

## Cognitive and Strategic Processing of EFL Students their effects to the Listening Skills of EFL Students

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### Abstract

While hearing is essential for communication, it is the least studied skill among English as a foreign language student at the national and international levels (EFL). Furthermore, academics and teachers do not always grasp how listening happens, how it can be taught, and how it can be assessed. Our study looked at the listening processes elicited by EFL students when listening for comprehension to fill this need. “A 30-minute multiple-choice listening test, followed by prompted recalls, was performed by twenty-four students.”“Their triggered memory transcriptions, listening notes, and test responses were assessed to see which cognitive processes and approaches they employed while listening and how successful they were as listeners.”“Although people used cognitive processes for listening to both lower and higher levels, most participants, both high and low ability listeners, reported relying on more inefficient lever processes” (word recognition and parsing). Participants often use inferencing, elaboration, and understanding monitoring. Cognitive processes and strategies were triggered in a highly interactive and complex way. “The findings have implications for how effective listening abilities should be taught in the EFL classroom, the type of materials that should be used,” and the most effective techniques for measuring listening skills.

**Keywords:** “EFL listening, Cognitive processes for listening, strategies for listening, L2 listening education”

### INTRODUCTION

While developing learners' ability to communicate in English is a fundamental aim of education today, English instruction and assessment have historically emphasized teaching and assessing English structure and lexis knowledge. This is reflected in the design of English national tests such as O-NET and the TOEIC's worldwide appeal. Both of these examinations allocate a significant amount of the final score to decontextualized grammar and vocabulary testing rather than directly measuring test takers' ability to speak in English. Furthermore, investigations of classroom

practice have shown a considerable focus on reading, vocabulary, and grammar, partly due to the washback effect of these examinations (Byusa et al., 2021). Another significant barrier is the teachers' own lack of speaking abilities and unfamiliarity with the processes necessary for communicative training (Korkmazgil & Seferolu, 2021). In response, new initiatives have been launched to develop more stringent language competence standards for teachers (Fu & Wang, 2021) and provide opportunities for training in communicative language teaching styles (Ismailova et al., 2020).

Listening is a big challenge in the environment since it is crucial for good oral engagement but seems undeveloped in most English schools. Several difficulties with students' ability to listen for comprehension have been highlighted in earlier research. For example, Islam and Stapa (2020) observed that low-proficiency EFL learners struggle with perceptual processing, or the ability to perceive linguistic information in what they hear (e.g., distinguishing between sounds and recognizing words and meaning). According to the study, they have poor comprehension of L2 vocabulary and are unfamiliar with linguistic elements of target language texts such as the sound system and text structure. As a result, people cannot discern words, phrases, or idea units when listening, significantly impairing their ability to grasp what they hear. Wei (2021) observed that, in addition to linguistic difficulties in hearing texts, EFL listeners suffered from listening speed and accents. They could not understand foreign accents or follow English spoken at an average rate (Wei, 2021). Furthermore, most of them were unaware of practical listening abilities that may assist them in effectively performing a task. Instead, they were seen to pay particular attention to each word and worry when they did not understand it; as a result, they did not proceed to a higher level of processing and were unable to grasp any of the text (Wei, 2021).

These challenges with listening comprehension are not limited to pupils but seem to be a widespread concern among language educators. Numerous attempts have been undertaken to develop ways that may assist children in improving their listening abilities. Several studies (Rukthong, 2021) assessed the listening strategies used by low- and high-ability listeners to establish a list of listening strategies that should be covered during a training session. Another study (Ahmadi Safa & Motaghi, 2021) encouraged listeners to adopt good listeners' cognitive and metacognitive skills. However, the results do not seem acceptable since participants' knowledge did not appear to improve despite their greater conscious awareness of particular listening methods (Motaghi, 2021).

These studies were ineffective in improving EFL listening abilities because they focused only on strategic processing. Strategic processing refers

to students' steps to help and monitor cognitive processing to enhance their learning or understanding (Hinz et al., 2021). Indeed, the cognitive processes created during a learner's life are vital agents of listening processing (Zarrabi, 2020) and hence cannot be disregarded. Mental methods, which are broad cognitive activities that learners participate in to acquire or grasp new knowledge, are combined with strategies (Hinz et al., 2021). Consequently, focusing just on procedures may not sufficiently tap into the mental processes related to target language usage (Hinz et al., 2021).

