A preliminary investigation of difficulties faced by EAP listeners: the relative importance of lexical knowledge

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Introduction

It is often assumed that tertiary ESL students in Hong Kong are comparatively weak at listening, speaking and writing, but that their lexical knowledge and reading skills are comparatively good. One incident led me to question this assumption about the extent of lexical knowledge among Hong Kong students and to begin the preliminary investigation reported here: out of a class of 13 students, seven perceived the phrase the state does intervene (with the does heavily stressed) as the state doesn’t ... . At first it appeared as if this might indicate a phonological difficulty: the inability to distinguish clearly between negative and affirmative verb forms in continuous speech (see e.g. Tauroza 1990) is a problem even for native speakers. This factor may indeed have contributed to the difficulty that the listeners had with this particular phrase, but further probing led to the realisation that the major problem in this case was likely to be lexical rather than phonological: only two of the 13 said that they had met the word intervene before (in spoken or written form), and only one of those could state its meaning. What seemed to have happened was that many of the students, faced with the stretch of speech /dəzɪntəvɪn/ ‘recognised’ or opted for /dəzmənt/ as a more likely chunk than the unknown /ɪntəvɪn/ and so created a meaningless segmentation.

Here, then, I report some findings from a preliminary investigation of difficulties encountered by students at HKUST in listening to and comprehending academic lectures. Of particular interest was the extent to which lexical ignorance might affect our students’ success in listening. The main purpose of the investigation was to gain broad insights into the difficulties faced by EAP listeners at HKUST. It was hoped that this would lead to the formulation of hypotheses that could be tested more thoroughly at a later date.
Research into L2 listening

Bottom-up and top-down

Much research into L1 listening has focused on the lack of clarity in the phonetic signal and the importance of context and background knowledge in determining meaning. For example, Liberman (1970) demonstrated that the realisation of most phonemes varies according to the immediate phonetic environment, and that a stretch of speech cannot be dissected to produce a single phoneme and only that phoneme. Warren and Warren (1970) reported that when the single ‘word’ tress was repeated continuously for three minutes (without pause and at a rate of two utterances per second), listeners would ‘hear’ differences in the utterances, ranging from dress and stress to Joyce and florist. Other research has shown that when words are removed from the stream of speech and the context in which they were contained, only about 50% are intelligible (Pickett & Pollack 1963).

These findings have pointed to the difficulty in perceiving speech that is decontextualised in an experimental setting. At the discourse level, however, with artificial constraints removed, there are very few such problems for the L1 listener. Many studies have shown the surprising amount of understanding that can be maintained when the context is known, even when ‘noise’ is considerable.

Researchers into L2 listening have argued that given the far greater load facing the listener, both phonological decoding skills and inferencing skills should be emphasised in the L2 listening class. For example, Brown (1990:151) has said,

The foreign learner needs to learn to control the phonological code of the target language sufficiently to be able to use the richness of cues at this level – with sufficient ease to provide a constrained input for the ‘top down’ inference-driven interpretation to be constructed.

Similarly, O’Malley et al. (1989) found that both bottom-up and top-down strategies were employed by effective listeners.
Phonological processing

Brown (1990), while acknowledging the crucial role of top-down processing in listening comprehension, sees phonological processing as being of primary importance for the L2 listener. In particular, she singles out the need to identify stressed syllables as being crucial:

it is this aspect of spoken English [sc. the recognition of stress], more than any other, which the teacher of English to foreign students should concentrate on. (ibid.:56)

While no EAP listening materials have concentrated primarily on the recognition of stress, several (e.g. McDonough 1978; Rogerson & Gilbert 1990) have presented it as an important technique. This is no bad thing in itself: as Brown (op. cit.:151) puts it,

It is essential in English to learn to pay attention to the stressed syllable of a word, since this is the best and most stable feature of the word’s profile, and to those words in the stream of speech which are stressed, since these mark the richest information-bearing units.

However, some research (e.g. Tauroza 1990) has found that recognition of stressed syllables in English is not necessarily a problem for L2 listeners. This complements findings from L1 research that indicate that salient features in connected speech are rarely misperceived. (Of the approximately 1,000 native-speaker misperceptions collected by Bond and Garnes (1980), only 4% resulted from misperceptions of stressed vowels.) Moreover, an examination of spoken texts sometimes reveals that perception of stressed words may not, by itself, give the listener much clue to the meaning of a passage. (See Appendix 7A for an example.)

