

Incidental vocabulary acquisition from an authentic novel: *Do Things Fall Apart?*

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Abstract

Nation (2006) has calculated that second language (L2) learners require much more vocabulary than previously thought to be functional with language (e.g., 8,000–9,000 word families to read independently). This level is far beyond the highest graded reader, and would be difficult to explicitly teach. One way for learners to be exposed to mid-frequency vocabulary is to read authentic materials. The original *A Clockwork Orange* study (Saragi, Nation, & Meister, 1978) showed impressive amounts of incidental vocabulary learning with first language (L1) readers, but subsequent studies with L2 learners (using graded readers or simplified materials) showed only modest gains. This study explores the degree to which relatively advanced L2 readers can acquire spelling, word class, and recognition and recall of meaning from reading the unmodified authentic novel *Things Fall Apart*. After more than 10 exposures, the meaning and spelling could be recognized for 84% and 76% of the words respectively, while the meaning and word class could be recalled for 55% and 63%.

Keywords: vocabulary acquisition, incidental learning, English as a foreign language (EFL), extensive reading, word knowledge

In a landmark study, Nation (2006) calculated the amount of vocabulary necessary to function in English, using a 98% coverage figure (Hu & Nation, 2000). He found that it took much more vocabulary than previous estimates: 6,000–7,000 word families for spoken discourse and 8,000–9,000 families for written discourse. His figures highlight the need for learners to master more vocabulary than previously thought necessary. A good case has been made for explicitly teaching the highest-frequency vocabulary (the first 2,000–3,000 word families; see Nation, 1990, 2001), and graded readers also address this vocabulary level. Conversely, it is not particularly problematic if low-frequency vocabulary is unknown (higher than about the 9,000 level identified by Nation), because these items occur so infrequently. However, this leaves the ‘mid-frequency’ vocabulary between these extremes (3,000–9,000 levels), which Nation now shows is necessary for learners to know, but which often receives little attention.

Moreover, mid-frequency vocabulary is problematic for teachers, because it is difficult to cover this many lexical items explicitly, while most graded reader series finish somewhere around the

3,000 level (e.g., *Cambridge English Readers* = 3,800 headwords; *Penguin Readers* = 3,000, *Oxford Bookworms* = 2,500). While intentional learning will always be the most effective approach (e.g., Horst, Cobb, & Nicolae, 2005; Laufer, 2005; Prince, 1996; Schmitt, 2008), there are practical limits to the amount of vocabulary that instructors can explicitly teach in their programs. This means that learners will also need the incidental learning which accrues from extensive input. As graded readers currently ‘top out’ at around 3,000–4,000 families, this entails vocabulary learning from authentic materials. In order for incidental learning to be effective, a great deal of reading is required, so it needs to be pleasurable for learners to remain involved over a period of time (Day & Bamford, 1998). This suggests that novels could be a good source of exposure, as they involve extended reading and learners can select them according to their own interests.

To show an ‘extensive reading of authentic texts’ approach to be effective, (at least) two issues need to be addressed:

- Occurrence of target vocabulary in input

Does mid-frequency vocabulary occur in authentic texts in sufficient number and with sufficient repetition to be learned?

- Learning from input

What types of vocabulary knowledge can learners acquire from incidental reading exposure?

In an important critique of incidental learning, Cobb (2007) cogently tackled the first issue. He showed that lower-frequency vocabulary (essentially everything less frequent than the 3,000 level) is relatively scarce in most texts. This was illustrated in Nation’s (2006) finding that only 4.90% of the tokens in the BNC came from the combined 4,000–9,000 frequency levels, although this made up 25.25% of the types. This can also be shown with individual texts. For example, an analysis of novels arbitrarily chosen from those available on the internet shows relatively low percentages of mid-frequency vocabulary: 3.77% of the first chapter of the novel *Little Woman*, 2.32% of the first chapter of *The Erie Train Boy*, and 2.52% of the first chapter of *Emma*. Even in a ‘better’ case, a text by a Canadian journalist Rex Murphy, the percentage is still only 5.02% (Cobb, 2007). This scarcity of mid-frequency vocabulary has serious implications for incidental learning which few incidental learning studies have considered to date. The most important ones include the need for an explicit teaching component alongside the incidental approach, and the possibility of selecting or modifying texts to have more occurrences and more repetition of the vocabulary we wish learners to acquire (See Cobb, 2007, for more detail on this).

This study addresses the second issue: What can learners acquire from the unknown vocabulary which *does* occur in authentic texts, in this case novels?

L1 Reading Research

It is uncontroversial that natives learn a great deal of vocabulary from context. L1 children initially learn vocabulary from mainly verbal exposure (Ingram, 1989), but then reading begins to contribute as well, with studies such as Jenkins, Stein, and Wysocki (1984), Nagy, Herman, and Anderson (1985), Herman, Anderson, Pearson, and Nagy (1987), and Shu, Anderson, and Zhang (1995) showing significant gains in learners' vocabulary knowledge as a consequence of reading tasks. This led Nation and Meara (2002) to conclude that "learning incidentally through listening and reading accounts for most first language vocabulary learning" (p. 39). The relationship between reading and vocabulary acquisition has been particularly widely explored in L1 contexts (e.g., Freebody & Anderson, 1983; McKeown, 1985; Nagy & Anderson, 1984; Nagy, Anderson & Herman, 1987; Nagy & Herman, 1987; O'Sullivan, 2000; Stanovich, 1986), and it is clear that substantial vocabulary acquisition does take place from reading.

Saragi et al. (1978) demonstrated that such vocabulary learning occurs from reading novels, using *A Clockwork Orange* (Burgess, 1972). After reading the novel, twenty native English students were tested on their knowledge of 90 of the Russian slang words called 'nadsat' which appeared in the novel (none of the participants spoke Russian). Results on the multiple-choice meaning recognition test showed that the average score of the nadsat words known by participants was 76%, implying that "extensive reading results in a substantial amount of vocabulary learning" (Saragi et al., 1978, p. 78). Moreover, results showed that "the minimum number of repetitions for words to be learned in a reader should be somewhere around 10" (p. 76).

