Exploring listening comprehension tactics and their interaction patterns

Abstract

Much of listening strategy research has focused on broad strategy use with little attention paid to the different mental techniques by which each strategy is operationalised. This study examined a group of Chinese ESL learners' listening strategies and the tactics that operationalised these strategies. It also conducted an exploratory analysis of the way these tactics interacted in the processing sequences of two learners. Data were collected and analysed using a retrospective verbalisation procedure based on the principles of human information processing proposed by Ericsson and Simon (1993. Protocol Analysis: Verbal Reports as Data, second ed. MIT Press, Cambridge, MA). Besides revealing tactics for two new strategies, the study identified a number of tactics for operationalising some existing strategies in the literature. Altogether, 44 listening tactics have been identified. In the comparison of the two learners' retrospective protocols, it was found that although they used many similar strategies, the higher ability listener demonstrated more effective use of both cognitive and metacognitive tactics. The paper concludes that examining specific tactics was useful in clarifying some strategies in the literature and that an investigation of how individual tactics interact in processing sequences could offer insights into cognitive differences between learners. It also recommends the use of carefully selected retrospective protocols on tactic use for classroom awareness-raising activities.

1. Introduction

This study uses a strategy framework for explaining the comprehension processes that occur during learner listening. Research that examines the use of strategies during listening has at least two benefits. Firstly, compared with examining the product of comprehension such as answers and test scores, an investigation of processes during listening can help us determine directly those mental behaviours that may contribute to or impede comprehension. Comparing these processes could also shed light on the cognitive differences between learners of different listening abilities. Secondly, it supports the cognitive view of language learning, which successfully draws on important developments in contemporary cognitive psychology (Johnson, 1996; Skehan, 1998). Cognitive theory focuses on learners' use of various mental techniques for overcoming limited information processing capacities (McLaughlin, 1987), and argues that language development is accelerated by learner attention to language and learning tasks (Schmidt, 1990; Wenden, 1991), and strategy use (O'Malley and Chamot, 1990; MacIntyre, 1994). Strategy research into learner listening can therefore be productively applied to language teaching pedagogy.

This paper reports on the broad strategies and specific techniques, referred to here as tactics, employed by a group of learners of English as a second language. It hopes to show that an investigation of listening tactics is important to our understanding of differences in listening effectiveness among learners and that an inventory of tactics can be useful for teaching.

2. The concept of strategy

Several views of comprehension have influenced our understanding of learner listening comprehension. These include the three-phase (perception–parsing–utilisation) comprehension model (Anderson, 1995), the parallel distributed processing (PDP) model of cognition (McClelland et al., 1986), and more recently, the construction-integration model (Kintsch, 1998). Regardless of which model one uses, a common feature of listening is that it is transient and processing often occurs within limited capacity working memory (Rost, 1994; Graesser and Britton, 1996). In the case of first language users, much of the processing (such as recognition or 'decoding' of words and parsing of utterances) is automatised, whereas language learners often have to work under the constraints of an overloaded working memory, and a lack of linguistic, sociolinguistic and content knowledge (Call, 1985; Færch and Kasper, 1986; Brown, 1995; Goh, 2000). To achieve reasonable comprehension, learners often engage in mental mechanisms, which the literature refers to as 'strategies', following the use of the term in cognitive psychology. In cognitive psychology, the term 'strategy' is linked to conceptual frameworks of human learning and memory and refers to mental steps or operations carried out to accomplish cognitive tasks such as map-reading, memorisation, processing information and problem-solving (Gellatly, 1986; Flavell et al., 1993). In educational psychology, besides this

cognitive dimension, strategies also include metacognitive and social-affective dimensions (Weinstein et al., 1988).

Many applied linguists have commented on the lack of consensus about the definition of the term (Wenden, 1987; Bialystok, 1990; Larsen-Freeman and Long, 1991; Ellis, 1994; McDonough, 1995, 1999). This diversity is largely due to the way the term has been used in different contexts, such as interlanguage communication (Færch and Kasper, 1983a; Kasper and Kellerman, 1997) and second/foreign language learning (Oxford, 1990; O'Malley and Chamot, 1990; Cohen, 1998), as well as the theoretical assumptions that strategy researchers bring into their work. For this study, two perspectives on strategies are adopted. The first is the distinction between strategy and tactic. The second is the twin criteria of consciousness and goal-directedness for identifying strategic behaviours.

2.1. Strategy–tactic distinction

Some research makes the distinction between general and specific strategies. This distinction, however, does not sufficiently differentiate a general strategy from its operationalisation. The term 'tactic' is used here to refer to individual techniques through which a general strategy is operationalised (following Snowman, 1986; Schmeck, 1988). For example, we may say that a strategy such as selective attention can be operationalised through tactics, such as noticing familiar words and paying attention to intonation. Oxford and Cohen (1992) noted that a strategy–tactic distinction can address confusion about hierarchic relationships among strategies and thereby offer greater conceptual clarity in ongoing discussions of strategies. It can also avoid the problem of 'hypertaxonomizing' where overly long lists of strategies are produced.