Syntactic processing

By contrast, the syntactic processing carried out by listeners has not received much attention. In a study of the ability to decode grammatically novel sentences that were presented in spoken and written form, Stolz (1967) found that when faced with grammatically feasible but unnatural sentences, L1 speakers tended to do very little syntactic processing if there was only one reasonable syntactic interpretation. Thus, the sentence
The baker that the butcher that the candle-stick-maker paid congratulated borrowed 200 dollars.

would require a lot of processing, whereas

The game that the inmates that the judge sentenced played involved bats and balls.

would require very little. Similar results have been obtained with research that has investigated more natural speech patterns and situations. For example, Conrad (1985), in a study of L2 listeners, found that with increased proficiency, learners relied more on contextual than syntactic clues. This parallels the findings of research into L1 listening (referred to above).

Awareness of discourse patterns

From the 1980s onwards there have been several studies of discourse markers in EAP/ESP lectures. Chaudron and Richards (1986) divided the markers into “macro-markers” (such as Another interesting development was) and “micro-markers” (such as and), and found that lectures containing macro-markers were recalled more successfully than the same lectures containing micro-markers instead. DeCarrico and Nattinger (1988) arrived at a slightly different categorisation, noting, among other things, that the Chaudron & Richards study did not consider local and global levels of organisation, and appeared to use length of item as one of the criteria for classifying discourse markers. Instead, they divided what they termed “macro-organizers” into ‘global’ and ‘local’, according to their discourse function rather than their length. They also recommended that discourse markers be taught to ESL students, and this trend to focus on discourse markers can be clearly seen in EAP coursebooks such as Lynch (1983). A contrary approach has been taken by Olsen and Huckin (1990), who found that a knowledge of discourse markers was not enough to ensure understanding when a point-driven rhetorical organisation was used by the lecturer. However, this type of organisation would seem to be uncommon in EST lectures and further studies are awaited on the relative usefulness of a knowledge of discourse markers in comprehending non-point-driven lectures.
Lexical knowledge

In comparison with the research into the importance of phonological and discoursal knowledge in lecture comprehension, the role of lexis has received very little attention. In an analysis of error types made by French-speaking students when transcribing passages of spoken English, Angelis (1974:4) found "a strong phonological influence in most of the errors recorded", with the largest category being 'combined errors' (comprising a third of the total number of 359 errors), followed by the morphological, phonological and lexical categories (each with from a fifth to a sixth of the total number of errors) and lastly the syntactical category (a twelfth of the total). However, as 81% of the errors in the phonological category were related to one particular distinction between English and French (/h/ insertion or deletion), Angelis' data might suggest, that alongside other factors, the area of lexical knowledge in listening comprehension is at least worthy of investigation.

In a similar study, Kelly (1991) asked 11 French speakers (a teacher of English and second-year Science undergraduates) to transcribe passages in English taken from the BBC World Service. However, in an attempt to avoid the unhelpful category of 'combined errors', he tried where possible to determine the basic cause of a miperception. He also included a 'perceptual' category rather than a phonological one, including under this any error that might have been made by a native speaker of English (i.e. which made some sense in the context) and could not have been avoided by greater familiarity with English vocabulary or grammar. He thus categorised the transcription errors into perceptual (e.g. a/*the, grave/*great, in sight/*inside), lexical (e.g. *streamlining/*string-learning, committed for/*with trial) and syntactic (e.g. the question is whether/*well if they can). His finding was that lexical errors constituted 48.7% of the 148 errors (perceptual errors, 38.5% and syntactic errors, 12.8%); and that lexical errors made up 65.5% of all errors where comprehension was severely impaired. These data would seem to support Kelly's claim that lexical ignorance is the main obstacle to listening comprehension for advanced foreign-language learners, and were one of the inspirations for the present study, which is described below.

It is important to make clear exactly what is meant when an aural miperception is classified as 'lexical'. Kelly (op.cit.:139) states that "A sine qua non is to recognize the aural, as well as the written form", and by spoken forms he means "the standard forms as they occur in clearly enunciated speech and as they sound when uttered in isolation". However, taking the example of *streamlining above, it can be seen that the learner's transcription *string-learning is due at least in part to phonological factors such as the probable confusion in the listener between
/i:/ and /ɪ/. Kelly's attempt to get at the root cause of a misperception, if not corroborated by further investigation, is likely to result in a number of debatable categorisations. Nevertheless, his focus on the extent to which students can recognise words in connected speech (whether or not they already know the written or citation forms) appears to be an important one.

