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Improving lexical access and acquisition through reading the news: case studies of senior high school students in China

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This paper reports an empirical study investigating the effects of extensive reading on vocabulary uptake, and speed of word access, among of Chinese high school students using English as a second language. It builds on a study by Masrai & Milton (2018) which reported that an informal program of watching the news on TV and reading subtitles, carried out outside class, could result in significant and measurable improvements in both orthographic vocabulary size and speed of lexical access. This study investigates whether these findings can be repeated with learners from a different L1 background, and reading process background, and where the vocabulary noticing focus of the intervention is removed. The participants were given tests of written vocabulary size, aural vocabulary size, and reading speed. These tests were conducted before and after a six-week intervention which involved reading current news materials. The results showed an increase in reading speed which is assumed to indicate an improvement in the speed of lexical access, but no obvious growth in vocabulary size. It is suggested that this is a learning method which can help facilitate Chinese students' ability to acquire their second language ability in English.

Key words: ELT, Second language acquisition, Chinese education, vocabulary uptake, senior high school, lexical access, reading speed

1. Introduction

Informal learning is a term suggested by Milton (2008) to characterise learning activities conducted outside the classroom and for fun. It is distinguished from incidental learning. Informal learning has a clear learning goal such as learning new words in a foreign language, whereas incidental learning can be inside or outside class, is not necessarily done for recreation, where the activity is meaning focused, and where the acquisition which occurs, something like L2 vocabulary knowledge, is not the goal of the activity. Prior research (Chen 2018, Milton 2012, 2018, Nation 2007, Pigada & Schmitt 2006) has confirmed the positive effect of informal learning in a number of different aspects of language. For example, informal learning can help boost participants' interest and motivation; extensive reading is helpful for different ages of people, including both children and adults (Liu & Zhang 2018). There is a connection between informal learning and vocabulary size gains (Milton 2018). Informal learning is a

broad topic, therefore, that can encompass a variety of approaches and activities and which is thought to produce a similar variety of positive effects. Both individual studies such as watching DVD films, singing songs (Milton 2008) and reading a comic-book (Horst & Meara 1999), and meta-analyses, such as Liu & Zhang (2018), confirm that informal learning can result in vocabulary learning.

While many of these studies investigate vocabulary size gains, the Masrai & Milton (2018) study extends this focus to the fluency dimension in Daller et al's (2007) three-dimensional model of the mental lexicon, and to the dual-processing model of the lexicon (Coltheart 1978) which considers the lexicon in terms of orthographic and phonological halves. Masrai & Milton's study, therefore, examined the effects of an intervention involving daily watching of news with English subtitles. It investigated whether this intervention would impact differently in gains in the orthographic and phonological side of the lexicon; confirming the Coltheart and Rastle view of two separable halves of the lexicon. They also investigated whether this intervention could result in changes in the speed of processing of the written word; Daller et al's fluency dimension. To achieve this, the study made use of some recently developed software to measure language improvement, such as the XK-Lex test (Masrai & Milton 2012) to calculate participants' orthographic vocabulary size, and A-Lex (Milton & Hopkins 2005a), a test designed to measure phonological size. It also used ReadLex (Milton & Hopkins 2005b), a test designed to measure reading speed in English. The results suggested the reading intervention resulted in a measurable improvement in orthographic vocabulary size, but not phonological vocabulary size. It also resulted in a measurable improvement in reading speed. However, the case study format (one L1 Arabic speaker), requires repetition to confirm whether these results can be generalized.

The study reported in this paper is intended to extend the Masrai & Milton (2018) study. It investigates vocabulary learning which occurs among senior high school students in Mainland China from a program of news reading outside class. Five participants were given a six-week news reading activity, including 36 pieces of news, with 200 to 400 words each, and were given pre-test and post-tests to help the research investigate their language ability change. The investigative methods are taken from the original paper and involve the use of the XK-Lex, A-Lex, and ReadLex vocabulary tests to measure orthographic vocabulary size, phonological size and reading speed. It was intended to investigate whether extensive reading, even without the vocabulary noticing element of reading subtitles which was used in the original study, can be beneficial in promoting vocabulary knowledge and use.