This distinction can benefit listening strategy research in three ways. Firstly, tactics identified may be used to validate listening strategies reported in the literature. Secondly, we can examine qualitative differences in strategy use among learners by scrutinising their tactics for operationalising the same strategy. Finally, by analysing the interaction of tactics, we have a means to examine the relative effectiveness of different learners' strategic processes.

2.2. Consciousness and goal-directedness

Many researchers agree that a key characteristic of strategic behaviour is consciousness, which has often been discussed in terms of automatic and controlled processing (Shiffrin and Schneider 1977; Schneider et al., 1984). Automatic processes are cognitive processes that have been well learned and make little or no demand on processing capacity. They do not require attention and are therefore unavailable to conscious awareness and difficult to modify (Logan, 1988). Controlled processes, on the other hand, are conscious. They require attention and can be used flexibly in changing circumstances. Comprehension processes that can become automatic include word recognition and syntactic analysis. When these low-level processes become automatic, more cognitive capacity is freed for higher-level processing, such

as making inferences. Thus, when there is difficulty with processing a message at the level of perception or word recognition, there will be little cognitive capacity left for high-level processing. Low proficiency language learners often experience this problem.

A second characteristic of strategic behaviour is goal-directedness. McKoon and Ratcliff (1986, 1992) have argued that L1 readers would only make strategic inferences when necessitated by comprehension goals. Three comprehension goals that can motivate strategic inferencing have been suggested (Graesser et al., 1994). Firstly, readers want to fulfil their overall purpose for reading a particular text. Secondly, readers need to establish a meaning of the text that is coherent locally and globally. Thirdly, they need to explain the actions, the events or the phenomena referred to in the text, which include questions about cause–effect, anaphora, theme and roles. We can apply these goals to listening comprehension. As a criterion for identifying strategic processes, goal-directedness is consistent with the view that listening is a purposeful process, "that people listen for a purpose and it is this purpose that drives the understanding process" (Rost, 1990:7). Furthermore, goal-directedness embraces the notion of problematicity, a feature commonly linked to strategy use (Færch and Kasper, 1983b; Poulisse, 1990), but at the same time extends beyond problem-oriented behaviours. It thus provides a plausible explanation for why an individual can be engaged in strategic activities even though a problem may not be present (Bialystok, 1990).

3. The study

The present study investigated the listening strategies and tactics used by a group of ESL learners. An intended outcome was a preliminary inventory of comprehension tactics consisting of those that may validate existing categories of strategies in the literature as well as new ones that may be revealed through the study. It also aimed to describe the way tactics interact in sequences of processing. This paper reports the findings to the following research questions:

1. What listening strategies and tactics do ESL learners use?
2. How do comprehension tactics interact in sequences of processing? Is there a difference between learners of different listening abilities in the use and interaction of tactics?

The questions were investigated by examining the informants' retrospective verbal data. Findings to question 1 will be presented as inventories of cognitive and metacognitive strategies and their component tactics. These have been identified from immediate and delayed retrospections of 40 informants. Protocol extracts and frequencies of tactic use will be presented to support the results. Question 2 is descriptive and exploratory in nature. It was investigated through an analysis of two informants' protocols.

3.1. Methodology

3.1.1. Verbal data

Data were collected through verbal reports by using the information-processing model proposed by Ericsson and Simon (1993). Based on widely accepted theoretical assumptions about human information processing, this model specifies the amounts and kinds of mental information that can be retained for reporting, and the conditions for accessing and reporting this information. It identifies two kinds of verbalisation that are possible. One is concurrent verbalisation and refers to introspection of cognitive processes at the time they are being attended to. The second is retrospective verbalisation and refers to reporting about cognitive processes occurred earlier. The following implications have been drawn for this study:

1. Verbal data on listening processes are predominantly retrospective. Because of the rapid flow of information, the working memory has to be freed for processing continuous input. What listeners will typically do is to process the heeded input first before reporting through retrospective verbalisation.
2. No extra demands are made on processing capacities during listening because retrospective verbalisations do not interfere with processing of input. What may be expected, however, are incomplete verbalisations because learners may have problem expressing some things in the target language. Although this may render some information inaccessible, it does not invalidate the information reported.
3. Probes that do not require informants to consult their memories about actual cognitive processes that take place should not be used. They should be asked only to describe how they try to understand what they hear.

3.1.2. Informants

The informants were male and female students, aged between 18 and 19, from the People's Republic of China. They were in two naturally occurring classes selected from a cohort of 80 students in an intensive English language programme in Singapore. Two informants were identified for further analysis and comparison of tactic use and interaction. Informant A had a listening score in the 90th percentile of the entire cohort while Informant B's score was in the 30th percentile. Their scores were based on the listening comprehension component of the Secondary Level English Proficiency (SLEP) Test (Educational Testing Service, 1991).

