UNIVERSITY OF GRONINGEN
RESEARCH MODULE NEURO-LINGUISTICS (LTX021B10)
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Research report

The role of explicit attention in assonance as a learning cue in L2 acquisition

January 14, 2018

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Abstract

Earlier studies have shown advantageous learning effects of phonologically-cued stimuli in the L2 teaching of collocations. Such effects were, however, only substantial if participants were explicitly made aware of the nature of such cues. This study aims to validate this interaction between explicit attention and assonance as a specific phonological learning cue. Two lists of 30 collocations, in this case two-word phrases, were composed. The collocations were controlled for frequency and concreteness. Moreover, age of acquisition (AoA) and an approximation of vocabulary size of participants were taken into consideration. One list of collocations was used for each experiment. Each list was read aloud to the same class of 16 mostly Dutch-English students, thereby adapting a within-subject design. The second experiment included examples and an explanation of assonance, while the first experiment excluded such instructions. Importantly, concreteness of meaning was found to be heavily related to participant performance, despite being controlled for. Frequency was successfully controlled for and not associated with performance. The performance of participants was not related with their age of acquisition or vocabulary size. The results are shortly discussed in terms of reproducibility and the nature of collocations. No strong effect of explicit attention was found, but the patterns did not contradict earlier studies. It is concluded that a highly intensive and elaborate instruction is required to achieve a learning advantage of assonance.

Contents

1 Background

Language acquisition remains an impressive and largely mysterious feat of human beings. For the most part the ability seems an automatic and rapid process, as children usually attain a substantial vocabulary and acquire most core features of a language before they attend primary school. This perceived automaticity declines, however, the older the learner is when acquiring a second language (L2). It is generally assumed and experienced that at higher ages it takes substantial effort or skill to attain native-like fluency in an L2. A study into L2 learners learning Swedish showed that near-native level (as considered by native Swedish speakers) learners are almost all simultaneous bilinguals or have an exceptional aptitude for learning languages (Abrahamsson & Hyltenstam, 2008). The authors considered this to be an indication that truly native-like fluency is heavily conditioned by language aptitude and is in essence limited to a small subset of the population. Leaving aside the unpredictability and highly individual nature of L2 acquisition, it is clear that attaining fluency in a second language is an intensive process for any learner.

A crucial obstacle L2 learners face is learning the chunks of language that are readily available to native speakers through a significantly more intense contact with the language. These chunks of fixed linguistic combinations (so-called lexical phrases) occur in many different forms and are present in all natural languages to a vast degree (see Ellis, 2008). Native speakers have intuitions about such lexical phrases and exhibit an advantage in processing (as shown for reading tasks in Conklin & Schmitt, 2008) as opposed to phrases that are assumed to be generated by elementary linguistic computation. A corpus study by Li and Schmitt (2009) details the process of a Chinese MA student improving her academic writing for a degree in teaching English as a second language. While the participant had increased her inventory and also used lexical phrases more appropriately, the authors note she still used a limited amount of lexical phrases. It is also worth noting that the corpus data included a dissertation, which is vastly different from regular discourse as the formulation of sentences is subject to considerable time pressure in the latter context. Taking facts together demonstrates a paradox: an L2 learner has to learn linguistic sequences that are crucial to perceived fluency, but they are notoriously difficult to internalize and the learner has to do so with limited resources.

Lexical phrases constitute a highly heterogeneous group of linguistic items. Analytical view and terminology of researchers furthermore strains comparability of studies into lexical phrases. A noteworthy attempt at classifying sub-types of lexical phrases has been made by Granger and Pacquot (2008). Besides stressing the main problems of the field of phraseology, the authors specify an extensive classification based on definitions (as opposed to a corpus-based approach). The framework divides lexical phrases into three categories: referential, textual, and communicative lexical phrases. Referential lexical phrases, phrases relaying a content message and the least discourse-dependent, include (lexical and grammatical[1]) collocations, such as *heavy rain* and *depend on*. Manning and Schütze (1999) come to similar conclusions after a consideration of the contemporary literature on collocations. They consider the following three properties to be common among the myriad of definitions: (1) semantic *non-compositionality*, i.e. the meaning of the collocate cannot wholly be predicted from the meaning of its part, (2) syntactic *non-modifiability*, i.e. the number of words cannot be more or less and the collocation cannot be grammatically transformed or reordered, and (3) *non-substitutability* of the collocates by words that are contextually similar, i.e. the non-acceptance of substituting 'heavy tea' for 'strong tea'. While these authors come from different perspectives (linguistic and corpus-based approach respectively) on lexical phrases, they converge to a reasonably common ground when it comes to collocations: collocations are more than simply co-occurring elements. Manning and Schütze argue that a manual compilation will always be of a higher quality than a computer-generated collection

