

NNS Readers' Strategies for Inferring the Meanings of Unknown Words

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This article compares the strategies used to infer the meanings of unknown words by three NNS readers – a 'good' reader, an 'average reader' and a 'poor' reader – from a series of six readings. Information about the readers comes not only from their answers but from a series of questionnaires. The writer concludes that the good reader uses a wider range of strategies than the weaker ones, and that all readers, strong or weak, tend to 'read in' meanings from their own specialized subject (in this case chemistry).

INTRODUCTION

This article is concerned with the strategies nonnative-speaker students of English use to infer the meanings of unknown words they find in their reading in English, and asks whether there are differences in the strategies used by successful and unsuccessful readers.

In trying to discover the strategies students use one cannot rely solely on students' reports of their strategies. As Vann and Abraham write:

..... these descriptions of the "good" language learner have in most cases been based on teacher/researcher observations and learners' generalized (often retrospective) reports. In some recent studies interviews with learners have generated statements such as "I look up words I don't know" In others questionnaires on strategies and learning behaviours have been used. Little subsequent research has attempted to confirm how strategies are utilized as learners engage in actual tasks (1990: 178).

Porte (1988) also found that some poor learners expressed a belief that their teachers would "either not approve of, or not be interested in, their strategy" (1988: 169); and that they had often transferred strategies (such as writing out word lists) used and approved of in their schools, but which were, for one reason or another, inappropriate in the new learning situation. Faced with different demands from the teacher, students continued to use these old strategies, but clandestinely.

We should therefore have some scepticism towards students' reports of their strategies. Fearing disapproval, they may hide their real strategies and pretend that they use strategies which they know their present teacher approves of.

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While much has been written on the subject of learner strategies (e.g. articles by Wenden (1985, 1987), Hosenfeld (1976, 1984) and Vann and Abraham (1990), and books by Oxford (1990), Skehan (1989) and O'Malley and Chamot (1990), little has been written on the specific subject of this article, strategies for inferring the meanings of unknown words. Research has been done. Porte (1988), who obtained his information solely from interviews, found that while poor learners used some of the same strategies as successful learners,

they may demonstrate less sophistication and a less suitable response to a particular activity. Several learners, for example, when asked about how they discovered the meaning of an unknown word in a text, said that they would immediately look up the word in a bilingual dictionary or limited their investigation of context to one or two words immediately adjacent to the target word. (1988: 168)

Vann and Abraham, who used both "think-aloud" techniques (1990: 180) and examination of learners' products on various tasks, found, like Porte, that "unsuccessful learners used many of the same strategies as the successful learners" (182-3). On the only task they describe which is of relevance to the present study – a cloze (which of course involves production as well as comprehension) – their two unsuccessful learners used radically different strategies. One either repeated a word she had found earlier in the passage or looked "for words that were compatible with the words or phrases immediately surrounding the blank." (186). The other "..... was very much concerned with trying to get the gist of the passage" (187).

Studies by Hosenfeld (1984) and Cooper (1984) have also attempted to identify the differences between unsuccessful and successful readers of English as a foreign language. Cooper's conclusions, based on "discussion questionnaires, interviews, studies of past examination results, and observations of teaching and learning" (1984: 124) were that "unpractised readers" (those whose previous education had been conducted in their first language, not in English) showed a range of attitudinal and strategic deficiencies. Firstly, they were poorly motivated to improve English. Secondly, they were used to a classroom situation in which the teacher was the authority, and thus conditioned to a dependent role. Thirdly, they "showed excessive veneration for each word," neglecting "the importance of developing the ability to use the wider context to interpret what one does not know" (1984: 124).

Cooper writes:

Unpractised readers showed a tendency to use previous knowledge that was irrelevant to the context Moreover, they were influenced by the power of known collocations regardless of the meaning carried by the larger context (128).

..... unpractised readers were so preoccupied with the unknown word and its immediate context that they were blinded to the meaning potential of the whole context offered (128).

Hosenfeld, who used "think aloud" techniques, describes successful readers thus:

High scorers (called successful readers) tended to: keep the meaning of the passage in mind, read in broad phrases, skip inessential words, guess from context the meaning of unknown words and have a good self-concept as a reader. By contrast, low scorers (called unsuccessful readers) tended to: lose the meaning of sentences as soon as they decoded them, read word by word or in short phrases, rarely skip words, turn to the glossary for the meaning of new words, and have a poor self-concept as a reader (1984: 233). Among other things, "successful readers" also tended to: identify the grammatical category of words; use the glossary as a last resortand use their knowledge of the world.

AIM OF THE PRESENT STUDY

This was to build on these findings by comparing the strategies used for coming to an understanding of unknown words in reading passages, by "successful readers", those who were "averagely successful" and "unsuccessful" readers.

Study reading is a vital part of any university course. Cooper (1984: 122) writes: "In principle, reading is important at the university level where the system normally places a high premium on the students' ability to extend their knowledge independently of their teachers." Yet those who have to do this reading in a second or foreign language face a huge additional burden. Here is a chemistry lecturer at Sultan Qaboos University, Sultanate of Oman, describing the problems his Omani students had with reading (compare Cooper's conclusions about the attitudes of "unpractised readers", given above):

If it had been in your country or in my country you could rely on the students, and say: "Well, go home and read these examplesBut a major problem here is that they are not able to read at a decent speedI think they get discouraged if we give them reading to do.All of them could read a passage, but it took a long time. But after that they still had not the slightest idea of the meaning...

They rely very much on us. They don't rely on themselves at all. This may not be all their fault. Certainly they're not taught to do anything for themselves in school.