3.1.3. Data collection

The data were collected mainly through immediate retrospective verbalisations or 'think-aloud' sessions. Some data were also obtained from weekly listening diaries, which provided data on delayed retrospective verbalisations, for the purpose of triangulation. For the immediate verbalisation sessions, the informants listened to a pre-chunked text with pauses. At each pause, they reported how they had tried to understand the preceding segment. The listening diaries asked the informants to record a specific listening event and what they did to understand what was said.

Two listening passages were adapted from "How to Listen" by Marion Geddes (1988). One described the effects of ultra-violet light on our eyes ('UV passage'). The other described the camel's hump ('Camel passage'). The two passages were selected according to the following criteria: around 250 words, authentic text, information report text type, well-organised information, familiar topic, and at least one piece of information and five words that informants might be unfamiliar with. The informants did not have any special training sessions with problem solving tasks. Instead they were given a familiarisation practice to ensure that they knew the kind of information they should report.

The pilot study involved two learners who I met with individually for about 30 minutes in my office. Both of them chose to report in English but switched to Chinese Putonghua whenever they had difficulty finding the right words to use. I explained to them that they would hear a short passage with pauses, and that after listening to each segment of the passage they should say how they tried to understand it. After this, they listened to the first segment of the passage and began reporting. From their verbalisations, it was clear that the informants understood what they had to do. They then continued with the reporting for the rest of the passage. Data collection sessions with the rest of the informants were also conducted in my office. When the UV passage was used for verbalisation, the practice was done using segments of the camel passage, and vice versa.

3.1.4. Data analysis

To identify tactics from the data, Ericsson and Simon's principles of human information-processing were used to distinguish verbal data on actual strategy use from general statements about strategies. The interviews were transcribed and reports that showed strategic processing were identified, interpreted and coded. For example, one informant said, "*I can guess the meaning. Though there may be several words I did not understand. Because the sentence compare the camel with other animals. And it mention first that other animals has fat under the skin, maybe, I guessed that the camel haven't fat under the skin but in the hump*." This was interpreted as follows:

	Verbalisation	*Tactic*	*Strategy*
1	"there may be several words I did not understand"	Identify words not understood	Metacognitive
2	"because the sentence compare the camel with other animals"	Using context to draw inferences	Cognitive
3	"it mention first that other animals has fat under the skin"	Using familiar words to draw inferences	Cognitive
4	"I guessed that the camel haven't fat under the skin but in the hump"	Using prior knowledge to draw inferences	Cognitive

The tactics were examined for shared features and then classified under listening strategies identified in the literature. Two groups of tactics emerged which did not appear to operationalise any of the existing strategies. The terms 'fixation' and 'real-time assessment of input' were used to represent these new tactics.

To check coding reliability, a colleague with a postgraduate degree in applied linguistics coded a portion of the data independently. Reliability of data interpretation was further assessed by calculating the intra-coder and inter-coder reliability coefficients using the formulae suggested by Young (1997):

Intracoder reliability coefficient:

$$\frac{\text{Number of items coded the same in the first and second coding}}{\text{Number of items coded in the first coding}}$$

Intercoder reliability coefficient:

$$\frac{\text{Number of items coded the same by researcher and external coder}}{\text{Number of items coded by researcher}}$$

The coefficients for intracoder and intercoder rating were 0.88 and 0.76, respectively.

4. Results and discussion

Both cognitive and metacognitive listening tactics were examined. Cognitive strategies identified in the literature include inferencing, elaboration, prediction, translation, contextualisation (O'Malley et al., 1989; Oxford, 1990; Young, 1997; Ross, 1997) and visualisation (DeFillipis, 1980). Metacognitive strategies identified include self-monitoring, comprehension monitoring, selective attention and self-evaluation (O'Malley and Chamot, 1990; Bacon, 1992; Young, 1997). The terms 'self-monitoring' and 'self-evaluation', however, were imprecise and unable to capture even the broad strategic differences in the data. I have therefore used the term 'directed attention' to refer to attention monitoring, while 'comprehension monitoring' and 'comprehension evaluation' were used to distinguish between checking of comprehension during and after listening.

The data revealed a total of 44 listening tactics. These were subsequently grouped under 14 strategies. Figs. 1 and 2 show the lists of cognitive and metacognitive strategies and their respective tactics. Retrospective protocols illustrating selected tactics are also presented (see Tables 1 and 2).

4.1. Cognitive tactics

Cognitive tactics were used to process utterances directly by transforming them into mental representations that could be stored and recalled. Twenty-two such tactics were identified.

Through cognitive tactics, many informants made associations between new and old information. Some of these tactics had clear benefits. When informants used contextualisation tactics they were less preoccupied with getting the exact meanings of words. Instead they were more interested in constructing the big picture in terms of local cohesion (within the text) and global cohesion (with information outside the text).