There has been little research into incidental vocabulary learning from authentic novels by L2 learners,¹ as most studies use simplified materials designed for those learners. Studies using such materials, particularly graded readers, have generally shown small gains, although later studies, using more sensitive and comprehensive test batteries, have demonstrated wider learning. These L2 studies are reviewed in the next section.

L2 Reading Research

The Saragi et al. (1978) study gave birth to a number of L2 studies (the so-called 'Clockwork Orange Studies'). Pitts, White, and Krashen (1989) conducted a similar study with adult second language acquirers who were asked to read the first two chapters of *A Clockwork Orange*. Participants were then tested on their knowledge of 30 nadsat words. Results showed that, though modest (6.4–8.1%), there was some nadsat vocabulary acquisition through reading compared to controls (0%).

Similarly, Horst, Cobb, and Meara (1998) conducted a replication study of the original study in which 34 second language learners were asked to read a simplified version of Thomas Hardy's *The Mayor of Casterbridge* (Jones, 1979). After reading the complete novel, participants were tested on their knowledge of the target words' meanings by means of a multiple-choice test focused on word definitions. This study demonstrated that L2 learners recognized the meanings of new words and built associations between them as a result of reading. The amount of word learning was more than in Pitts et al. (1989), with about one new word out of every five being picked up, and furthermore, this learning persisted over a period of at least 10 days. The study

also found that the target words needed to appear at least eight times for substantial gains to occur.

A variety of recent non-Clockwork Orange studies have also documented vocabulary learning from reading graded readers. For example, Horst's (2005) participants learned about 17 new words from four 20-page extracts of graded readers. Crucially though, this represented well over half of the unfamiliar words they encountered in this reading. Brown, Waring, and Donkaewbua (2008) found encouraging amounts of durable incidental vocabulary learning in terms of word form recognition and meaning recognition in a multiple-choice test, but far less in terms of being able to produce the meaning in a translation task. Waring and Takaki's (2003) Japanese participants recognized the meaning of 10.6 out of 25 words on an immediate multiple-choice test, but only were able to provide a translation for 4.6 / 25. However, after three months, while the meaning recognition score dropped to 6.1, the translation score dropped much more sharply to 0.9. This indicates that incidental vocabulary learning from reading is more likely to have a bigger effect on recognition of, than on recall of, lexical knowledge, and that any recall learning tends to have less retention over time than recognition learning. One implication is that the learning shown in immediate posttests cannot necessarily be considered as long-term learning.

Some studies have focused on the incidental acquisition of aspects of lexical knowledge other than meaning, also using graded readers and adapted texts as the reading materials. For example, Day and Swan (1998) investigated whether exposure to target words while reading could result in an incidental increase in learners' spelling ability, and found a causal relationship between reading and spelling ability. A few studies have looked at the acquisition of multiple word knowledge aspects from reading. Pigada and Schmitt (2006) conducted a case study with a learner of French in order to examine whether one month of extensive reading improved the participant's lexical knowledge in terms of spelling, meaning, and grammatical characteristics. Moreover, they considered frequency as one of the variables affecting words' retention. They found that some degree of learning was demonstrated for 87 out of the 133 words tested, (i.e., an improvement in one of every 1.5 words tested). Spelling was strongly enhanced, even from a small number of exposures, while meaning and grammatical knowledge were enhanced to a lesser degree. They also found that there was no frequency point where the acquisition of meaning was assured, but by about 10+ exposures, there was a discernable rise in the learning rate.

In a laudably comprehensive study, Webb (2005) demonstrated that both reading and writing tasks had a positive effect on the five aspects of knowledge he tested: orthography, association, syntax, grammatical functions, and form-meaning. This was despite the fact that the reading was very minimal indeed (three glossed sentences). He followed this up with a study (2007) exploring how much one, three, seven, and 10 encounters with words in short contexts (one or two sentences, average 14 words) facilitated the learning of the same five word knowledge aspects. He found that even one exposure lead to measureable learning, and by 10 exposures, the word aspects were known receptively for about seven out of 10 target words, although the productive knowledge lagged behind (around 3–4 words out of 10). These multi-aspect studies indicate that vocabulary acquisition from reading is more diverse than the previous meaning-only studies have been able to show.²

Overall, these and other studies (e.g., Day, Omura, & Hiramatsu, 1991; Grabe & Stoller, 1997; Hafiz & Tudor, 1989; West, Stanovich, & Mitchell, 1993) have shown that reading does lead to L2 vocabulary learning, but most suggest that the number of words learned is relatively modest. Set against this, the three multi-aspect studies (Pigada & Schmitt, 2006; Webb, 2005, 2007), which were able to describe a wider range of learning, indicate that reading can enhance a variety of word knowledge aspects. In sum, it appears that L2 learners can make meaningful lexical gains from reading, *if they get enough exposures*.

The problem is that as vocabulary becomes less frequent, these exposures grow harder to come by. Cobb (2007, 2008) analyzed academic, fiction, and newspaper sub-corpora of the Brown Corpus (163,000–179,000 words each), and found that 27 out of 30 target word families at the 1,000 level occurred frequently enough in a sub-corpus for acquisition to occur, assuming a learning threshold of six exposures. This shrunk at 24/30 at the 2,000 level, and only 11/30 at the 3,000 level. Cobb concluded that “fewer than half of the 3,000 level words present themselves sufficiently [frequently] for reliable learning to occur. Further, the situation only gets worse for word families at the 4,000 and 5,000 levels and beyond” (2007, p. 45; see Nation & Wang, 1999, for more on this based on graded readers).

Where does this leave us in light of Nation’s (2006) larger vocabulary targets? Schmitt (2008) argued that the only way to achieve such large vocabulary sizes is to combine a substantial intentional learning program with wide reading.³ Graded readers will be useful at the start of the process, but eventually learners will need to move to authentic texts to meet more mid-frequency vocabulary.