While strategies have received much research attention, other cognitive processes connected with listening processing remain largely unknown. This might be because it is harder to notice cognitive processes that are activated spontaneously and hence are not as apparent as strategies (Luoma & Martela, 2021). As Yapp et al. (2021) point out, the fact that cognitive processes are less observable does not indicate that they are negligible, mainly when functioning simultaneously with techniques. New research must be used to investigate the subtle connection between cognitive processes and methods to have a comprehensive picture of what happens when listeners seek to grasp spoken text and what elements contribute to L2 listening success.

This study aims first to examine how L2 English listeners of varying capabilities participate in different cognitive processes and methods and then to evaluate the consequences for classroom practice. It begins by digging into the theoretical basis of L2 hearing processing. Following that, the results of a study on how English learners use cognitive processes and techniques while listening are presented. The data on how good and bad listeners engage with what they hear are then used to provide precise suggestions regarding the kind of materials, processes, and assessments that may be most beneficial for improving listening competence.

## LITERATURE REVIEW

### Processing of auditory comprehension

In theory, listening is seen as a cognitive function (Khudoyberdievna, 2021). However, it seems that defining and characterizing listening styles is a challenging undertaking. When

describing the listening process and accompanying techniques, "(Duque de Blas et al. 2021) underline the necessity of evaluating the setting in which the target language is used."(Duque de Blas et al. 2021) defined two primary kinds of tactics based on this concept: "language learning methods and language use strategies." "Language learning strategies are the methods or procedures that students employ to enhance their learning process and the quality of their performance throughout the learning process."

According to Aryadoust(2021), there is no apparent distinction between these two categories since both language learning and language use strategies are employed for both

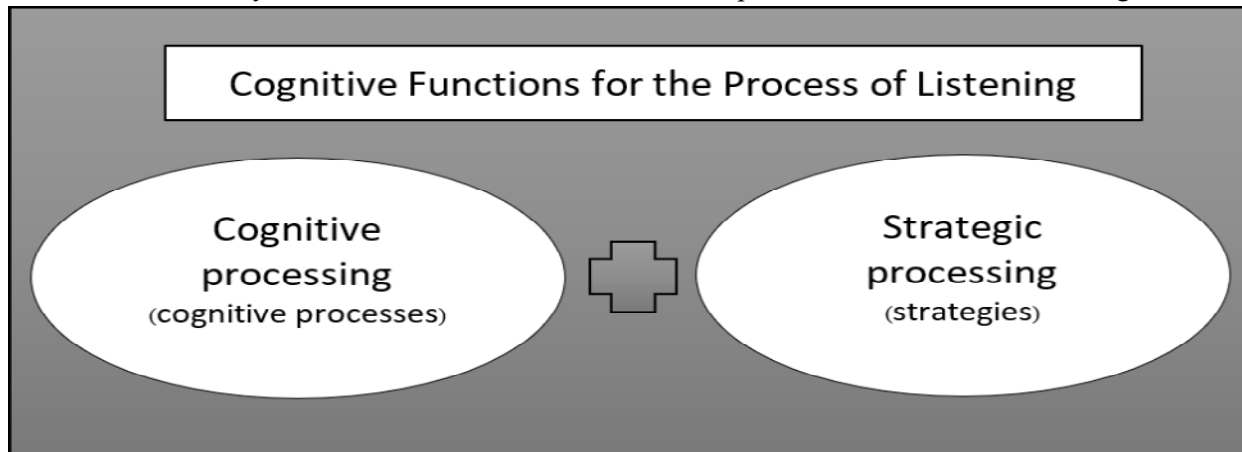
*Figure 1. Cognitive functions for the process of listening derived from Hinz et al., 2021 and Zarrabi (2020)*

learning and communication aims. On the other hand, language use methods are precise actions in which learners rely on real-time communication to achieve a job. As a consequence of this line of thought, this study conceptualizes cognitive activities for listening processing as processes that listeners engage in while attempting to comprehend what they hear, regardless of whether they are doing it for language use or language learning purposes. According to the study (Zarrabi, 2020; Hinz et al., 2021), "the process of EFL listening for comprehension consists of two distinct types of processing: cognitive and strategic processing (Figure 1), which will be addressed in detail below."