Inferencing (Filling in missing information and guessing meaning of words)
Use contextual clues
Use familiar content words
Draw on knowledge of the world
Apply knowledge about the target language
Use visual clues

Elaboration (Embellishing an interpretation to make it meaningful and complete)
Draw on world knowledge
Draw on knowledge about the target language

Prediction (Anticipating contents before and during listening)
Anticipate general contents (global)
Anticipate details while listening (local)

Contextualisation (Relating new information to a wider familiar context)
Place input in a social or linguistic context
Find related information on hearing a key word
Relate one part of text to another

Translation (Changing words, phrases or sentences into L1 before interpretation)
Find L1 equivalents for selected key words
Translate a sequence of utterance

Fixation (Focussing attention on understanding a small part of a text)
Stop to think about the spelling of unfamiliar words
Stop to think about the meaning of words or parts of the input
Memorise/repeat the sounds of unfamiliar words
Memorise words or phrases for later processing

Visualisation (Forming a mental picture of what is heard)
Imagine scenes, events, objects etc. being described
Mentally display the shape (spelling) of key words

Reconstruction (Using key words to recreate meaning)
Reconstruct meaning from words heard
Reconstruct meaning from notes taken

Fig. 1. An inventory of cognitive tactics in learner listening.

The success of some tactics, however, was dependent on other factors. Elaboration tactics, though generally helpful, were counter-productive when the wrong kind of knowledge was drawn upon. Translation tactics actually slowed down processing and often took the informants' attention away from clues that might have assisted their comprehension. Reconstruction tactics were not useful when the informants did not hear or note down a sufficient number of key words for recreating the original message. Sometimes even when many key words were noted, some informants

Pre-listening Preparation (Preparing mentally and emotionally for a listening task)
Preview contents
Rehearse sounds of potential content words
Encourage oneself to relax

Selective Attention (Noticing specific aspects of input)
Listen to words in groups
Listen for gist
Listen for familiar content words
Notice how information is structured (e.g. discourse markers)
Pay attention to repetitions
Notice intonation features (e.g. fall and rise tones)
Listen to specific parts of the input
Pay attention to visuals and body language

Directed Attention (Monitoring attention and avoiding distractions)
Concentrate hard
Continue to listen in spite of difficulty

Comprehension Monitoring (Checking/ confirming understanding *while* listening)
Confirm that comprehension has taken place
Identify words or ideas not understood
Check current interpretation with context of the message
Check current interpretation with prior knowledge

Real-time Assessment of Input (Determining the value of specific parts of the input)
Assess the importance of problematic parts that are heard
Determine the potential value of subsequent parts of input

Comprehension Evaluation (Checking interpretation for accuracy, completeness and acceptability *after* listening)
Check interpretation against some external sources
Check interpretation using prior knowledge
Match interpretation with the context of the message

Fig. 2. An inventory of metacognitive tactics in learner listening.

Table 1
Retrospective protocols of selected cognitive tactics

	Protocols
Inferencing	
Use contextual clues	"... the article talk about how camel can store food. So I think the hump means 'tuo feng'."
Use familiar content words	(Heard "a nice knapsack on his back") "Maybe a kind of bag or something—on the back. (Pointing to own backpack on the floor).
Draw on knowledge of the world	"Actually, I, at first I didn't know what 'hampe' (*Actual word: Hump*) is, but when you talk about the food store and the fat, I can guess the meaning by the knowledge I've learnt in Chinese."
Apply knowledge about the target language	(Heard 'adiposity') "Is it means, again means the store, it gives out energy?...Deposit. I thought of... it's a word used in banking... I think there is some relationship, I guess."
Elaboration	
Draw on world knowledge	"About water. I think in the dessert camel can find the grassland and there is some water."
Prediction	
Anticipate general contents	"I can understand this sentence because I have known something about camel...if you don't say anything more I will still know what you're going to say."
Anticipate details while listening	"Because in the first sentence it says the hump. And I remember that usually the camel has two humps and maybe the next sentence is on what the use of the hump, what's the importance to the camel, so it also can helps me to understand."
Contextualisation	
Place input in a social or linguistic context	(Heard "the camel's hump") "I don't know the word's exact meaning, but I remember the word is on the road—hump."
Find related information	"When I heard the first sentence talk about the, the general animal, I think. I looked for the information in my memory about this. So with this information I listened."
Relate one part of the text to another	"I tried to remember the words before and then catch the main idea."
Translation	
Find L1 equivalents for selected key words	" I...this word came to my brain, that is 'shou duan, fang fa, shou duan'. It's mechanism. The way...the strategy."

Table 1 (*continued*)

