Lexical Inferencing in Context in L2 Reading Comprehension*

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1. Introduction

One of the continuing issues in second language acquisition is clarifying how learners increase vocabulary knowledge and how they use it for comprehension and production of the target language. One simple and common way to acquire new vocabulary words in a second language can be memorizing the definitions with the help of word lists or word cards. Nowadays, however, second language acquisition research especially in the area of reading comprehension has revealed that learning words in isolation is not of much help to increase useful vocabulary knowledge, but rather learning words in context is essential for appropriate second language development. These findings have encouraged researchers to develop materials for extensive reading, where learning of vocabulary words in context is expected to occur. In extensive reading, readers encounter unknown words several times in multiple contexts and are encouraged to infer the meanings of them, while trying to make sense of the text. The reasoning behind this can be that one of the characteristics of vocabulary words is multiplicity of meanings and, therefore, contextually specific meanings of words in a passage can only be attained in relation to the meaning derived from the context. Acquisition of vocabulary words ultimately is the building up of semantic networks with contextually specific meanings of words. In other words, vocabulary words especially their multiple meanings have to be learned in relation to the rest of the words in context.

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One very familiar case of successful establishment of vocabulary knowledge can be observed in L1 acquisition. The vast majority of L1 vocabulary acquisition is achieved by children inferring on their own the meanings of the new words they encounter in context, while rarely they are explicitly given definitions by way of dictionaries or caretaker's explanation. L1 vocabulary knowledge is built up by forming semantic networks of words in a variety of contexts on the part of the acquirer. In other words, L1 vocabulary acquisition is mostly attained through implicit learning rather than explicit learning. This high level of success of L1 vocabulary learning suggests that if quantity and quality of contextual input is appropriate and rich enough, vocabulary words can be acquired by inferencing the meanings of them in relation to the rest of the words in context. An L1 acquirer in this way is said to have obtained some 20,000 word families as a university graduate, although this may be a conservative estimation (Nation & Waring, 2000).

What happens when a second language learner tries to accumulate new vocabulary words is that contextual input both in quantity and quality is often not rich enough to nurture a desirable development of a semantic network. Now our task in the field of second language acquisition is to clarify how the process of inferencing new words in context can be done so that we can find ways to optimize the process of inferencing unknown words in L2 acquisition. Although some second language learners attain a very high level of vocabulary, L2 learners in general are expected to have 3,000 to 5,000 word families for basic comprehension, and this number could go down to 2,000 to 3,000 when production is concerned (Nation & Waring, 2000). If we compare the mental lexicon of L1 and L2 users, there seems to be a great gap between the way vocabulary knowledge in L1 and that in L2 are formed. Second language acquisition research so far has not been capable of explaining the difference between L1 and L2 vocabulary acquisition; however, there might be some hint in the way lexical inferencing functions in these cases of language acquisition.

This paper attempts to explore what kind of lexical inferencing L2 learners employ so that they can be successful or fall short in attaining the goal of reaching the appropriate meaning of unknown words. To be specific, the study attempts to illustrate and characterize what processes L2 learners take in trying to find the meanings of unknown words in the context of reading a passage. This study reports on the qualitative analysis of the thinking process of L2 learners and attempts to

deduce any pedagogical implications which can be useful for L2 learners to be successful in lexical inferencing.

The organization of this paper is as follows. Section 2 reviews past literature on inferencing unknown words in context. Section 3 reports the study with Section 4 presenting the results and discussing the findings. Section 5 deduces pedagogical implications and summarizes the paper.

2. Literature review

Researchers' and teachers' interest in lexical inferencing probably got started in the late 1990s, when the field of second language acquisition extensively discussed incidental vocabulary learning in reading, or specifically extensive reading skills development. Incidental vocabulary learning should heavily involve inferencing of unknown words. Under such circumstances, Bengeleil and Paribakht (2004) did a fairly thorough study on the relationship between proficiency levels of learners and the knowledge sources they used as well as their success rates plus retention. The results indicated that proficiency level did not affect the kinds of knowledge sources much with sentential knowledge sources most frequently used, while advanced learners showed a higher success rate. Since then numerous studies have attempted to identify the relationships between lexical inferencing and such variables as proficiency or maturity levels (Haastrup, Albrechtsen, & Henriksen, 2004; Haastrup 2008; Riazi & Babaei, 2008), success rates (Nassaji & Hu, 2012; Kaivanpanah & Moghaddam, 2012), relationship between L1 and L2 (Wesche & Paribakht, 2010), and learners' vocabulary knowledge in L1 and L2 (Karlsson, 2014). The total view on the results obtained, however, is quite intriguing. Some research results reinforce other results, while others contradict each other.