It is a commonly accepted theory that in reading in either a first or second language one should not be held up by the individual words one does not know. Wallace, for example, writes:

Someone reading a historical novel set in the nineteenth century and coming across a reference to "the aristocrats riding along the country roads in their magnificent broughams, barouches and clarences" will probably guess that these are all names of horse-drawn carriages of some kind, and be content with thatIt is unlikely that knowing the precise differences between these old-fashioned carriages would add anything to the reader's understanding or enjoyment of the story.

(1982: 33)

It is an important aim in any EFL reading programme to train students to go for the overall meaning of the article or bookand notbe put off or distracted by individual words that they don't know.

.....word decoding is something we want to discourage.

(41-2)

However, when reading scientific texts for academic study, it is often the case that one cannot understand the text at all, at even the most basic level, without an understanding of a few basic words. A precision of understanding is required in science which often makes an ignorance of individual words of vital consequence. When it happens that one does not understand a word which could be important, what does one do ?

Wallace lists four things the teacher can do: to explain the meaning in simpler English, to ignore the word, to get students to look the word up in their dictionaries or to "try to get the meaning from the class, and if they don't know it already, to try to get them to guess or *infer* the meaning" (1982: 42). Language teachers at Sultan Qaboos University regarded teaching the understanding of unknown vocabulary as a vital part of their teaching. Given that the students were certain to meet unknown words in their study reading, and that they simply did not have time to look up all these words in the dictionary, what were they taught to do ? Here are two language teachers at SQU talking:

Teacher A:

..... something like vocabulary in context is a skill which has to be taught, and isn't just acquiredFirst, deciding which words need to be understoodwhich implies that you have to realize that not every word is important. Secondly, what you do about that word which is unfamiliar, the various strategies which you can use to work out the meaning. I would say that's one of the key skillsLook at the word for roots, breaking it down to see if there's anything they recognize – maybe a prefix or a suffix or a root they recognize. Another strategy is to look at the whole context of a sentence and decide whether there are probably going to be positive or negative connotations. Look at the word and decide what part of speech it is

Teacher B

The skills that we can definitely teach – there's understanding vocabulary in context, for example. In the first year we give them word lists to use. In the second year we try to move away from that and teach the students to use context skills. We give them a set of about five strategies to use. The first one is to identify the word class or word group – the part of speech. It doesn't necessarily help you get the meaning, but if you know, for example, that the word you want is a noun, and the meaning you've got is not a noun, then you know you've got the wrong word. Then there's using the immediate context, and then the wider context. Then we also tell them to use their – world knowledgeWe don't actually discourage them from using dictionaries, but I think these students are not used to using dictionaries, and we exploit that inability. Otherwise we might have to tell them not to bring their dictionaries to class. We have two sets of vocabulary – one that can be guessed easily from the context and one that cannot, and we treat them separately. In the case of the second we usually just supply a meaning.

SUBJECTS

The subjects were second year students of chemistry at Sultan Qaboos University, Sultanate of Oman, to whom the present researcher was teaching English for science five hours a week. The researcher had two classes of such students, a total of thirty nine students, all of whom completed the various tests and answered the questionnaires.

Whether or not a reader was "successful" was judged by a) the researcher's knowledge of the students, as their class teacher over a period of six months, b) their marks in the first year's reading exams at the university, and c) their marks on the various reading tests the researcher gave them.

METHOD

A. Questionnaires

Over a five month period, students were given questionnaires concerned with reading in a foreign language. Only some of the questions asked were relevant to the present study, and these are listed below:

- 1) It was hypothesised that the strategies students were using now would partly be reflections of how they were taught reading earlier, both at school and during the first year of the university, so students were first asked about their earlier student careers: how they were taught reading, their opinion of this teaching, and what they thought they had actually learnt.

- 2) Students were asked why they were learning English. This was in response to the argument put forward by, among others, Vann and Abraham, that interest and engagement are important factors in determining success or lack of it in a learner.
- 3) Students were asked to rate their reading abilities and compare them with their abilities at other skills (writing, speaking, listening). This was in response to the finding by Hosenfeld that successful readers had a good self-concept as readers.
- 4) Students were asked "What do you do when you come to passages of reading that you do not understand?" This self-report needs to be treated with some caution, for the reasons hinted at by Porte above, i.e. that students may want to please teachers by mentioning strategies that they approve of, and hide strategies which they may feel teachers will disapprove of.
- 5) Students were asked what their main difficulties were in reading in a foreign language.
- 6) Students were asked whether they thought that reading in a foreign language was something that could be taught. This gives an idea of their receptivity towards being taught reading.

These questions were not all asked at once. Students were given two to four questions at a time over a period of five months, and given several days in which to think over these questions. They were encouraged to write as fully as possible. By the time that the first questions were given, the students had been taught by the researcher for several months, and considerable rapport had been established.

Woods (1986) discussing the role of questionnaires in ethnographic work, mentions the need for "rapport, unobtrusiveness, naturalness, and the need for crosschecking" and notes that, as used by ethnographers "..... questionnaires are just one method in a package" (115). Questionnaires were used here only as a preliminary to the main part of the study – the examination of how students actually dealt with unknown words. The advantages methods such as questionnaires and written exercises, as used in this study, have over interviews and the "thinking aloud" approach used by Hosenfeld and others are in the greater amount of time to think and formulate an answer in a foreign language, the greater privacy the students have in their thinking, the considerably greater ease of collecting information, and the perhaps intimidating nature of an interview for students.

B. Tests

Throughout this same period, students were given six tests which examined the ways they dealt with unknown words when reading in a foreign language. These

are described in order below. All the tests used scientific texts of 400-500 words, from textbooks written for native speakers or from periodicals such as "Time."