He ends by arguing, in contrast to Brown, that emphasis should be placed on vocabulary expansion rather than on phonological processing, at least at the advanced levels of language learning:

Instead of attributing the learner’s listening comprehension difficulties to an auditory or perceptual deficiency, about which very little can be done, and instead of focusing on developing strategies, the functioning of which very largely depends on language knowledge, the main effort on the part of the learner and the teacher at this stage must be on lexical expansion.

(Kelly 1991:147)

**Methodology**

It must be emphasised that the study described here was exploratory in nature, and that as there was no attempt to test hypotheses, there was also no attempt to control any of the variables that contribute to the complexity of the listening comprehension process.

Various methods were used to obtain data. These included introspection, dictation, transcription, oral repetition, listening clozes, note-taking (in handwriting and by typing onto a keyboard that recorded the keystrokes), and comprehension questions. For the sake of space, I will only discuss here the less ‘usual’ activities; all the methods will be described and discussed in more detail in Pemberton (forthcoming).

Introspective activities were of two types. In some, a tape-recording was stopped after each idea unit, and in the pauses, students recorded any thoughts or problems they had had in listening to the sentence or phrase; these activities involved what may be termed ‘immediate retrospection’. In others, students were asked to record any problems they had had in listening at the end of a whole passage; these involved ‘delayed retrospection’.

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There was one oral repetition activity; this was similar to a dictation, except that the passage was heard once only, and the sections were repeated orally by each student during pauses in the input. There was one transcription exercise – again, similar to a dictation, except that the students had control over the playing of the tape, and could rewind it as often as they needed to.

Many of the tasks were based on material from *Study Listening* (Lynch 1983), which was the core book for the course described below. With the exception of the tasks that involved speaking (oral repetition and introspection), the tasks formed part of the participants' normal coursework. Feedback was provided on their performance and they did not seem to be aware of any unusual 'experimental' situation. In any case, participation in all the tasks was likely to be of benefit to them for their end-of-semester listening examination. The research took place in a language laboratory in the last six hours of a 42-hour course.

The participants in the different exercises ranged in number from seven to eleven. They were all first-year undergraduate students belonging to a second semester EAP class at the Hong Kong University of Science and Technology. Students are assigned to EAP courses at the University on the basis of their Use of English grade at 'Advanced' (i.e. Matriculation) level. Currently, students who achieve a score of D or below are required to take a Language Enhancement course; this number represents roughly three-quarters of all first-year students. The average scores of the participants in the two listening components of the examination given at the end of the first semester (dictation and listening comprehension) were 48.3% and 42.3%, compared with overall averages (for the 448 students who sat the examination) of 45.2% and 47.4% respectively. The average score on a listening examination taken at the end of the second semester was 70.2% for the participants, compared with an overall average of 65.7% (103 students). Thus, in terms of listening skills, the participants were fairly typical of the students taking EAP courses at the University as a whole.
Results

For comparison with the results of Angelis (1974) and Kelly (1991), Table 7.1 below gives the numbers of occurrences of different types of errors from a transcription exercise. As can be seen, it was decided to classify the errors into the categories perceptual, morphosyntactic, phonological, lexical and miscellaneous.

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>No. of errors</td>
<td>% of total</td>
<td>No. of errors</td>
<td>% of total</td>
</tr>
<tr>
<td>Perceptual</td>
<td>49</td>
<td>30.1</td>
<td>57</td>
<td>38.5</td>
</tr>
<tr>
<td>Morphosyntactic</td>
<td>46</td>
<td>28.2</td>
<td>19</td>
<td>12.8</td>
</tr>
<tr>
<td>Phonological</td>
<td>30</td>
<td>18.4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lexical</td>
<td>14</td>
<td>8.8</td>
<td>72</td>
<td>48.7</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>24</td>
<td>14.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>163</td>
<td>100</td>
<td>149</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 7.1: Occurrences of different error types in student transcriptions.

As Table 7.1 shows, these categories were different from those used in previous studies, which means that the results are not directly comparable; nevertheless, they were adopted because it was not felt that the previous categorisations were fully satisfactory.

