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Phonemic repetition and the learning of lexical chunks: The power of assonance

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Abstract

Knowledge of lexical chunks correlates positively with L2 proficiency. However, high estimates of the number of chunks in natural language have led to scepticism about the feasibility of large-scale chunk-learning on non-intensive, classroom-based courses. Furthermore, few proposals for chunk-teaching have looked beyond the noticing stage. One exception, designed to put learners on the path to *remembering*, is to have them associate figurative expressions with mental images. However, this procedure can *only* apply to figurative expressions and so cannot help with the *non*-figurative chunks with which phraseology also abounds. In the present paper we therefore explore complementary means of facilitating chunk-learning. Evidence has been reported that L2 chunks which exhibit alliteration are significantly easier for learners to remember than similar, non-repetitive chunks. In the present paper we demonstrate that an evidently less salient kind of phonemic repetition, assonance, also has significant mnemonic effect. The relevance of this for language pedagogy is underscored by estimates suggesting that phonemic repetition, including assonance, is ubiquitous in (English) phraseology.

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Keywords: Assonance; Mnemonic effect; Lexical memory; Phonemic repetition; Phonological patterning; Lexical approach; Foreign language teaching

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1. Introduction: proposals about the teaching and learning of lexical chunks

Although it was contended at least as early as 1925 that foreign language teachers ought to take account of conventionalized word strings, or lexical **chunks** (Palmer, 1925, [reprinted 1999](#)), the teaching of lexical chunks was given low priority by language teaching methodologists and pedagogically orientated linguists throughout most of the 20th century. About a quarter of a century ago, this state of affairs began to change, and there is now a considerable accumulation of monographs and papers which, taken together, make a strong case for the teaching of lexical chunks (e.g., Cowie, 1994; Ellis, 1996; Kjellmer, 1991; Lewis, 1993, 1997, 2000; Nattinger and DeCarrico, 1992; Pawley and Syder, 1983; Renouf and Sinclair, 1991; Schmitt, 2004). Evidence for the importance of chunks in language use has come from a variety of fields: cognitive linguistics (e.g., Langacker, 1987), the study of first language acquisition (e.g., Tomasello, 2003), psycholinguistics (e.g., Wray, 2002), corpus linguistics (e.g., Sinclair, 1991) and the study of oral fluency (e.g., Pawley and Syder, 2000 and other papers in Riggensbach, 2000). But, as is widely recognized, there are problems which must be addressed by those who believe that the teaching of chunks should be given a higher priority. Firstly, there appear to be many thousands, perhaps many tens of thousands, of lexical phrases in current use (e.g., Wray, 2002, p. 283). Secondly, with respect to normal foreign language courses (i.e., ones involving no more than a few hours of class time a week) the revolution in lexical learning *aims* remains unsupported by any remotely commensurate revolution in teaching *methods*. In short, given that students have generally found vocabulary learning challenging enough already, it must be asked what justification there is for supposing that the majority of them can be expected to learn – that is, properly understand and *remember* – any very large number of additional, polyword items. Against this background, Swan (2006, p. 6) has cautioned that failure to prioritize (and thus sharply limit) the number of chunks targeted would be like “trying to empty the sea with a teaspoon”. Others too have pointed out the need to prioritize (e.g., Carter, 1987; Carter and McCarthy, 1988).

While we would all do well to bear Swan’s caveat in mind, claims that knowledge of lexical chunks correlates highly with proficiency (e.g., Wray, 2002) are now supported by the results of empirical experiments (Boers et al., 2006a; Ejzenberg, 2000; see Oppenheim, 2000, for further evidence and a useful review of the literature). In other words, anyone wanting to attain a high level of L2 proficiency had better set about trying to learn lots of lexical chunks. Moreover, in contexts of real-time language production, where fluency is an important parameter in gauging proficiency, it seems that mere breadth of chunk-knowledge does not suffice. Not only does the learner need to know many chunks, the chunks need to be deeply entrenched in the learner’s memory so they can, without hesitation, be accurately retrieved (Eyckmans, 2007; see also Oppenheim, 2000, for theoretical background). It is therefore unsurprising that, while the need for some prioritizing is acknowledged, proposals have nevertheless been made about how to increase the number of chunks that can be learned.