[1]Based on Granger and Pacquot: Lexical collocations are usage-determined combinations and constitute a semantically-independent base and a semantically-dependent lexeme which is licensed by the base. Grammatical collocations are combinations of a lexeme and a grammatical item, which in English usually results in a lexeme combined with a preposition.

and refer to the seminal and meticulous work of Benson, Benson and Ilson (2010). Their dictionary of English collocations is used in this study as a starting point for stimuli composition.

A study into collocational acquisition by Laufer and Waldman (2011) indicates that the difficulty of creating a substantial repertoire of lexical phrases in an L2 also holds specifically for collocations. For this study a group of Hebrew-English L2 learners were divided into three proficiency categories: basic, intermediate, and advanced. Similarly to the study by Li and Schmitt (2009), the production of collocations was significantly lower in all proficiency groups when compared to native speakers. Furthermore, around a third of the produced collocations in every proficiency group were incorrectly used. This persistent deviation of native-like norms, even into high proficiency, shows striking similarity to the difficulty of attaining L2 suprasegmental phonology and suppressing a foreign accent. The latter difficulty has often been used as an argument to suggest there is a critical period in L2 learning (Flege, Yeni-Komshian, & Liu, 1999). While this idea is not without substantial opposition or amendment, it is generally accepted that specific language domains are more difficult to acquire than others. The lexicon is perceived to be one domain for which it is possible to attain native-like levels (Hellman, 2011)[2], but collocations are considered a sub-domain of the lexicon. It is clear that methods into successfully teaching specifically collocations are prudent, because collocations differ from general vocabulary in nature and are clearly attained with much more difficulty.

In recent years, several established L2 teaching methods have attempted to incorporate lexical phrases, such as incidental learning (Webb, Newton, & Chang, 2013) and making collocations more salient in linguistic input (Peters, 2012). Another line of research focuses on the advantage of phonological cues. This is based on the assumption that some phonological patterns can make collocations more noticeable for language learners. Such an effect has been shown to hold for full rhyme (Macnamara, Moore, & Conway, 2011) and alliteration (Lindstromberg & Boers, 2008a). Assonance is another such advantageous phonological pattern (Lindstromberg & Boers, 2008b) and is portrayed by phrases in which the vowel is repeated in phonologically prominent locations (e.g. *go with the flow* and *back in action*). Assonance differs from full rhyme, for which both the vowel and the coda need to be repeated. Through the less restrictive nature of assonance, it is substantially more abundant in English than full rhyme (Boers, Lindstromberg & Eyckmans, 2014). Therefore, assonance can in principle be a suitable cue for learning a considerable amount of new collocations in an L2.

There is, however, a frequently observed significant obstacle in applying L2 teaching methods, which is that learners need to be explicitly instructed into what they are trying to learn. Explicit attention is assumed to amplify any advantage, but also often seems to be a necessary condition for long term memorization in general. Schmidt (1995) embeds this problem for L2 learning into the broader general psychological literature on memory and cognition. Schmidt argues that collocations (like other lexical items) require explicit attention in learning. This is confirmed by earlier experiments carried out by Boers, Lindstromberg, and Eyckmans (2014). Noting that the earlier studies showing the advantage of phonological cues did not account for explicit attention, they hypothesized an interaction effect between assonance and explicit attention as factors. Their study consisted of two experiments. In the first experiment participants were dictated a list of assonant and non-assonant items and were at a later point asked to freely recall as many as they could. In the second experiment the participants were shown examples of assonant and non-assonant collocations and were instructed to note for each collocation whether or not the participant thought it was assonant or not. The authors expected that in the first experiment there would be no statistically significant difference between the number of recalled assonant and control items, but that in the second experiment more assonant items would be remembered than control items. These predictions were borne out and are the foundation of the current study.

[2]Although all domains, even the lexicon, are reported to be affected in certain way in an L2. See Herschensohn, 2013, for overview and discussion.