The study is essential for the following three reasons. Firstly, it is widely known that what is taught is not what is learned (Milton 2009). Students only obtain some of the knowledge that teachers provide. The uptake from formal classroom teaching is usually not enough to achieve fluency. Masrai & Milton (2018) report that the uptake of orthographic vocabulary is around 2.5 words per contact hour. This is smaller, typically about half the volume of the words made available for learning. Informal learning, which can allow students to enjoy English after school and in addition to classroom time, may allow learners to acquire words more efficiently. Because learners can choose the topic and content of materials which they like, students are likely to have higher motivation for learning English, they may improve their language ability more quickly, and benefit from a wider variety of learning contexts than is possible in the classroom. Children are likely to be more willing to read where the materials are something new and are fun, than from the unchangeable and limited classroom English textbooks which are provided for non-native speakers. The study can tell us whether an approach of this kind is beneficial to learners.

Secondly, there is little research examining the effect of news reading as an activity in language learning, and little on the effect of such an activity on lexical processing. In the past, researchers have tested movie-watching (Milton 2008) in some situations, informal online learning through mobile phones (Jurkovič 2019), and even extensive reading with graded readers (Carney 2016). As technology

improves, people are more willing to choose more up-to-date and exciting methods of learning compared with traditional news reading, however, the availability of these methods in the Chinese classroom seems limited. Such methods may be time-consuming and are not accessible for Chinese senior high school students where, typically, learners are not allowed to use mobile phones in school. A brief, leisure-time activity, such as extensive news reading which can take only 15 minutes every day using technology which the students already possess, seems a suitable approach for Chinese students where learners already have the motivation to improve their English and perform better in exams. This investigation can add to research and tell us whether such activities are attractive to and practical for learners.

Thirdly, this study can help expand the methodological horizon for English teaching in China. Most formal teaching can still be characterized in terms of traditional English teaching or learning approaches. Most Chinese students, too, still utilize the traditional formal teaching-learning activities they are familiar with. Pressure to succeed may make both teacher and learners conservative in their choice of learning activities and may favour these formal activities, and hard work, making them fearful of trying anything new. However, these approaches, although well-used, may not make not be optimal. Chen (2018) argues that the informal teaching approaches might boost students' learning motivation in English due to the variety of topics for reading learners can choose. Renandya and Jacobs (2016) take this a step further and suggest informal learning seems to improve the traditional teaching methods to some extent, and enlarge students' English vocabularies more efficiently. This study may help extend the range of methodology used in EFL teaching in China and make it more effective.

This paper will firstly focus on a previous relevant literature review describing the importance of learning vocabulary, especially on learners' language abilities like reading speed and reading comprehension. This is followed by an empirical study with a thorough discussion of the results.

2. Literature Review

2.1 Vocabulary uptake

Vocabulary is usually considered to be fundamental in developing language proficiency in L2 speakers (Milton 2009). Research has established that there is a connection between vocabulary and language ability where, generally, the more vocabulary a learner knows, the better they can perform communicatively. Van Zeeland & Schmitt (2013) stated that 2000-3000 word families are needed to reach a basic understanding when facing listening tasks. Coxhead & Boutorwick (2018) stressed the importance of high-frequency vocabulary in dealing with complicated text, especially in maths and science. In mainland China, English is regarded as indispensable for academic and career advancement (Lawson & Hogben 1996). Most Chinese teachers hold the view that vocabulary is a crucial factor in learning L2 English for native Chinese students (Chen 2009). More research is stressing the importance of English vocabulary learning in China.

For example, Wei (2007) did an examination of vocabulary learning in Chinese College-level Learners to figure out the most efficient vocabulary learning strategy. This study used a learning strategy questionnaire to collect data from mainland Chinese college participants. The results showed that contextualized activation and management strategies were seldom used. This is a pity because such activities are considered to aid long-term retention and use of vocabulary. Wei also found that female students in both English majors and non-English majors were more aware of the importance of management in vocabulary learning, which means they use vocabulary learning strategies more frequently than male students.