One category of such proposals has to do with encouraging learners to become independent learners of vocabulary of all sorts (e.g., Nation, 2001) or of chunks in particular (e.g., Irujo, 1986, p. 298). Another category of proposals (and of teaching materials) concerning chunk-learning relies on such familiar procedures as making lists, gap-filling and matching exercises, and pattern practice (e.g., Lewis, 1993, 1997, 2000; Nattinger and DeCarrico, 1992). However, none of these procedures are notably likely to engender acts of mental

processing that result in the entrenchment of encountered multiword expressions in long-term memory. One reason for this is that these standard procedures are typically designed to treat phraseological patterns as arbitrary and therefore as unlikely objects or occasions for insightful rather than rote or rote-like learning.

Sharply contrasting with the above proposals is a relatively small number of ones designed to accord with the massive evidence from experimental psychology that greater depth of mental processing correlates very strongly with successful long-term recall (e.g., Craik and Lockhart, 1972). One of the few proposals for promoting insightful learning of chunks is to help learners appreciate the connections between the current meaning of an idiomatic chunk and its literal meaning or original usage (e.g., Boers et al., 2004; Csábi, 2004). For example, learners confronted with *learn the ropes* can be encouraged to speculate about what this chunk could have meant to crewmen on a tall sailing ship, and then be guided to see how current usage of this chunk derives from its original reference to a key part of becoming oriented as a new crewman on a ship – namely, learning the names and functions of all the many ropes. This experimentally validated procedure was inspired by work in cognitive semantics (e.g., Gibbs, 1994; Lakoff, 1987) which has revealed that a great deal of figurative language (including phrasal verbs as well as other idioms) is not at all as arbitrary as has often been assumed. However, while this ‘cultural-etymological-imagistic’ approach modestly expands our methodological armory for chunk teaching, it can apply only to chunks which are figurative (e.g., metaphorical or metonymic); yet phraseology also abounds with chunks which are non-figurative. Moreover, correlation analyses suggest that the overall procedure in question (which can be varied in a number of ways) may not be equally beneficial across all learner profiles because not all learners have the same tendency to make mnemonic use of mental pictures in the relevant task setting (Boers et al., 2006b).

Let us now turn to ways of helping learners remember chunks (1) which are not necessarily figurative and (2) which constitute a category of intriguing promise – namely, chunks which show phonemic repetition. It appears that in the process of standardizing certain particular word combinations rather than synonymous competitors, salient sound repetition – particularly rhyme and alliteration – has played a part (Boers and Lindstromberg, in press). This can help explain the precise lexical selection in a considerable number of compounds (e.g., *pick-pocket*), strong collocations (e.g., *wage war*), idioms (e.g., *get short shrift*), proverbs (e.g., *When the cat's away, the mice will play*), discourse markers (e.g., *first and foremost*) and various other types of chunk (e.g., *Trick or treat!*) – each of which could have been, or still could be, worded somewhat differently (e.g., *When the cat's gone, the mice will play*). In other words, the appeal of phonemic repetition appears to render a substantial part of phraseology non-arbitrary (i.e., non-accidental) over and above that part which is non-arbitrary because it is figurative or onomatopoeic. (For example, the conventionalization of *learn the ropes* – as opposed to some other form of words with some slight difference of meaning – was plainly motivated, although not inevitably determined, by the fact that some generations ago a great many speakers of English knew a fair amount about seafaring.)

2. Types of phonemic repetition in chunks and estimates of their frequency

Whether figurative or not, conventionalized lexical chunks show various amounts and kinds phonemic repetition (Table 1).