1 **'Radon'**: In this reading the words to be explained were underlined. The students were asked to write what they thought the word meant, and told that they must also describe why and how they came to such an understanding. There was no time pressure, as students had an entire double lesson (100 minutes) to finish, if they needed this amount of time.

2 and 3 **'The chemistry of coal'** and **'Acid rain'**: These were gap filling exercises. The same procedure was followed as in the first test. Whereas in the first passage students were able to use the appearance of the word, here there was no word. The test thus became a slightly different one. Students could only rely on the surrounding context to gain an understanding.

4 and 5 **'Cooking'** and **'Synthetic Polymers'**: In these passages the word was deleted and a nonsense word supplied. The nonsense words supplied were deliberately chosen to create a conflict. For example, a word would be given a typical adverbial ending (-ly), where an adverb was impossible; or a word similar to a very common and familiar word would be supplied, where the familiar word would create nonsense of the passage.

The researcher could then see what happened where students had to choose between grammar and sense, or familiarity and sense: would they let the context of the whole passage dictate their answer or would they let their grammatical knowledge, for example, take them outside the sense of the passage?

Of course, a conflict can only be created where the students are aware of the alternatives. For this reason, the passages chosen were fairly easy, and the "distracting information" given was of a kind that the researcher knew the class had covered in its first year at SQU.

6 **'Acid rain'**: The same passage as had been given as a gap-filling exercise was given again six weeks later, but this time nonsense words were supplied. Again, these words were deliberately designed to distract the students from the contextual clues. The researcher was able to compare the answers and reasons given six weeks before, with the present answers and reasons, and see whether students had changed their answers in the light of the nonsense word. In other words, this showed which was a stronger clue to them: the sense and context, or the appearance of the word. The formats of the different tests are summarised in Table 1.

When giving out all these passages, the researcher stressed that he was most interested in the *reasons* students gave for choosing a particular meaning, and was not interested in the meaning without a reason. When all passages and questionnaires had been completed, he was able to complete a profile for each student showing the kinds of strategy for dealing with unknown words each possessed

Table 1: Test Formats

No:	Title(s)	Format	Comments
1	Radon	underlining	
2	The Chemistry of coal	gap-filling	
3	Acid rain	gap-filling	
4	Cooking	nonsense words	
5	Synthetic Polymers	nonsense words	
6	Acid Rain	nonsense words	Same text as in 3, taken 6 weeks later

CASE STUDIES

We now continue with a detailed look at three students – one from the top of the range, one from the middle, and one from the bottom, and how they dealt with the reading passages. From this we shall be able to note any differences in the strategies used by “successful” and “unsuccessful” readers.

SHAMSA

On the first year’s reading exams Shamsa had a mark of 79%, well above the average of 67%. She wrote of the teaching of reading she received in secondary school:

We had reading books, but usually our teachers used to read, or we used to read it to ourselves silently. If the reading was followed by some questions, they used to tell us that we don’t need to know every single word. We had questions, grammar exercises on the reading, and sometimes questions about what the pronouns referred to. I do not think I learnt much. The main thing, I think, was how to find answers to the questions and to know what was the reading about.

She wrote this of the teaching of reading during the first year of the university:

The main thing that we were taught was to know the main points and ideas in the readings, and also we did not have to understand every word in the reading, and that shouldn’t stop us from going on.

Shamsa was very interested in learning English. She wrote:

I’ve been interest (sic) in English since I was a child. Maybe because I had to speak English with my cousin, who couldn’t speak any other language except English because she was born in Canada and lived there all her childhood.

However, she had a poor self-concept as a reader, listing reading as her weakest skill, after speaking, listening and writing (in that order). She wrote:

My weakest skill is reading. I can read, but sometimes I find it difficult to pronounce some words, and also confusing because some words may look the same but pronounced differently.

Notice the connection she makes between the spoken language (pronouncing words) and reading. She continued in this vein when answering the question as to whether reading in a second language could be taught:

Yes, by selecting books of good literary value, and reading them loud with the students in the classroom, explaining their literary values, meaning, language, construction, etc.

She had done little reading, in Arabic or English, outside her university courses in the past three months, because of lack of time. This is what Shamsa said she did when she came to passages of reading which she did not understand:

- I try to read it several times.*
- Underline the words that I don’t understand and I think that it is very important*
- If I have a dictionary I find the meaning. If not I try to guess the meaning from the context.*
- I try to find and understand the main idea or ideas.*
- We could also find the meaning by the suffixes and prefixes.*

We have here a picture of a person who is motivated, interested in the subject, receptive to teaching, aware of her own weaknesses as a reader, and who can articulate some strategies that she uses in English for dealing with unknown words (although she remembers very clearly that her teachers both at secondary school and the university told her that the “general sense” was more important than individual words). Let us see how she dealt with the unknown words in the passages.

1 “Radon”

Shamsa knew several of the words, and used syntactic information and information from the word itself to arrive at a meaning for the unknown words:

Test “Many Europeans remain sceptical to or unaware of the danger of long-term exposure to the colourless and odourless gas.”

Ans. sceptical: “unaware,” from “or” in the paragraph.
exposure: “to come in contact from the outside,” from “ex” meaning “out.”

However, reliance on the look of the word led her to make false connections in several cases:

Test “Survey results released in September showed enough contamination throughout the U.S. to justify testing in every home.

Ans. contamination: from “contain,” to have within.

Here the researcher has to speculate. Perhaps Shamsa saw the words ‘in every home’ as a pointer towards ‘contain.’ At any rate, the sentence still has meaning in the way Shamsa interprets it.

Test “Health officials noted that workers at the spas were in considerable danger because of continuous exposure to the gas.”