	Protocols
Translate a sequence of utterance into L1	"Receive his eyes? When I translate word by word then I'm going to be confused...Receive—'jie sou' Receive–'jie shou', on his eyes. 'Tai yang guang ji zhong zai ta de yan jing shang,shi majority?' [Does it mean that sunlight is focussed on his eyes?] 'Ta de yan jing jie shou tai yang guang?' [His eyes receive the sunlight?]
Fixation	
Stop to think about the spelling of unfamiliar words	(Heard "under our skin") I thought under, under what skin? Rar skin?...Uh, I spelled, according to the pronunciation...Under R-A-R-S-K-I-N
Stop to think about the meaning of words or parts of the input	(Heard "adiposity") Because when I listening, if we come to this word, I think, the most suitable meaning of this, of the word, usually I put it there. So when you read 'a deposity', then I thought oh that's a word...what meaning will be most appropriate?
Memorise/repeat sounds of unfamiliar words	(Heard "the food store in the rucksack") "Ah yes, this word 'rocksa'."
Memorise words or phrases	"What's the meaning of 'designed by a committee'?"
Visualisation	
Imagine things being described	"I can understand this sentence because I have known something about camel, so you talk about the hump, just like a picture showing before me. I can see two humps..."
Mentally display the shape (spelling) of key words	"I can remember the 'fat' is spelling and the 'hump' is spelling, but I don't think the 'water' and the 'food store', no use spelling, just listening."
Reconstruction	
Reconstruct meaning from words heard	"Er, first I listen to the word, words, and the whole sentence. And I try to catch the word that I...very easy to understand, and to...connect them, such as the food, and the store...get the...get the meaning."

were still unable to arrive at an understanding because they lacked the relevant background knowledge to complete the gaps.

A strategy that to my knowledge has not been reported in the literature is what I have termed 'fixation'. Fixation refers to the various ways in which the informants focussed all their attention on a small part of the message. Because many informants experienced poor sound-script recognition, they tried to spell familiar sounding words in the hope that they could match them with something they already knew. Some informants also stopped listening to think about the meaning of one part of the input. Other tactics included repeating and memorising sounds of an unfamiliar word or a phrase. The informants hoped that this would facilitate recalling and

Table 2
Retrospective protocols of selected metacognitive tactics

	Protocols
Pre-listening preparation	
Rehearse sounds of potential content words	"Ultra-violet, ultra-violet, ultra-violet..."
Encourage oneself to relax	"This time, the strategy that I induct is to be relaxed. Just talk and listen as it you were speaking and listening to Chinese. Don't be nervous if there are any blocks. Just continue, considering the pause as a very natural phenomenon in speaking."
Selective attention	
Listen for familiar content words	"Er, first I listen to the word, words, in the whole sentence. And I try to catch the words that I ... very easy to understand..."
Listen for gist	"The speed was very fast; especially the linking pronunciation made me misunderstood. However, I tried my best to catch the idea of the whole situation. I can understand the major part of broadcasting."
Notice how information is structured	"I noticed the junction of several parts. We often get confused when we don't know the structure of the whole speaking."
Pay attention to repetitions	"If you only read the words only once, maybe I can't. Because you said it again and again and I heard it, I can remain interest so I can understand."
Listen to specific parts	And because...because I hear it's *also*, then I concentrate on the word after 'also'."
Directed attention	
Concentrate hard	"I tried to concentrate."
Continue to listen in spite of difficulty	"Province. Province and evidence. And I think I don't know the word so I gave up and tried to catch the following part."
Comprehension monitoring	
Confirm comprehension	"This part I think is much easier than the first one. I can understand it."
Identify words or ideas not understood	"There's one word, I didn't hear. Er the something is ...er protects eyes, and some other I can't remember."
Check current interpretation with context of the message	"But actually I know this meaning, but this meaning doesn't make any sense to me in this sentence."
Check current interpretation with prior knowledge	"I was saying to myself, mm... did I guess right? How can eyebrow protect the ultra-violet light to our eyes I think what I know influence my understanding and comprehension."

Table 2 (*continued*)

	Protocols
Real-time assessment of input	
Assess the importance of problematic parts	"I didn't quite, I didn't catch the word before 'water', or several words, but later I, when I hear the word 'water' and comparing with the context, I think it's something... but never mind, I hear the word 'water'."
Determine the potential value of subsequent parts	"Yeah. I concentrated my mind on the first part . . I can judge that the second part is not very important. Just like that case, only a, a, addition and nothing else."
Comprehension evaluation	
Check interpretation against external sources	"Beach. What's beach? (Beach is 'hai tan')... Yeah, but in this case, er I can't connect the 'hai tan' to ' beach'.
Check interpretation using prior knowledge	"I think 'mechanism' is... I learnt the word in Chinese, so in Chinese it means 'ji xue'. It means something about machines. I cannot relate it to the camel."
Check interpretation with the context of the message	"I think it means something like protect, and I think 'insurance' is to protect. ... And I think it's suitable here so I (laughs) tell, tell myself I'm right!"

processing at the next available opportunity, such as by using a dictionary or asking someone about the meaning. Although rehearsal or repetition may strengthen an item in short-term memory, language learners generally have limited capacity in their short-term memory to retain information in the target language. Moreover, two factors—trace decay and interference from new input—can impede the delayed processing of what is still stored in the short term memory (Nagle and Sanders, 1986). Fixation tactics were therefore often counter-productive. Some informants in fact realised this, as one reported "*Sometimes I try to remember it. At first I can remember it, but after the whole dialogue is finished I want to remember what I can remember just now, but I can't remember at all.*"

4.2. Metacognitive tactics

Metacognitive tactics were used to manage complex cognitive processes before, during and after processing the information. Twenty-two metacognitive tactics were identified and they each fulfilled one of the three functions of metacognition, namely, planning, monitoring and evaluation.