Table 1
Types and degrees of phonemic repetition^a

Type	Examples
Multi-word repetition	<i>Damned if you do, damned if you don't</i>
Word repetition	<i>(That story will) run and run; (do something) over and over; (walk) arm in arm; the lowest of the low; forever & ever; as ____ as ____</i>
True rhyme	<i>(at this) late date; take a break; go with the flow; hurly-burly</i>
Repetition of beginnings and ends	<i>Tittle-tattle; wishy-washy; teeny-tiny; bric-a-brac; topsy-turvy</i>
Near rhyme	<i>last gasp; gas mask; back in action; a plaster cast</i>
Alliteration (or front-front consonance)	<i>Stand still; fast food; beat around the bush</i>
Simple assonance	<i>stone cold sober; blood and guts; in great shape; Try as I might, [I] couldn't...</i>
Consonance	<i>above board; stumbling block; roll call</i>
No repetition	<i>cutting edge</i>

^a Our ordering of types of repetition is not intended to be an exact reflection of salience in perception or in other cognitive processing. Additionally, note that word repetition, rhyme, and near rhyme all include both assonance and some degree of consonant repetition.

By means of counting and categorizing all the chunks in contemporary idiom dictionaries, estimates have already been made of the frequency of salient types of phonological repetition (Boers and Stengers, forthcoming). For example, about 19% of the entries in the *Collins Cobuild Dictionary of Idioms* (Sinclair and Moon, 2002) show alliteration and/or rhyme (with alliteration being by far the commonest pattern). Moreover, if we focus on relatively short idioms, whose compactness is likely to enhance one's perception of phonological repetition, the proportion is even greater. For example, it turns out that no fewer than 41% of similes in English alliterate and/or rhyme (e.g., *as drunk as a skunk, as fit as a fiddle, as cool as a cucumber, as right as rain*).

What is more, the counts referred to above only considered very salient sound patterns (rhyme and alliteration). They did not, for example, include cases of simple assonance. Table 2 gives a breakdown of new counts of phonemic repetition in a set of 508 figurative idioms that are signaled in the *Collins Cobuild Dictionary of Idioms* (Sinclair and Moon, 2002) as “frequently used”. Because it is difficult to draw the line between near rhyme and simple assonance, we have conflated these two categories. In any case, our counts so far suggest that some kind of phonemic repetition – including simple assonance, which seems on the face of things to be of lesser salience (see Section 5, below) – may be at work in one fourth of the stock of English idioms.

The proportion of phonologically motivated lexical selection may even be greater in segments of the idiom repertoire made up of short, compact phrases. For example, if

Table 2
Number of instances of phonemic repetition in a set of 508 English idioms

Type	Number	Examples
Word repetition	3	<i>shoulder to shoulder</i>
True rhyme	6	<i>fat cat</i>
Alliteration + Assonance	9	<i>carry the can; rule the roost;</i>
Alliteration	58	<i>Practise what you preach; run riot; too close to call</i>
Assonance	52	<i>pave the way; a false dawn; jump the gun</i>
Total	128 (= 25.20%)	

Table 3
Number of instances of phonemic repetition in a set of 107 English binomials

Type	Number	Examples
Word repetition	1	<i>neck and neck</i>
True rhyme	3	<i>high and dry; fair and square</i>
Alliteration + Assonance	3	<i>through thick and thin; part and parcel; done and dusted</i>
Alliteration	37	<i>down and dirty; signed and sealed; spick and span; rack and ruin; black and blue</i>
Assonance	13	<i>cakes and ale; cut and run; the cut and thrust of; all mouth and trousers</i>
Total	57 (=53.27%)	

we focus on so-called binomial idioms (i.e. phases of the form *A* and *B*), we find that *more than half* of these chunks show some kind of phonemic repetition. This is shown in Table 3, which gives a breakdown of the types of repetition in a set of 107 binomials listed in the *Collins Dictionary of Idioms*.