Before stating the specifics of the current study, it is important to make an important note about semantic properties of collocations and their possible influence on participant performance. Specifically, the factor 'concreteness' has been proven to be a mediating factor (Boers, Lindstromberg, & Eyckmans, 2012). For the current study, this has been taken to mean 'concreteness of meaning', i.e. how tangible and imaginable the semantic referent of a linguistic expression is. The terminology is difficult to compare across studies as the exact definition tends to differ. Next to that, concreteness has been found to correlate highly in free recall tasks with other semantic properties such as imageability (Hamilton & Rajaram, 2001). This factor is not focal in the current study, but it is important to control for (see paragraph 2.2).

Another possible interfering factor is the age of acquisition (AoA) of L2 learners (Granena & Long, 2013). The relationship between the age at which L2 learners start learning an L2 and their predicted attainment has been a discussion in (applied) linguistics for decades and is fruitless to repeat here in its entirety. The study by Granena & Long establishes that collocations, besides phonology and morphosyntax, seem to be sensitive to an age effect. A later onset of learning a language predicts a greater difficulty in learning collocations. For this reason, age of acquisition will be controlled for in the current study as well (see paragraph 2.1), but without a specific hypothesis as it is out of the scope of the current study.

The goal of the current study was to validate the results of the study by Boers, Lindstromberg, and Eyckmans (2014). Specifically, taking together the earlier studies, it was tested to what degree assonance is an advantageous learning cue in and of itself and whether or not explicit attention is a necessary stipulation. In order to more rigorously test the effect of explicit attention, the current study employed a within-subject design as opposed to the between-subject design of Boers and his colleagues. Next to that, a greater set of collocations (30 items per experiment instead of 15) was presented to participants in order more reliably quantify a difference between assonant and non-assonant recall. Two experiments were carried out in a similar fashion to the study by Boers and colleagues. The hypotheses was replicated as well: no advantage of assonance was expected in the absence of explicit attention. A significant advantage of assonance, i.e. a higher number of recalls per collocation, was expected when participants were explicitly instructed to focus on the pattern. Specifically, no significant difference between the recall of assonant and control item was expected in the first experiment and such a difference was expected for the second experiment.

2 Methods

Two experiments were carried out in order to test the hypotheses. The first experiment tested whether the presence of assonance was insufficient to achieve a recall advantage. The second experiment was constructed such that it tested whether or not more assonant collocations were recalled when the participants were explicitly made aware of assonant patterns.

2.1 Participants

The participants were 16 second year bachelor students of English Language and Culture (University of Groningen, the Netherlands). The within-subject design allowed for a diverse group of language backgrounds. 13 participants were Dutch-English, and the remaining three participants had a German-English, Finnish-English and unknown (but assumed Dutch-English) language background. The mean age was 21 years (SD= 3 years) and 12 of the participants were female. The mean age of acquiring English was 9 years (SD= 2 years), indicating that most participants had contact with English before their secondary school (which usually starts around the age of 12 in the Netherlands).

As an initial inclusion criterion, the participants were required to have a minimum level of

English vocabulary. This was tested by means of a vocabulary test of the University of Ghent[3]. This test approximates vocabulary size through a lexical decision task. This approximation is then given as a percentage of 'all' English words. Each participant was required to perform this test three times outside of class and the scores were averaged. Prior to the first experiment, the inclusion boundary was assumed to be reasonably set at 70%. After the data collection, however, this inclusion criterion was discarded so as to not exclude too many participants. Next to this, only 10 participants completely filled in the questionnaire (at the end of which the vocabulary test was provided). Instead, then, the recall performance was checked against vocabulary size by means of a correlational analysis.

2.2 Materials

A set of in total 60 collocations was composed (30 for each experiment). Half of the collocations were assonant collocations and the rest were non-assonant collocations. Each experimental list of 30 collocations was preceded and succeeded by one distractor item, totaling 32 items per list. This was done to account for the well-known effect of participants best remembering the first and last item of a list. These items were left out of analyses.

A subset of these phrases were taken from the original study by Boers, Lindstromberg and Eyckmans (2014). Next to this, new stimuli were designed. All stimuli had the following properties: (1) the assonant and control item had one common collocate, (2) consisted of the same amount of syllables, (3) had the same syntactic structure (either adjective-noun or noun-noun combinations). An example pair is *high price* and *high rate*. Both collocations consist of an adjective-noun combination, consist of monosyllabic words, and share a common word: *high*.