### Cognitive processing

Cognitive processing refers to processes that occur automatically, with listeners seldom

from the incoming texts. Parsing occurs when listeners divide an audio stream into meaningful components. Listeners use their grammatical



knowing the operations they partake in when seeking to interpret a hearing text. As a result, a specific and new research technique is necessary to probe into listeners' cognitive processes. Dang et al. (2021) described comprehension as a three-stage process that comprises perceptual processing, parsing, and utilization. Perceptual processing is linked to sound decoding and word grouping. It is a kind of bottom-up processing that occurs when listeners detect sounds in listening texts. These sounds are retained in the listener's working memory to allow them to recognize words or groups of words in the sound stream before being replaced with sounds/words

skills and semantic cues to identify pieces of information utilizing this approach. Utilization includes interpreting the relevance of what has been heard. Listeners rely on the meaningful units gained throughout the prior rounds of hearing processing to understand the text's overall meaning. These three processes coincide and are closely intertwined (Hinz et al., 2021). That is, while one method is operating, its output may be forwarded on for additional processing at a higher level or returned for further processing together with new incoming text (Hinz et al., 2021).

In reality, the process by which hearing comprehension happens is yet unknown. “Is it a bottom-up or top-down method of processing? Bottom-up processing occurs when the three hearing processes are conducted consecutively,” according to Lazaridou et al. (2020). (Perceptual processing, parsing, and usage). Listeners begin by decoding acoustic-phonetic information, recognizing words, parsing, semantic processing, and pragmatic processing, and then utilize the initial phase results as input for higher-level processing. On the other hand, top-down processing is not sequential but somewhat interactive and interrelated in a number of ways (Lazaridou et al., 2020). Multiple sources of information, such as linguistic knowledge, auditory input, and world knowledge, are included in the processing process depending on the available information and what listeners perceive would assist in their understanding of a listening text.

Cognitive processes take place at breakneck speed, swinging between top-down and bottom-up systems (Lazaridou et al., 2020). For L1 listeners, these processes occur spontaneously and with little or no cognitive awareness. However, since L2 listeners do not comprehend the target language and L1 listeners, they cannot digest texts as quickly. Furthermore, various characteristics, including thematic, lexical, and grammatical knowledge, seem to contribute to the automaticity of L2 listeners' operations. When listeners cannot absorb messages spontaneously, they engage in a controlled process or strategic processing to overcome impediments and grasp the texts (Hinz et al., 2021).

### **Strategic processing**

Strategic processing, or the use of listening techniques, is engaged when L2 learners have minor language, contextual, and cultural information than L1 learners, “showing that the employment of cognitive and metacognitive strategies is significant in facilitating listening comprehension” (Hinz et al., 2021). In L2 listening, essential cognitive processes include inferencing or relying on linguistic information to infer missing details or unfamiliar words/meaning, elaboration, or using past knowledge to explain or understand the importance of the input. These strategies are

generally helpful in supporting listeners in bridging knowledge gaps that may occur due to an inability to absorb complete information, hence increasing text comprehension. However, some students may have formed inaccurate “beliefs about language learning, impairing listening comprehension processing (Park & Yun, 2017).” “For example, they may feel that they must decode and comprehend each linguistic component in the input to grasp a text completely.” “This is unlikely to be necessary or possible in real-world listening situations demanding speedy online processing.” “Learners may need metacognitive abilities to manage their listening practices to catch up on what they listen to comprehend a text correctly.”

Earlier studies have emphasized the significance of metacognition in language processing (Peele, 2018). It supports the management of cognitive processes and allows language learners to overcome language processing problems. According to Hinz et al. (2021), the use of metacognition in listening requires some level of awareness since listeners utilize metacognitive procedures to achieve specific goals. According to Hinz et al. (2021), metacognitive processing for listening is activated for four significant reasons: 1) listening preparation, 2) comprehension monitoring, 3) overcoming difficulty with comprehending, and 4) assessing the strategy and its results, some of which need the implementation of sub-strategies. First, listeners must prepare for listening and create the circumstances essential for good listening. Listeners may “(1) bring to mind their prior knowledge of the issue and pertinent cultural knowledge,” “(2) forecast words and concepts they may hear during the hearing,” and “(3) anticipate what they will listen to throughout the listening input.” Second, listeners assess their understanding by listening to a message and evaluating their level of comprehension. “They may appear to verify that their predictions are consistent with the incoming text and that their current interpretation is consistent with world knowledge, reassess inaccurate predictions, assess comprehension of desired information and necessary details, and determine the effectiveness of their approach in comprehending the text.” Following that, to address comprehension issues, listeners adapt