Following the example of Kelly (1991), all errors which might have been made by native speakers, in that they did not severely alter meaning or syntax, were classified as 'perceptual'. Examples of these errors are the transcriptions of *boost sum and develop local industry as *boost undeveloped local industry, a stricter control as *restricted control and in fact as *in effect. Experience with the transcription of lectures for the Hong Kong Corpus of Computer Science and Information Systems Lectures has shown that not only are such misperceptions very common, but that they are often difficult to detect, even for trained native-speaker transcribers and after several replayings.
Under ‘morphosyntactic’ were placed errors that seemed due to lack of attention to the surrounding grammatical context, or lack of syntactic knowledge. It was thought that native speakers would have been unlikely to have made such errors. Included here were such errors as *third world government often have ... for third world governments often have*, *large foreign company for large foreign companies* and *tourist industry for the tourist industry.*

Some of the errors seemed to be due to faulty perception rather than lack of grammatical or lexical knowledge, and yet they were not errors that a native speaker was likely to have made. These were therefore classified as ‘phonological’ (a category used by Angelis, but not Kelly). Examples are *foreign companies are invented for foreign companies are invited*, *demand for amount and *going up for grown up*. A re-examination of the data has shown that this is a somewhat fuzzy category as it is often difficult to determine whether someone has (but doesn’t apply) the relevant lexical or syntactic knowledge – i.e. the error is mainly a phonological one – or whether their error is in fact due to lexical or syntactic ignorance. Arguably, a number of the errors placed under the ‘phonological’ category could also, or alternatively, be classified as lexical or morphosyntactic. This lack of reliability represents a major weakness in the use of transcription when not combined with other methods of data collection.

Where it seemed likely that mistranscriptions could have been avoided if the listener had known the words, these were classified as ‘lexical’ errors. Examples are *economic for ecological*, *well by for whereby* and *mainly for namely.*

In many cases, more than one factor may have caused the error. Where I thought it to have been likely, I categorised errors under ‘miscellaneous’, rather than try to determine the major cause. This category also contained cases in which the listener made no attempt at a word, and some ‘mistranscriptions’ which were due to, or corrections of, repetitions or false starts by the speaker. Examples from this category are *participular for particular and *clean white beaches for white clean white beaches [sic].*

The pattern of more errors falling into the perceptual and morphosyntactic categories was true for almost all the students: for all the students except one, most errors were in the first two categories, and fewest in the third and fourth categories (phonological and lexical). The exception was one student, who produced almost half of the total number of errors that were classified as phonological (12 out of 30); these also represented his major error category (12 out of 37). The proportion of lexical errors obtained in the present study differs markedly from that obtained
by Kelly (particularly in the case of his student participants). Reasons for this discrepancy will be discussed further below, but for the present it is clear that a major reason must be the lack of objectivity in the classification of error types.

**Phonological processing**

Some weak forms were clearly difficult for the students to perceive. In the listening cloze exercise, whereas all eight students correctly wrote down *deindustrialisation, unemployment* and *vehicle*, no one correctly perceived *they see it* and only one correctly perceived *they're* (see Table 7.2 below). On the other hand, *can* (/kæn/) was correctly perceived by all eight students and *can have* (/kənˈhæv/) by seven out of eight (the misperception being *can make* rather than its semantic opposite *can't have*, which might have been expected); and *at* was correctly perceived by seven students in *and look at*, as was *of* in *and of course*. And * (/ən/) was slightly more problematic, however, being perceived by five students in *and of course*, but by only three in *and look at*. This latter finding tallied with an earlier one that, out of 13 students, none had been able to perceive *and* in the sequence *boost um and develop* /bʌstəməndɪˈveləp/ or the sequence *and education* /ənɪˈdʒɛdʒiˈkeɪʃn/.

<table>
<thead>
<tr>
<th>Items</th>
<th>Number correct (n = 8)</th>
<th>Misperceptions (and number of occurrences)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>they see</em> /ˈsiːi/</td>
<td>0</td>
<td><em>we see</em> (3), to see (2), we see it (1), seen it (1), a (1)</td>
</tr>
<tr>
<td><em>they're</em> /ˈθer/</td>
<td>1</td>
<td><em>is</em> (3), <em>it's</em> (1), they (1), are very (1), cost (1)</td>
</tr>
<tr>
<td><em>can</em> /kæn/</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><em>can have</em> /kənˈhæv/</td>
<td>7</td>
<td><em>can make</em> (1)</td>
</tr>
<tr>
<td><em>and look</em> /ændˈlʊk/</td>
<td>2</td>
<td><em>look at</em> (5), and looking (1)</td>
</tr>
<tr>
<td><em>and of course</em> /ənəvˈkɔːs/</td>
<td>5</td>
<td><em>of course</em> (2), as a result (1)</td>
</tr>
</tbody>
</table>

Table 7.2: Selected perceptions from a listening cloze exercise (phonological factors).