Although no estimates are yet available for other categories of chunk such as compounds (*broadband*), collocations (*fatally flawed*), discourse markers (*It is safe to say that. . .*), and exclamations (*Good God!*), the figures concerning idioms suggest the possibility that a good many currently conventionalized chunks exhibit some degree of phonemic repetition. In other words, chances are that learners will encounter in their course materials a fair number of phrases exhibiting sound patterns that may merit attention because, as we shall see below (and as advertisers and poets have long suspected), such expressions are indeed relatively easy to remember.

3. Evidence for the mnemonic effect of salient phonemic repetition in L2 chunks

The counts referred to above suggest very strongly that alliteration is one of the most common types of phonemic repetition in English phraseology. Accordingly, it was alliterative chunks which first attracted our attention. Evidence of the mnemonic power of alliteration in the context of L2 learning was first reported by us in this journal (Boers and Lindstromberg, 2005). In that report we reanalyzed data from experiments designed to evaluate the mnemonic effectiveness of a cognitive-semantics-inspired imagery approach to the learning of idioms (see Section 1 above), and we noticed that recall rates were significantly higher for targeted idioms which happened to alliterate than for those which showed no phonemic repetition. However, those data were drawn from experiments designed to measure the mnemonic effect of mental imagery rather than sound patterns, and consequently the alliterating chunks that happened to be included in the exercises were not necessarily well matched with the non-alliterating chunks in terms of such factors as their length and the frequency of the content words.

Because of the presence of such uncontrolled variables in that early study, we felt that more conclusive evidence, drawn from experiments designed especially for the purpose of measuring the memorability of alliteration, would be welcome. In one of those experiments (reported in detail by Lindstromberg and Boers, forthcoming), alliterating (*non-figurative*) chunks were recollected significantly better by participants than their matched control stimuli (that showed no phonemic repetition) both in an immediate post-test ($n = 25, p = 0.0041$, one-tailed) and a delayed post-test given two weeks later ($n = 14, p = .0018$, one-tailed).

In short, the mnemonic power of at least one salient (and common) kind of phonemic repetition, alliteration, seems well evidenced (see also Section 4 below for evidence from fields outside applied linguistics). It may be worth mentioning that in the experiment just described the participants were made aware of the presence of alliteration, which may have been a decisive factor in triggering the mnemonic effect. There is no guarantee that language learners will always notice the occurrence of alliteration spontaneously.

The question now is whether a type of phonemic repetition that is felt to be less salient, such as assonance, might also have mnemonic potential. Might assonant chunks also be relatively easy to retrieve from long term memory – which, among other things, would enhance their availability in fluent speech? To our knowledge, little or no evidence of the memorability of assonance has yet been reported in the applied linguistics literature. We therefore need to turn to other fields to evaluate the available evidence, if any.

4. Evaluating the available evidence for a mnemonic effect of assonance

A short period of Googling ‘rhyme’ and ‘alliteration’ will produce ample evidence that it is widely believed, particularly within the fields of advertising and literature, that these two patterns of phonemic repetition make language memorable. Nor is this belief unknown among teachers and applied linguists concerned with the learning of foreign languages (see, e.g., Cook, 2000, pp. 25–29). As mentioned in Section 3 above, there is now experimental evidence to suggest that alliteration does indeed facilitate recall of lexical chunks, and we shall see in the present section that there is good evidence that rhyme too is mnemonic. But the cognitive salience of these two patterns of phonemic repetition may well be exceptional. For assonance, which appears on the face of things to be less salient, the literature presents relatively little evidence of a mnemonic effect.

In the experimental study of language in advertising, researchers have generally been less concerned with long-term verbatim recall than with message conveyance, suggestiveness, impact and so-called ‘ad engagement’. It has nonetheless been found that under certain circumstances (e.g., when a reader is just browsing) the wording of a rhyme is more memorable than that of a semantic figure of speech such as a pun (McQuarrie and Mick, 1996, 1999, 2006; Mothersbaugh et al., 2002). It should be stressed that these studies have focused on texts in L1. In any case, we know of none that has directly addressed the memorability of assonance.