However, this all rests on the assumption that L2 learners can benefit from reading authentic texts. The acquisition studies above suggest this is so, but only indirectly, as they almost exclusively used simplified texts, which should have made the lexical learning easier. This study will focus on incidental vocabulary learning from an unmodified authentic novel, using an improved version of the Clockwork Orange methodology. Given Cobb’s (2007) warning that mid-frequency vocabulary does not reoccur particularly often, we will also examine the amount of learning that accrues from various exposure frequencies in the authentic text.

An Updated Clockwork Orange Methodology

The reasons for the small gains in incidental vocabulary acquisition from reading reported by some of the earlier studies might be due to methodological constraints, including very small amounts of reading, insensitive measurement instruments, inadequate control of text difficulty, or small numbers of target words (Horst et al., 1998; Schmitt, 2008). The length of the texts and resulting reading time in most studies have been short, for instance, less than 30 minutes in Day and Swan (1998), around 30 minutes in Day et al. (1991), from 40 to 60 minutes in Pitts et al. (1989), 10 minutes in Nagy et al. (1985), and from 10 to 15 minutes in Herman et al. (1987). Studies like Jenkins et al. (1984), Saragi et al. (1978), Pitts et al. (1989), and Day et al. (1991) have used measurement instruments not sensitive enough to small and partial gains in learners’ vocabulary knowledge, failing to consider the incremental nature of lexical learning. In addition, most studies have focused on meaning acquisition, with the consequent neglect of other aspects of lexical knowledge. Also, almost all studies (with the exception of Pigada & Schmitt, 2006)

used paper and pencil tests, with no backup confirmation of the results. Studies like Grabe and Stoller (1997), Pigada and Schmitt (2006), and Joe (1995) have examined the behaviour of just one participant, who was highly motivated to learn the language. While informative, it is unclear how generalizable their results are, since the positive results may be due to personal variables like motivation, language proficiency, language learning ability, or reading ability. Another possible limitation is the effect of pre-reading testing, since learning could be influenced by the initial test and not only by the actual reading in studies like Horst et al. (1998) and Shu et al. (1995). Other studies like Hafiz and Tudor (1989) have examined learners in an ESL context, which means that participants were exposed to very rich environments. The learning gains reported may have been due not to reading, but to other types of input received from the environment.

Furthermore, the studies which used the novel *A Clockwork Orange* (Pitts et al., 1989; Saragi et al., 1978) did not consider the fact that this novel was long, complex, and “a kind of reading material significantly different from the prose that learners normally encounter” (Read, 2000, p. 46). However, very few other studies used complete, unmodified, authentic texts, focusing instead on graded readers, simplified versions of a particular text, or adapted texts. While this is sensible given the advantages of graded readers (Nation & Wang, 1999) or simplified texts, many intermediate and advanced learners will want to read authentic texts, so it is worth determining the amount of incidental learning that can accrue from such reading.

In an attempt to avoid as many of these methodological constraints as possible, we decided to explore incidental vocabulary acquisition from reading using a hybrid of *Clockwork Orange* and multi-aspect methodologies. Using an authentic novel with foreign words will allow us to determine whether incidental lexical acquisition can occur from the type of novel reading learners may engage in on their own, and multi-aspect measurement will provide a better indication of a range of vocabulary learning. In addition, we will utilize personal interviews as our measurement procedure to ensure we have an in-depth basis of determining learning. It will also allow us to gauge participants’ attitudes towards the study and the reading task assigned to them. This methodology will be used to explore the following questions:

1. To what extent does reading an authentic novel lead to gains in L2 learners’ knowledge of the spelling, word class, and meaning of words in the text?
2. Does frequency of occurrence have an effect on incidental vocabulary acquisition? If so, how many exposures are needed in order to learn a word’s spelling, word class, and meaning?
3. What is the relationship, if any, between participants’ attitudes and vocabulary acquisition?

Methodology

Participants

The participants who took part in this study were 20 Spanish learners of English as a foreign language (EFL), ranging in age from 23 to 26 years old (12 female, 8 male). All of them were

university students in Spain in the last year of their undergraduate degree, or recently graduated. They had studied English for an average of 10 years in the Spanish educational system, where lessons were mainly focused on learning grammar, but with little extended communication practice. They had all spent one academic year in England as part of their undergraduate studies, with the Erasmus exchange program. It is the only time they spent living in an English environment. No standardized measure of their language proficiency was available, but all were able to converse easily in English, although some were not able to participate in complex and deeper discussions about more abstract or difficult topics. They had successfully completed classes in the British university system during their study-abroad period, and reported few problems in reading the assigned novel. Participants were interviewed beforehand to check their suitability for the task. Overall, the participants can be described as relatively advanced users of English.

Reading Material

Many previous studies have used texts that are very different from the kind of texts that learners normally encounter in authentic situations, failing to provide accurate understanding of how they cope with real texts (Bernhardt, 1991). Some of the advantages of using authentic texts are increasing interest, motivating students (Currie, 1997), offering a real context and preparing students to read outside the classroom (Barnett, 1989). Based on these advantages, the use of an authentic novel was preferred for this study.

The novel selected was *Things Fall Apart*⁴ (Achebe, 2001), an English novel, which, based on our intuitions, we thought would be interesting for our participants (this was later confirmed in participant interviews), and short enough, at around 67,000 words on 150 pages, to be readable in a reasonable amount of time. Moreover, based on the intuitions of the first researcher, who had a good knowledge of the participants' level of proficiency, we judged that the language level was appropriate for their L2 reading competence (again, later confirmed in the interviews). Above all, it fulfilled one of the main conditions, the use of a foreign language unknown by our participants, in this case, the Idemili dialect of the Nigerian language Ibo. Consequently, any gain in this foreign vocabulary after reading the book would be due to reading the text. It was an L1 English novel but, as compared to Saragi et al.'s (1978) study, in the context of the present study was used as an L2 text. Our text had the advantage of containing foreign words, but compared to *A Clockwork Orange*, was shorter, less complex, potentially more interesting, and more appropriate for our learners' competence levels.