Ans. spas: “outside, outdoors,” from “space.”

Again, ‘outside’ is not an impossible meaning.

2 “The chemistry of coal” (gap-filling)

Shamsa got eight out of the ten words here exactly right, and for the other two gaps she produced words which were possible alternatives within the context. In coming to these answers she used her knowledge of chemistry, and grammatical, syntactic and semantic knowledge (she could not use ‘etymological’ knowledge, from the appearance of the word, as the word was missing). Examples are given below (the correct word is in brackets after the gap):

Test “There is great variation in the composition of coal from different deposits and even within a given deposit. This makes it _____ (difficult) to develop general procedures for processing raw coal.”

Ans. difficult: from the meaning – it would be difficult to develop general procedures from the variation in the composition.

Test “While the composition of coal is highly variable, it is mostly carbon, although large amounts of oxygen and hydrogen are also present. Coal has a _____ (relatively) small nitrogen content.”

Ans. very: because there must be an adverb describing the small nitrogen content, since there is “a” before the gap. The sentence before also compares the large amount and the small amount, and from that it seems that the amount of nitrogen is very small.

Test “As the bacteria living in the water _____ (consumed) the sulphate, which served as a source of oxygen for them, the sulphur that remained was deposited in the sediment and became trapped in the coal.”

Ans. took in or consumed: it must be “took in” since the sulphate serves as a source of oxygen for the bacteria, so the bacteria consume it, and also there is no verb in that sentence.

Here Shamsa uses her knowledge of science (bacteria consume oxygen) and grammatical knowledge (the sentence has no verb), as she does also in the example below:

Test “However, the main pollutants are the nitrogen and sulphur oxides that are thought to be the main _____ (causes) of acid rain.”

Ans. causes: there must be a noun after “main,” the adjective, and from my knowledge acid rain is resulted from sulphur oxides.

From the two passages examined so far, it seems that Shamsa does as well when the word is missing – in other words, when she is forced to rely on the context.

3 “Acid rain” (gap-filling)

Shamsa again used all the strategies mentioned above to get all the words either exactly right or acceptable alternatives. Examples are:

Test “The shale also has a high carbon content which means that it burns _____.”

Ans. easily: anything which contains carbon when exposed to heat burns quite fast. So we need an adverb to describe the burn.

Here she uses her scientific and grammatical knowledge.

Test “With rainfall in the Smoking Hills of pH two – 100 times _____ (more) acidic than rainfall in areas of industrial pollution – the lakes and land should be dead. _____ (However), life on land and in the water seems to flourish in the region.”

Ans. more: because the sentence is in the comparative form “than.”
however: because from the sentence it is written that life should be dead but then in the next sentence it is written that life seems to flourish. These two sentences make a contradiction, that’s why I used “however.”

Here she used semantic, grammatical and syntactic knowledge.

4 “Cooking” (nonsense words)

The answers Shamsa gave to this passage show clearly how consideration of the appearance of the word could interfere with her very good sense of meaning when using the context and world knowledge alone. We start with two examples where she does consider the context and her world knowledge in her explanations (the word which has been replaced by a nonsense word is given in brackets after it):

Test “The linear chain is then folded to give a library (complex) but very specific three dimensional structureWhen heated, the three-dimensional structure of a protein becomes more random.....”

Ans. library: complex: because usually when something, or a chain, to be more specific, is folded and cross-linked, it becomes a very complex structure, especially that it is in three dimensions and in random form.

Here she has used only the context and her knowledge of the world.

Test "Cooking is used to garify (modify) molecules and thereby make them easier to digest."

Ans. garify: to decompose = change it into simpler form, because if something is easier to digest it has to be in a simple form.

In the next example she is distracted by the form of the word:

Test ".....it is much easier for the digestive enzymes which break down the chains to function. Part of the work has already been steepated (done)."

Ans. steepated: to become very easy = in a steep form or way, from the word "steep." A step further because the digestion process goes in steps and from the sentence it means that one step is done.

Here the false etymology has led into realms of fancy, grafted onto the context, but her final words show that she has understood the context. In the next two examples, the form of the word has distracted her away from the context in her explanation, and she gets them both wrong, in a way which her knowledge of chemistry and world knowledge could have enabled her to avoid:

Test "The protein molecules react with oxygen, leaving a hydous (sooty) deposit of carbon and other molecules rich in carbons."

Ans. hydous: from hydro- meaning "water."

Test "A less extreme if slower form of cooking is boiling food in extemps (water)."

Ans. extemps: ext- meaning "out," so all together meaning the result coming out.

5 "Synthetic polymers" (nonsense words)

Here again Shamsa found the forms of the word interfering with the consideration of context and world knowledge which had served her well in the second and third passages:

Test "Polymers like bakelite are lessed (called) thermosetting plastics."

Ans. lessed: from the word "less," to make much more smaller.

Test "Thermosetting plastics, once formed, cannot be melted and remoulded. Indeed, if they are intered (heated) to high temperatures, they decompose ..."

Ans. intered: encountered, put in – from "inter," which means "inside."

For other words, Shamsa uses the context, syntactic and grammatical knowledge and her world knowledge to arrive at a correct meaning. Is this when she cannot obtain any "help" from the form of the word? It is impossible to tell in which order she uses the strategies.

Test "The first synthetic or macrate (man-made) polymer was produced in the USA in 1907"

Ans. macrate: synthetic, because in the sentence there is "or," that means synthetic and macrate have the same meaning.

Test "The small gaseous ethylene molecule can be induced to take part in a chain reaction,until the resultant macromolecule is so big that it therms (forms) a white solid."

Ans. therms: forms, gives: because the result of a reaction usually forms something.