This is not just a matter of purely research interest. Central government in China also stresses that English is vital in dealing with the growing demand for global communication. China uses an English Language Ability (CSE for short) standard system as a reference tool for teaching, learning, and assessment and this standard is similar to the function of The Common European Framework of Reference (CEFR) and has been linked with the European system. CSE is designed for Chinese students to be classified at three broad language levels: basic, intermediate, and advanced. It gives descriptions of different abilities, including overall ability, reading, writing, speaking, and listening for all students' grades. This policy stresses that future English teaching in China should focus on language ability and other vital competencies like logic and calculating to cultivate more English-proficient speakers (Chen 2018). Cai & Yun (2020) recently provided some tentative teaching methods within the CSE's framework to improve students' intercultural communicative competence. This research illustrates that more language input is necessary for Chinese speakers learning English to reach a high language ability.

China has linked the CSE with the widely-used IELTS test framework, to connect Chinese tests and British tests. The link is presented below (see Table 1). Shangchao (2019) focused on the consistency and feedback of the IELTS reading test results and China's Standards of English Language Ability (CSE). The results were consistent in most of the levels except CSE 8. This consistency could help Chinese students know their English levels in British tests. For example, the recommended level for senior high Chinese students is level 3, according to CSE. Students are likely to acquire 3500 words in English to enter university. Thus, Chinese students who hold 3500 vocabulary size are more likely to perform less than level 4 in CSE or less than 4.5 in IELTS overall grading.

IELTS Score	CSE Level 4	CSE Level 5	CSE Level 6	CSE Level 7	CSE Level 8
Total Score	4.5	5.5	6	7	8
Listening	5	6	6.5	7.5	8.5
Reading	4.5	5.5	6	7	7.5
Speaking	5	5.5	6	6.5	7
Writing	4	5	6	7	7.5

Table 1. Results of Linking IELTS to China's Standards of English Language Ability

2.2 Vocabulary uptake from formal and informal instruction

Vocabulary is increasingly understood as complex and multidimensional and because of this, it requires equally multidimensional methods to teach it (Kim et al 2018, Pellicer-Sánchez 2016). Formal classroom learning is one method that can enhance knowledge uptake. For example, Yang (2009) illustrated that explicit correction by the teacher and prompting in the classroom leads to a higher uptake rate than recasts. However, formal teaching has some limitations. Cobb (2009) has stated that the vocabulary teaching that textbooks provide is limited because textbooks recycle only a small number of vocabulary items, and did little to expand their vocabulary. Milton (2009) makes the same point. The number of words needed for fluency is so large, and word knowledge so complex, that there is probably insufficient time in the classroom, and insufficient space in the textbook, to present, explain and recycle every vocabulary item.

Attention in vocabulary has moved away from the classroom, therefore, to consider the possibilities that informal learning can offer outside the classroom (for example, Masrai & Milton, 2018; Milton, 2012; Nation, 2007). To the potential benefits in terms of offering wide contexts for learning, and form enhanced motivation, can be added the extra time made available for vocabulary learning. It is sometimes asserted that vocabulary learning in these contexts is incidental and requires little effort or attention on the part of the learner (for example, Harris and Snow 2004). However, research

suggests that while informal vocabulary learning such as reading activities, which has a clear vocabulary learning focus, can be highly successful in enhancing vocabulary uptake (for example, Milton 2008, Chen 2018). Purely incidental vocabulary learning from extensive reading, without this clear learning focus, can be much less successful (Horst et al 1998, Carney 2016) at least in terms of growing a large vocabulary for communication.

The relationship between formal and informal learning, even in an area where this is researched, is still not well understood. Both seem to be needed if something as large and as complex as a foreign language lexicon is to be fully mastered and it can be argued that the two teaching methods are of equal importance (Renandya & Jacobs 2016). There remains an idea, however, even if this is not supported by research, that the lexicon is acquired mostly incidentally and by informal learning outside the scope of the formal classroom curriculum, as in Harris & Snow (2004).