Like cognitive tactics, some metacognitive tactics were more useful than others. On the whole, pre-listening preparation tactics prepared informants both, cognitively and affectively. By anticipating contents, content words and rehearsing their sounds, informants avoided word recognition problems and processed the input more quickly. By actively encouraging themselves to relax during listening, they also

lowered their anxiety in what many learners would agree to be a stressful activity. Another planning strategy used was selective attention. Informants decided in advance those aspects of the input they wanted to pay attention to.

Three groups of monitoring tactics were used. Directed attention, which helped to monitor attention, ensured that the informants perceptual processing was not interrupted. Nevertheless, some informants' found the tactic of maintaining concentration to be stressful because they had not learned to vary the intensity of their concentration. To check and confirm understanding *during* listening, comprehension monitoring tactics were used. Two advanced monitoring tactics made use of both external and internal resources to check current interpretation. These resources included information in the text, visuals, prior knowledge and context. The infrequent use of these two higher-level monitoring tactics strongly suggested that the informants' comprehension monitoring was inadequate. Pressley et al. (1992) found that even with adult first language users, comprehension monitoring was often lacking. It is therefore not surprising that the language learners in this study did not always monitor their comprehension effectively.

The third group of monitoring tactics operationalised a strategy that. to my knowledge, has not been reported in the literature. I have classified them as tactics for 'real-time assessment of input' strategy. Informants used them to assess how important certain parts of the input were as they listened. Their decision directly determined whether these parts were given further attention. One tactic that some informants used was to assess whether or not the problematic part would affect the cohesiveness and coherence of the emerging interpretation. As one noted: "*There is no grammatical mistake if you omit the word*", and another: "*I think I can combine with my personal experience. I know that fat can keep heat. Then isn't very necessary for me to know the not familiar, the new word.*" One informant tried to determine the potential value of parts of the text he was about to hear. The decision was made based on how much he had understood up to that point. Unlike directed attention tactics which ignored all problems, tactics for real-time assessment of input gave those informants the option to actively employ other tactics to facilitate understanding. For example, when they considered a part to be important, some informants would listen out for repetitions, for rephrasing of the same idea, or for a summary at the end. Finally, use of these tactics allowed the informants to vary the intensity of their attention, thus making listening less stressful for them.

Comprehension evaluation strategy was operationalised by tactics that checked accuracy, completeness and acceptability of an interpretation *after* listening. These tactics were characterised by external, internal and contextual measures used. The most common tactic was to check the interpretation against the context of the input. Interestingly, some informants who had understood key words in a passage rejected their literal comprehension because it did not fit in with what they thought the passage was about. Interpretations were also checked against prior knowledge to evaluate how plausible or acceptable they were. Other tactics included asking the speaker to confirm their interpretation and looking up a dictionary to check the inferred the meaning of unfamiliar words.

4.3. Interaction of comprehension tactics

Informants often used a combination of tactics to process each segment of the passage. This is consistent with the view that text comprehension is a dynamic process involving the interaction of mental techniques. To offer some insights into differences between learners of different listening abilities in this process, the interaction patterns of comprehension tactics of two informants are presented.

4.3.1. Informant A (high listening ability)

Informant A's verbalisations revealed an interaction of cognitive and metacognitive tactics in five of the six sequences of verbalisations. Through this, A managed to achieve a reasonable interpretation of the whole passage in spite of problems at the beginning (Table 3).

In RP1, A noticed a problem as soon as she began, but continued listening. She used familiar words to infer the meaning of the passage and the word 'hump'. With her knowledge about the camel, A reached the understanding that the segment was about the camel's hump. She also inferred the meaning of 'hump'. Throughout this sequence, A kept her attention on the input. In RP2, A used fixation tactics to tackle the word 'adiposity'. She memorised its pronunciation and stopped to think about its meaning. This could be because she thought she knew the word since 'adiposity' sounded like 'deposit'. In RP3, A heard the word 'providence'. She memorised its sounds and using some familiar words inferred its meaning as a type of organism. The presence of key words from the segment in RP3—skin, fat and 'organism' (actually 'mechanism')—showed that they were used to reconstruct meaning, albeit unsuccessfully. A used this reconstruction tactic again by creating an interpretation from 'heat' and 'food store'. This time it was acceptable because she had the relevant knowledge to support her reconstruction. This is an example of how bottom up processing can be useful when supported by the right type of prior knowledge during top-down processing.

In RP4, A repeated a phrase containing the unfamiliar word 'knapsack' as soon as the input stopped. She tried to understand it, perhaps with some help from me. At the same time, A was actively monitoring her understanding of other parts of the segment. She used two high level monitoring tactics. Firstly, she compared her interpretation with her knowledge about how camels stored heat in their bodies. Secondly, she checked her interpretation with the context in the segment by paying attention to the next part of the input. In this processing sequence, A managed to monitor her ongoing comprehension while retaining a problematic part of the input in her working memory. In RP5, A arrived at a preliminary interpretation of 'knapsack' by associating it with 'hump'. She also tried to evaluate her comprehension by asking me for the answer. Once again, A used her prior knowledge to assist her understanding. At the same time, she used the context that had evolved by then to interpret and confirm her understanding of an unfamiliar word. In RP6 A actively monitored her comprehension and attention. She pointed out the exact part she had not understood, but continued to listen. Because she recognised the word 'advantage', she successfully related the last part of the segment to an earlier part.