6 "Acid rain"

This was a repeat of the gap-filling exercise given six weeks before, but this time the gaps were filled with nonsense words. A comparison of the two thus gives direct evidence of the strength for each student of the competing cues, and what happens when there is a conflict between them. Shamsa's answers on this were on the whole less clear and cogently argued, even where she got the answer correct, than when she had only the context, and no word, to rely on:

Test "When the shale gets wet, the sulphur inside it transides (combines) with water and oxygen in a chemical reaction."

Ans. transides: trans- – to move across. Transides means to move about and react. Because the mixing of chemicals usually results in a reaction.

Here the word, with its apparently familiar prefix "trans-", has clearly distracted, when one compares the clarity and brevity of the answer given in the gap-filling exercise:

Ans. reacts: because sulphur, water and oxygen produce a chemical reaction.

In the example below Shamsa misses the contrast which she caught in the earlier passage:

Test "With rainfall in the Smoking Hills of pH two – 100 times more acidic than rainfall in areas of industrial pollution the lakes and land should be dead. Predilly (however), life on land and in the water seems to flourish in the region."

Ans. predilly: apparently: because it seems.

Compare the perfectly correct answer in the earlier passage.

Ans. however: because from the sentence it is written that life should be dead but then in the next sentence it is written that life seems to flourish. These two sentences make a contradiction, that's why I used 'however'.

On other occasions Shamsa arrives, by use of the context and her knowledge of science, at correct answers:

Test "The shale also has a high carbon content, which means that it burns revanly (easily)."

Ans. revanly: easily, because carbon helps in the process of combustion.

Test "Metals such as iron, aluminium and magnesium, which are normally bound to soil particles, become liberated in highly acidic soil. When taken up through the topling (roots), they interfere with the metabolism of plants."

Ans. topling: roots of plants, because plants take up materials from the soil through their roots.

To sum up, we see in Shamsa a student who is sensitive to all clues in the text: she uses grammatical, syntactic and semantic knowledge, her knowledge of science and the world, and her knowledge of the forms of words, and shows exactly the signs one would expect when a situation of conflict is produced for someone who is aware of the conflicting signs: she exhibits confusion. Her weakness, shown even in the first passage, where actual, not nonsense words were given, was in being distracted by the appearance of the word, and not bothering to consider the context if she thought the word had a familiar look. It is interesting that she did better when the word was missing – i.e. when forced to consider the context alone – than when the word was present.

KARIMA

Karima's mark on the first year's reading exams was 64%, slightly below the average mark of 67%.

Of the teaching of reading in her secondary school, she wrote (her spelling has been corrected, for the sake of comprehensibility):

We taught reading in secondary school by the teacher gave us chance to read the passage with ourselves and then read it with the teacher, then we discussed the questions together. We taught also stories, and the teacher gave us the questions about it. The exercises we had were questions about the passage, pronouns and what it referred to, and ordered the sentences. I learnt first how to read the answers from the passage, I understood the pronouns and knew I can read the passages alone.

Of the reading teaching in the first year of the university she wrote:

We taught last year about how to use the dictionary, vocabulariesand some grammar, part of speech and so on. The exercises we had which about the dictionary were the meaning of some words and the part of speech of it I learnt from these now I can use the dictionary, I know the part of speechand now I can understand most of the words I meet.

She had good motivation to learn English, and apparently strong interest, listing several reasons for studying it:

- 1 *English is the language of modern.*
- 2 *All the researches are written by English.*
- 3 *All the science discoveries are written by English.*
- 4 *If we travel to the English countries we can understand what they are speaking about.*

She rated her reading abilities quite highly:

I am best in writing, reading and speaking, because writing is about rules, and we make the sentence as the rules. Reading, because we read the passage and understand it and answer the questions. I don't prefer it because it take from me a long time. I am worst in listening, because perhaps I don't hear.

Her reading over the past three months had been only in Arabic: a book of Islamic advice, a book on organic chemistry, and a book on computers.

She had definite ideas about how reading in a foreign language should be taught, and a positive attitude to such teaching:

Yes, it can be taught by make every one in the class read a paragraph from the passage loudly. Learn us exactly rules to find the part of speech and the punctuation. It can also be taught by teach us how to guess the meaning of the words and how to spell correctly.

This is how she wrote that she dealt with passages of reading she did not understand:

- 1 *I read the passage by the first paragraph and pick up the meaning of the difficult words and make same thing to the other paragraphs.*
- 2 *I should ask my teacher about the difficult words and read the paragraphs slowly.*
- 3 *In exam when I find the difficult passage it takes from me a long time to understand that passage, then I try to understand the difficult and new words from the sentences before and after it.*

Her main difficulties in reading in English were:

The new words which in our reading are very difficult. We can't distinguish between the parts of speeches. We can't spell the words correctly.

Very apparent is Karima's longing for clear rules to aid her understanding. We have a picture (not least from the way she expresses herself) of a student who is keenly motivated and receptive, but to some extent still struggling with English. She remembers quite clearly some of the techniques she has been taught for dealing with passages she cannot understand (finding the part of speech, using the adjacent sentences). Let us now see how she actually dealt with the unknown words in the passages.

1 "Radon" (words underlined)

Karima uses a wide range of techniques to deal with the unknown words, and gets them mostly right. She shows no hesitation in risking intelligent guesses based on the meaning of the words around, even where she has clearly understood very few of those words:

Test "Survey results released in September showed enough contamination throughout the U.S. to justify testing in every home."

Ans. contamination: investigation or researches, because he say "testing in every home."

Test "Officials in Britain and West Germany say they are having trouble persuading residents of the danger presented by the gas."

Ans. residents: causes the problem, because he say "trouble persuading."