2.3 Informal vocabulary learning and reading speed

The research which is the focus of this paper, and where we attempt to test its conclusions, is Masrai and Milton (2018). This paper conducted a study of informal vocabulary learning in an L1 Arabic speakers learning English who watched movies and the news on TV in Arabic but with subtitles in English. The subject watched 38.87 hours of movies and 8.6 hours of news broadcasts. His language ability was tested through in three different ways: vocabulary size measured by recognition of written words (orthographic vocabulary size), vocabulary size measured by listening to words (phonological vocabulary size), and reading speed. Comparing the data from pre-test and post-tests, their results showed a substantial, 900 word gain in orthographic vocabulary size, a slight improvement in orthographic vocabulary size, and an increase of over 30% in reading speed. It appeared that an informal activity focussing on processing the orthographic form of words, and linking them to meaning, produced benefits in terms of knowledge and access in the orthographic half of the lexicon. The phonological side of the lexicon was, as they expected, relatively unchanged by the activity since there was no obvious L2 listening focus in the activity. Masrai and Milton were particularly interested in this result because of the way they understand native Arabic speakers transfer their L1 Arabic reading skills to reading in L2 English. This kind of intervention, they hoped, would provide useful guidance for such L2 learners of English in overcoming difficulties in reading quickly and fluently in their second language.

Another similar study was conducted by Masrai (2020), which investigated the relationship between phonological vocabulary knowledge and extensive listening. The subjects in the study listened to English L2 news and movies and read the translation in L1 Arabic in the subtitles. They took the same pre- and post-tests as in the original Masrai & Milton (2018) study and the expectation was that phonological vocabulary size would be enhanced with this treatment but the orthographic vocabulary size would not. The results suggested phonological vocabulary was enhanced by the intervention. The rate of learning was higher than that observed in classroom learning, although slower than for the uptake of words in written form in Masrai & Milton's (2018) study and other studies.

3. Research Questions

The review of the academic literature in the area has suggested the potential benefits of extensive reading in L2 English learning are worth further exploration. For many L2 learners in China, the learning of vocabulary still relies heavily on memorizing words and on translation. These are mechanical and tedious processes. If extensive reading can be shown to be an effective method in L2 vocabulary learning then more people can learn better and in a more relaxed way.

The research in this paper is intended to add to the literature by investigating vocabulary learning from extensive reading, but in a population which does not have L1 Arabic, with its attendant reading processes, by way of background. It can be argued that learners from a Chinese background, where the L1 is logographic, may produce rather different results. The research is intended, too to investigate whether incidental learning from a reading activity can include the gains in lexical access that Masrai & Milton observe in their study of informal learning through reading. In this research, therefore, we seek to answer the following questions:

Before the reading intervention

1. Do L1 Chinese learners of English display the unusual phonologically and orthographically balanced lexicon noted in Milton & Hopkins (2006) and Milton (2018)?
2. How quickly do the participants read successive 10-word lines in a passage of prose?

After the reading intervention

3. Does the participant grow the lexicon's orthographic side at the rates noted in other studies?
4. Does the participant grow the phonological vocabulary after extensive reading?
5. Does the participant read the same passage faster?

4. Material and Methods

4.1 Participants

In this research, the participants were five female volunteers from grade one senior high school, aged about 16. Three of them began studying English in junior high school, which means they had experienced three years of formal English learning. They were believed to have gained a 1,500 word basic vocabulary from junior high school. The other two students started learning English in elementary school, and had more than six years of English study. Their vocabulary was expected to be higher than the others, therefore, and they aspired to attain a level of 3,500 words to attend university.

4.2 Methodology and tests

To carry out the programme of research, three vocabulary tests are used. Each of the tests focuses on one specific aspect of vocabulary ability:

XK-Lex for reading vocabulary size,

A-Lex for listening language size, and

ReadLex for learners' reading speed.