Target words

Working with the corpus program *WordSmith Tools* (Scott, 1997), the African words in the novel were carefully analyzed, looking at which word knowledge aspects could be tested, the number of times each word appeared in the text, and each word's meanings and possible collocations. Since meaning was one of the aspects of word knowledge we wanted to test, we discarded those words which would make it difficult to test meaning, for example when we judged that the context surrounding a word did not make its meaning clear, or when the word was a proper name. From these considerations, a final list of 34 target words emerged.

In order to account for the role of frequency, target words were grouped according to the number of times they appeared in the text, constituting five different frequency groups: 1 occurrence, 2–4, 5–8, 10–17, and 28 or more (see Appendix A).⁵ We then checked whether the words in the five frequency groups were roughly equivalent in intrinsic difficulty. First of all, there were not any noticeable differences in terms of meaning transparency, as words referring to concrete objects or concepts that also exist in Western culture (e.g., *tie-tie* [rope], *ilo* [village playground], *nna-ayi* [our father]) and words referring to foreign concepts (e.g., *ogbanje* [kind of evil children], *egwugwu* [greatest, masked spirits in the clan], *egwe* [typical musical instrument]) were evenly distributed along the five frequency groups. The target words were mainly nouns (30 out of the 34 target words), with one adjective and three words which could be used as either noun or adjective. Regarding target words' length, the only noticeable differences were in the 2–4 frequency group, whose words were longer and may therefore be slightly more difficult to learn, and in the 10–17 group, which were short. The target words appeared to have a similar degree of pronunciation difficulty, except for the single occurrence group, which may have had a slightly higher percentage of words difficult to pronounce. Finally, the spelling of many of the target words violated some of the readers' L1 spelling rules, and so may have been somewhat difficult overall. However, the two 10–17 occurrence words seemed to have easier spelling, because they were short and congruent with the Spanish spelling system. While it was impossible to be sure that the words in the different frequency groups were completely equivalent in learning difficulty (see the Limitations section), these steps should have ensured that they were so to a very large extent.

Measurement Instruments

Nation (1990, 2001) has made it clear that there are many things to know about a word, and has provided the best specification of word knowledge to date. From our analysis of the target words and their context in the novel, we selected three aspects of word knowledge from Nation's framework that we found we could usefully measure.⁶ In this 'dimensions approach' (Read, 2000) to testing, we created a recognition test of spelling, a recall test of word class, and both recognition and recall measures of meaning knowledge. Measuring multiple aspects of word knowledge meant that the test battery should be sensitive to small gains in vocabulary knowledge and to partial lexical knowledge, as gains in any of three lexical aspects should be captured, as well as any incremental improvement of meaning knowledge to recognition mastery, or from recognition to recall mastery.

The mode of the test was a combination of multiple-choice test and a semi-structured one-to-one interview. Doing the measurement in a one-on-one environment, while time consuming, gives the researcher an excellent chance to produce a valid and confident determination of lexical knowledge, as interviews allow interaction and the ability to probe further to ensure the degree of knowledge (e.g., Schmitt, Schmitt, & Clapham, 2001). The interviews were divided into five consecutive parts. The first was the assessment of the target words' spelling with a multiple-choice test. Four different options were provided for each of the target words, the correct spelling and three distractors on a sheet of paper each participant received. A 'don't know' option was added in order to minimize the effects of guessing in participants' responses. After the interviewer checked that the participant was clear on the task, they then worked their way

through the test, also giving their answers orally to the interviewer, who probed to more fully understand their state of knowledge (see Appendix B, Part 1 for examples of this instrument).

The second part involved measurement of word class. The test instrument listed the target words, after which, the participant was asked to write the part of speech (noun, verb, adjective, or adverb; see Appendix B, Part 2). They answered orally at the same time, and the interviewer checked that they were choosing the most suitable response according to the knowledge they were demonstrating. The participants all knew the English word class terminology, and were comfortable with these concepts.

Next, knowledge of meaning was assessed. Because the words were encountered in a written context, cards were prepared as prompts, each containing one of the 34 target words (see Appendix B, Part 3). After being shown a card, participants were asked to say everything they knew about the meaning of the target word, while the interviewer took down notes. If it still was not clear whether the meaning was known, the interviewer probed further to determine whether recall mastery was reached or not,⁷ by using prompts and encouraging the participant to give more information, taking care not to ‘give away’ any information about the target word.

The participant’s meaning recognition was then tested. In this case, 34 cards were created, each one containing a multiple-choice item, which presented a target word in a sentence context. These sentences were carefully written about the topic of the novel, while avoiding giving participants any clues about the meaning of the target words. There were five different options for each item: the correct option, three distractors, and a ‘don’t know’ choice, which was included to avoid participants’ guessing (see Appendix B, Part 4). We made sure that the sentences provided were non-defining contexts and that any of the options given could fit in the sentence. As before, participants read the different questions aloud and gave their answers both orally and by writing them down on the test instrument, followed by any necessary probing by the interviewer. The target words in these four tests were randomized in terms of frequency, but were then presented in the same order in each test.

Finally, a section on participants’ attitudes was included so as to have the possibility of examining the relationship, if any, between readers’ attitudes and vocabulary acquisition. Nine questions were prepared concerning participants’ opinions about their participation in this study (see Appendix B, Part 5). The questions were asked orally, with the participants encouraged to answer freely.

Procedure

Once the book was selected and analyzed and the measurement instrument designed, we distributed the book among the participants. Readers were simply asked to read the book for pleasure without paying special attention to any aspect of the book. Participants were informed about the existence of a post-reading interview but its content was not revealed to ensure that they would not pay special attention to the target words. The reading time available was around one month, which proved sufficient for almost all of the participants (only one participant mentioned any stress related to limited time). As the African target words were new for all participants, there was no need for a pre-reading test.