Table 3
Retrospective protocols of Informant A (high ability listener)

	Retrospective protocols	Types of tactic	Strategy type
1	At first, I didn't catch the first sentence. Then gradually... uh, I cannot figure out the words, some of it are unfamiliar to me (CM2). And the last sentence, ''it can store food'' (IF2) and that's something at the back of the camel (EL1), so I can relate to former sentence and the meaning(CT3), even though the word and the whole sentence I didn't know (DA2).	comprehension monitoring + inferencing + elaboration + contextualisation + directed attention	Metacognitive + Cognitive
2	I heard the word 'po-co-si-ty'(FX3). I didn't know the meaning (CM2), so I spent a little time on that (FX2) and I missed the first and other important words in the last sentence (CM2)	fixation + comprehension monitoring + fixation + com monitoring	Cognitive + Metacognitive
3	I don't know how to say... 'Providy' (FX3) is a organism under the, including skin and fat of some sort (IF2) (RC1) . And it gives some heat keeping as well as food storing (RC1) (EL1).	fixation + reconstruction + inferencing + reconstruction + elaboration	Cognitive
4	His nice apsack back (FX3) (FX4). Actually I was surprised by the meaning that camel store the heat in the cold night not um in daytime (CM4). So I paid particular attention to the following sentence (SA5) (CM3), but the last sentence is too long so I think I missed the middle phrases (CM2).	fixation + fixation + comprehension monitoring + selective attention + comprehension monitoring + comprehension monitoring	Cognitive + Metacognitive
5	Is the meaning is equal to hump in the beginning (CE1)? Because food is stored in hump (IF1), and the heat resource is stored there in the hip, hip sack (IF3). Is the two terms equal?	comprehension evaluation + inferencing + inferencing	Metacognitive + Cognitive
6	In the middle I didn't hear clearly about one part, something, just before comparison between camels and other animals (CM2). But I after hearing all the paragraph (DA2) I can find camel didn't, camels don't store the heat in all their skin, just in their knapsacks, so this is the outstanding advantage they have... distinguish from other animals (CT3).	comprehension monitoring + directed attention + contextualisation	Metacognitive + Cognitive

4.3.2. Informant B (low listening ability)

Evidence of tactic interaction in sequences of processing was also present in the retrospective protocols of B. There was, however, some difference in the quantity and quality of tactics used (Table 4).

In RPI, B monitored his understanding from the beginning. Although he did not understand 'hump', B used the context to infer its meaning. He also visualised the hump so as to make the interpretation personally relevant and easier to process. This sequence shows B making use of his prior knowledge and familiar key words efficiently to achieve comprehension in spite of initial problems. In RP2, B once again noticed an unfamiliar word, but at the same time paid special attention to familiar ones. He tried to use these words to infer the meaning of the unfamiliar word, but eventually ignored it. Although his comprehension did not improve, B showed that he had the tactics to cope with difficulties. There was, however, no evidence of him trying to use his prior knowledge to assist comprehension. This could be because the words he recognised were insufficient for schema activation. In RP3, on hearing 'reserve', B repeated it several times and even stopped listening to think about its meaning. This time these tactics paid off and he recalled where he had seen the word. By placing it in a wider context of 'copyright reserved', he understood the meaning of this vaguely familiar word. In this sequence B appeared to rely almost exclusively on cognitive tactics.

In RP4 B revealed that he paid close attention to the words. When he heard something familiar, a relevant schema was activated. By relating the segment to his prior knowledge, he tried to derive a general sense of the meaning. He noticed unfamiliar new words, and again paused to think about their meaning. Realising he did not understand them, he turned his attention back to the input. RP5 shows B using three metacognitive tactics for comprehension monitoring and directed attention. B noticed several unfamiliar words, but ignored them because he could ''understand the sentence'', which he had probably processed automatically. Finally, in RP6, B recognised the word 'advantage' and immediately linked it to his knowledge about the usefulness of the camel's hump. With that knowledge he predicted the words that he would hear. He also visualised the desert, which he associated with the camel.