XK-Lex (Masrai & Milton 2012) is a Yes/No test which makes an estimate of a learners' knowledge of the most frequent 10,000 lemmatised words in English. It takes a principled sample of 100 words across the frequency range to form an initial estimate of size. It also includes 20 highly infrequent English words, which are never usually known even by native speakers, to form a judgement of over-estimation, and this is used to produce an adjusted score. The version used in this study was a pencil and paper test rather than a computer test, which means testees could go back to revise their answers during the testing.

A-Lex (Milton & Hopkins 2005a) is a computerised Yes/No test which measures phonological knowledge of the most 5000 frequent lemmatized words of English. The test comprises a principled sample of 100 real English words, drawn from across the frequency range, and 20 non-words that sound similar to the real items. Like the function of non-words in XK-Lex, the inclusion of the pseudowords is used to prevent guesswork from participants.

The final test, ReadLex (Milton & Hopkins 2005b) is a computer delivered test of reading speed. The test comprised 40 lines of an English text with 10 words per line, presented one line at a time. The participants were asked to read each line in turn and click a button to load the next line. The programme measures the time taken to load each successive line. The scores are thought to be a measure of lexical access; the automaticity with which words in the lexicon can be recalled for use when needed.

4.3 Material and data collection

The participants were asked to undertake a news reading task six days a week for six weeks. The news presented 200 - 400 words and was taken from a current news online source, assessed at A2 and B1 level, and suitable for senior high school students. The reading task took the participants 15-30 minutes and varied according to their reading ability. Thus, the learner would read about 9,000 words in 36 days and could use a dictionary to look up any unknown words. There was no further intervention. The vocabulary tests were administered both before and after this six week intervention.

5. Results

This study investigates the effect of a reading intervention on three aspects of vocabulary knowledge and ability. Owing to the small sample sizes in this study statistical analysis has not been carried out. Caution must be taken, therefore, in drawing conclusions from the results. The results of pre- and post-tests are shown and discussed below.

Table 2 gives the scores from XK-Lex, the orthographic test of vocabulary size, which has a ceiling of 10,000 words.

XK-Lex	Pre-test	Post-test
participant 1	1500	1800
participant 2	2800	3500
participant 3	3900	3100
participant 4	3900	3500
participant 5	3700	3900
mean	3160	3160
sd	1033	811

Table 2. Vocabulary size from XK-Lex

Individual scores on the orthographic vocabulary size range from 1500 to 3900 before the intervention, and from 1800 to 3900 after the intervention. This range reflects the variation in time spent learning prior to testing, and overall language level, as explained above. The participants, based on their vocabulary size appear to be, as expected, at about CEFR A2 level for the lowest scoring learner and about CEFR B2 level for the higher scorers. The higher scoring participants' vocabulary size is roughly that of the requirement of Chinese university entrance of 3500 according to the demands of the Ministry of Education. This number also means that they could have a basic understanding of

comprehension and communication (Milton 2008). The mean score both before and after the intervention is 3160.

Table 3 gives the scores from A-Lex, the phonological test of vocabulary size, which has a ceiling of 5000 words.

A-Lex	Pre-test	Post-test
participant 1	650	900
participant 2	1250	850
participant 3	650	1300
participant 4	1450	2100
participant 5	2350	2750
mean	1270	1580
sd	701	824

Table 3. Vocabulary size scores from A-Lex

Individual scores on the phonological test vary from 650 to 2350 on the pre-test, and from 850 to 2750 on the post-test. Again, this variation is thought to reflect the range of learning time and level in the learners. The mean score increases from 1270 before the intervention, to 1580 after the intervention and this reflects the fact that four of the five participants increased their individual scores in this area of their knowledge

Table 4 gives scores from ReadLex, the test of reading speed or, as Masrai & Milton (2018) describe is, speed of lexical access.

	Pre-test	Post-test
participant 1	5.8	3.7
participant 2	6.8	4.3
participant 3	6.1	7.1
participant 4	6.0	4.5
participant 5	6.4	3.1
mean	6.2	4.5
sd	0.39	1.53

Table 4. Reading speed scores from ReadLex in minutes

Individual scores on the pre-test are quite consistent and vary from 5.8 to 6.8 minutes. There is rather more variation in the results of the post-test where individual scores vary from 3.1 to 7.1 minutes. Four of the five participants improve their reading speed substantially taking, sometimes, only half the time to read the test passage after the intervention. The mean score diminishes substantially too, therefore, and is reduced from 6.2 to 4.5 minutes.