The collocations were controlled for frequency by use of corpus data. Specifically, all frequencies were pulled from the full (unsmoothed) English 2007 database from Google Ngram (Michel et al., 2011). This database includes the combined American English and British English corpus and consists of an unknown count of entries. For this reason, the frequencies are not absolute but instead $\log_{10}$-transformed for interpretation. A $\log_{10}$-transformed increase of 1 equals a 10 times greater occurrence in the dataset. It is worth noting that a higher lexical frequency does not necessarily mean a higher recall. A study by (Merritt, DeLosh, & McDaniel, 2006) has shown that lexical frequency negatively correlates with performance at recall tasks that are similar to the one used in this study, i.e. a 'free recall' task. In such a task, the participant is asked to remember stimuli and recall them in any order he or she likes. In essence, a possible advantage of high frequency is eluded by using a free recall design, but correlations were calculated between recall and frequency in order to check for such an effect.

Furthermore, the collocations were controlled for concreteness of meaning. Collocations with a high degree of concreteness are known to be recalled more easily. In order to control for this, 10 native speakers of English (most of which from the UK) rated the full set of 106 possible collocations for concreteness of meaning. They rated each collocation on a five-point scale (1 – 1.5 – 2 – 2.5 – 3). The average of these 10 ratings was taken as the concreteness value for a given collocation. The collocation properties and full item lists can be found in Appendix 6.1 and 6.2.

2.3 Procedure

The lecturer of the relevant course was approached by e-mail and agreed to allocate parts of two lectures to the experiments. Before the instructions of the first experiment the procedure was explained to the students. They were informed the experiments would take place during class and that they were asked to fill in a short background questionnaire outside of class. They were offered to sign informed consent shortly prior to the instruction of the first experiment.

[3] http://vocabulary.ugent.be

2.3.1 Experiment 1

The collocations were presented in counterbalanced order. The participants were informed they were to remember as many items as possible as they would be tested later in the lecture. There was no instruction about assonance in this first experiment. Each collocation was dictated and the participants wrote the collocation down immediately after hearing it twice. These sheets were then collected. The participant were then almost immediately asked to write down as many collocations they could remember in any order. These sheets were collected as well. 30 to 35 minutes later the participants were once again asked to write down as many collocations as they could on a sheet of paper.

2.3.2 Experiment 2

The second experiment took place two weeks after the first experiment. The instruction this time included an example of an assonant collocation and a non-assonant collocation, i.e. 'red fox' and 'black cat'. Furthermore, they were informed that assonance is 'the repeated occurrence of a vowel in two words'. As the participants were language bachelors, this instruction was expected to be sufficient. The participants were presented with the list once and afterwards they were presented with the list again (in the first experiment participants heard the stimulus twice consecutively). This time the participants were also asked to denote whether or not they thought a collocation as assonant or not with a (+) or a (-) after each collocation. Again, the participants wrote down as many as they could recall immediately after initial presentation and did the same 30 to 35 minutes later.

3 Results

3.1 Summary of results

The recall values per collocation for Experiment 1 and 2 are presented in Tables 1 and 2 respectively. Tables 1 and 2 show that in the first experiment more collocations were recalled than in the second experiment. Furthermore, as was to be expected, in almost every case the mean delayed recall value was lower than the immediate recall value (the control phrases were recalled similarly in Experiment 1). There is an asymmetry between the two experiments regarding the contrast between assonant phrases and control phrases. While the control phrases were recalled more often in the first experiment, in the second experiment the assonant phrases were recalled more often.

3.2 Analysis

The current study is designed in such a manner that the difference between the experiments pertains to a difference in explicit attention on the relevant phrasal patterns (assonant or control phrase). This design concordantly lends itself for a Factorial ANOVA with two binary factors: explicit attention (i.e. Experiment 1 or 2) and assonance (i.e. assonant or non-assonant). This statistical test was applied to both the data from the immediate recall test and the delayed recall test (see Figure 1 for interaction plots). There was no significant main effect of either experiment ($F(1,56) = 1.067$, $p > 0.5$, $\eta_p^2 = 0.019$) or assonance ($F(1,56) = 0.025$, $p > 0.5$, $\eta_p^2 = 0.000$) for the immediate recall condition. Similarly, no significant main effect was found for experiment ($F(1,56) = 2.706$, $p > 0.5$, $\eta_p^2 = 0.046$) or assonance ($F(1,56) = 0.482$, $p > 0.5$, $\eta_p^2 = 0.009$) for the delayed recall condition. Crucially, there was no interaction effect of experiment and assonance for the immediate recall condition ($F(1,56) = 0.909$, $p > 0.5$, $\eta_p^2 = 0.016$) and neither for the delayed recall condition ($F(1,56) = 0.707$, $p > 0.5$, $\eta_p^2 = 0.012$).