Experimental researchers within the field of literature – or more precisely, *oral* literature – have found rather more evidence that phonemic repetition is mnemonically potent, but again assonance has been investigated far less than either alliteration or rhyme (see Rubin, 1995, for a survey of the relevant experimental evidence). With respect to assonance, in one notable experiment investigators replaced 24 words in the lyrics of a ballad; for instance, *rough road* (with alliteration) became *tough road* (without alliteration) and *behind time* (with assonance) became *beyond time* (without assonance). The ballad was then presented to undergraduate university students 10 times. One minute after the last presentation, the subjects were tested for verbatim recall. Phonemic repetition was found to enhance recall significantly. Tellingly, during recall subjects occasionally supplied the phonemically repetitive phrases which had been in the original lyrics (e.g., *rough road*) even though they had never been exposed to these phrases in the experiment (Wallace and Rubin, 1988, pp. 299–300). Unfortunately for our purposes, this study did not involve enough assonant phrases for firm conclusions to be drawn about the mnemonic effect

of assonance in particular. And, again, the researchers (as is normal in this field) were primarily concerned with recall of L1 texts rather than L2 phrasal lexis.

The study of childhood language has yielded a good deal of evidence consistent with (but apparently not directly attesting to) a mnemonic effect of phonemic repetition. For example, Jusczyk et al. (1999) have reported sensitivity to alliteration in nine-month-old infants, and Dowker (1989) has found that children as young as three are sensitive to rhyme and alliteration in English both as L1 and L2. (See also De Cara and Goswami, 2002; Dewhurst and Robinson, 2004.) Yet again we know of no similar findings relating specifically to assonance.

In the literature on the experimental study of memory for lexical forms, the memorability of rhyme is well-evidenced (e.g., Bower and Bolton, 1969). After rhyme, it has been alliteration that has been most studied – principally, if not entirely, in the context of investigations into five kinds of effect in memory: the suffix effect, tip-of-the-tongue effects, phonological similarity (PS) effects in item recall, PS effects in serial recall, and effects of phonological neighborhood density. Let us briefly review the findings from these investigations and assess their relevance with respect to assonance.

(1) The term ‘suffix effect’ denotes an effect on one’s ability to remember the final item(s) of a just-heard list of words, an effect which is brought about when a researcher appends (or ‘suffixes’) a semantically irrelevant item to that list. Rhyme in particular has been found to have effects on recall which are consistent with this pattern being relatively easy to recall (Carr and Miles, 1997). However, we know of no findings for assonance.

(2) It is well known from studies of tip-of-the-tongue effects that attempts to recall a meaning-cued word can result in retrieval of wrong words that begin or end with the same sounds (or letters) as the word that is being sought in long term memory. The usual explanation for this is that words with similar beginnings or endings tend to be especially tightly linked in the mental lexicon (Aitchison, 1987, pp. 118–127; Rubin, 1995, p. 73). This view runs counter to the possibility that assonance is strongly mnemonic in either L1 or L2.

(3) Even by 1995 there had been hundreds of experimental investigations of the effects of phonemic repetition, or phonological similarity (PS), on item recall (Rubin, 1995, p. 77). In the course of these investigations subjects saw and/or heard lists of individual words after which (usually very soon after) their ability to remember these words was tested. According to (Rubin (1995, pp. 77–83)), who surveys this literature, the basic procedure generally involved presenting a ‘target’ word along with a ‘context’ word intended to cue memory of either the meaning or the form of the target word. For example, a metonym might cue recall of the *meaning* of a target word while an alliterative context word might cue recall of its *form*. In fact, use of both rhyming and alliterative context words has been found to promote recall of form, but (highly interestingly with respect to foreign language teaching) only when subjects were made aware of the patterns of repetition in question (Rubin, 1995, pp. 77–79). Although we ourselves have by no means surveyed this entire literature, it so far seems that L1 assonance has not been found to be as mnemonic as L1 rhyme and alliteration, and no phonological similarity effect studies focusing on L2 assonance have come to our attention.