In contrast with the above results for *can*, none of the seven students in the transcription exercise recognised the weak form for *have* /əv/ in the phrase *which have grown up*—in fact only one of the students (who transcribed *of which going up*) could be said to have heard/decoded anything of the syllable before *grown up.*
Syntactic knowledge

One syntactic structure seems to have been unknown to most of the students: a noun clause within a that clause. Thus of the section

there's a danger ... that what attracts tourist development / things like white clean white beaches / are in fact polluted by the sorts of development which goes on

only two out of seven students correctly transcribed that what; the other transcriptions were: the what (1), what (1), that water (1), that (1) and φ (1).

Lexical knowledge

There was some evidence that students could not recognise certain words in connected speech, when they definitely knew the written forms and probably knew the citation forms as well. In the transcription exercise, culture (a word whose written and citation forms they were very familiar with) was correctly transcribed by only three students – the mistranscriptions being countries (2), country and council; and in one dictation, only four out of 13 students recognised enables as a chunk out of the segment enables ozone /ˌenəˈbləʊzəʊzn/, unaware that the initial vowel in enables is pronounced /iː/ rather than /e/. The fact that on the oral repetition exercise two students were unable to repeat effective from the sequence most effective strategy – when they were able to repeat the words (or approximations of them) preceding and following it – might also indicate lack of knowledge of a spoken form. Similarly, one student repeated /rɪˈkrɪʃən/ for the sequence very efficient /ˈvɛriʃəntʃənt/ (four out of nine students commented that they could not understand this sequence in a dictation).

Other misperceptions that may have been largely due to ignorance of lexical items (or ignorance of their spoken forms) are presented in Table 7.3 below:
<table>
<thead>
<tr>
<th>Items</th>
<th>Number correct (n = 6)</th>
<th>Misperceptions and number of occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>assembly</td>
<td>2</td>
<td>assembling (1), senile (1), gender (1), stately (1), standard (1), a (1)</td>
</tr>
<tr>
<td>automated phase</td>
<td>0</td>
<td>automatic phase (2), automated face (1), automatic face (1), automaten face (1), automatic fit (1), automatic (1), optomatic field (1)</td>
</tr>
<tr>
<td>rift</td>
<td>0</td>
<td>width (4), gap (3), rift (1)</td>
</tr>
<tr>
<td>once again</td>
<td>3</td>
<td>on SC (1), on sc??ly (1), as against (1), exactly (1), a (1)</td>
</tr>
<tr>
<td>because after all</td>
<td>0</td>
<td>because (4), because of that (1), cause (1), but it actual (1), actually (1)</td>
</tr>
</tbody>
</table>

Table 7.3: Selected perceptions from a listening cloze exercise (lexical factors).

Students were able to pinpoint unknown words when introspecting/retrospecting on texts. This was particularly so with unknown words such as synovial membrane and prophylactic drugs, but also with non-technical words. The following are words which students said that they either did not know or did not comprehend (with numbers of students making such statements in brackets): blackmail (2 out of 8), clamp down (2 out of 8), curative (1 out of 8), generation (1 out of 8), racket (6 out of 8), resilient (7 out of 9) and victimising (7 out of 8).

Note that as there was no contact between the participants and myself once an activity had begun, these numbers only reflect those students who felt inclined to comment at a particular time; the actual extent of lexical ignorance might be greater.

**Discourse awareness**

There were instances in which participants did not seem to be using ‘high-level’ discourse processing strategies. Firstly, many students did not focus on questions posed or problems stated by the lecturer. It is possible that this apparent inability to perceive discourse cues may have led to miscomprehension of the lecturer’s overall argument. For instance, while taking notes from the following passage, all the participants noted down key content words like individual or take drugs, but failed to note that there was a problem or note down the question posed by the lecturer:
... and finally there's the problem of the individual himself / who must take the drugs / will he in fact take drugs especially if these are anti-malarial drugs / especially if these are pressed on him by well-meaning but foreign personnel? (Lynch 1983)

Similarly, while most participants were able to note down an approximation of persuade people to change food habits in response to the following passage (from later in the same lecture), no one noted that achieving this would be a problem:

... and at the end of the day again we have the problem of the individual / you can persuade the farmer to grow new crops / you can provide you can irrigate the fields to help him do it / but at the end of the day you must persuade him to eat them / and one of the major problems is persuading people to change their food habits.