So far we have discussed past research from the point of view of research results, but one more standpoint we would like to take can be the teachers' point of view. From a pedagogical point of view, it also is important to clarify what we can do to help learners to become better at inferencing unknown words. Karlsson (2014) suggests that inferencing both in L1 and L2 has potential and allowing such skills development in both languages may help learners. This suggestion reminded us of an earlier report by Fraser (1999), who investigated strategies taken by eight Francophone intermediate university students when encountering unknown words.

Fraser suggested a combination of inferencing and consultation of a dictionary as verification can be of help because her participants performed best in regards to retention with this combination of strategies.

Because the results so far are not straightforward, lexical inferencing seems to be very important theoretically and pedagogically as well. In other words, it is essential to find out 1) how learners implement inferencing; and 2) what kind of inferencing leads to successful attainment of meanings. This study tries to respond to the following research questions.

Research Questions:

1) What kind of clues do intermediate learners of English utilize to infer the meanings of unknown words encountered while reading an English passage?
2) What are possible factors that contribute to or hinder successful inferencing the meanings of unknown words?

3. The Study

3.1 Participants

Five intermediate senior English majors at a college in Tokyo participated in the project. They were taking a graduation thesis writing course and were each expected to finish writing a 5,000 to 8,000 word thesis. Among the five denoted by HK, KI, MS, YKT and YMT, one had spent a year studying abroad in the UK taking some content courses, one had spent a year as an assistant for a Japanese class while also taking some courses in an American university, one had spent a year assisting in a Japanese immersion education program in the U.S., and the remaining two had just studied English at a four-year college. They are considered to be at about the same intermediate level of English proficiency in terms of dealing with the passage given for the task in this study.

3.2 Procedure

While reading an English passage, the participants were asked to articulate and document whatever came to their mind when they encountered an unknown word. In this process, they read and reported on their thoughts while reading an English passage for comprehension and inferencing the meanings of the unknown words

they encountered. They first glanced through the reading passage and marked the words they thought they did not know. They were asked to list these words so that they can specifically work on the task of inferencing the meanings of these unknown words.

After making a list, they read through the passage while recording their utterances about the passage and the unknown words. The recording was expected to reveal what clues the participants used and how they reached or did not reach the meanings of unknown words. At the end of the reading and recording tasks, the participants were asked to write a 400 character summary of the passage in Japanese. This task was designed to set the shared goal for reading among the five participants. This also was intended to check the level of their reading comprehension of the passage. The recording was transcribed by two assistants and double-checked for its accuracy. The researcher qualitatively analyzed the script.

3.3 Materials

For the reading passage, "Genetic Engineering" (Wesche & Paribakht, 2010, p. 172), which had 250 words, was used (Appendix 1). This material was chosen with consideration to any further comparison of the studies in the future. In addition, the level of the passage seemed appropriate for the participants of the present study.

As for the target words, all five participants marked ten to thirteen words or phrases as being unknown. This amounts to approximately 5% of the reading passage, which could safely be considered within the range where the participants should have reasonable clues for inferencing the meanings of the unknown words they encounter. From these eight words which were commonly listed as unknown were chosen for analysis in this study. These eight target words (TW hereafter) were chosen so that we can compare the processes of inferencing among the five participants. The eight TWs are: *breakthroughs, hailed, inadvertently, trigger, intuitively, backfire, snoop*, and *incubate*.

3.4 Analysis

The analysis was done qualitatively by examining the utterances which appeared in the script from the voice recordings and classifying the kind of clues the participants used. They were classified into categories which were based on knowledge sources the participants used for inferencing. They are linguistic sources

such as word (“1”), sentence (“2”), or discourse (“3”) level knowledge with an addition of interlingual (“4”) sources and non-linguistic (“5”) sources like topic knowledge or general knowledge. These categories are derived from “The taxonomy of knowledge sources used in L2 lexical inferencing” in Bengeleil & Paribahkt (2004, p. 231).