Both informants combined several comprehension tactics to process each listening segment. There was evidence of cognitive and metacognitive tactics working together, as well as top down and bottom-up processes interacting to achieve comprehension. Informant A used a wider range of cognitive and metacognitive tactics which interacted efficiently to facilitate comprehension. She used prior knowledge, linguistic knowledge and contextual information, three important comprehension resources, to process input and manage the processing. In contrast, B used only one inferencing tactic and only low-level comprehension monitoring tactics. However, the two listeners shared some similarities. They engaged in top-down processing wherever possible, as evidenced in their use of tactics for inferencing, elaboration, prediction, and contextualisation, which relied heavily on prior knowledge. Both also got fixated on problematic parts but were also ready to ignore difficulties and continue listening. A possible explanation for this is that when they found a word

Table 4
Retrospective protocols of Informant B (Low ability listener)

	Retrospective protocols	Types of tactic	Strategy type
1	Oh you talk about a word I'm not sure (CM2), but I guess its meaning... *Ni jiu shi tan na ge luo tuo de tuo feng*. (You were talking about the camel's hump). (So you didn't know what hump was?) Yes, but after you said it several times and from the words around it I can guess its meaning (IF2)...it's a picture. (VS1)	comprehension monitoring + inferencing + visualisation	Metacognitive + Cognitive
2	... at the beginning there is a word I'm not sure of its meaning (CM2) ... firstly, I tried to understand the meaning of the words around it (SA1) and guess its meaning (IF2). When I failed, I just let it pass (DA2).	comprehension monitoring + selective attention + inferencing + directed attention	Metacognitive + Cognitive
3	Reserve.... And I repeat the sentence in my mind... (FX3) And think about what's the meaning of ''reserve''. Um, reserve... reserve... (FX2)...(Did you get the meaning?) Yes. 'bau liu'... because I saw the words several times on the...ah,... beginning of some books, the copyright reserved. (CT2) Because I have a deep impression of the copyright reserved.	fixation + fixation + contextualisation	Cognitive
4	I listened to you first and then my general knowledge will come into the mind (CT2) ... after you read the sentence, only one sentence, I will reflect, reflected the meaning of new words (FX2)... In that case I don't understand the word (CM2), so I let it pass (DA2).	contextualisation + comprehension monitoring + fixation + comprehension monitoring + directed attention	Cognitive + Metacognitive
5	...in the middle of that sentence, I'm not sure several words (CM2), but I think I can understand the sentence.(CM1). So I let them pass. (DA2)	comprehension monitoring + comprehension monitoring + directed attention	Metacognitive
6	... when I listened, when I heard the word ''advantage'', um I think what are the advantage the hump has (CT2). So hmm, I will think that you will talk about his food store on his back and of course words connected with the desert (PD2), the picture in the desert (VS1). It will help me to understand the second part of what you say.	contextualisation + prediction + visualisation	Cognitive

vaguely familiar they would try to think of its meaning. If, however, they knew the word was completely new, they would ignore it and keep their attention on the input. The interaction of tactics when one segment of the input was being processed shows that although individual tactics were useful, successful comprehension also depended on whether the listener was able to combine various mental tactics in a way that could truly enhance comprehension.

5. Pedagogical implications

The application of strategy research in the classroom has been a matter of some debate (see Gu, 1996, on learning strategies, and Yule and Tarone, 1997, on communication strategy research). Reactions in the field of listening have also been mixed (see Buck, 1995; Mendelsohn, 1995). Although the value of listening strategy training is inconclusive (Chamot, 1995), research findings could still be used to improve learner listening indirectly through awareness-raising tasks. There appears to be a strong relationship between learners' metacognitive knowledge and strategy use, as research in both education and ESL/EFL has shown (Paris and Winograd, 1990; Gagnè et al., 1993; Mantle-Bromley, 1995; Yang, 1999; Cotterall, 1999). In this regard, the results of the present study may have at least two applications. Firstly, the inventory of strategies and tactics can be a means by which learners discover more about listening processes. Secondly, transcribed retrospective protocols can be used to show learners how listening tactics are applied. Besides examining other people's protocols, learners can do some verbalisation themselves. Their protocols can be recorded and transcribed, and given back to them to reflect on the strategies and tactics they use. Effective as well as counter-productive tactics can be highlighted and discussed.

An early criticism of strategy training in general education pointed to the fact that many interventions focussed on independent techniques which may not fit together in anyway to produce a coherent learning outcome (Schmeck, 1988). This might perhaps explain why some listening strategy training programmes did not get the success intended. Once again, retrospective protocols that show interaction of tactics in sequences of processing can demonstrate to learners how different tactics support one another in achieving comprehension.

6. Conclusion

This study sought to better understand how a group of ESL listeners processed and managed information through specific tactics that operationalised broad strategies. It achieved its objective of producing a preliminary inventory of comprehension tactics that helped clarify and validate some existing categories of strategies. Two new strategies and their component tactics have been identified: fixation and real-time assessment of input. An analysis of two informants' retrospective protocols showed the interaction of various tactics that made use of prior knowledge, text

and context. One important difference was in the number and quality of tactics used in inferencing, comprehension monitoring and comprehension evaluation strategies. The findings in the study showed that the strategy–tactic distinction was useful for a better understanding of qualitative differences in the application of broad strategies and the hierarchic relationships between strategic behaviours during listening. For further research, it would be useful to find out how the choice of tactics and tactic interaction patterns directly affect individual performance in listening tests that contain longer texts and a variety of text types.

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