Spearman's rank correlation efficients were calculated (summarized in Table 3) to exclude the possibility of interfering factors. These factors include the age of acquisition (AoA) of a participant and

Table 1: Recall per collocation for Experiment 1.

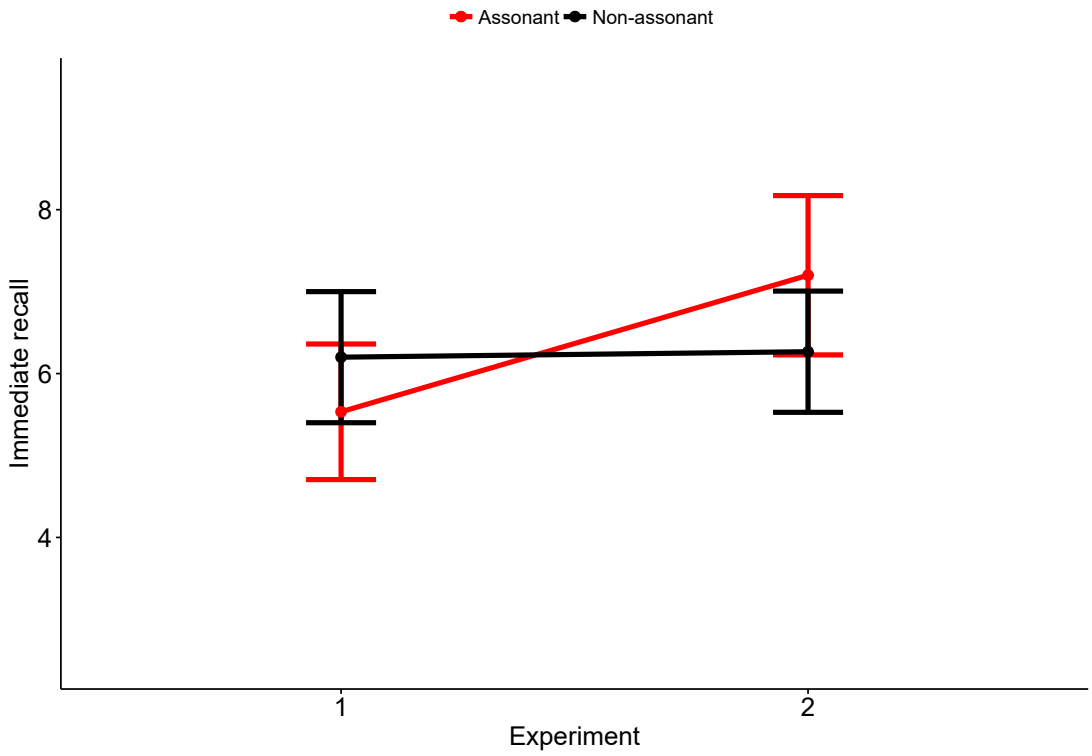
Assonant phrase	Recall		Control phrase	Recall	
	Immediate	Delayed		Immediate	Delayed
wheat field	12	13	wheat flour	15	13
bike ride	6	8	train ride	5	5
town house	9	9	town square	10	10
fresh bread	7	9	stale bread	8	11
stage name	4	4	pen name	6	5
coast road	4	4	side road	7	10
right side	10	9	right arm	8	6
quick trip	6	5	quick stop	5	4
job loss	4	6	net loss	5	4
main gate	6	4	main road	11	10
low tone	2	1	low cost	4	4
long shot	3	1	long hair	10	10
land grant	5	2	land claim	1	1
high price	6	3	high rate	2	3
cream cheese	10	10	goat cheese	11	13
Total	**94**	**88**		**108**	**109**
Mean (SD)	**6.3 (2.9)**	**5.9 (3.6)**		**7.2 (3.8)**	**7.3 (3.9)**

Table 2: Recall per collocation for Experiment 2.