(4) The PS effect in immediate *serial* recall is manifested when serial recall of a list of lexical items (typically short words) is worse when the items are phonologically similar than when they are different. This effect is robustly evident both when lists are heard

and when read (e.g., Baddeley, 1986). However, phonological similarity among list items has been found to benefit *non*-serial recall (see Gupta et al., 2005, for a review of this literature). Gupta et al. (2005) is unusual in that four of the five experiments they report concern not only rhyme but also ‘lead repetition’ (i.e., repetition of initial consonant plus the following vowel) which is a combination of alliteration and assonance. It was a pattern they found to have a significant mnemonic effect, albeit one not as strong as the effect of rhyme. However, there was no pure assonance condition; the stimuli were not in L2; and the stimuli were not chunks. Also, rather typically, it was only immediate recall that was tested.

(5) Studies of phonological neighborhood (PN) density aim to determine the character of long term phonological representations and relate to the hypothesis that phonologically (and orthographically) similar words are grouped into tight clusters in mental space (for surveys, see Dell and Gordon, 2003). The PN hypothesis – which accords well with spreading activation theory (e.g., Lupker and Williams, 1989) – is intended to explain why the recall of a word can be primed by another word which is formally similar to it. Early researchers in this area believed that any two ‘neighbors’ in a PN differ by only one phoneme, irrespective of where the phoneme might be (e.g., in word initial or word final position). In this view, alliterative neighbors – for instance – should be no more likely to cue each other than assonant neighbors, given equal degrees of phonemic overlap in the two conditions. However, there is now robust evidence that both *front–front* and *back–back* overlaps have greater (short term) cuing effect than an overlap in the middle of a word in both noticing and recall (Gupta and MacWhinney, 1997; Treiman, 1988). While L2 chunks do not appear to have attracted the interest of PN density researchers, one clear implication of findings in this area is that assonance may not be as mnemonic as either rhyme or alliteration.

In summary, considerable evidence is available in fields outside of applied linguistics that rhyme and alliteration are in some degree mnemonic (at least with respect to short term recall of L1 words). However, strikingly little of the evidence available concerns the presumably less salient pattern of assonance, let alone assonance in L2 chunks. Wallace and Rubin’s (1988, pp. 299–300) experiment on verbatim recall of L1 ballad lyrics, which is tantalizingly relevant to matter of recall of chunks, involved few assonant chunks. The literatures of the experimental study of the language of advertising, child language, the suffix effect, and PS effects in *item* recall do not, so far as we know, include any reports on the mnemonic effect of assonance in L1 or L2 chunks. Findings from research into the PS effect in *serial* recall offer only slim support for the view that assonance could be mnemonic in chunks while findings from research into tip-of-the-tongue and PN effects can be interpreted as suggesting that assonance does not at all have the same mnemonic impact as rhyme and alliteration.

Because of the dearth of studies on the potential memorability of assonance and because of the need to find ways of facilitating the retention of L2 chunks, we set up a new experiment, which we report below.

5. Method

Participants were undergraduate language majors at the end of their first year of studying English as one of two foreign languages. Thirty-five students underwent the treatment

and took the immediate post-test. Of the initial 35 participants, 25 took the delayed post-test given one week later (10 students were absent).

The procedure was as follows. Participants were asked to form groups of two or, because n was odd, three members. One member of each pair/group was given a pre-shuffled pack of 24 slips of paper each bearing an assonant or a non-repeating two-word chunk. The target chunks were as follows¹:

Assonant	Non-repeating
1. home phone	school lunch
2. floor board	roof tile
3. sea breeze	storm cloud
4. newsroom	workplace
5. queen bee	tea cup
6. loud sound	soft touch
7. best friend	first choice
8. day break	hair loss
9. right size	good taste
10. black cat	wet sponge
11. cheap seat	short note
12. high price	bad luck

Given the level of proficiency in English of the participants (language majors in higher education), we could safely assume that the meanings of all these phrases would be transparent to them.