Interviews were conducted within 2 to 5 days of completion of the book. Due to the importance of creating a relaxed environment (Hafiz & Tudor, 1989), interviews were held at participants' convenience, at their houses, at the researchers' house, or in a quiet cafeteria. The degree of rapport with all participants was excellent, and a positive atmosphere prevailed in all interviews.

Interviews were conducted by the first author in English (which the participants were comfortable with), except for the instructions, which were explained in Spanish to ensure that the participants had fully understood what they had to do in each part of the session. Furthermore, participants were encouraged to ask any questions they had during the course of the interview, and not to guess the answers, but to select the 'don't know' option as many times as necessary. The one-to-one interview format allowed the interviewer to probe participants' knowledge of the various target word characteristics at length if necessary. Thus we are confident that the scores closely reflect participants' true lexical learning, and are not the product of guessing. At the beginning of each part of the assessment, the instructions were explained to the participant and example items completed. Once the participant was clear on the procedure, the five sections of the test were completed in lockstep order. There was no time limit for any of the parts of the interview, or for the session overall. The average interview lasted around one hour.

Scoring System

The spelling test, the word class test, and the meaning recognition test were scored dichotomously as either correct (1 point) or incorrect (0 points). In the word class test, in cases where words had more than one possible word class and participants only knew one of them, a value of 0.5 was assigned to their responses. With meaning recall, a three-point rating system was used. Zero (0) signified no knowledge of the main meaning of the word, one (1) on the scale indicated full recall knowledge was demonstrated, and if the participant succeeded in showing some degree of knowledge of the meaning, but they failed in providing a complete definition, a value of 0.5 was assigned (see Appendix C for examples of meaning recall responses and scores assigned).

Finally, participants' attitudes were analyzed. A table was prepared collating the different answers and opinions participants had given. Because many of the answers were similar, it was possible to calculate the number of participants who had given similar answers in terms of percentages.

Results

Table 1 shows the percentage of target words where learning occurred according to the different word knowledge aspects and frequencies of occurrence. The results show that incidental vocabulary learning can occur from reading a single authentic novel. For all target words and all word knowledge aspects, there was measurable learning in 28% of the cases, or in 9.39 out of the 34 target words. This was in a context where an authentic novel was read for pleasure, with no indication that new vocabulary needed to be focused upon. This shows that the type of incidental vocabulary gains demonstrated by studies using graded readers (e.g., Horst, 2005; Horst, Cobb,

& Nicolae, 1998) can also be obtained from authentic reading, if the learners' language competence is high enough.

However, the learning gains were not consistent across the different word knowledge aspects. The largest gains were made on meaning recognition (43%), with participants acquiring this aspect for close to half of the target words tested (14.45/34 words). In contrast, the meaning of only 14% of the target words was learned to a recall level of mastery. This supports previous findings that it is difficult to reach a recall level of mastery from only incidental receptive learning (Schmitt, 2008). The next best learned aspect of word knowledge was spelling, with 34% of the orthographic word forms being recognized. It is interesting to note here that although many teachers might assume that it is more difficult to learn a word's meaning than spelling, in this study, fewer word spellings were recognized than meanings.⁸ Finally, the readers were able to state the word class of 20% of the target words. Thus, this authentic novel, combined with our particular target words and testing instruments, resulted in an acquisition profile as follows: Meaning Recognition (43%) > Spelling Recognition (34%) > Word Class Recall (20%) > Meaning Recall (14%).

Table 1. *Total scores by word knowledge aspect and frequency group*

Frequency of occurrence	Spelling recognition %	Word class recall %	Meaning recall %	Meaning recognition %	All word knowledge aspects %
1	30	9	5	29	18
2–4	16	7	5	33	15
5–8	37	20	11	45	28
10–17	85	54	48	80	67
28+	70	72	61	87	73
Total	34	20	14	43	28
Mean number of correct words (Max = 34)	11.65	6.65	4.80	14.45	9.39

The target words were divided into frequency bands to explore the effects of frequency on incidental acquisition. Overall, there does not seem to be much difference in learning between 1 occurrence and 2–4 occurrences. Thus, readers will pick up about the same amount of learning whether they see a word 1 or 4 times. There is a noticeable increase in learning at 5–8 exposures, but it is at 10–17 exposures that a very substantial jump in the amount of learning occurs. Beyond this, moving to 28 or more occurrences does continue to enhance lexical learning, but not at the same rate as from (5–8) to (10–17) exposures.

A Kruskal-Wallis comparison was run between the frequency groups (the data was non-normal) to test for differences. There were significant differences within all word knowledge aspects: spelling ($\chi^2 = 62.51, p < .001$), word class ($\chi^2 = 56.33, p < .001$), meaning recall ($\chi^2 = 55.11, p < .001$), and meaning recognition ($\chi^2 = 60.73, p < .001$). Post-hoc tests revealed the following patterns at the $p < .05$ level:

Spelling:	1 = 2–4 < 5–8 < 10–17 = 28+
Word class:	1 = 2–4 = 5–8 < 10–17 = 28+
Meaning Recall:	1 = 2–4 = 5–8 < 10–17 = 28+
Meaning Recognition:	1 = 2–4 (1 < 5–8, 2–4 = 5–8) < 10–17 = 28+

Thus there was always a significant difference between the 1, 2–4, 5–8 frequency groups and the 10–17, 28+ frequency groups, and sometimes between the 1, 2–4 frequency groups and 5–8, 10–17, 28+ frequency groups. This suggests the existence of two overall frequency bandings, and on balance, it seems best to make the division between 5–8 exposures and 10–17 exposures. This means that words which have a frequency of exposure of 10 or more are learned substantially better than words with less exposure. Moreover, this advantage seems to hold across a number of different word knowledge aspects. Collapsing the data into these two overall frequency bands clearly shows the difference in learning at the 10+ occurrence threshold (Table 2). We can also note that after 10–17 exposures, our learners were able to recognize the meaning and form for around 80% of the target words, and recall the meaning for over half.