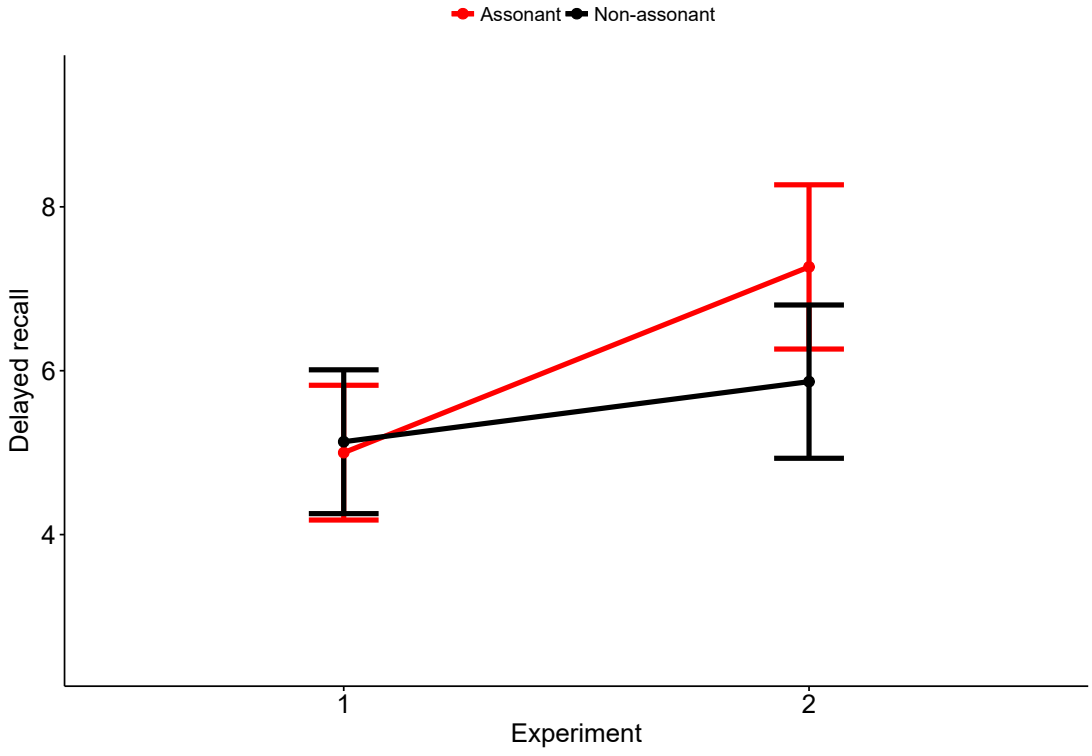
Assonant phrase	Recall		Control phrase	Recall	
	Immediate	Delayed		Immediate	Delayed
pale face	6	4	round face	4	4
big thing	5	4	old thing	2	2
gas tank	1	2	fish tank	2	1
file size	9	4	class size	6	5
wild life	7	6	shelf life	6	5
thin strip	2	1	thin ice	6	5
health plan	5	4	floor plan	2	2
loud sound	3	2	loud noise	4	2
drug bust	11	13	drug deal	6	9
faint trace	3	3	slight trace	4	3
rice wine	9	10	port wine	13	13
death threat	11	10	bomb threat	8	8
nice time	6	5	wrong time	3	4
stem cell	8	6	blood cell	6	5
clean sweep	7	3	clean cloth	11	7
Total	**93**	**77**		**83**	**75**
Mean (SD)	**6.2 (3.1)**	**5.1 (3.4)**		**5.5 (3.2)**	**5.0 (3.2)**

Table 3: Correlation matrix of background variables, as listed in leftmost column (*p-values in italics*).

	Offset Exp. 1	Offset Exp. 2	Immediate recall	Delayed recall
AoA	-.07(*.78*)	-.06(*.83*)		
Vocabulary	.33(*.29*)	.16(*.63*)		
Frequency			-.03(*.79*)	.04(*.75*)
Concreteness			.43(*.00*)	.51(*.00*)



(a) *Interaction plot for immediate recall.*



(b) *Interaction plot for delayed recall.*

Figure 1: Interaction plots of time conditions (immediate and delayed) with 95%-CI's.

the 'offset score' of a participant: how many collocations a participant recalled in the delayed condition as opposed to the recall score of the immediate condition (i.e. offset= $\text{recall}_{\text{delayed}}$–$\text{recall}_{\text{immediate}}$). Instead of the vocabulary size inclusion criterion, vocabulary size was correlated with offset scores as well. Furthermore, to exclude interference from collocation properties, the recall per item was correlated with its established frequency and concreteness.

