



The vocabulary knowledge framework.

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INTRODUCTION

One of the most influential papers in the “canon” of writing on vocabulary acquisition is Jack Richards' paper the role of vocabulary teaching (Richards 1976). Although this paper is now more than 20 years old it continues to influence and inform research on vocabulary acquisition – cf. for instance Ellis (1995), Schmitt and Meara (1997) and Schmitt and McCarthy (1997). Richards' paper in effect set an agenda for much of this research, and though the themes it highlighted have been picked up, reordered and restructured by other writers (e.g. af Trampe 1983; Blum-Kulka 1981; Madden 1981; Nation 1990), the basic concerns of this work remain remarkably similar to the ones that Richards catalogued.

Richards' paper is concerned with “what does it mean to know a word?” To be fair, the theoretical issues which lie behind this deceptively simple question are not Richards' main interest. Rather he is concerned to work out how current thinking in linguistic theory might inform classroom practice. In spite of this, Richards' paper has been taken by some authors, including myself, as a sort of characterisation of word knowledge, and some decidedly theoretical research projects have recently grown up with Richards' vocabulary knowledge framework as their foundation.

Richards' himself is very cautious about linking pedagogical practice and research in this way: "... a consideration of recent work in theoretical or applied linguistics does not necessarily lead to discovery of new and exciting ways to teach vocabulary. Rather it provides background information that can help us to determine the status of vocabulary teaching within the syllabus." (p78). This caution has not always been followed by people who have adopted Richards' eight assumptions as a framework for describing vocabulary knowledge.

This paper will first summarise and comment on the eight assumptions that form the main theoretical part of Richards' paper, and I will then go on to show why I don't think these assumptions make a good model of vocabulary knowledge.

Richards' eight assumptions, and some problems they raise.

Richards' article laid out a set of eight assumptions which characterise the relevant theoretical concerns of linguists at the time he was writing. These assumptions are listed below.

1. The native speaker language continues to expand his vocabulary in adulthood, whereas there is comparatively little development of syntax in adult life.
2. Knowing a word means knowing the degree of probability of encountering that word in speech or print. For many words, we also know the sort of words most likely to be found associated with the word.
3. Knowing a word implies knowing the limitations imposed on the use of the word according to variations of function and situation.
4. Knowing a word means knowing the syntactic behaviour associated with that word.
5. Knowing a word entails knowledge of the underlying form of word and the derivatives that can be made from it.

6. Knowing a word entails knowledge of the network of associations between that word and the other words in language (sic.)
7. Knowing a word means knowing the semantic value of the word.
8. Knowing a word means knowing many of the different meanings associated with the word. (p83).

It is easy to see how Richards' eight points arose directly out of research that was current in the mid-1970s. Assumption one derives directly from work on L1 acquisition which was suggesting that children had a largely complete grasp of the syntax of their L1 by about the age of seven (Chomsky 1969). Assumption two links to the beginnings of research on computational analysis of large corpora -- the Kucera and Francis list, for instance, was published in 1967, but work of this sort was beginning to have a significant impact on the way of linguists thought about grammar by the mid-1970s (Kucera and Francis 1967, Sinclair 1991). Significantly, the COBUILD project dates from about this period. Assumption three relates to current work in Register: Richards specifically mentions temporal variation, geographical variation, social variation, social role, field of discourse and mode of discourse, all topics which had recently attracted considerable attention in linguistics. Assumption four is actually less all-embracing in fact than it appears to be in the list above. Here Richards is mainly concerned with a short-lived development in syntactic theory -- case grammar -- which faded shortly after Richards' paper appeared. Interestingly, recent linguistic theory has shown signs of return to grammatical models in which the syntactic properties of words are a more central concern (Hudson 1984). Richards, however, was not aware of these future developments, and seems to be more narrowly concerned with the possibilities of case grammar. Assumption five draws on the work of Chomsky and Halle (1968), and is principally an argument about the underlying regularity of morphological processes in English from a phonological point of view. Assumption six picks up on the work of cognitive psychologists, notably Deese (1965), who had attempted to explain word association behaviour in terms of a few simple relationships between words. Assumption seven reflects two current approaches to descriptions of meaning. The first of these was a series of attempts to describe meaning in terms of fundamental semantic components (Bierwisch 1970). The second was an attempt to describe affective aspects of meaning by means of Osgood's semantic differential technique (Osgood, Suci and Tannenbaum, 1957). Assumption eight, unlike the others, does not appear to be based on any specific research, and clearly reflects what is, from the language teachers point of view, a gap in the research available at the time.