Test ".....exposure to the gas will help cure rheumatism and other ailments."

Ans. cure: a disease, because it follows by a disease.

Her guesses based on the words around were more frequently correct than wrong even when the reasoning on which the guesses was based was faulty:

Test ".....it is found in all soil and rock in at least trace amounts."

Ans. trace: it means little (small) amount, because he say before it "at least" which is used for small thing.

Test "U.S. health officials say radon exposure is second only to smoking"

Ans. officials: who's responsible in the health to kill and fight the disease, because it follows by "say"

(presumably she understands that officials are people, because of "say").

She also uses syntactic clues:

Test "Many Europeans remain sceptical about or unaware of the danger"

Ans. sceptical: they don't take their attention to the disease. I know this because the word "unaware."

(she has seen that "sceptical", joined to "unaware" by "or", is in some way equivalent to it).

She uses prefixes and suffixes twice, but in one case this leads her to produce nonsense:

Test ".....unaware of the danger of long-term exposure to the gas"

Ans. exposure: the out shape, because the prefix "ex" means "out."

2 "The chemistry of coal" (gap-filling)

Karima used contextual clues and knowledge of the world skilfully, on the whole; her failings came in applying the right part of speech in the context, a failing which is productive and may have little to do with her actual comprehension.

In the following examples she has merely got her grammar wrong, while supplying a possibly correct word:

Test ".....some coalcontains more than 10 times this much sulphur. This ____ (high) sulphur content is thought to be the result of bacterial action."

Ans. much: because the sentence before it said same thing

Test "In the combustion reaction carbon and hydrogen are _____ (converted) to carbon dioxide and water."

Ans. produce: because two things are combine and something will produce.

(even the weaker students get almost all answers right when the subject matter is purely chemistry)

In the following example, one can see her understanding of the context, even though the final answer is wrong:

Test "Initially, the heat causes a breakdown of the coal structure leaving behind an almost pure carbon substance."

Ans. small: because after burning there are small things or substance.

However, in the examples below, Karima seems have grasped at any word which is vaguely connected with those that occur:

Test “Coal has a relatively small nitrogen content.”

Ans. molecular: because he said after it name of element.

Test “As the bacteria that remained in the water consumed the sulphate the sulphur that remained was deposited in the sediment and became trapped in the coal.”

Ans. contain: because after this word it said something inside.

3 “Acid rain” (gap-filling)

Karima uses her world knowledge, the immediate context, and attempts to use grammar, although it is used incorrectly. Here, the grammar is no help at all:

Test “What are the long-term _____ (ef fects) of acid rain?”

Ans. consists of, or used: because the sentence want a verb.

The sentence does not want a verb: elementary grammar would tell her that a noun is needed here.

In the example below she uses only her world knowledge:

Test “Metals such as ironbecome liberated in highly acidic soil. When taken up through the _____ (roots), they interfere with the metabolism of plants.”

Ans. soil: because the plant take the material from the soil.

In the example below she is using the immediate context:

Test “The creatures _____ (settled) in sediment tha t was rich in sulphur.”

Ans. found: because the word after it is a place.

In the example below she looks outside the immediate sentence, but misunderstands the relationship between the sentence before and the sentence containing the unknown word:

Test “With rainfall in the Smoking Hills area of pH two – 100 times more acidic than rainfall in areas of industrial pollution – the lakes and land should be dead. _____ (However), life on land and in the water seems to flourish in this region.”

Ans. therefore: because the result of the previous sentence is explain in this sentence.

In this passage, Karima has made attempts at using other strategies – looking outside the immediate sentence, and using her knowledge of grammar – but she has not been successful in this.

4 “Cooking” (nonsense words)

Karima was again strong on her use of context and world knowledge, and got all answers correct, except for two, for which she used as clues the form of the word, producing an answer which went directly against the sense:

Test “One of the simplest forms of cooking is barbecuing, in which the meat is heated directly by a frize (flame).”

Ans. frize: be frozen or absorb – because it absorb the meat.

Test “On the outside of the meat, which is hottest, burning occurs: the protein molecules react with oxygen, leaving a hydous (sooty) deposit of carbon and other molecules rich in carbon.”

Ans. hydous: something has water, because the prefix “hyd-” mean water.

5 “Synthetic polymers” (nonsense words)

In this passage, exactly the same pattern emerges as in the earlier passages. Karima uses the context and her world knowledge well, does not use grammatical clues, and when she uses clues from the form of the word she gets the meaning wrong (as she was intended to in this passage, where the nonsense words contain clues such as prefixes which go against the sense of the context).

The two examples below are correct:

Test “The first synthetic or macrate (man-made) polymer was produced in the U.S.A.”

Ans. macrate: another meaning of synthetic or making, because the writer says “or” (another meaning).

Test “until the resultant macromolecule is so big that the substance therms (forms) a white solid.”

Ans. therms: produces, because the substances produces a white solid.

But in the next example, although she has used the context, her lack of grammatical knowledge has made her choose the wrong part of speech, and she has also been led astray by the look of the word:

Test “The small gaseous ethylene molecule can be induced to take part in a chain endate (reaction), in which the string of added molecules just gets longer and longer”

Ans. endate: it has no limit, because the writer says “the chain gets longer and longer.”

Here she has clearly been influenced by “end-” (it has no limit, it has no end)

In the example below (there are two more of these in this passage), she has let the form of the word induce her to write nonsense.

Test “Upon cooling the result, he exoland a clear, hard, amber-like material”

Ans. exoland: out the land, because the prefix “exo” means “out.”