No strong correlations were found between (1) a participant's AoA and 'offset score', and (2) a participant's approximated vocabulary size and 'offset score'. There was no strong correlation between frequency of a collocation and its recall by the participants. However, a strong and significant correlation was found between the concreteness of a collocation and recall for both the immediate condition ($\rho = 0.43$, $p<0.05$) and the delayed condition ($\rho = 0.51$, $p<0.05$).

4 Discussion

After establishing the acquisition of collocations as a substantial stumbling block for L2 learners, this study attempted to establish the role of assonance as a learning cue. Returning to the question formulated at the outset of this study, i.e. whether or not explicit attention is necessary for an advantageous learning effect of assonance, the following conclusions can be drawn. First off, it is clear that assonance does not work as an 'unconscious' learning cue, which is indicated by the results of the first experiment. Furthermore, participants did not recall significantly more collocations in either one of the experiments. Notably, an advantage of assonance was still absent when participants are explicitly instructed to check for assonance in a dictation task. This pattern is the same for both immediate recall and delayed recall of collocations, indicating there is no noticeable different effectiveness of the method for long term learning[4].

The results were unexpected given earlier research. However, it should be noted that the same direction of effects were found. This is most visible when comparing Figure 1 and Figure 2. Specifically, the assonant and non-assonant items were remembered equally well in the immediate conditions: in the first experiment the non-assonant items slightly better and in the second experiment the inverse was true. However, while the two types of stimuli were remembered very similarly in the delayed condition of the first experiment, the assonant items were ostensibly better remembered than the non-assonant items in the delayed condition of the second experiment. This is the crucial case, however, as it portrays the most similarity to real world learning environments: explicitly taught and aiming at the long term. In this sense the results do not contradict Boers, Lindstromberg, and Eyckmans (2014).

No interference in the results by the age of acquisition or approximated vocabulary size of participants was found, indicating no interaction between recall and variables (uncontrolled for in participant selection) that are typically related to or indicative of linguistic competence. Therefore, it is possible that the method in its current form is more dependent on general cognitive skills (i.e. memorization and short term processing) than purely linguistic factors. This seems corroborated by the fact that performance was not influenced by the corpus frequency of collocations either. Performance was heavily influenced, however, by concreteness of meaning as established by native speakers. This sensitivity indicates that participants at least partially relied on linguistic resources in execution of the free recall task.

The question of why a seemingly reliable effect does not reach statistical significance in a replication study is still left unanswered and can be interpreted in several ways. One possibility for explaining the non-significance is the strong relationship between performance and concreteness of meaning, despite controlling for it by native speaker ratings. There are two ways this can be interpreted: either the concreteness questionnaire was not clear enough for the native speakers or concreteness of

[4]It should be noted that the delayed condition was not substantially later than immediate condition, i.e. 30 to 35 minutes.

meaning is a highly difficult factor to control for. The concreteness questionnaire had a substantial explanation (i.e. examples of distinctly concrete collocations and a counterexample) and there were more native speaker ratings than in the study of Boers and colleagues. Therefore, it is unlikely that the questionnaire is the source of the problem. It is then safe to assume that concreteness is difficult to account for, especially so for collocations as they consist of at least two collocates. The semantics of the core collocate may be substantially adjusted by the semantics of the dependent collocate. This semantically composite structure of collocations is problematic for approximating semantic properties and needs further exploring (but goes beyond the scope of this study).

Another possibility is the difference in sample size (Boers and colleagues: 55 and 44 in Experiment 1 and 2 respectively). This limited sample size is partially an artifact of the within-subject design. Teachers are, understandably, generally unwilling to allocate time of two separate lectures to experiments. The greater sample size in Boers and colleagues' study allowed for the use of a statistical test with more statistical power, i.e. Student's t-tests. It should be noted, however, that t-tests, while strictly speaking designed to be used with continuous variables, are generally accepted to be used for counts as well. Besides a desire for conservative testing, our limited sample size demanded the use of non-parametric tests. This is not to be taken as a negative side to either study, but it is a noteworthy difference in terms of statistical significance.

A final suggestion for future research is to quantify a degree of explicitness of instructions used in experiments. Naturally, it is difficult to quantify such specific components of research methodology, but its absence makes for difficult reproducibility. A more elaborate (i.e. longer or detailed) instruction in how to recognize assonance could have lead to a more pronounced effect of explicit attention. Additionally, a more extensive instruction ensures that all participants are on the same line after the instruction. The participants were asked if they understood what assonance was, but the notation of which collocations were assonant, to their mind, showed that the phonological pattern was not reliably clear to all participants. It remains unclear whether or not Boers and colleagues encountered the same problem.