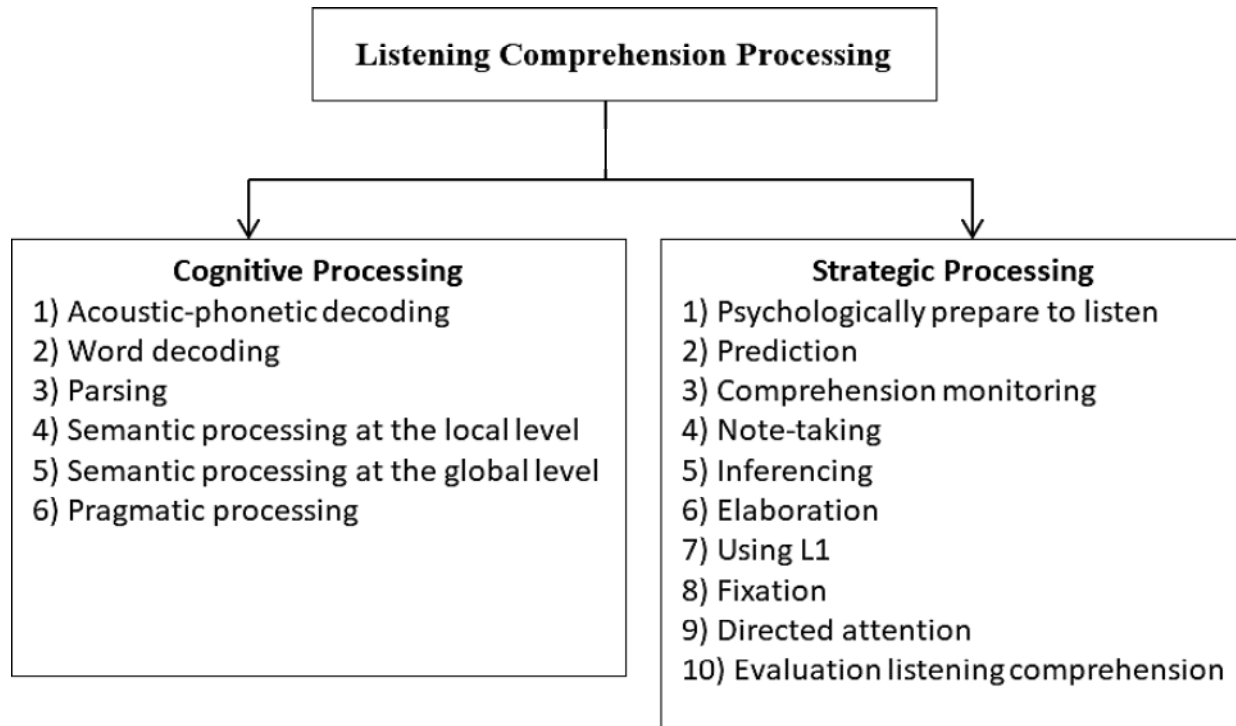
their current listening method if it does not seem to be working and use other tactics to address the issue. These tactics include the following: (1) inferencing (connecting disparate parts of decoded data to decipher the meaning of an untranslated section of text), (2) elaborating (altering conclusions to reflect new possibilities by depending on the listeners' world or subject knowledge), (3) use L1 to jot down the things that come to mind throughout the listening (internalize the listener's text's meaning in L1), (4) fixation (pause to consider or direct attention to a specific section of a text), (5) directed attention (refocusing the public's attention on the forthcoming text), and (6) assessing the listening strategy and its results (assessing their progress in problem-solving and in the listening task).

To summarize, this research examines the listening process in connection to two distinct aspects of language processing: cognitive and strategic processing (see Figure 2). Based on listeners' prior knowledge, "cognitive processing is a class of mental operations that directly contribute to text understanding." It is subdivided into six processing categories, as defined by Zarrabi (2020), which include the

following: "1) acoustic-phonetic decoding," "2) word decoding," "3) parsing," "4) Semantic processing at the local level," "5) Semantic processing at the global level," "and 6) pragmatic processing." On the other hand, strategic processing refers to applying cognitive and metacognitive methods to resolve difficulties that arise while hearing and enhancing the listening process. Strategies vary from cognitive processes in that they entail some level of awareness, which enables listeners to explain their strategic processing even when they cannot identify the nature of each strategy.