It should be clear from this brief summary, that Richards' paper is not really an attempt to provide a systematic account of what it means to know word. And far less is it an attempt to provide a systematic framework for describing and accounting for this knowledge. Rather, it belongs to that other genre -- an honest attempt to give an account of contemporary linguistic research with inferences and applications to teaching where appropriate. It is significant in this regard that more than half of Richards' paper is concerned with showing how current teaching practice can be justified by reference to the assumptions described earlier. That is, the pedagogical practice is not derived from the research: it is already in place, but justified by the research in an ad hoc way.

Once we realise that Richards' paper was not intended as a complete account of word knowledge in a second language, then number of things fall into place.

Firstly, it explains why the list of assumptions contains these eight items, and conspicuously omits other aspects of word knowledge, which might have been important in other contexts. What we have here is a short review of current themes in linguistics which might be relevant to vocabulary teaching. In fact, the listed topics will be familiar to anybody who has a copy of one of many anthologies of linguistic research which were published around the time the Richards was writing. Lyons (1970), for instance, contains papers that touch on all eight of the assumptions in Richards' list.

Secondly it explains the odd ordering the Richards' assumptions. It always surprised me that assumptions seven and eight -- knowing a word means knowing the semantic value of word, and knowing many of the different meanings associated with it -- should appear so low down the list of assumptions. These two facets of word knowledge seem so crucial that we might have expected them to appear at the head of the list in letters four inches high. In comparison, facets of word knowledge such as assumption two -- knowing whether word is frequent or not -- seem to be much more peripheral.

Thirdly, treating Richards' paper as the review rather than as a formal statement about word knowledge, allows us to explain why the list of assumptions contains a number of obvious gaps. There is nothing in the list which relates in any obvious way to the problem of active versus passive vocabulary, for instance. Nor is there anything in the list which relates to vocabulary growth or to vocabulary attrition. Nor is there anything which relates to the conditions under which words are acquired, and so on. In short with the possible exception of item six -- the word association assumption -- the list is driven exclusively by the concerns of descriptive linguistics, rather than by psycholinguistic or pedagogical concerns.

Finally, seeing the paper as a review allows us to explain Richards' puzzling use of the word *assumptions* to describe his eight statements. If the list of points was really intended as assumptions to be queried and probed, then a research programme might have emerged out of his paper. In fact, the statements are assumptions only in the sense that they form a background for the research reported. None of them is seriously questioned in this paper -- and indeed it is difficult to see how any of them could be seriously objected to, though each of them contains a large number of hidden problems which are the real but covert assumptions at the back of this paper.

By way of an example, let us try to unpack just one of the simple statements in Richards' list, assumptions 6: knowing a word entails knowledge of the network of associations between that word and other words in the language. There are a number of hidden assumptions in this statement:

- a: each word in a language enters into a network of associations with other words in the language;
- b: the resulting network is broadly similar for all speakers of a language;
- c: it is possible for us to specify what this network is;
- d: a speaker of the language "knows" the network (the use of *know* is problematical here);
- e: the network is fixed and stable;
- f: the network of associations is a primary feature of a lexicon -- rather than a secondary phenomenon which derives from some other, deeper structural property;
- g: bilingual lexicons are not significantly different from the lexicons of monolingual speakers.

And so on. It is clear from the short account, that assumption six is not nearly as straightforward as it looks at first glance. A close look reveals a great deal of uncertainty, even muddle, in it, suggesting that the way lexicons were being thought about in this paper was very far from a coherent theoretical framework.

Although Richards was quite explicit about the pedagogical emphasis on his paper, this has not stopped other people from developing his ideas into a "word knowledge framework" -- an attempt to characterise all the information that a fluent speaker might need to know about a word. This seems to me to be a rather unfortunate development. My reason for reaching this conclusion is the Richards' model of word knowledge strikes me now as a peculiarly word-centred one. At first sight, a word-centred model of lexical knowledge might not seem to be a bad thing. Obviously, one might argue,

learners acquire a great deal of knowledge about individual words, and this knowledge needs to be codified and catalogued if we are to give a proper account of what it is the learners learn when they develop a competent L2 lexicon. With the benefit of experience, this plausible argument strikes me as wrong. And worse than that, it is wrong in a way which forces into what can only be described as a research cul-de-sac.