Finally, in the next example, she has not really considered the context; she has merely found a meaning associated with one of the words she knows in the sentence, and that meaning does not make sense within the sentence as a whole:

Test “Polymers like bakelite are lessed (called) thermosetting plastics.”

Ans. lessed: depend on or covered, because plastics is something which cover with.

6 “**Acid rain**” (with nonsense words instead of gaps)

Karima again uses her world (or scientific) knowledge intelligently several times:

Test “To answer this question scientists would need to find a place where acid rain has been falling for thousands of years. This is very exicient (difficult)”

Ans. exicient: difficult, because it is difficult to find the place where acid rain has been falling.

Test “The shale also has a high carbon content, which means that it burns revanly (easily).”

Ans. revanly: quickly, because carbon atom quick the reaction.

However, on the three occasions where there is a prefix which she recognises, she ignores the context in favour of a meaning based on the (intentionally misleading) prefix, as in:

Test “.....the lakes and land should be dead. Predilly (However), life on land and in the water seems to flourish in the region.”

Ans. predilly: before history, because the prefix “pre-” means before. The writer shows us the life on the land before now.

Karima could have seen that this is wrong from the tense of the verb “seems,” but here again her lack of grammar hinders her.

We have now built up a picture of a learner who, in comparison with Shamsa, is limited in her resources for inferring the meanings of unknown words: she lacks the grammatical strategy, and her more limited vocabulary leads her sometimes to

guess desperately at any words connected with a word she recognises. She is also far more easily led into ignoring the context and creating nonsense because of the form of the word. However, she often uses her world knowledge and a consideration of the context successfully.

HAMAD

Hamad's mark on the first year's reading exams was 43%, well below the average of 67%.

When we come to students of Hamad's low level of proficiency, there is a much greater production problem: is he able to write down his reasons for inferring a particular meaning in comprehensible English? Although a greater effort had to be made on the part of the interpreter, on the whole Hamad did manage to make his reasons comprehensible, however wrong his answer. Hamad wrote of the reading instruction he had obtained in secondary school (his spelling is corrected, because it sometimes makes what he writes nearly incomprehensible):

In the secondary school we have learned reading lessons of different titles. The titles were varied between science and arts. After each lesson, questions were asked to us to answer. The main thing that we learnt is how to obtain the ideas from the lessons.

Of the first year at university, he writes briefly, and not very revealingly:

.....the lessons that we had was all science. From these lessons we get our fundamental information.

His reason for learning English was that “my studies are in English,” and of his skills at English he wrote: “My best is speaking and my worst is reading, because when I'm reading I didn't understand but I can speaking better than reading.”

The main difficulties he had with reading in English were:

I cannot understand many words I meet in the text. I find difficulties in tying the paragraphs and ideas with each other.

He thought reading in a foreign language could be taught “by improving the vocabulary of the students and practising reading, and correct the errors that a student make.”

This is what Hamad said he did when he came to passages he did not understand:

- 1 To understand what is the passage talk about.
- 2 To use the knowledge of the world (things that we already know).
- 3 Use word derivation.
- 4 Use the wider context.

Hamad, then, had a low self-rating as a reader. His motivation for learning English seems to be purely instrumental. Difficulties in reading in English are (as with the others) firstly vocabulary problems, and the teaching of reading in a foreign language will be done partly by tackling that vocabulary problem.

Now let us see how Hamad actually dealt with unknown words in the passages.

1 **“Radon”** (unknown words underlined)

Hamad answered only five of the questions. His strategy in all of them was the same: to write down a meaning connected with the nearest words. Thus:

Test “.....exposure to the odourless and colourless gas”

Ans. colourless: not visible, because “colourless.”

Here he was evidently indicating that he knew that the suffix “less” in colourless meant “without”, and he has more or less guessed correctly.

Test “..... survey results released in September showed enough contamination throughout the U.S. to justify testing in every home.”

Ans. contamination: proof, because he said “showed enough.”

The researcher assumes that Hamad must have come across phrases such as “showed enoughto prove” in his chemistry.

2 **“The chemistry of coal”** (gap-filling)

Hamad got the first question right but he gives no explanation of how. He also got the right sense, again by fastening onto the general sense, in this example:

Test “..... some coalcontains more than 10 times this much sulphur. This ____ (high) sulphur content”

Ans. much: because it said about amount.

The third answer he guessed more or less correctly was this:

Test “In the combustion reaction carbon and hydrogen are _____ (converted) to carbon dioxide and water”

Ans. combined or reacts or formed, because that said about chemical reactions.

When the students are on their home ground of chemistry they all, even the weakest, generally get answers correct, and this will be commented on later. In the next example we see Hamad fastening onto words from chemistry to give him a (wrong) meaning:

Test “However, the main pollutants are the nitrogen and sulphur oxides that are thought to be the main _____ (causes) of acid rain.”

Ans. structure: because he said about elements and if an element combined it give structure of acid.

Here he was trying to force the example onto the familiar ground of chemistry, a tendency which, again, all the students shared. Hamad's other answers were incomprehensible.

3 **“Acid rain”** (gap-filling)

The only answer Hamad got correct was, again, connected with chemistry:

Test “.....the sulphur inside it _____ (combines) with water and oxygen in a chemical reaction.”

Ans. react: because the sentence said about chemical reaction.

4 **“Cooking”** (nonsense words)

Three of the answers here were in the right area:

Test “Cooking is used to garify (modify) molecules and thereby make them easier to digest.”

Ans. garify: to breaking molecules and thereby make them easier.

Test “An estily (essential) component of diet is protein.”

Ans. main: because the main component of diet is protein.

Test “Vegetarians who eat roften (dairy) products get their animal protein from milk or cheese.”