Knowledge source categories used for the analysis

Linguistic sources
- word level: “1”
- sentence level: “2”
  - “2m”: overall sentence meaning
  - “2sp”: syntagmatic and paradigmatic relations in a sentence
  - “2g”: grammatical analysis in a sentence, e.g. mention to parts of speech
- discourse level: “3”
- interlingual sources: “4”

Non-linguistic sources: “5”

Each code above can be explained by sample extracts from the transcript as follows:

“1”: (In order to attain the meaning of *inadvertently*) “*nannka* advent, *nanikano shutsugen no youna kanji-ni nattete*… [something like, appearance of something, and then maybe…]” or “in *ga tsuite iru kara*…[since *in* is attached…](MS)

“2m”: “Some *to* others *tte hikakuga-atte*, others *no ato ga*, worry that this first cloning may… [there’s comparison between *some* and *others*, which is followed by *worry that this first cloning may*...](KI)

“2sp”: (In order to attain the meaning of *breakthroughs* which follows *scientific*) “scientific.... *kagakutekina* [scientific]….”(HK)

“2g”: (In order to attain the meaning of *trigger*) “*kokode wa doushi de tsukawareteiru to omou no de*…[I suppose it is used as a verb here…](MS)

“3”: “*yaccha ikenai kara*….[since it’s wrong to do so…]”(KI)

“4”: “*tsugi no* to clone *wa…eh*…clone *wo tsukuru*, clone-*ka suru*. [next, to clone means to make clones or make clone-like…]

“5”: “*ano America-no rap kashu no namae shika dete konai-n desu kedo*…[all I can think of is the name of an American rap singer.]

The attempts made by the five participants in the transcript that showed inferencing of the TWs were marked as "1," "2m," "2sp," "2g," "3," "4" or "5." All the inferencing efforts made by the participants concerning the TWs are listed in Table 1.

4. Results, discussion and limitations

4.1 Results

4.1.1 General tendency

Studies in the past show that sentence level inferencing is most frequently employed by learners at both intermediate and advanced levels of proficiency (Bengeleil & Paribakht, 2004). The participants in the present study showed a similar tendency. This tendency is observable in Table 1, which presents how the five participants attempted inferencing the meanings of the TWs in this study.

The table shows the eight target words (i.e., *breakthrough, hailed, inadvertently, trigger, intuitively, backfire, snoop,* and *incubate*) in the left-most column with the symbols (HK, KI, MS, YKT and YMT) of the five participants at the top row. The table further lists the kinds or levels of knowledge sources the participants used, e.g., "1," "2m," "2sp," "2g," "3," "4" or "5," which are listed in "Knowledge source categories used for the analysis" in section 3.4. As has been stated above, Table 1 demonstrates the strong tendency of all five of the participants in using sentence level inferencing, as is shown by the very frequent listings of "2m (sentence meaning)" and "2sp (syntagmatic and paradigmatic relations of words)." We see that some participants produced numerous cases of inferencing for some target words, while others fewer still depending on the target words; still we can see that the frequency of sentence level inferencing, i.e., knowledge source "2," is most frequent across all the participants. Symbols, "○, △, and ×" denote "correct, partially correct, and incorrect" inferencing results. They are followed by the translated expressions of the word meanings the participants reported to have reached.

Knowledge source "2sp (syntagmatic and paradigmatic relations of words)" is most frequently used. The participants looked at the adjacent or surrounding words to infer the meanings of the target words. For example, participant HK uttered "*scientific*…." or "*kagakutekina* [scientific]…." In this attempt, HK tried to find the appropriate meaning of *breakthrough* as something semantically suitable to follow the word *scientific* or *kagakutekina* [scientific]; thus knowledge about the