Table 2. *Total scores by word knowledge aspect and collapsed frequency group*

Frequency of occurrence	Spelling recognition %	Word class recall %	Meaning recall %	Meaning recognition %
1–8	28	12	7	36
10+	76	63	55	84

In the last section, the study explored participants' attitudes to the reading and the study. The interviews revealed that all participants had read the complete book and that all had enjoyed taking part in the study, although three said that participation had been a little burdensome because of the book topic or the limited amount of reading time available. In addition, most participants (18 out of 20) found the level of the book appropriate for their level of English, verifying our original judgment. Furthermore, the two participants who found the level of the book a bit difficult for their level of English did not show noticeably lower scores. Seventeen out of the twenty participants liked the book overall and found it interesting. Only one participant found the presence of foreign words in the book to be a problem for general understanding, and only three participants felt that there were sometimes too many foreign words. Finally, sixteen of the participants had the feeling of having learnt something of the target words. Four of these sixteen participants also had the impression of having learnt something of the foreign culture, and two believed they had learnt something more about English. In contrast, four participants did not have the feeling of having learnt new vocabulary.

Discussion

This study chronicles the vocabulary development from reading the authentic novel *Things Fall Apart*. The results presented in Table 1 clearly indicate that substantial learning occurred.

Learning ranged from 14–43% of the target words, and this compares favorably with many studies, which have shown very small incidental gains from reading. However, we believe that our study may be a better reflection of the true vocabulary learning possibilities from reading for several reasons. First, we know that the gains must stem from the reading, as there was no other opportunity for exposure to the target African words. Second, *Things Fall Apart* was generally well-liked, and so may be similar to the type of English novel our learners might read on their own. Third, the students read for pleasure at their own rate, again mimicking an ecologically-sound type of reading. Fourth, we measured a number of word knowledge aspects, giving a more comprehensive picture of lexical acquisition from reading. Finally, by using an in-depth interview methodology, we can be relatively sure of the validity of the measurements we made.

Despite these results, it is useful to note that our percentages are not as high as are typically produced by intentional learning tasks. Laufer (2005) reviewed a number of studies, which contain an explicit focus on vocabulary. Those in which the explicit exercises were related to, but not embedded in, meaning-based tasks led to 33–86% of the words being learned. Exercises which required work on isolated words, without a meaning-based task, led to gains of 13–99%. We can thus conclude that meaningful learning can accrue from reading an authentic novel, but that the amount of incidental learning is unlikely to match the amount available from an explicit teaching approach. In a review of instructed second language vocabulary learning, Schmitt (2008) suggested that the best methodology may be to combine incidental and intentional approaches, such as by using explicit post-reading tasks to consolidate and enhance the vocabulary initially met while reading.

Meaning recognition was the best learned word knowledge aspect, and this is perhaps not surprising as readers typically read for meaning. However, spelling recognition was learned to a somewhat lesser degree. Many teachers might believe that learning a word entails learning its meaning, with the word form presumably just picked up along the way. These results indicate that learning word form to a recognition level may be more difficult than learning meaning to the same level, and indeed, there is an abundance of research showing that the acquisition of word form can be problematic, both orthographically and phonologically (e.g., Barcroft, 2002; Cutler & Norris, 1988; de Groot, 2006; Koda, 1997; Laufer, 1988). This suggests that some explicit attention to form may be required to help it ‘catch up’ with meaning knowledge, particularly if there is a mismatch between L2 and L1 spelling systems, as there was in this study.

While this study demonstrates that the multiple exposures available in reading can often lead to the ability to recognize meaning, it also suggests that a sufficient number of exposures might lead to the ability to recall it. One out of the two target words, which were met 10–17 times, were learned to a recall level, as well as 61% of those met 28 times or more. Previous research has suggested that it is difficult to gain recall mastery of meaning from only incidental learning (Schmitt, 2008), but it may be that with enough repetitions, recall mastery can be achieved simply from reading. Even if this is true, it seems advisable to add explicit recall tasks to achieve recall mastery, rather than wait for such a large number of exposures to be achieved from reading alone, especially given Cobb’s (2007, 2008) finding that the requisite number of exposures may be a very long time in coming.

Some anecdotal evidence for the power of explicit attention came from the participant who gained the highest scores on all word knowledge aspects (spelling: 59%; word class: 57%; meaning recall: 50%; meaning recognition: 65%). She explained in the interview that, although we had not revealed the content of the post-reading interview, she thought it would be about the African words. This personal intuition led her pay more attention to the target words, underlining the African words she encountered and having another look at them when finishing the reading. These activities clearly increased target words' saliency, facilitating their later recognition and recall, and having a positive influence not only on the amount of learning, but also on the degree of certainty of such learning.

The data showed that even one exposure lead to considerable learning of word form and meaning recognition, although it made little impact on recall of word class or meaning. However, the real increase in learning began with 5–8 occurrences, and accelerated with 10–17 exposures. There is a growing body of evidence that suggests that 8–10 exposures is the point where incidental learning begins to reach a critical mass and learning accelerates (e.g., Horst, Cobb, & Nicolae, 1998; Pigada & Schmitt, 2006; Waring & Takaki, 2003), and our overall results seem congruent with this conclusion. However, there was considerable individual variation in our study, and the number of exposures needed to start accelerating learning was not the same for all participants. Most participants seemed to begin making better gains between 5–8 exposures and 10–17 exposures, which led to the results in Table 2, but for some it occurred sooner (between 2–4 exposures and 5–8 exposures), and for some later (between 10–17 exposures and 28+ exposures). One possible explanation for the variation found in this and many other studies is the finding that the quality of the context may have a greater influence on incidental vocabulary acquisition than the number of exposures to the target words in the text (Webb, 2008). Also, although this study demonstrated learning from an authentic novel, the need for considerable repetition argues for the value of graded readers, where repetition and recycling are a basic principle.⁹

Finally, participants' attitudes turned out to be very similar, which did not allow us to investigate differential effects of these attitudes on readers' vocabulary gains. However, the encouraging figures and results of this study make us think that participants' positive attitudes and opinions had a facilitative effect on vocabulary acquisition.