On the other hand, cognitive processes are automated processing (Hinz et al., 2021). Strategic processing is defined in this research by Hinz et al. (2021) as ten techniques that are engaged for four distinct reasons during listening activities. They are 1) psychologically prepared to listen, 2) prediction, 3) comprehension monitoring, 4) note-taking, 5) inferencing, 6) elaboration, 7) using L1, 8) fixation, 9) directed attention, and 10) evaluation listening comprehension.

Figure 2. Components of listening comprehension processing adapted from Zarrabi (2020) and Hinz et al. (2021)



### Relationship between language processing characteristics and language usage success

Studies examining the association between strategy utilization and accomplishment in learning or task performance have shown ambiguous results. Ahmadi & Keshmirshekan (2019) examined the link between cognitive and metacognitive methods utilized and performance on “a multiple-choice reading test” in a sample of 384 English language learners. The researcher discovered a clear correlation between mental and metacognitive techniques employed and reading ability using a cognitive-metacognitive questionnaire and retrospective interviews. Metacognitive methods were used more often by very successful test-takers than by moderately successful and failed test-takers. Škodová (2021) examined the associations between “593 college test takers' use of metacognitive and cognitive methods and their performance on an EFL reading test.” “Together with a 50-item reading

test, a 38-item questionnaire collecting metacognitive and cognitive techniques was employed to gather data.” “The findings indicate that there are correlations between metacognitive and cognitive processes utilized in a test situation and that combining metacognitive and cognitive methods may assist in enhancing test takers' reading scores.”

While some research (Ahmadi & Keshmirshekan, 2019; Škodová, 2021) identified a favorable association between cognitive and metacognitive methods and language competence, others discovered just a modest relationship. Yabukoshi (2021) examined the link between participants' stated use of cognitive and metacognitive techniques and their performance on language tasks using a questionnaire. The research established a link between mental and metacognitive strategy utilization. However, there were either weak or no correlations between the methods' utilization

and performance. Xu & Qui (2020) investigated the link between 30 students stated strategic actions and their ability to speak in integrated and independent activities. In general, the research found no correlation between the number of methods used and speaking performance. When the link between the techniques utilized in different task types (independent vs. dependent tasks) and performance scores were examined, both negative and positive associations were discovered. List et al. (2021) also found weak connections between the adoption of metacognitive methods and academic achievement. List et al. (2021) examined the reading strategies and educational text comprehension of 113 male students who spoke English as their first language. A questionnaire was utilized to get information on their metacognitive reading methods, and an academic reading exam was performed to measure their ability to read.

The lack of agreement regarding the “relationship between strategy use and language task performance in previous research could be attributed to a variety of factors,” including the study's context, the participants' learning experiences, and linguistic background, the skills examined, and the types of tasks used to assess ability. Additionally, to these aspects, like Mittal et al. (2020) note out, discrepancies in strategy definitions and classifications and their complicated interplay may contribute to the variances. This research aimed to elucidate the complexities of how EFL students use cognitive processes and tactics.

#### **“Research questions”**

“The following research questions were posed in this study:”

- 1) How do EFL listeners engage their cognitive processes and strategies during a listening comprehension test?
- 2) Are there any distinctions in cognitive processes and strategies when listening achievement levels are compared?

#### **METHODOLOGY**

The data indicate that cognitive and strategic processing contribute considerably to listening comprehension performance despite the difficulties discussed above. It is intended to

help readers get a better grasp of how these two processing modes interact while listening. Although the research is being done in a testing environment, the findings are intended to provide light on how EFL listeners approach and process their listening for understanding. This is because participants were advised to take the exam seriously and that the score received serves as an indicator of their listening aptitude.

#### **Participants**

The research included 24 L1 students at a university where twelve were in the social sciences and humanities while the remaining twelve were in the sciences. They varied in age from 18 to 22, with an average of 19.5 years. There were eight male pupils and sixteen female students. The participants were purposefully chosen based on two criteria: their field of study and their English proficiency. Due to the possibility that the area of study influenced how listeners viewed a listening text, students from both Sciences and Social Sciences and Humanities were chosen. Due to the study's secondary objective of comparing the listening process across learners of varying levels, their average score from required English courses was utilized to approximate their English proficiency. This was done to guarantee that persons with high, medium and poor ability were recruited. Participants were required to complete one of four variants of a listening test that had fifteen listening inputs and participate in stimulated recalls after each hearing.