Secondly, it is possible that many of the students did not make predictions about the organisation of a lecture (beyond the next sentence or so) while actually taking notes. For example, when taking notes from a section of the above lecture that began a hundred years ago / in the United Kingdom / four out of ten children died in childhood ..., only one of the participants noted down the contrasted word today (or an alternative), which appeared at the end of that section, introducing a section in which, by comparison, the present state of the UK's health was described.

By contrast, when the organisation of a lecture was made explicit, e.g. through an introductory phrase such as Today we are going to look at two common and serious diseases of the moveable joints, several students were able to use the information to make predictions.

Thirdly, it appears that at times several students did not use contextual clues to revise their misperceptions. For example, in a dictation, the money referred to at the end of the phrase to be sold to the hawkers for thousands of dollars only resulted in three transcriptions of sold or sell (the misperceptions being south (2), sought, †corsalitd and φ).

However, it is clear that on many occasions, the participants did use top-down processing to make up for deficiencies in their phonological processing abilities. The misperceptions of rift produced by seven out of the eight participants (see Table 7.3) serve as an example of where this was effective. In other cases, the attempt to create meaning was less successful: one student, for example, interpreted irrigate the fields as "alleviate the drug."
Combinations of factors

There were many cases in which several factors seem to have influenced a particular misperception. At the phrase or sentence level, there were also several cases in which a number of factors appeared to combine to cause a breakdown in comprehension. For example, in the sequence *health education must come first / you must educate people to smoke less / to drink in moderation, smoke less* was only correctly perceived by four out of eight students (misperceptions being *small stress, small girls, sma(ill)? /smɔ:/ grass and smoke gas*). Here, it appears that background knowledge about health education campaigns might have corrected the phonological misperception that led to the segmentation *smo/kless*. As this was an oral repetition exercise, participants were unable to rely on incoming information to modify their first perceptions; however, as only one of the eight correctly perceived *drink in moderation*, it is possible that, had the passage been given as a dictation or transcription exercise, ignorance of a lexical item (*in moderation*) might have been another factor contributing to (rather than correcting) the misunderstanding of the passage.

One student, in response to the dictated input *a pad of cartilage*, said that she could only understand “some kind of word cartilage”: in this case, it is unclear whether her difficulty stemmed from unfamiliarity with the weak form /əv/, ignorance of the word *pad*, expectation of an adjective before *cartilage*, or a combination of all three factors.

Many participants mentioned that if they “missed” a few words, they would lose track of the meaning of a sentence. As one said,

I miss the last four words and maybe / I lose [...] concentration on the [...] last four words and so er / I have some difficulties in knowing the meanings of this sentence.

One student, attempting to make sense of the sequence *in the incidence of skin cancers worldwide*, said that he concentrated so much on *incidence* that he “missed” the following words. This suggests that the latter part of the sequence may have been lost before it could be broken into meaningful chunks and processed in short term memory (cf. Rivers 1971; Anderson 1990). Sometimes, if meaning was constructed from partial information, it might turn out to be incorrect, as another student explained:

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Because I miss some word then / er the meaning of the following sentence is completely different from the original one / so I got the wrong information.

These processing problems are, of course, exacerbated when the student is asked to take notes as well as listen. One student voiced a very common complaint:

I found that / I can't [...] concerning in the first point how to write it down then the second point is coming and then I get lost / so I can't get the last last point er / / then I missed all the thing.

Another explained that not knowing a word in one instance caused her to miss the point of a sentence:

I know that the word *curative* is a main word but I don't know how to spell it and I try to spell it from [...] its pronunciation, so I miss the last point.

**Discussion**

**Lexical knowledge**

From the results, lexis by itself did not appear to be the main area of difficulty. One reason for this may be that the lectures chosen from Lynch (1983) for use in the study were ones on general topics ('Urbanisation', 'Preventive medicine', 'Microtechnology' and 'Development and aid') which were expected to be reasonably familiar to the students. The one lecture on a specific topic ('Brazil's Pro-Alcool Project') with specialised vocabulary (e.g. *feedstock*, *biogas*, *cassava*, *sugar beet*) was deliberately not included, as lack of background knowledge would have made the task of processing excessively difficult for the students.