Ans. roften: something eat, because he said “vegetarians who eat”

5 **“Synthetic polymers”** (nonsense words)

Hamad continues using the one or two near and familiar words:

Test “The first synthetic or macrate (man-made) polymer was produced in the U.S.A.”

Ans. macrate: substance, because he said “produced,” and produced mean to make a substance.

Test “The small gaseous ethylene molecule can be induced to take part in a chain endate (reaction)”

Ans. endate: limit, because “end” mean “limit.”

Hamad was not present for the sixth passage.

Hamad is a very weak student, clearly out of his depth at this level of reading, in spite of eleven years learning English in school and one in the university. Only on rare occasions did he get the answers correct. He had no strategy apart from that of looking at the immediate words – never did he show that he had considered the sense beyond the immediate sentence, let alone the immediate paragraph. He never used grammatical or syntactic strategies, and was therefore unable to be misled by them in the passages containing nonsense words. The single other strategy that he used was that of using the suffix in “odourless.”

CONCLUSION

We have examined the work of three of the thirty nine students. A look at the others reveals the same patterns, and leads to the same conclusions:

1 All the students, even the weakest, sometimes made use of their world knowledge, and at least a minimal use of the context surrounding a word.

2 Only the stronger students made use of a context wider than a paragraph, and the weakest students make use only of the immediate sentence, latching desperately onto the words they knew.

3 The stronger the student, the wider the range of strategies used. All the strategies are needed to gain a precise idea of the meaning. Karima’s lack of grammar, for example, severely handicapped her, even where she made sense of the context. The weaker students were more satisfied with vagueness. Perhaps this was due to a lack of the engagement noted as necessary by Vann and Abraham, a lack of desire to grapple with the meaning of the text. It is one thing for Hamad to write that “roften” (a nonsense word replacing the word “dairy”) means “something eat” etc., but Muneera and Salwa show a different level of understanding and engagement in their answers:

Muneera:

roften: adjective: means empty of meat or dry stuff comes from animals, but not their meat. That because they mention after this cheese and milk as roften products, and we know they came from animals, and because they said “vegetarians who do not eat meat”, so they must mean those products come from animals which dried.

Salwa:

roften: it is some kind of food, but not meat, from which the vegetarians get their animal proteins. Because it is an adjective, and because of the word “eat.”

The strongest students, such as Shamsa, made use of context, world knowledge, syntax, grammar, punctuation and the roots of words in inferring meanings. Punctuation was used, for example, to understand the word in the gap in the following sentence, quoted earlier:

_____, life on land and in the water seems to flourish in the region.

Muneera:

however: after this word there is a comma, so “however” connects the sentence with the last one.

Taiba:

subsequently, because here we need adverb before the comma.

From the position of the comma, it is evident that the word to fill the gap could not be an adjective or article, as several students wrote, (for example: ‘the: because we need article before “life”’), since these would not be separated from the noun by a comma.

The weaker students used a smaller context and had no command of grammatical and syntactic strategies. This finding goes against that of Vann and Abraham and Porte, quoted earlier, writing about general learning skills, that weaker students had many of the same strategies, but used them inappropriately. Weaker students lacked strategies.

4 The students were all, again including the weakest, stronger when the subject was chemistry. This was the particular subculture of English with which they were familiar. The attempt to make the unfamiliar approximate to the familiar seems to be the basic strategy used in reading both in a first and second language. Just as Steffensen and Joag-Dev (1984) noted students interpreting and changing culturally unfamiliar stories to fit their own cultural schemata, so here the students frequently tried to fit unfamiliar sentences into the familiar terms of chemistry. Here is an example:

Hana:

Test “.....hundreds of others gather in caves deep underground hoping that exposure to the gas will help cure rheumatism and other ailments.”

Ans. cure: only the element, without anything, because he said “cure rheumatism and other ailments.”

Here Hana has understood “cure rheumatism” as being “pure rheumatism,” in other words, “the element rheumatism not mixed with anything else,” rheumatism being an element (ailment). She ignores the spellings “cure” and “ailment” to produce such a meaning.

Steffensen and Joag-Dev write (1984: 60):

..... reading comprehension is a function of cultural background knowledge..... If they (readers) do not (possess the schemata assumed by the writer), they distort meaning as they attempt to accommodate even explicitly stated propositions to their own pre-existing knowledge structures.

This is what is happening here.

5 The weaker the student, the more likely to go on the "look" of the word, and the more they let this decide the meaning of the unknown word, even when such a meaning flies against the sense of the context. On the other hand, all the students, including the strong ones such as Shamsa, were easily distracted by the "look" of a word from considering the context (this was so even in the first passage, where the actual words, not nonsense words, were given). The appearance of the word can be highly misleading. This calls in question the commonly used strategy of using prefixes, suffixes, and the root of the word as an aid to meaning. So often is there an extension of the basic meaning of the root or affix that this can often be more a hindrance than a help. The present study gives support to Nation's words (1983: 89-90):

Experience has shown that using affixes and roots alone as a means of guessing meanings is not very reliable. Also, once a word has been analysed according to its parts, this guess at its meaning is more likely to result in twisting the interpretation of the context to modify the guess of the meaning.

A final question: what is the use of this kind of exercise to the students? The researcher would argue, with Alderson and Urquhart (1984: 246):

The results of the two case studies convincingly demonstrate the usefulness of developing students' awareness of the strategies they currently use, and of consciously trying to get them to use new strategies.

Some students, the weaker ones, have probably never before been forced to consider how they arrive at meanings, and are now made aware of the fact that there are methods to deal with an otherwise incomprehensible text. They are also, in discussions after all the tests have finished, made aware of the fact that obvious clues can lead up blind alleys, and have the importance of the total context pointed out to them.

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