In each pair/threesome the person with the packet of slips dictated all the chunks to their partner(s), who then wrote them down. Participants were subsequently asked to sort the slips into one assonant and one non-asonant set. As the participants were already familiar with the concept of assonance, simply giving them an example of an assonant chunk (not one of the targets) was sufficient to enable them to perform the task.

Because the sorting task involved a simple binary decision (either the vowels/diphthongs in each two word chunk are the same or they are not), we assumed that participants would consider the two types of target chunk for the same amount of time and with roughly the same cognitive effort.

Directly after the sorting task the participants were asked to write down as many of the phrases as they could remember. This we will refer to as the ‘immediate recall test’.

One week later, students were presented with a jumbled list comprising 48 two-word phrases (the original 24 chunks which they had sorted before) and another 24 ‘distracters’, half of which are assonant and half of which show no form of phonemic repetition. The following were the distracters that were mixed in with the above-mentioned 24 target phrases:

¹ We included compounds such as *newsroom* on the grounds, firstly, that these expressions almost certainly derive from ones spelled as two separate words and, secondly, their current spelling as one word merely underscores the extent to which the combination of the words has become conventionalized. Interestingly, the ‘lexical phrase hypothesis’ (according to which a very great many phrases are stored in mind rather as if they were single words) suggests the argument that there should be many more orthographic compounds in standard English than there now are – e.g., *lotsof* instead of *lots of*.

Assonant	Non-repeating
1. town house	park bench
2. goal post	road sign
3. rat trap	bird cage
4. sad fact	moon walk
5. grass land	stone wall
6. low tone	dark night
7. next step	false move
8. high tide	end game
9. odd job	lone voice
10. wish list	waste bin
11. nice try	well done
12. knee deep	foot long

The participants’ task in what we shall call the delayed recognition test was to tick the chunks they remembered from the dictation and sorting tasks they performed the previous week.

6. Results

In the immediate recall test, more assonant than non-asonant phrases were recollected. On average, students wrote down 5.91 assonant target phrases (SD 1.61), compared to a mean of 4.23 non-asonant ones (SD 2.17). The Wilcoxon Signed Ranks Test shows the greater likelihood of assonant targets being recollected to be significant at $p < 0.0009$ (one-tailed; $n = 35$). The difference in memorability between the two sets of target phrases is also attested by the results of the delayed recognition test. On average, students correctly recognized 10.32 of the assonant phrases they had encountered the previous week (SD 1.99), while the mean for the non-asonant phrases was 8.16 (SD 2.11). The Wilcoxon Signed Ranks Test yields $p < 0.0002$ (one-tailed; $n = 25$). In short, both test results are unequivocally consistent with assonance having a marked mnemonic effect,² at least in the wake of tasks designed to promote *noticing of form*.

7. Conclusion

From the teacher’s perspective, the question of the moment is, how can I make phrase-learning feasible for my students? Can I do anything besides merely pointing out chunks as they occur in this or that text or period of class work? The familiar answers so far are as follows:

² The p -values obtained in this experiment were actually even smaller than those obtained in an analogous experiment (also consisting of a peer dictation followed by a sorting task) in which we measured the memorability of alliteration (Lindstromberg and Boers, forthcoming). At first sight, this is surprising as it would seem to suggest that assonance is even more mnemonic than alliteration. An alternative explanation, however, is that sorting out assonant phrases from non-asonant ones requires more cognitive effort than sorting out alliterative phrases from non-alliterative ones, and that surplus cognitive investment may have left deeper traces in memory.