#### **Research materials: Listening comprehension test**

Four parallel versions of a listening comprehension exam based on the same concept were created and utilized as a university competence assessment. The data collection instrument was an English exam administered in four rounds in 2017. Each version had 30 multiple-choice questions and was designed to be completed in 30 minutes. Three components comprised the examination:

Part I (Items 1–10), which consisted of ten brief exchanges, was designed to assess an individual's capacity to listen for key ideas. Each talk lasted around 15-20 seconds and included a variety of topics, from airport pickup to recreational activities.

Part II (Items 11-20), which consisted of three lengthier talks (1.00-1.15 minutes in length), was designed to measure an individual's capacity to comprehend the nuances of the topic. Test participants were instructed to respond to three to four things after listening to each talk.

“Part III (Items 21-30) consisted of two interviews/advertisements (about 1.5-2.0 minutes in length),” with each interview/advertisement followed by five questions regarding both the specifics and the overall idea of the talk.

Test takers were required to first listen to the spoken words and then listen to the subsequent questions and answer them one by one to finish the exam successfully. This exam did not allow for question previews, and test-takers were only permitted to listen to each question once. Cronbach's Alpha scores for the tests after the pilot study and item amendment were 0.85 for version 1, 0.78 for version 2, 0.81 for version 3, and 0.81 for version 4, indicating good reliabilities.

#### Data collection: Stimulated recalls

The researcher stimulated recollections one-on-one with 24 individuals immediately after listening to each talk and answering the associated questions. “The researcher began by

explaining to the participants what the stimulated recall procedure would include and what they would be responsible for throughout data collection.” A video clip was taken of each participant while they completed the exam. After participants listened to each input and responded to the related question(s), the listening test was halted, and a stimulated recall was administered. Every participant was asked to watch a video of themselves taking the test, examine their responses and any notes taken, and explain to the researcher what they were thinking while listening, what they paid attention to, why the participants took notes (if any), how the participants chose the answer, and what they understood/knew about the input texts. Participants completed a sample listening item before data collection and immediately participated in the stimulated recall. This was done to ensure they comprehended the entire data-gathering procedure.

Because each version of the test consisted of three sections with fifteen listening inputs, and the 24 participants were randomly allocated to one of the four versions, a total of 360 stimulated recollections were arranged (see Figure3).