Limitations of the Study

Inevitably, there are a number of limitations to note in this study. The nature of the novel and the target words did not allow us to test as many word knowledge aspects as we would have liked. Also, the characteristics of the foreign words included in the text did not allow us to test a larger number of target words, nor to have the same number of words in all frequency categories. Nevertheless, we feel the study does give a good indication of the word knowledge aspects we were able to cover.

The type of reading used in this study corresponds to extensive reading, but the decision to read this particular book was not the participants' own choice, which might have hindered the amount

and quality of readers' vocabulary acquisition. However, as most readers ended up liking the book, the negative effects of having the book prescribed are likely to be minimal.

One issue involves the interpretation of the learning gains of words, which belong to a real foreign language and culture. The large differences between the African words being tested and the participants' L1 might have caused smaller gains than if the L2 words had come from a language (and culture) closer to Spanish, or which followed the spelling patterns of English. Learning other English words may have been easier, and so from this perspective, the study may understate the effect of lexical learning from this type of reading. Conversely, these African words may have been highly salient, and so have led to greater attention and learning than may have been the case with less 'noticeable' words. We are unable to differentiate between these possibilities in this study, but the question of whether words with unfamiliar spelling patterns lead to better or poorer incidental learning is an interesting one for future research.

An important limitation is the lack of a delayed posttest. Studies with delayed posttests invariably found some decay of knowledge (e.g., Waring & Takaki, 2003), and it seems extremely likely that the type of gains reported here would not remain intact without further exposures or some explicit reinforcement.

A key aspect of this study was the reading of an unadulterated authentic novel. However, this meant that we had to use the Ibo words in the frequencies in which they appeared in the novel. This limited our ability to fully match the words in each frequency band for every difficulty factor (e.g., word length, phonotactic properties). This may have had some effect on the overall learning difficulty of the various frequency bands, but only for the spelling measure, as any potential differences in the difficulty of orthographic form should not have affected the acquisition of meaning or word class.

Finally, the results reported here are indicative of relatively advanced learners, who were interested and engaged in the reading and the study. Less able learners, or less interested readers, may well obtain lesser vocabulary gains.

Conclusion

The original Clockwork Orange study (Saragi et al., 1978), inspired by Nation, showed impressive amounts of incidental vocabulary learning with L1 readers, but subsequent replications with L2 readers showed only small gains. Our study, using a more reader-friendly authentic novel with foreign words, and a multi-aspect word knowledge test battery, found considerable amounts of vocabulary learning. The results support the recommendation of reading novels as a useful way of improving learners' vocabulary knowledge.

However, these results must be interpreted along with Cobb's (2007) point about the marginal percentages of lower-frequency vocabulary in authentic texts. Our results showed that some learning does occur even with few repetitions, but the finding that the best learning occurs with 10+ exposures is problematic for an extensive reading approach. Incidental learning *does* occur from extensive reading, but to help learners acquire the mid-frequency vocabulary they need, it

may well be necessary to add explicit teaching tasks to supplement this reading, or select texts which have a higher percentage of mid-frequency vocabulary than is typical. In the final analysis, the most effective response to the vocabulary challenge which Nation (2006) laid down is likely to integrate both an explicit teaching approach and an incidental learning approach, including the extensive reading of authentic texts.

Notes

1. Cobb (2008) noted that there has been little L2 reading research involving unsimplified texts of any kind, let alone full novels. See Parry (1997) for an exception.
2. It should be noted that the reading in Webb's studies (a few sentences) is different in kind from the more extended reading involved in most of the other studies reviewed. Also, Webb used nonsense words in these very short contexts where the only unknown words were the target nonsense words. Hence, attention must have been drawn to them, unlike in more extended texts.
3. Cobb (2007) shows how computer-aided text analysis, manipulation, and enrichment can be used to facilitate both incidental and intentional learning.
4. Not only is *Things Fall Apart* an authentic English-language novel, it is considered an important piece of literature in its own right. "It is a staple book in schools throughout Africa and widely read and studied in English-speaking countries around the world. It is seen as the archetypal modern African novel in English, and one of the first African novels written in English to receive global critical acclaim" (Wikipedia). It is "the seminal African novel in English" (<http://www.wsu.edu/~brians/anglophone/achebe.html>).
5. The frequency distribution of the Ibo words in the novel made it difficult to form consistent frequency categories (e.g., 2–4, 5–7, 8–10 etc.). The categories were devised according to what seemed to make the most sense given the actual frequencies of the target words.
6. The other word knowledge aspects in Nation's framework were not amenable to testing in this case. We originally wished to measure collocation, but the analysis showed that there were no consistent collocations for the target words. Likewise, the target words had no special register characteristics. We could not expect the learners to acquire the pronunciation only from reading.
7. Laufer and Goldstein (2004) pointed out that the terms *receptive knowledge* and *productive knowledge* can be confusing because they actually cover two separate distinctions:
 - whether the word *form* is supplied for a given meaning, or whether the *meaning* is supplied for a given form
 - whether one can *recall* versus only being able to *recognize* the meaning or form

Because the word form was given in both meaning tests, we use the terms *recall* and *recognition* in this study. Strictly speaking, they are closest to Laufer and Goldstein's *passive recall* and *passive recognition*, although they used the L1 in their test formats, while we based ours around the L2.

8. Strictly speaking, the spelling and meaning recognition tasks are not fully equivalent. The spelling task required only recognition of the correct orthographic word form, but the meaning task required first the recognition of the written word, and then selection of the correct meaning option on the multiple-choice test.