Similarly, the high proportion of lexical errors found by Kelly (1991) is probably due in part to the passages chosen: one, a journalist's report from Cyprus, contains the lexical items *no-man's land*, *bullet-scarred*, *flatroofed*, *chipped*, *whitewashed*, *buddle*, *Cypriot* and *exodus* - as might be expected, a very high proportion of the errors on this text (11 out of 17) were lexical.

The discrepancy between the two studies must also be partly due to the difference in the categorisation of error types. Kelly, it appears, may have been too keen in
some instances to assign errors to the lexical category. Several of the errors he cites would seem to be due not to lexical ignorance but to phonological difficulties (e.g. naturally / *nationally disappointed, emanating largely / *lastly from) or lack of syntactic knowledge (prior to / *apart of these two meetings, it’s had the government finger waggled / *wag at it. other than / *all of them print this, paid compensation / *paid a compensation).

By contrast, in the present study, some of the errors should perhaps have been classified as ‘lexical’. An example are the misperceptions of culture, referred to under ‘Results’ above as examples of possible lexical errors, which were actually classified in the transcription data as phonological errors, it being thought that the students must have actually known the word but have been unable to access it due to the unfamiliar pronunciation. Many of the errors assigned to the ‘miscellaneous’ category were partly lexical, but it was not felt possible to say that lexical ignorance was definitely the main cause when many other factors were involved. Without further investigation, the categorisation of certain errors may be little more than guesswork on the part of the researcher.

In order to obtain a more accurate analysis of the importance of lexical knowledge in academic listening comprehension, several steps need to be taken:

(a) Listening texts used for data collection should be representative of the type of academic listening that the students normally engage in. In the case of HKUST, despite the fact that 12% of a student’s courses must be in Humanities or Social Science subjects and one third of the courses must be from outside the major subject department, the majority of a student’s lectures are in the areas of Science, Engineering or Business. Thus, listening material from these domains is likely to be of greater relevance than material oriented towards the Social Sciences, as with the coursebook used for this research. That is not to say, of course, that the content of the listening texts should be familiar – students must be able to process new information. But it makes sense for them to be faced with lexical, syntactic and discoursal features that are typical of lectures in their own disciplines rather than of lectures from another field.

(b) Evidence from transcriptions needs to be corroborated by other research methods in order to find out from students what a certain word or stretch of speech means to them, and what if anything causes them difficulty when listening to it or writing the transcription. Immediate retrospection, oral interview and oral/written comprehension tests are some of the methods that should be used.
Non-lexical factors

Phonological processing was clearly still a problem for several of the students in the study. The weak forms of and and have caused difficulties (in contrast to the more prominent weak form of can, which did not appear problematic).

Syntactic knowledge does not seem to have been a major problem area for the students. While a large number of errors on the transcription were classified as morphosyntactic (28% of the total), the vast majority of these (85%) involved the deletion of word-final morphemes, deletion of articles or a change in tense. In contrast to errors that were classified as phonological (e.g. *invented for invited, *polluted council for local culture) or lexical (e.g. *accents for assets, φ for boost) these have a comparatively small effect on the meaning of the passage.

As regards discourse awareness, while there was evidence that students used top-down strategies to arrive at meaningful representations when bottom-up skills or lexical knowledge could not help them, there was also evidence that students were at times unable to use higher-level cognitive skills such as predicting and using contextual clues to revise misperceptions. Moreover, attempts to rely more on top-down inferencing than on bottom-up phonological input were not always successful.

In many cases, student misperceptions were due to combinations of factors.