Table 1

	HK	KI	MS	YKT	YMT	
breakthrough (noun, compound)	2sp–2sp–2m–2sp △new discovery	2m–2sp–2sp–2m–2sp–1–2sp 2sp–2sp–2sp ×research so far; knowledge; opinion; thought	2m–1 △great discovery of the century	2sp–2sp–2sp–2sp △discovery	(happened to recall without inferencing) ○breakthrough	breakthrough almost all △= close but not Type 2 elaborate enough
hailed (verb, one-syllable)	2m–2m △regarded	2m–2m–2m–2sp–2m ○applauded	2m–2sp–1 △accepted; interpreted; regarded; recognized	2m △accepted	2m–1–1 △being given attention to	hailed almost all △= close but not Type 2 elaborate enough
inadvertently (adverb)	2m ×badly; strongly	2m ×continually; for a long time; rapidly	2m–2sp–1–1–2m 2sp–2sp ×like having possibility of something dangerous may happen	1– ×not progressive; not acceptable	1–2sp ×start all of a sudden ×suddenly	inadvertently all × Type 3
trigger (verb, one-syllale)	2sp–2sp ○trigger	2sp–2m △bring about ×leave traces	2g ○trigger	2sp–2sp △cause	5– ○trigger △cause	trigger almost all ○ Type 1
intuitively (adverb)	2sp–3 × similar to "definitely" definitely not; badly	3–2sp ×strictly; passionately; violently	1(recalled)–2sp ○intuitively cf. 1:「intuition=insight」	2sp ×surely	(incorrectly recalled and without inferencing) △insitinctively	intuitively all ×, exept for Type 3 recalling
backfire (verb, compound)	2m–1 ×becomes at the state of emergency; back of body; fire; one's back on the wall (cf. = *haisuino-jin*)	2m–2m ×becomes (backward) spark (cf. = (*ushiro-mukini*) *hidaneni-naru*)	2g–1–3–2sp–2sp–2g 2g–2sp–1–1–1–3 ×something bad happens	1– ×power failure; dangerous situation; something serious happens	2m–1–3–3–2g–1 ×becomes invisible	backfire all × Type 3
snoop (verb, one-syllable)	2sp–2m ○steal; peep	1–2sp–2sp ×overgrow (cf. = *habikoru*) △start searching	5–3–3–1–2m–2sp ○steal; peep; look into; steal into	2m–2sp ×pass through ×slip through	1–2sp △creep upon quietly	snoop almost all ○ Type 1
incubate (verb; with affix)	2m–2sp–2sp △bear; produce	2sp–2sp–2sp △produce; bear	2m–2sp–3 △bear; produce	2sp △bring up	2m △produce	incubate almost all △= close but not Type 2 elaborate enough

syntagmatic relationship of words is explored to attain the meaning of the TW. A similar attempt is observable in KI's utterances to attain the meaning of *intuitively*: "*akiraka-ni hotondo-no hito-hitobito-wa kou-itta … atarashii* technology *wo* intuitively *ni* reject *suru*. [Apparently, most people intuitively reject this kind of technology]." In this attempt, KI tried to find possible appropriate words that could collocate with *reject*.

The second most frequently used knowledge source is the whole sentence as a semantic unit, i.e., "2m (sentence meaning)." For example, participant KI, when exploring the meaning of *hail*, uttered, "Some *to* others *tte hikakuga-atte*, others *no ato ga*, worry that this first cloning may… [there's comparison between *some* and *others*, which is followed by *worry that this first cloning may*...]," which is a case of "2m (sentence meaning)." KI also uttered, "While she is hailed *wa nannka* worry *no gyaku*? *…toka*,… miracle *wo yorokobu mitaina imi-ga* hail. [Does *while she is hailed* mean the opposite of *worry*?; then *hailed* could mean something like rejoicing the *miracle*]," i.e. "2m (sentence meaning)." She tried to fit the TW, *hail*, into the sentence meaning, taking the meaning of the subordinate clause into consideration as well.

As for other knowledge sources as a clue for inferencing, word level ("1"), discourse level ("3") or non-linguistic sources ("5") are used in some occasions. Word level analysis, ("1"), in the case of the present study does not seem to lead to successful meaning attainment. Participant MS, in trying to figure out the meaning of *inadevertently*, mentioned "*nannka* advent, *nanikano shutsugen no youna kanji-ni nattete…* [something like, appearance of something, and then maybe…]." For this TW, *inadvertently*, YKT tried such analysis as "in + adver" and YMT "in + ad + vernt." Neither attempt led successfully inferencing the meaning of the TW. Although for the compound verb *backfire*, most of the participants successfully divided it into "back + fire," without successfully finding out the relationship of these two morphemes to attain the more or less figurative meaning of "to have the opposite effect to the one intended, with bad or dangerous results (*Oxford Advanced Learner's Dictionary*)." Most of the participants ended up with interpreting the TW as something emergent, bad or serious; in other words, inferencing a similar meaning but not elaborate enough to what is conveyed by *backfire* in the context of the passage.