The logic of using Richards' statement as a framework is that it forces us to look more and more closely at knowledge of individual words. For instance, the framework immediately turns a simple question like "Does X know FISH?" into a much more complex set of questions. Using the word knowledge framework, we can rephrase our original question as:

- Does X know the probability of encountering FISH in print?
- Does X know the probability of encountering FISH in speech?
- Does X know the limitations on the use of FISH?
- Does X know the syntactic behaviour associated with FISH?
- Does X know the derivations of FISH?
- Does X know the network of associations linked to FISH?
- Does X know the semantic value of FISH?
- Does X know the different meanings of FISH?

I suppose that in an extreme case it might be possible to devise a set of tests which could provide appropriate answers to these questions. Note, though, that if we are dealing with a word which has many different meanings, then the number of basic questions gets very large very quickly. FISH, for example, has at least four different meanings: the living animal, the flesh of the animal, the verb *to fish*, a children's card game, and so on. There is also a range of metaphorical extensions of these basic meanings, *fishing for compliments*, for instance or *fishing for personal information* on the Internet. Add to this the derivatives of FISH such as *fishing*, *fisbery*, *fisherman*, and so on, and the task of describing what it means "to know FISH" rapidly becomes an impossible one. Testing all of these various aspects of word knowledge would require is to develop and administer a battery of 40 or 50 tests, just to describe knowledge of a single vocabulary item. This is clearly out of the question for most practical purposes. However, even if we could devise a battery of tests of this sort, we would inevitably find that many L1 speakers and an even larger number of L2 speakers failed on some parts of the test battery -- partial knowledge of words seems to the norm in L1 as well as in L2.

These problems clearly make things very difficult for the framework approach. If we extend the framework approach to a vocabulary of any size, say 1000 words, then the sheer size of the measurement task makes the approach unworkable in real-life situations. If we work with smaller target vocabularies, then it is difficult to produce generalisations about lexical competence in general. In any case, the fact that speakers will typically not know all that there is to know about a word means that the framework approach ends up by disappearing up its own assumptions, as it were: it is difficult to see how it can avoid making more and more detailed statements about fewer and fewer words.

Some alternatives to the word knowledge framework

Is there a way out of this impasse? I think there are two main alternatives to the vocabulary knowledge framework.

The first alternative is to abandon the attempt to describe knowledge of individual words altogether. This rather drastic solution was one which I advocated in Meara 1996. I suggested there that the task of specifying everything that learners know about the contents of their L2 lexicons was intrinsically impossible, but it might be possible to simplify the problem. Instead of looking at individual words, it

might be possible to look at the properties of a lexicon as a whole. Obviously, in practice, this would have to be done by testing individual words, but it might be possible to reduce what needed to be tested to a small number of significant dimensions. Meara 1996b suggested that three dimensions might be enough to give a rich categorisation of learners' lexical competence. We would need to be able to specify how big the learners' lexicons are; we would need to be able to specify how automatically the items in a lexicon could be accessed; and we would need to find a simple measure of how rich a lexical structure linked the words in the lexicon. So far only the first of these dimensions has been studied in any depth (Meara 1994; Nation 1990; Goulden, Nation and Read 1990). Some preliminary work on lexical structure has been published (Read 1993; Vives Boix 1995), and some very exploratory work on automaticity is also beginning to appear (Segalowitz, Watson and Segalowitz 1995; Meara 1996), but a great deal of work on practical models and lexical competence still remains to be carried out.