For ease of comparison, the information in these tables is summarised in Figures 5 and 6 allowing pre- and post-test results to be compared.

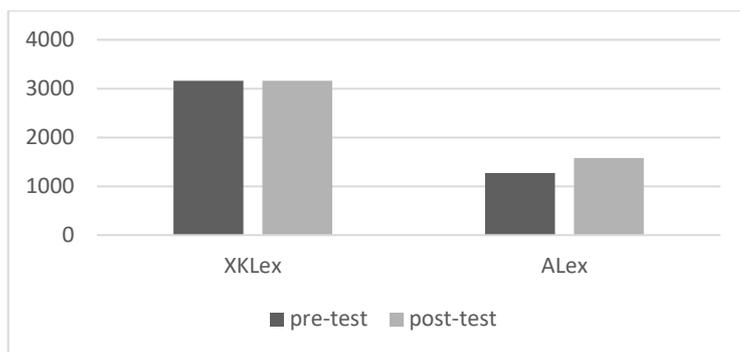


Figure 5. Comparison of XK-Lex and A-Lex scores



Figure 6. Comparison of Read-Lex scores (minutes)

6. Discussion

There are five specific research questions asked in this paper and the answers provided by the results are dealt with in turn in the sections below.

6.1 Does the learner display a balanced lexicon?

The results suggest that participants have a much larger orthographic vocabulary size than phonological vocabulary size. This conclusion can be reached when pre-intervention and post-intervention scores are compared. Table 7 illustrates this.

	A-Lex pre-test	XK-Lex pre-test
participant 1	650	1500
participant 2	1250	2800
participant 3	650	3900
participant 4	1450	3900
participant 5	2750	3700
mean	1270	3160
sd	701	1033

Table 7. Comparison of pre-test XK-Lex and A-Lex scores

The two scores are not strictly comparable, of course, because the ceiling in the XK-Lex test is double that of the A-Lex test. However, these are the tests used in the Masrai and Milton (2018) study which provides the basis for this research. Nonetheless, it is possible to draw persuasive conclusions here. In the original 2018 study the subject's A-Lex scores were about 90% of the XK-Lex scores which allowed Masrai and Milton to conclude that the subject possessed a balanced lexicon. This was expected given the subject's L1 background where this type of lexicon is commonly observed (for

example, Milton et al 2010, Milton & Riordan 2006). In this study the subjects' A-Lex scores are of the order of 40% of the XK-Lex scores which is very similar to the results for non-L1 Arabic learners investigated in the Milton et al 2010 study, and characterized as an unbalanced lexicon. This means the learners know a lot more words in written form than they do by sound.

6.2 How quickly do the participants read successive 10-word lines in a passage of prose?

The reading speed test is thought by its creators (Milton and Hopkins 2005b) and by Masrai and Milton (2018) to give an indication of the speed of lexical access. A feature of knowing a word is the ability to recall it for use automatically when it is needed. This is fluency in the Daller et al (2007) three dimensional model of word knowledge. Segalowitz & Hulstijn (2005) call this automaticity. Alhazmi & Milton (2020) record that educated native speakers on this test take, on average, about 2 – 3 second per line and about 2 minutes for the whole test which is roughly in line with other measures of reading speed in English native speakers (Harrison 2001). The subjects in this study are roughly intermediate level learners with comparatively small lexicons and are not expected to match native-like performance. Reading speed will, of course, be affected both by vocabulary size, whether the words a text contains are known at all, and by the learners' fluency, whether the words that are known can be called to mind for use automatically.