Discourse level knowledge, ("3"), is used only once in a while. HK, inferring

the meaning of *intuitively*, mentioned "*annmari, tabun rinnri-teki-ni mada ima monndai te iuka, mondai atte, tsukurenai to omou kara*… [perhaps, because of ethical problems, or because there exists ethical problems, I think we can't make such a thing, so…], and settled with the meaning "*definitely*," which is not exactly what the TW meant. The TW, *intuitively*, and the inferred meaning "definitely" are in a sense similar, but they carry different meanings as well. Another example of "3" can be MS trying to figure out the meaning of *backfire*, mentioning "*kono bunmyaku-teki-ni, mah, seifu-ga nanimo shinai-tte-iu sono* this lack of action *ga, ah, mah, warui houkou-ni icchaunnjya naikatte*…[If you take the context into consideration, 'this lack of action,' that is, the government not doing anything, may lead to some kind of bad direction…]." This is an attempt to put the sentence including the TW into the general flow of the context of the passage. There is one thing worth mentioning about discourse level knowledge source. The other participants did not make as many specific comments about the context or the whole discourse as MS did here, but as a matter of fact, there seems to exist a constant effort to try to make sense of sentence meanings in light of the whole context of the passage. It is not explicitly verbalized, but the participants persistently made an effort to grasp the meaning of the sentences in the light of discourse meaning.

Non-linguistic knowledge source, ("5"), is rarely used. MS mentioned her knowledge about an American pop singer in relation to the TW, *snoop*, apparently articulating that she knew that this knowledge was irrelevant to comprehend the text. Another example of using a non-linguistic knowledge source is the case with YMT working on the TW, *trigger*. She referred to the physical structure of a gun with a specific comment on the part "trigger" to attain the meaning.

All in all, the strong tendency to use resources available within the sentence is prevalent across the participants and across the TWs. Similar to what has been stated in Section 2, which described past studies, this study also demonstrates that sentence level clues are most frequently used. Therefore, Research Question 1 could be responded to as follows:

RQ1: What kind of clues do intermediate learners of English utilize to infer the meanings of unknown words encountered while reading an English passage?

Response to RQ 1: The most frequently used clues are sentence level knowledge followed by some cases of word level, discourse level knowledge and non-

linguistic knowledge.

In the process of detailed analysis on the reports by the participants, it is interesting to see constant code-switching from L2 to L1 and then to L2 or vice versa again and again. The cases of code-switching occur at any levels of linguistic components. The participants' language behavior in the study seems to demonstrate how learners try to relate the forms and meanings of the words while trying to fill the gap of the meanings of the unknown words. This characteristic language behavior will be further discussed later in the discussion section.

4.1.2 Characteristics of lexical inferencing attempts in terms of success

As Table 1 shows, the success rate of attaining the meaning of the TW is not very high. On top of all the efforts to successfully figure out the meanings of unknown words, it would be nice to see which inferencing should result in success and which not. From the point of view of success in attaining the meanings of the words, the data can be classified into three types:

Type 1: simple verbs like *trigger* and *snoop*

They do not seem to cause much trouble to learners. Compared to the remaining TWs, these two words are fairly well inferred. They seem simple in terms of meaning and since they are verbs, it might be easy to reach their meanings. Since verbs form essential parts of the sentence, identifying what happened can be fairly easy to attain. Also these two verbs do not seem to include any elaborate meanings. Perhaps the idea that "*technology* does something" and "what criminals can do" are concrete in terms of content and maybe make the TW's meaning easy to infer. In a sense, the context for these verbs might have contained rich clues to infer their meanings.

Type 2: Inferencing can bring understanding to a similar meaning, but still the elaborate aspects of the words are not attained: *breakthrough; hailed; incubate*.

The characteristic aspect of inferencing these TWs can be that the participants did a good job by coming very close to the meanings of the TWs, while the attained levels of the meaning fell short of the intended one. A closer look at the inferencing

results of *breakthrough* shows that the participants knew that it was some kind of great finding or discovery but not to the extent that the TW carries the meaning related to further or future development. In a similar vein, inferencing *hail* led them to interpret the TW as "regard," "accept," or "recognize." This attainment is not wrong, but *hail* has a stronger connotation of enthusiasm or being special. A similar thing can be said about the TW, *incubate*. Most of the "2sp" and "2m" knowledge source, i.e., such words as "women, force, their bodies," and "babies" helped the participants infer something similar to giving birth to a baby. The text, however, uses an uncommon word, *incubate*, in this context. It is probably because it's a passage about cloning. Consequently special meaning is carried by this TW, and unless we are very careful or accurate about the detailed meanings of the TW, it is difficult to attain the elaborate meaning of *incubate*.