The second alternative to Richards' framework is one which has been hinted at many times in the research literature, but never really developed. Unlike the dimensions approach outlined above, this approach is word-centred, rather than learner-centred, but it does not attempt to describe or account for the detailed linguistic properties of words. Rather, it attempts to identify a number of stages through which all words pass on their way to being fully integrated into a speaker's lexicon. Models of this sort are often implicit in work on second language lexical acquisition, but they are not often fully elaborated. Where they are elaborated, the underlying metaphor is usually some sort of continuum. A typical example of this sort of model is to be found in Palmberg (1987). In this paper, Palmberg developed a rather complex metaphor about vocabulary learning as a hill which can increase in both height and area, and then wonders:

“Qualitatively, we may study first, how far individual words move along the continuum, and how fast they move as far as they go. To put it differently, are there transitional stages of learning through which learned words pass, and if so are these stages identifiable...? Assuming that such stages do exist... are there any clear thresholds of the type active threshold and passive... that words must cross before they can be considered to be properly learned...? Do all words, given time, pass from recognition knowledge to active production, or do some words remain forever passive...? Do words become fully integrated into the learner's mental lexicon only gradually...or can they jump straight into active production from having been heard and correctly understood by the learner for the very first time...? If so under what conditions is this possible?” p203.

Although the continuum idea is a plausible one at first sight, it turns out to be much less satisfactory when examined closely. The main problem with it is that a continuum by definition implies at least one dimension which varies continuously, and it is by no means obvious what this dimension might be in the case of words. Many writers, including Palmberg, talk quite glibly about the passive/active continuum, for instance, but it is very difficult to imagine how a continuum might be an appropriate model for vocabulary. What varies, and how does this variance produce the required effects?

My own feeling is that the transition from passive to active is definitely not a continuum but is a clear candidate for a threshold effect, and it is not difficult to develop plausible theoretical accounts of vocabulary development which make this quite explicit (see for example Meara 1990). Whether there are degrees of passiveness, or degrees of activeness within these two broad states is not at all clear, however. People who have talked most about vocabulary continua have never really developed the idea beyond the very rough metaphor, and typically do not concern themselves with this level of detail.

The idea that words pass through a number of discrete stages seems to be a much more promising one than the continuum idea. Here again, though, little systematic research aimed at identifying these

possible stages has been carried out. The two obvious candidates states -- a passive/receptive state and an active/productive state -- play an important part in the pedagogical discussion about vocabulary teaching, but it is very difficult to find any systematic elaborations involving more complex state models (cf. Waring 1999 for a detailed discussion of this point.)

There are too main exceptions to this claim. The first exception is a series of papers by Wesche and Paribakht (e.g. 1996) which developed the idea of a vocabulary knowledge scale. Wesche and Paribakht identify a scale consisting of five stages of vocabulary knowledge, and they suggest a set a short tests which might characterise where any particular word is positioned on the scale. The five states are defined as statements that learners might make about their knowledge of a particular word, but in the case of the more complex statements, some evidence that the learner's claim is true is required. Wesche and Paribakht's stages are listed below:

1. I don't remember having seen this word before;
2. I have seen is word before but I don't know what it means
3. I have seen is word before and I think it means...
4. I know this word. It means...
5. I can use this word in a sentence e.g....

Although Wesche and Paribakht's scale includes five states, state one simply reflects no knowledge at all about word. This means that the effective scale is only four points.

Like the continuum idea, the Vocabulary Knowledge Scale appears more attractive at first glance than it does under close scrutiny. The main reason for this is that the Vocabulary Knowledge Scale, like the vocabulary knowledge framework we described earlier, is essentially concerned with describing what stages individual words pass through. The level of description here is a lot coarser than was the level of description in the framework model, and this makes the task of describing word knowledge considerably simpler. Only the very basic stages through which a word might pass are described, and no attempt is made to account for more detailed knowledge about a word that develops over time. However, for a vocabulary of any size, describing word knowledge even at this level still remains a formidable task. Wesche and Paribakht's level five, for instance, requires the testee to write a sentence containing the target vocabulary item, and this sentence then has to be rated by a competent assessor. This severely limits the number of words that can be tested on any one occasion. To be fair, Wesche and Paribakht are well aware of these limitations: they argue that the purpose of the Vocabulary Knowledge Scale is not to estimate general vocabulary knowledge, but rather "to capture the initial stages or levels in word learning which are subject to self-report or efficient demonstration, and which are precise enough to reflect gains during a relatively brief instructional period... An extension of the scale might presumably be used to explore (more detailed) aspects of knowledge but if this were done with significant numbers of words, it would greatly reduce its administrative feasibility". p27.