9. However, Nation and Wang (1999) found that, even in graded readers, not many words are repeated 10 times or more.

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Appendix A

Final List of Target Words According to Frequency Groups:

Group 1 (Freq. 1)	1. Ekwenzu 2. Nne 3. Nno 4. Ogwu 5. Udu	6. Uti 7. Nza 8. Tie-tie 9. Nna-ayi 10. Nso-ani
Group 2 (Freq. 2–4)	11. Egusi (2) 12. Efulefu (3) 13. Iba (4) 14. Jigida (4) 15. Indichie (2)	16. Nneka (4) 17. Sisal (4) 18. Uli (2) 19. Umunna (4) 20. Agadi-Nwayi (2)
Group 3 (Freq. 5–8)	21. Ekwe (6) 22. Harmattan (6) 23. Ilo (6) 24. Kotma (5) 25. Ogbanje (7)	26. Ogene (6) 27. Osu (5) 28. Ozo (7) 29. Iyi-uwa (8)
Group 4 (Freq. 10–17)	30. Chi (17) 31. Ibo (10)	
Group 5 (Freq. 28+)	32. Egwugwu (35) 33. Foo-foo (28) 34. Obi (36)	

Appendix B

Examples of the Measurement Instruments

PART 1: SPELLING

- Among the following options, **which spelling do you recognize?** Choose **one of the options** for each word. (**See the example below**):

Example 1:

better bedder beter beder

Don't know

Now try yourself...

Example 2:

occasionally oasionally oassionally occassionally

Don't know

Let's start...

- | | |
|------------------------------------|------------|
| 1. ekwukwu ekwugwu egwugwu egwukwu | Don't know |
| 2. ovvi obbi ovi obi | Don't know |
| 3. ekwe ekbe egwe egbe | Don't know |

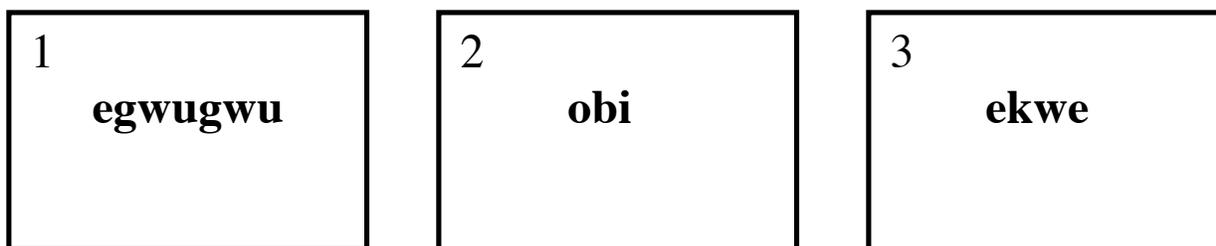
PART 2: PART OF SPEECH

- Indicate, if you know, the **part of speech** (noun, adjective, adverb or verb) of each of the words in the following list.

- | | Part of Speech | Don't know |
|------------|----------------|------------|
| 1. egwugwu | | |
| 2. obi | | |
| 3. ekwe | | |

PART 3: MEANING RECALL

(Examples of the cards used to present the 34 target words)



PART 4: MEANING RECOGNITION

- Now I am going to show you 34 cards, one card for each of the target words. These words are presented in a sentence and underlined. After each sentence you will find **four different options** for the possible meaning of the word. You will have to **choose** the option you think corresponds with **the meaning** of the underlined word (*See the example below*):

Example:

- The view was amazing.
- awful
 - astonishing
 - familiar
 - dull

1) An egwugwu appeared and talked to the crowd.

- a) messenger of the neighbour village.
- b) Ancestral, greatest spirit in the clan.
- c) The father of the tribe.
- d) Member of an enemy clan.
- e) Don't know.

2) He went to his obi.

- a) Men's bed.
- b) Compound.
- c) Village.
- d) Men's hut.
- e) Don't know.

3) He heard the ekwe.

- a) Spirits' call.
- b) Musical instrument.
- c) Crowd's shouts.
- d) Animals' roars.
- e) Don't know

PART 5: PARTICIPANTS' ATTITUDES

- Answer the following questions regarding your attitudes towards this research study:

- 1) Have you enjoyed participating in this research study? Was it a burden for you?
- 2) Did you read the complete book? How long did it take?
- 3) Did you enjoy reading the book?
- 4) How was the book level? Did you find the book difficult to understand?
- 5) Were foreign words a problem?
- 6) Were there too many foreign words?
- 7) Which strategies did you use for dealing with foreign words?
- 8) Did you have previous instruction on possible strategies to deal with new words you encountered while reading?
- 9) Do you think you have learnt any of the foreign words from the book?
- 10) Did you know any of the target words before reading the book?

Appendix C

Examples of Meaning Recall Responses And Scores Assigned

Word	Meaning	Response provided	Score assigned	Reason
Obi	Men's hut	Their houses; each one had one; where they lived; but just for men; the main house of the man.	1	It covered the main meaning of the word
Egwugwu	Ancestral, masked, greatest spirit of the clan	Spirits of the clan; they were like the wise men of the clan; the most important people in the clan; the judges; they were like the gods of the clan.	1	It covered the main meaning of the word.
Efulefu	Convert of the clan	Bad spirit; a child which was an evil spirit.	0	The definition provided was wrong. Probably confused with another word.
Harmattan	Cold, dry season	Something related to the village, and also related to the huts.	0*	The definition provided was not enough to show any clear knowledge. And it seemed to be wrong as well.
Ilo	Village playground	Physical space; a place in the village; place related to nature.	0.5	The information provided was right but not enough to cover the main meaning of the word.
Obi	Men's hut	Their hut; where they lived; type of hut or house they had; each one had one.	0.5	The information provided was right but there was one of the main features of the basic meaning missing: the fact that it was specific for men and not women.

* 0 points were also assigned to those cases in which no response at all was given.

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