Usual comprehension of the text probably does not lead to such elaborate meanings of *breakthrough*, *hailed*, or *incubate* as has been discussed above. If from the point of view of vocabulary acquisition in context, it might help to address learners' attention to some possible clues in the passage. In order to help recognize the future connotation of *breakthrough*, the sentence "It may not be as far off as you think." could be a sign that the new "discovery" should lead to our future life. For the reader to understand the degree of enthusiasm *hail* can convey, "a great deal of" can be a hint. If we are to be very careful, we may notice that simply interpreting *hail* as "regard" or "accept" may not be enough, but actually noticing this much elaboration seems difficult. The TW, *incubate*, can also be explained in a similar way. It is not simply bearing a baby in a usual way, but the passage tells us about keeping cloned babies, which is a peculiar way to keep a baby.

Type 3: Partial meanings can be identified but the elaboration on the detailed or specific meanings is not attained at all: *inadvertently; intuitively; backfire*.

These three words seemed most difficult to infer. Except for the comment made by MS who attained the right meaning of the TW, *intuitively*, no participants attained the meanings of any of these three TWs. Most of the participants guessed that some negative meaning is hinted at by *inadvertently*, but no one noticed that it carried the meaning of carelessness or something happening without intention. The TW, *intuitively*, also was difficult for the participants. Such inferred meanings like "definitely," "strictly," "passionately," and "surely" all express the force of rejection,

which can be shared by the TW, intuitively, but the meanings are very different. The TW, *backfire*, was a problem to the participants. They all knew the meanings of "back" and "fire" as individual words, but not the result of combining them, i.e., *backfire*. An understanding of the two components did not lead to figurative meaning of the TW. This type of TW is a difficult case for inferencing.

Thus, such adverbs like *inadvertently* or *intuitively* were difficult for inferencing and the figurative meaning of a compound verb was difficult as well. Research Question 2 can be responded to in the following way:

RQ 2: What are possible factors that contribute to or hinder successful inferencing the meanings of unknown words?

Response to RQ 2: From the limited data obtained in the study, we can at least say that simple verbs seem easy to infer, while elaborate adverbs and other words seem difficult to infer although readers somehow manage to attain a similar meaning, but sometimes it is very difficult to infer the TW's full meaning.

4.2 Discussion

4.2.1 What inferencing is all about

This study shows that when they are asked, readers attempt numerous inferences to attain the meanings of TWs using sentence level clues most frequently. In spite of their efforts, however, it is not easy to identify the best fit of the word meaning in a reading passage. In other words, however hard learners try, it is not easy to infer the meanings of unknown words. What we have learned is that learners come very close to the meaning of TWs. Of course some TWs have helpful clues or the word itself is simple and easy to infer. Some adverbs or compound words, however, seem very difficult even to the extent that attaining the meanings seems almost impossible. Often such words have elaborate meanings or do not have clues in the context.

Then does it mean that encouraging learners to do inferencing may not be worthwhile? On the contrary, even if attaining the exact meanings of the TWs in context is not easy, attempts at inferencing itself can be considered worth trying. If the TW is simple and has enough clues, learners do attain the meanings of such words. If learners are very careful about contextual clues, they could reach successful inferencing. Even though the success rate is not so high, encouraging learners to do inferencing is worthwhile because learners do a lot of exploration in the semantic

network of the TWs. We noticed that learners do a lot of code-switching at all levels of language components, trying to find out the semantic relationships of the target language vocabulary, syntagmatically, paradigmatically or in relation to the whole-sentence meanings. It was observable that in the process of constant code-switching, exploration into both L1 and L2 vocabulary words and their semantics is done. This seems to be an effort to develop the meaning relationships or semantic network of words in context, which could lead to enrichment of vocabulary knowledge. Vocabulary knowledge of multiplicity of meaning can be developed in such an effort as well. If learning vocabulary words is simply learning the definitions of them, there is no guarantee that target language vocabulary knowledge is structured in relation to the meanings of other vocabulary words in the L2. If a constant effort to explore the relationships of words in context is encouraged with flexible code-switching both in L1 and L2, such an attempt could lead to forming vocabulary knowledge with multiplicity of word meaning.

The section above discussed an aspect of vocabulary knowledge that is similar to what we have known as depth of vocabulary knowledge. Qian (1999) examined the roles that both depth and width of vocabulary play in reading comprehension and obtained the result that depth rather than width of vocabulary knowledge is more crucial in reading comprehension. Vocabulary exploration by trying to find the semantic relationships of words syntagmatically, paradigmatically, or in some other ways can be considered to be developing the depth of vocabulary knowledge (Read, 2000).