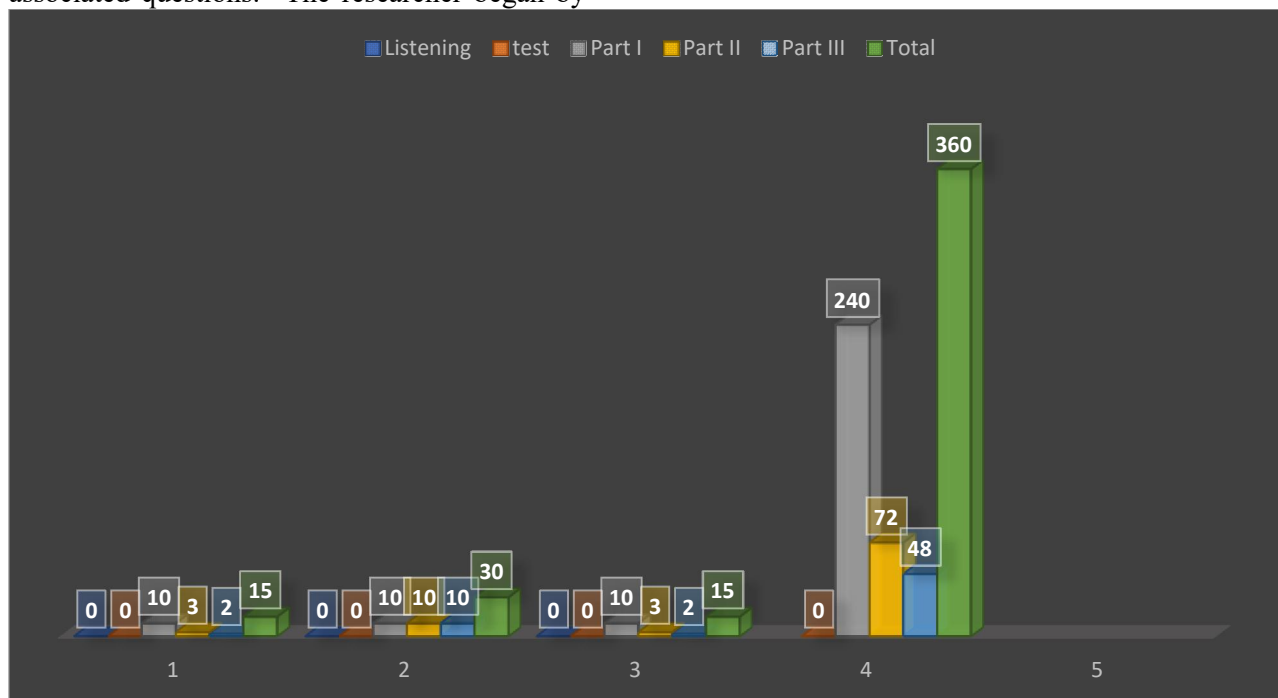


Figure 3. The number of Stimulated recalls organized in total



### Data analysis

The stimulated recall data were evaluated to ascertain individuals' cognitive processes and strategies to complete the test. It utilized a coding method derived from earlier research (see Figure 4), with codes categorized into two categories: cognitive processes and tactics. An external coder was utilized to examine 25% of the data to confirm the credibility of the data analysis. Cohen's kappa value for intercoder reliability was .82, indicating an adequate level of reliability. As said before, cognitive processes are automatic and difficult to detect. Thus, this research used a triangulatory coding strategy: what participants said they had heard or remembered about the text during the stimulated recall was examined alongside their listening notes and weighed against their performance on the tasks. A frequency count of cognitive and strategic processing occurred when participants demonstrated signs of action in their stimulated recollections or in the notes they took, compared to their response or what they claimed to understand about the text.

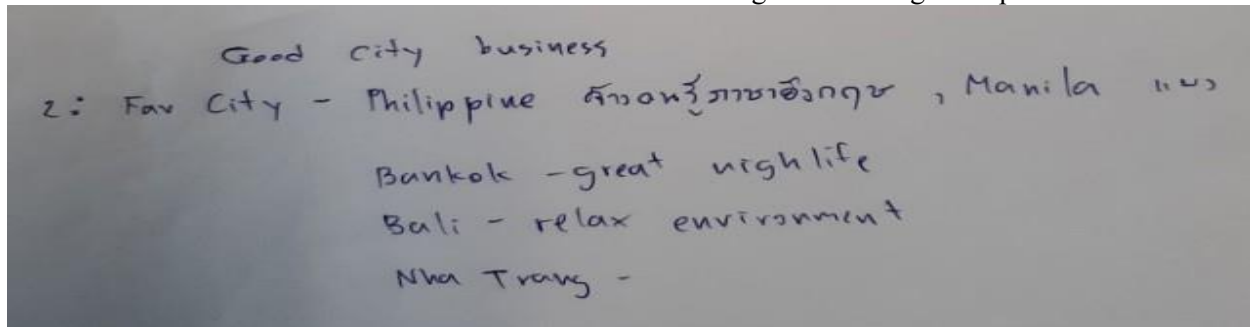


Figure 4. Participant's listening notes

### RESULTS

This section begins with frequency counts for each processing type. “It then compares the cognitive processes and strategies activated by participants with varying performance levels to provide an overview of the cognitive and strategic processing participants engaged in while completing the listening tasks.” It is essential to keep in mind that owing to the intricacy of mental processes that occur automatically and may go unnoticed in the data set, the number of frequency counts acquired may only represent the very minimum amount of

processing occurring. The second section discusses cognitive and strategic processing interdependence as shown by stimulated recollections. **During a listening comprehension exam, cognitive and strategic processes are triggered.** The study of stimulated recall “transcriptions and participant listening notes revealed that participants engaged in a variety of cognitive processes and techniques while listening to answer MC comprehension questions (see Figure 5).” Concentrating on cognitive

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**During a listening comprehension exam, cognitive and strategic processes are triggered.**