Conclusion

The present study can shed only the dimmest of light on the factors leading to misperception or miscomprehension by EAP listeners. It would seem safe to suggest, though, that lexical and phonological difficulties are causing students problems, and that simplistically recommending that they carry out higher-level discourse strategies (such as listening for gist or predicting) may not be an adequate approach. Top-down skills (as recommended by Lebauer 1984, for example) are vital to successful listening comprehension, but it would seem obvious that before these skills can be effectively employed, the spoken forms of words must first be recognised and comprehended. Lower-level processing skills and lexical ignorance (i.e. the inability to recognise words in connected speech) may be causing our students so much processing work that little spare capacity remains for them to carry out the higher-level cognitive strategies. This is yet to be tested empirically, however.
Kelly's (1991) argument that lexical ignorance is the main obstacle to listening comprehension for advanced foreign language learners has not been substantiated by this investigation. The present study does suggest, however, that the hypothesis that lexical knowledge plays an important role in ESL listening comprehension is a reasonable one, and one that is worth testing. On the basis of this exploratory study, several avenues for research suggest themselves:

(a) More focused research should be carried out to test this hypothesis. Such research should combine a number of methods, so that claims and evidence of listening difficulty can be checked against each other. Such a combination might include dictation or transcription, immediate retrospection and questions to determine comprehension. Further pilot studies would be needed to arrive at an optimal combination of methods.

(b) The present data should be examined to determine the extent to which students misperceived stressed syllables. Further data could be obtained (e.g. through introspective studies) to ascertain how far the perception of stressed syllables is a problem for Hong Kong students.

(c) Comparisons should be made between students' recognition and comprehension of academic and semi-technical vocabulary as it appears in connected speech in EST lectures, their recognition of the same words in spoken citation form and their comprehension of the same words in written form. Analysis needs to be made of the words that are most essential for EAP study (see e.g. the list in Nation 1990:235-239) and, if spoken forms are problematic, then ways need to be found of helping our students remember and perceive them.

(d) Studies could be undertaken to examine the correlation between lexical knowledge and listening ability. Is there a critical point in the size of the learner's lexicon, as Laufer (1991, 1992) has claimed with reference to reading ability, beyond which academic listening becomes 'fruitful' – or is the equation not so simple?

(e) Tests should be carried out to determine whether improved word recognition leads to an improvement in higher-level listening skills.
Notes

1. I would like to thank colleagues Mike Courtney, Steve Tauroza, Keith Tong and K.K. Tong for their helpful comments on an earlier version of this paper.

2. Milton (1991) provides partial evidence to the contrary: in a survey of staff and students at Hong Kong University of Science and Technology, “increasing their vocabulary size” was ranked by both staff (29 lecturers from Science and Engineering departments) and students (324 first-year undergraduates) as the third most important area in which students needed assistance. The areas that were thought to need most assistance were “improving grammatical knowledge” and “improving their reading comprehension speed in English” (staff) and “improving their reading comprehension speed in English” and “improving their reading ability in English” (students). These findings, though obtained from small samples, are echoed in other surveys (e.g. Ostler 1980; Johns 1981; Tawfiq 1984; Zughoul & Hussein 1985; Christison & Krahne 1986; Hughes 1988; James 1989) which found the receptive skills of reading and listening to be those that were considered most essential for tertiary EAP study. If lexical knowledge is likely to be seen as important for receptive language competence, it is also likely to be seen as important when it comes to language production: the lecturers in Milton’s survey rated vocabulary as the most important factor in students’ written reports; similarly, Santos (1988) found that professors rated lexical errors as the most serious of all errors in student compositions.

3. The equivalent categories in the other studies are ‘morphological’ and ‘syntactical’ (Angelis 1974) and ‘syntactical’ (Kelly 1991).

4. The errors from the Angelis study listed in this row were classified by him as ‘combined errors’. Although there is some overlap with my category ‘miscellaneous’, Angelis’ category is far larger than mine because he placed in it all errors that involved a word boundary misperception, whereas I tried to assign such misperceptions to another category first (e.g. the misperception of once again as *exactly was classified as a lexical error) and mainly reserved the label ‘miscellaneous’ for those errors for which I could not determine the major cause.

5. The lecturer in this passage had a Scottish accent and a careful delivery.
Appendix 7A

A stress perception exercise taken from McDonough (1978). The task given to the student is to mark the words that receive “important stress”. Here, such words appear in bold print. Notice the importance to the passage of negative particles (which are unstressed) and the likely result of relying on the stressed adjectives alone to deduce the lecturer’s attitude towards programming.

Well, fir ... first thing I want to say is that some people got the impression from what I said last week that programming is hard. I didn’t mean to give you that impression. I meant to give you the impression that programming is very strange, to start with; you can’t just expect to learn a set of rules and be able to write programs. However, programming is very easy. You can all learn to program. But it’s not just a matter of learning where to put the semi-colons; you’ve actually got to learn to think in a special way. It’s not a very difficult thing to learn, but you’ve got to do it. Right? That’s all I meant.