The learners in this study take, on average and before the intervention, over 6 minutes to read the passage. This is slightly longer than the subject in the Masrai & Milton study who was at a comparable level of language ability and with a comparably sized English orthographic L2 lexicon. This outcome likely reflects both the level of vocabulary knowledge these learners have and their comparative lack of fluency in word use. The literature suggests that individuals at the beginning of L2 learning, with small vocabularies, focus their attention in reading on their lower-level processes, which can slow down the reading speed (Segalowitz & Hulstijn, 2005). The literature also suggests that learners have to take the time to develop their reading skills and fluency in the new language (Favreau & Segalowitz, 1983). Another possible explanation comes from Fraser (2007), where his study found a strong association between L1 and L2 speed across different types of reading tasks. If the students read less in their first language, and are slow readers generally therefore, they are more likely to perform comparatively slowly when reading in the L2.

6.3 Does the participant grow the orthographic side of their lexicon at the rates noted in other studies?

Extensive reading is generally argued to aid the growth of a learner's lexicon (for example, Krashen 1989). To this can be added a caveat, on the basis of research into vocabulary acquisition. Research appears to show that where the focus of a reading activity is on noticing new vocabulary, an informal learning task therefore, then substantial vocabulary gains can be observed, as in the Masrai & Milton (2018) study which informs this study. Where there is no such focus, the activity is for meaning only and any vocabulary learning will be purely incidental, then vocabulary gains may be negligible (Horst et al 1998). The caveat, then, is that extensive reading can be effective in growing a lexicon provided the focus of reading includes noticing new vocabulary.

In this study there is no requirement for learners to notice new vocabulary, they are reading the news for information. It is an incidental learning activity, therefore, at least from the point of view of increasing vocabulary breadth. This may explain the outcome where, on average, there is no observable gain in vocabulary size following the intervention in this study. Three subjects in this study improve their XK-Lex scores but these gains are always smaller than in the Masrai & Milton study, while two learners exhibit similarly marginal decreases in score.

6.4 Does the participant grow the phonological vocabulary after extensive reading?

The Masrai & Milton (2018) and Masrai (2020) studies suggest that if systematic gains in the phonological side of the lexicon are needed then a listening activity that includes noticing the sound form of new words is probably needed. In this study, the activity is an orthographic one for information, with no prompting to notice the phonological form of words. Nonetheless, the results do suggest a gain in the phonological size of the learners' lexicons. On average, the A-Lex scores increased by about 20% after the intervention. This is about double the size of the gains in phonological size noted in the learner in the Masrai & Milton study. It appears that the intervention may have had the unexpected effect of increasing phonological vocabulary size. It is not clear why this should have occurred. Possibly, the learners in this study sub-vocalised while reading, thus enhancing their knowledge of the phonological form of words in their lexicon known predominantly in orthographic form. Possibly, and this is discussed below, the additional activities that the intervention provoked, including dictionary look-up for pronunciation, may have contributed to this unexpected outcome. The small number of subjects, as with all the conclusions in this study, means that any interpretation can be only tentative.

6.5 Does the participant read the same passage faster?

Table 4 indicates that, on average, the intervention resulted in a decline in the reading speed of the test passage. The mean reading speed fell from 6.2 to 4.5 minutes. After the intervention the learners in this study read the passage, on average about 30% faster, and this is very similar to the learning in the original, Masrai & Milton study. There appears to be no obvious growth in vocabulary size which might help explain such a decline. Our tentative interpretation of this is that, following the reading intervention, the learners in this study, as in the Masrai & Milton study, improved their speed of lexical access.

While there has been no obvious vocabulary noticing or learning focus in the intervention, and the learners are not required to notice new words, they are required to read regularly. The activity may not be focused on expanding vocabulary breadth therefore, but might be argued to focus on the skills required to enhance the vocabulary fluency dimension. This may explain the development of this aspect of the learners' ability.

