i>	fl	əb		√		
<i>grubby</i>	gr	əb	-i	√		
<i>hubba</i>	h	əb	-ə	√		
<i>lubber</i>	l	əb	-ər	√		
<i>rub</i>	r	əb		√		
<i>rubbish</i>	r	əb	-əʃ	√		
<i>scrub</i>	skr	əb		√		
<i>trouble</i>	tr	əb	-əl	√		
<i>tub</i>	t	əb		√		
<i>club</i>	kl	əb			√	
<i>hub</i>	h	əb			√	
<i>nub</i>	n	əb			√	
<i>slub</i>	sl	əb			√	
<i>bubble</i>	b	əb	-əl			√
<i>cubby</i>	k	əb	-i			√
<i>hubby</i>	h	əb	-i			√
<i>double</i>	d	əb	-əl			
<i>glub</i>	gl	əb				
<i>pub</i>	p	əb				
<i>rubber</i>	r	əb	-ər			
<i>sub</i>	s	əb				

-əmp 22/26 = 85% Rank 4 [overlap 1]

<b>1) <u>R&amp;L81 3-D (15)</u></b> <i>bump clump</i> <i>dump plump</i> <i>hump slump</i> <i>jump stump</i> <i>lump rump</i> <i>lump rumple</i> <i>rump crumple</i> <i>sump tump</i> <i>mump</i>	<b>2) <u>Pejorative (7)</u></b> <b>2a) <u>Personal</u></b> <i>chump</i> <i>frump</i> <i>grump</i>  <b>a&amp;b)</b> <span style="border: 1px solid black; padding: 2px;">rumpus</span>	<b>2b) <u>Aural</u></b> <i>crump</i> <i>thump</i> <i>trumpet</i>	<b>3) <u>Residue (4)</u></b> <i>pump</i> <i>trump</i> <i>compass</i> <i>crumpet</i>
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-əŋk 18/22 = 82% Rank 5 [overlap 4]

<b>1) <u>Pejorative (12)</u></b> <i>bunco funk</i> <i>bunk junk</i> <i>drunk skunk</i> <i>spunk</i> <i>flunk</i>	<span style="border: 1px solid black; padding: 2px;"><i>lunk</i></span> <span style="border: 1px solid black; padding: 2px;"><i>punk</i></span>  <span style="border: 1px solid black; padding: 2px;"><i>clunk</i> <i>thunk</i></span>	<b>2) <u>Human(oid) (5)</u></b> <i>monk uncle</i> <i>monkey</i>  <i>plunk</i>	<b>3) <u>Noise (3)</u></b>	<b>4) <u>Piece (2)</u></b> <i>hunk</i> <i>chunk</i>	<b>5) <u>Residue (4)</u></b> <i>bunker</i> <i>dunk</i> <i>hunker</i> <i>trunk</i>
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-ɪp 32/41 = 78% Rank 6 [large overlap]

<b>1a) <u>Convex/Up</u></b> <b><u>[+3D] (18)</u></b>	<b>1) <u>2D ± 3D (28)</u></b> <i>skip zipper flip</i> <i>zip drip blip</i> <i>trip cripple clip</i> <i>hip grip</i> <i>pip stipple</i> <i>lip nipple</i>	<b>3) <u>Residue (9)</u></b> <i>whip hippie yippee</i> <i>ship triple tipple</i> <i>gyp chipper skipper</i>	
<b>1b) <u>Concave/Down</u></b> <b><u>[-3D] (10)</u></b>	<span style="border: 1px solid black; padding: 2px;"><i>nip</i></span> <span style="border: 1px solid black; padding: 2px;"><i>dip</i></span> <span style="border: 1px solid black; padding: 2px;"><i>strip</i></span> <span style="border: 1px solid black; padding: 2px;"><i>chip</i></span>	<span style="border: 1px solid black; padding: 2px;"><i>tip</i></span> <span style="border: 1px solid black; padding: 2px;"><i>ripple</i></span> <span style="border: 1px solid black; padding: 2px;"><i>slip</i></span>  <span style="border: 1px solid black; padding: 2px;"><i>nipper</i></span> <span style="border: 1px solid black; padding: 2px;"><i>yip</i></span> <span style="border: 1px solid black; padding: 2px;"><i>kipper</i></span> <span style="border: 1px solid black; padding: 2px;"><i>quip</i></span>	<b>2) <u>Diminutive (13)</u></b>  <span style="border: 1px solid black; padding: 2px;"><i>scrip</i></span> <span style="border: 1px solid black; padding: 2px;"><i>slipper</i></span> <span style="border: 1px solid black; padding: 2px;"><i>snip</i></span> <span style="border: 1px solid black; padding: 2px;"><i>sip</i></span> <span style="border: 1px solid black; padding: 2px;"><i>rip</i></span> <span style="border: 1px solid black; padding: 2px;"><i>snippet</i></span>