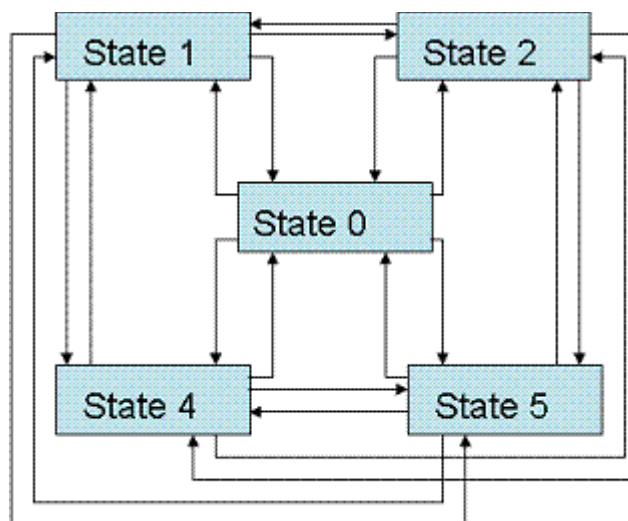
A second problem with the Vocabulary Knowledge Scale arises from the fact that Wesche and Paribakht seem to view the five (or four) states as a progression. A word in state five is reckoned to be more fully integrated than a word at stage three or stage four. There clearly IS some sort of progression between state two and the other states, but the idea of a strict progression between states three, four and five is rather more difficult to substantiate. In fact, there is no reason for us to believe that these descriptors reflect a succession of stages: it is perfectly possible for learners to write sentences their correctly illustrate the use of a particular word, even when they do not know the word's meaning. All they have to do is reproduce the context in which they first met the word, or reproduce a fixed expression which contains it. This suggests that level five does not necessarily follow level four,

or even level three. Similar problems also arise in the description of the earlier levels.

A further problem is that the Vocabulary Knowledge Scale as described by Wesche and Paribakht implies that once a transition from one level to the next has been completed it remains permanent. We all know, of course, that this is not the case in real life. Most of us will have had the experience of looking up a word in a dictionary while reading a foreign language text, and thinking we understand what it means. The transient nature of this knowledge sometimes becomes apparent when we find ourselves looking at self same word again, often only a few minutes after the original look up took place. This suggests that word knowledge may be much more volatile than the continuum or stage models imply, and this in turn suggests that the basic problem with the Vocabulary Knowledge Scale is the idea of a progression through a series of well-defined stages.

What happens if we abandon the idea of a progression, and think instead of a number of states which are functionally independent? Suppose for example, that we take Wesche and Paribakht's five states and set up a model like the one shown in figure one?

Figure 1: a multistate model of vocabulary acquisition



Unknown words start off in State 0.

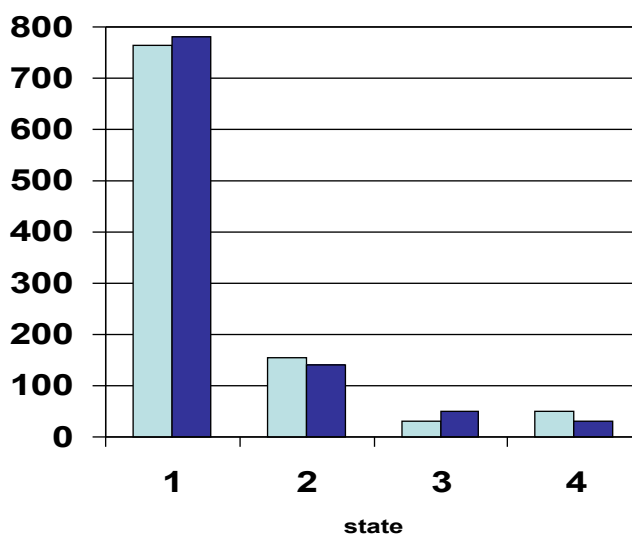
Known words can be in a number of different states (here five).

A word in any state has a measurable chance of moving to another state during the given time period. If these probabilities can be assessed for a particular learner, then we can predict long-term development in the overall structure of the learners let you come.

In this model we have five discrete states, and we allow words to move from any one state to any other state. That is, it is possible for a word to move directly from State 0 (I do not know this word) to State 5 (however this is defined) in a single move. It also possible for words to move from any of the higher states back into State 0 or any of the intermediate states -- that is, a model of this sort allows learners to forget words that they know. At first sight, this type of model looks inordinately complex. However, although the conditions under which these transitions might occur are not well-defined from a theoretical point of view, in practice we can sometimes work out the probability of words moving from one state to another for a particular learner in a particular set of circumstances.