Summing up, although the current study does not establish assonance as a learning cue, the results do not necessarily contradict earlier research. If assonance is to be used in L2 teaching, explicit attention is necessary for an advantage. Specifically, the form of explicit attention is crucial. Further research can discern what level of explicit attention is necessary, as the instructions about assonance were short in the current study. More elaborate pre-task instructions can instigate a higher awareness in students. Furthermore, it is feasible to determine which kind of tasks, next to dictation tasks, are suitable to artificial injection of assonant material. Since assonance is a phonological phenomenon, it is unlikely to be highly useful in reading, which is an important predictor of vocabulary size.

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6 Appendix

6.1 Frequency and concreteness for each collocation

See Table 4 for the properties of each collocation from the experiments. The lowest recall for assonant phrases was 1 (delayed recall of 'thin strip'). The highest number of recalls was found for 'drug bust', namely 13 times. Moreover, the lowest recall for the control phrases was 1, which was found for 'fish tank'. The highest number of recalls was found for 'port wine' in both the immediate recall and the delayed recall.

Table 4: Collocation properties: (absolute) $\log_{10}$-transformed frequency and concreteness values.

Assonant phrase		Properties		Control phrase	Recall	
	Experiment	Log_{10}-freq.	Concr.		Log_{10}-freq.	Concr.
wheat field	1	4.96	2.55	wheat flour	4.37	2.75
bike ride	1	4.87	2.70	train ride	4.57	2.75
town house	1	4.39	2.60	town square	4.47	2.75
fresh bread	1	4.72	2.40	stale bread	4.95	2.60
stage name	1	4.90	2.70	pen name	4.58	2.70
coast road	1	4.90	2.65	side road	4.70	2.45
right side	1	3.25	2.75	right arm	3.67	2.90
quick trip	1	4.86	1.85	quick stop	5.11	2.05
job loss	1	4.49	2.50	net loss	4.37	2.50
main gate	1	4.44	2.60	main road	3.79	2.65
low tone	1	4.25	2.00	low cost	3.75	1.85
long shot	1	4.20	2.05	long hair	3.83	2.15
land grant	1	4.54	2.00	land claim	4.99	2.10
high price	1	3.92	1.80	high rate	3.81	1.95
cream cheese	1	4.27	2.90	goat cheese	4.69	2.90
pale face	2	4.14	2.30	round face	4.44	2.45
big thing	2	4.27	1.70	old thing	4.46	1.65
gas tank	2	4.57	2.75	fish tank	4.93	2.80
file size	2	4.21	2.60	class size	4.34	2.45
wild life	2	4.53	2.35	shelf life	4.17	2.45
thin strip	2	4.98	2.00	thin ice	4.73	2.05
health plan	2	4.19	2.50	floor plan	4.22	2.70
loud sound	2	4.98	1.90	loud noise	4.45	2.05
drug bust	2	5.37	2.60	drug deal	5.19	2.80
faint trace	2	5.36	2.00	slight trace	5.73	1.95
rice wine	2	4.73	2.75	port wine	4.88	2.70
death threat	2	5.11	2.55	bomb threat	5.20	2.60
nice time	2	4.78	1.90	wrong time	4.25	2.00
stem cell	2	3.56	2.70	blood cell	3.91	2.90
clean sweep	2	4.92	2.10	clean cloth	4.90	2.30

6.2 List of collocations in experimental order

See Table 5 for the list of collocations as presented in counterbalanced order in Experiment 1 and 2.

Table 5: Presented order of collocations in Experiment 1 and 2, including distractor items.

Experiment 1	Experiment 2
front line	*flat roof*
right side	pale face
wheat field	big thing
high rate	gas tank
goat cheese	wrong time
quick trip	shelf life
main road	old thing
quick stop	round face
town square	file size
bike ride	wild life
land grant	class size
wheat flour	fish tank
cream cheese	thin strip
side road	loud noise
land claim	health plan
stale bread	port wine
long hair	loud sound
low cost	drug bust
stage name	faint trace
train ride	bomb threat
pen name	clean cloth
net loss	rice wine
town house	blood cell
low tone	drug deal
main gate	death threat
job loss	nice time
fresh bread	floor plan
long shot	stem cell
right arm	clean sweep
coast road	slight trace
high price	thin ice
short film	*dried meat*