- With respect to figurative expressions, teachers can try to help learners make sense of idiomatic meaning in terms of their original, literal meaning. The relatively deep mental processing involved makes it more likely that meaning and form will be remembered (e.g., Boers et al., 2007).
- For chunks of any kind, teachers and learners can encourage noticing and also resort to familiar workbook-type exercises (applied to vocabulary in general) such as matching and gap-filling. However, it can be argued that such exercises fall short of stimulating deep processing because the chunks are treated as arbitrary, and so pathways for insightful learning are left unexplored.

Fortunately, recent studies have shown (1) that the lexical makeup of a substantial number of English chunks is not completely arbitrary, but is instead motivated by phonemic repetition, and (2) that salient phonemic repetition can, if properly approached, make it easier for learners to remember a surprisingly numerous category of chunks regardless of whether they are figurative or not. Given comprehension of meaning, all that seems necessary for a statistically significant effect to occur is the performance of very basic noticing tasks such as mutual dictation and chunk sorting.³

What we have demonstrated in the present paper is that noticing phonemic repetition can effectively be taken beyond the salient types. Specifically, significant mnemonic benefits (over one week, at least) can also be brought about in the case of chunks exhibiting assonance, a pattern which appears to be of lesser salience. The relevance of this finding for language pedagogy is underscored by the observation that assonance is a relatively frequent pattern in English phraseology (see Section 2 above).

However, assonance is decidedly *not* a pattern which is easily identified by learners. We have seen in a study similar to the one described above that, in the absence of explicit guidance, many learners – although foreign language majors – fail to recognize even alliteration (Lindstromberg and Boers, forthcoming). Success rates for autonomous recognition of instances of assonance are worse – very low indeed. In other words, it should be part of a teacher's role to alert students to cases of phonemic repetition in chunks (not least of all cases of assonance) and, by doing so, to awaken its mnemonic power. In this connection, one of the experiments reported in Boers and Lindstromberg (in press) suggests that the occasional brief intervention by the teacher to point out to students that particular phrases in their course materials show rhyme or alliteration is by itself enough to improve uptake.

However, four key questions remain unanswered:

1. Do all types of phonemic repetition have similar mnemonic potential? The memorability of several types, including evidently very salient ones such as word repetition (e.g., *side by side*) and beginning-end repetition (e.g., *tick-tock*), has not as yet been measured empirically. Still, we may speculate that, given the observed mnemonic impact of notic-

³ A binary sorting exercise like the one we used in the experiment may be useful as an eye-opener (or ear-opener?), i.e., to raise students' awareness of this or that kind of phonemic repetition. We agree that – when applied to an obvious pattern – repeated use of such a simple exercise may quickly fall short of inducing sufficient task-involvement on the part of the students. On the other hand, when the exercise targets assonant patterns, it may prove useful as a means of making students aware of the pronunciation of certain words (e.g., of the potentially tricky pronunciation of *town* when they find out that *town house* assonates).

ing a comparatively light repetition (i.e., assonance), heavier types of repetition are also highly likely to have mnemonic potential.

2. How many significantly frequent phonemically repetitive chunks are there? The answer would seem to be, a few thousand at a minimum. For example, we have compiled a non-exhaustive list of phonemically repetitive chunks which includes over 2300 current items (See Lindstromberg and Boers, 2005, for an early, partial version.).
3. What fraction of all current chunks incorporate phonemic repetition? The hand counts in idiom dictionaries are suggestive (up to 20% without even including simple assonance), but clearly further research is needed with regard to other types of chunk.
4. What fraction of *frequent* chunks show phonemic repetition? Might the general memorability of phonemic repetition be reflected in comparatively frequent usage of alliterative and assonant chunks by the language community at large? Preliminary data on alliteration in idioms lend some plausibility to this speculation (Boers and Stengers, forthcoming). A positive correlation would tell us that, all else being equal, chunks showing phonemic repetition merit attention in teaching not just because the (brief) time spent pointing out the sound pattern is likely to be fruitful but also because phonemic repetition would be an indicator of likely frequency, a variable which is believed to correlate with usefulness.

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