Some work of this sort has been reported by one of my students (Meara and Rodríguez Sánchez 1993). using a series of models like the one Figure 1. His models typically used four states, which can be readily identified by the learners we worked with. He asked them to classify a large number of words into one of these four categories using a simple rating scale – a task which the testees were able to complete in a very short time. A second test two weeks later with the same words showed that the words did not always remain the same category. In fact, a large number of words changed category over the two week testing period: some words that were known at Time 1 were apparently forgotten the Time 2; other words not known or only partly known that Time 1 moved to a higher category during the same period. Far from being stable, the vocabularies of the learners we tested showed a very high degree of flux and change, particularly where less frequent words were concerned. Rodríguez Sánchez was able to use these data to calculate the probability of words moving from one state to another between the two tests. Assuming that these probabilities were relatively stable over longer periods, he was then able to predict long-term distribution of words in a large target vocabulary across the four states - “long-term” here means 46 months.) In many cases, these predictions were spectacularly successful: see for example the data in Figure 2, which illustrates how accurately a matrix model can make long-term predictions about vocabulary growth in a single subject. The data comes from a study in which an empirically derived transitional probability matrix like the one in Figure 1 was used to make a long-term prediction of the distribution of words from a 1000 word target vocabulary into four discrete categories (light shading). The dark shading shows the results of a real test taken some months later. The close correspondence between the prediction and the the actual data is very striking indeed.

Figure 2. predictions from a matrix model: distribution of words among four categories, predicted versus actual for one Subject.



Rodríguez Sánchez's work suggests that discrete state models and probabilistic measures of how likely words are to move between a number of defined states hold a great deal of promise. Unlike the unidimensional continuum models, or Wesche and Paribakht's fixed progression scale, Rodríguez Sánchez's models seem to be capable of generating predictions about the way whole vocabularies can develop or decline. We have been using them, for example, to investigate the way that advanced

learners' knowledge of L2 vocabulary grows very rapidly during a period spent abroad, but then goes into a slow decline once the students return home, and are no longer exposed to the target language for a significant part of the working day.

It is important to note, though, that this predictive power is achieved at a price. Rodríguez Sánchez's models rely on a matrix of transitional probabilities between the states of his model. Although in principle it would be possible to design models which were made up of more than four states, with bigger, more complex models would need to test many more words before we get reliable estimates of the transitional probabilities between states. With our four state models, we can get testees to rate about 300 words, a task which is just about possible since the rating task does not require very much time. A more complex model, say a 10 state model, would require a much larger number of words to be tested if we wanted reliable transitional probabilities between the states. A further problem is that all the words are able to move from one state to another according to these probabilities, and this means that while we can predict the overall distribution of words in a particular L2 learner's lexicon, these predictions describe what happens to the lexicon as a whole, not what happens to the individual words that make it up. In other words, Rodríguez Sánchez's work involves a shift away from individual words in favour of a more global description about how lexicons grow and develop. This of course, is very same shift as the one we described in our first alternative to Richard's vocabulary knowledge framework, where we tried to reduce the idea of lexical competence to a small number of significant dimensions. The generalisation here seems to be that we may not be able to pursue both a detailed analysis of word knowledge and make sensible statements about global aspects of lexicon competence at the same time.

CONCLUSIONS

In this paper I have discussed a number of different approaches to modelling what goes on when people acquire words in a second language. A very large part of this work is concerned are trying to provide detailed descriptions of how individual words get integrated into an L2 lexicon. Ideally, this work would like to provide a complete account of how words move from wholly unfamiliar sequences of letters or sounds to become functional units in an effective lexicon. Although this seems like a very laudable aim, I have argued here here that there is serious problem with the type of research that these aims generate. They seem to force us to focus more and more on the ever finer details of lexical knowledge, at the expensive of a deeper understanding of the global features of lexicon competence.

It seems to me that the best future for research and vocabulary does not lie in pursuing detail at this level. What really need is not so much a more detailed understanding of **words**, but rather a very much deeper understanding of **lexicons**. The area that we work in seems to one where the whole is considerably more interesting than the sum of its parts. The problem with some current models, I believe, is that they are in danger of losing sight of the wood through concentrating too hard on the individual trees.

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Notes.

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