6.6 General comments

In studies that address the learning of a foreign language lexicon, there is a considerable focus on how best and most effectively to grow the breadth of the lexicon. This is understandable given the importance of knowing enough words, and knowing the right words, to manage communication. This is, understandably too, a principal target of language learning if it is to be effective. There is an emphasis, additionally, on measuring and finding ways to improve learners' depth of vocabulary knowledge. This is important because, for fluency, the words a learner knows must be used in the right way and in appropriate structures. The learning of word knowledge, word breadth, in particular appears to be associated with very deliberate processes of word noticing and then word retrieval and use. There is less emphasis on the fluency or automaticity dimension of word knowledge where, perhaps, learning is less deliberately focussed but relies more on the processes of repetition and practice which turns declarative knowledge of and about words, into the procedural knowledge where these words can be used.

Our tentative interpretation of the results of this study gives credence to the potential usefulness of the extensive reading which many teachers and academic believe is so important for learning a foreign language to fluency. The process of regularly reading original and authentic material in a foreign

language, even without a deliberate vocabulary learning focus, can add to the overall goal of vocabulary learning. It appears that learners may not learn new words by the process of extensive reading, but the words they do know are accessed more readily and more quickly, adding to the fluency dimension. The pauses that mar fluent communication, where a word has to be retrieved with time and effort, are diminished. It seems to us that the intervention activity, where the learning of new words would be incidental, can be viewed as an informal learning activity from the point of view of developing the skill of reading. This conclusion is, probably, in line with the observations by Milton et al (2012) and Milton (2012), where game playing in a virtual world foreign language environment, resulted in little obvious vocabulary growth, but measurable increases in the amount of language that could be produced in any given time frame.

Part of the rationale for conducting this study with L1 Chinese participants was to revisit the Masrai & Milton (2018) study with learners from a different L1 background. The motivation for their study was to address perceived issues with the reading process which their L1 Arabic learners, almost uniquely, possessed. Our interpretation of the data in this study is that their conclusions are generalizable to learners of other languages. An extensive reading intervention in this study, as in their study, has resulted in measurable improvements in reading speed which can be interpreted as improved lexical access.

We have described our interpretation of this data as tentative and this is because, as with the Masrai & Milton (2018) study where the authors are equally tentative, the numbers involved in this study are very small. The methodology used to investigate this kind of learning is derived from the case study approach used in Horst & Meara (1999) and Milton (2008) where the lexical micro-environment of the learner can be controlled and understood, to better explain the language learning processes that are occurring. It has proved to be a most insightful methodology but does require repetition if conclusions drawn from the approach are to be confirmed. To this might be added that the intervention in this study was quite short, 6 weeks compared to the 20 week intervention and the absence of measurable vocabulary size gains may, conceivably, be a product of this very short learning time frame.

Finally, to us, the intervention appears to increase is potential for self-learning motivation. The participants have seldom experienced extensive English reading after school. The subjects in this study generally report they would finish the English homework set by their teachers and then would not use English until their next class. This kind of learning method is new for them, and appears to trigger high curiosity and motivation. These news reading activities were welcomed by the students guiding them to the news material, in this case Western news media, which they had not previously accessed. They did not report the material boring or uninteresting, which was feared at the outset of the study. Rather, it prompted them to further, useful, learning activity. Some reported searching the dictionary to confirm the pronunciation of words and to check meaning, to understand the passage entirely. This dictionary search activity may have contributed to the phonological vocabulary improvement observed after the intervention. Some of them even searched the equivalent Chinese news online actively to see possible differences. But, more than this, the activities proved sufficiently motivating in themselves for the participants to see the intervention through to the end with, we think, the lexical access improvement that resulted.

7. Conclusion

This research suggests that extensive reading may be beneficial to the process of vocabulary learning. It appears that it is an activity that could, very usefully, be added to the rather traditional approaches to language learning which are generally to be found in Chinese schools. Even among learners of intermediate level, and whose use of English language is not fluent, the reading of news media proved

to be accessible, interesting and motivating. Previous studies have suggested that a word noticing focus can make this type of activity an effective vehicle for the development of vocabulary breadth. This study adds to this by suggesting that, even without such a focus, the process of practicing the skill of reading in the foreign language improved the speed of accessing words and the fluency of the learners in the use of their English L2 lexicons. The intervention also prompted a range of additional, language related activities, such as dictionary look-up and further reading, which can be considered generally beneficial to the learning process.

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