4.2.2 What we can do about vocabulary acquisition

We still need to ask ourselves how and when learners will attain the meanings of words which are elaborate or do not have sufficient clues in the context. They do need to reach the full meaning in whatever way possible. This is where we should consider the L2 environment. Since the quantity and quality of vocabulary acquisition clues are different in L1 and L2, using explicit guidance in L2 might help. As Fraser (1999) suggested and demonstrated, the combination of inferencing and consultation with a dictionary could work best. Either approach may not be efficient as it stands alone, but if we combine these different approaches, i.e., implicit and explicit learning, might work together to promote L2 acquisition.

4.3 Limitations

The present study revealed a detailed process of intermediate proficiency level learners inferring meanings of unknown words. We have learned that they use sentence level clues most frequently with some success and shortcomings in other occasions. Whatever we can learn from this study, however, needs further investigation because the samples we used in the study is very limited. In order to deduce any generalization from the study, it will be imperative to do further research with learners of different cultural and linguistic backgrounds, with different kinds or levels of reading materials, and with different types of target words. There is still a lot to be investigated in the future.

5. Pedagogical implications and summary

Now that we know how hard learners work in trying to attain the meanings of unknown words in context, it is clear that it is very difficult to discover the elaborate meanings of some target words because sometimes the clues are very limited. While in the case of L1 learning, the levels of quantity and quality of input is high enough to support further exploration of meanings, the L2 learning environment often does not provide learners with such enrichment. Still L2 learners should find ways to attain the meanings of unknown words. This is where the combination of implicit and explicit word learning plays a role. By consulting a dictionary after exploring the semantic relationships of words in text on the part of the learners, they should be able to acquire the meaning of words both in terms of depth and width. Such a way of learning word meanings will help learners become better readers. In this way, learners are expected to become far better in acquiring new words as well. Further exploration in this kind of pedagogy is expected to still expand our knowledge about what vocabulary acquisition is all about.

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Appendix 1

Reading passage with target words underlined

Genetic Engineering

Have you ever wondered what it would be like to have an exact copy of yourself? It may not be as far off as you think. Researchers have long been interested in the idea, and scientific **breakthroughs** in this area have received a great deal of both positive and negative media coverage. The focus of much of the attention has been Dolly, a sheep that scientists in Scotland recently managed **to clone**. While she is hailed as a miracle by some, others worry that this first cloning may **inadvertently** set off a wave of unpredictable events. Who knows what the new technology might **trigger**? Scientists could breed clones of animals and human beings for use in scientific experiments or to act as organ donors. People could have themselves copied in a quest for eternal life. Religious cults might wish to create younger copies of their aging leaders. Obviously, most people would **intuitively** reject such uses of the new technology. However, once such technology is available, it is difficult to ensure that it is properly controlled. Most countries still have not developed policies to deal with cloning and similar activities. This lack of action may well **backfire** if nothing is done soon. Unless medical facilities are carefully controlled, for example, criminals could **snoop** through doctors' files to find the secret to cloning. Even more worrying is the potential for women to be forced to use their bodies to incubate cloned babies. Who knows what will happen? Only time will tell.

From Appendix C of Wesche & Paribakht (2010). (bold in the original)

Appendix 2

Dictionary meaning of target words:

From Oxford Advanced Leaner's Dictionary, 2000
breakthrough: an important development that may lead to an agreement or achievement
hail: describe sb/sth as being very good or special, especially in newspapers, etc.
inadvertently: by accident; without intending to
trigger: to make sth happen suddenly
intuitively: e.g. Intuitively, she knew that he was lying.
Backfire: to have the opposite effect to the one intended, with bad or dangerous results
snoop: (informal, disapproving) to find out private things about sb, especially by looking secretly around a place
incubate: to keep cells, bacteria, etc. at a suitable temperature so that they develop

From The American Heritage Dictionary of the English Language
breakthrough: a major achievement or success that permits further progress, as in technology
hail: to greet or acclaim enthusiastically
inadvertently: marked by or resulting from carelessness; negligent
trigger: to set off; to initiate
intuitively: of, relating to, or arising from intuition
backfire: to produce an unexpected, undesired result
snoop: to pry into the private affairs of others, especially by prowling about
incubate: to develop and hatch