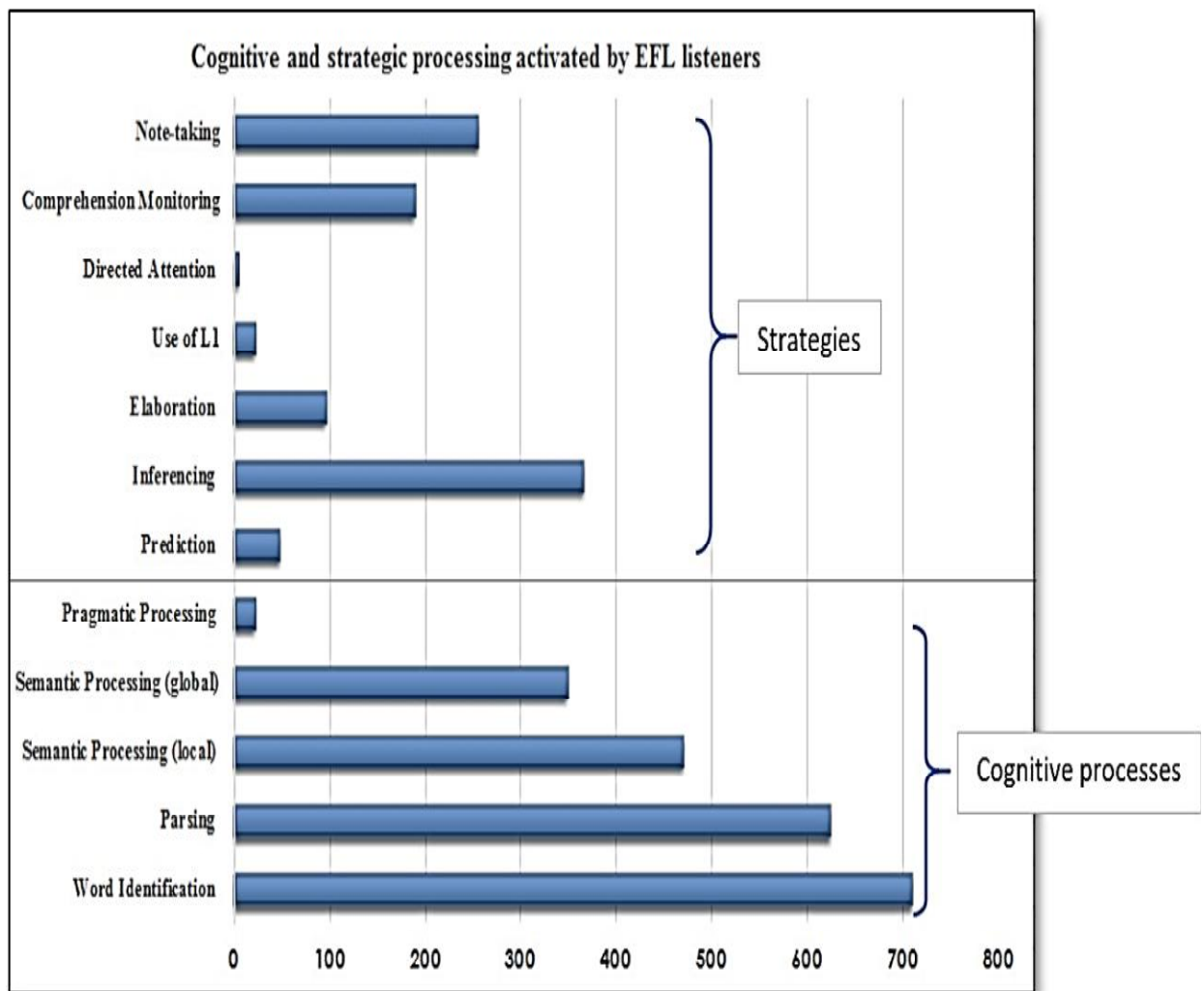
The study of stimulated recall “transcriptions and participant listening notes revealed that participants engaged in a variety of cognitive processes and techniques while listening to answer MC comprehension questions (see Figure 5).” Concentrating on cognitive

processes, “the highest rates were discovered for lower-level processing such as word recognition and parsing.” This is unsurprising, given that these mental processes were used to collect words, sentences, or bits of information within a spoken text, assisting listeners in making sense of the text they are hearing. Global cognitive processes, “such as semantic and pragmatic processing that allow listeners to understand the text’s meaning,” were engaged less often than local cognitive processes.

In terms of strategies, the findings indicate that they were used less than half as often as the total

number of cognitive processes counted. Inferencing was the most often used strategy, followed by note-taking, understanding monitoring, and elaboration; however, they were less frequently used than cognitive processes. Other methods, such as prediction, directed use of L1, and focused attention, were evidently utilized seldom. This study’s participants did not have three ways: psychological preparation for listening, fixation, and appraisal of listening comprehension.

Figure 5. Frequency of cognitive processes and strategies activated by EFL learners for listening comprehension processing

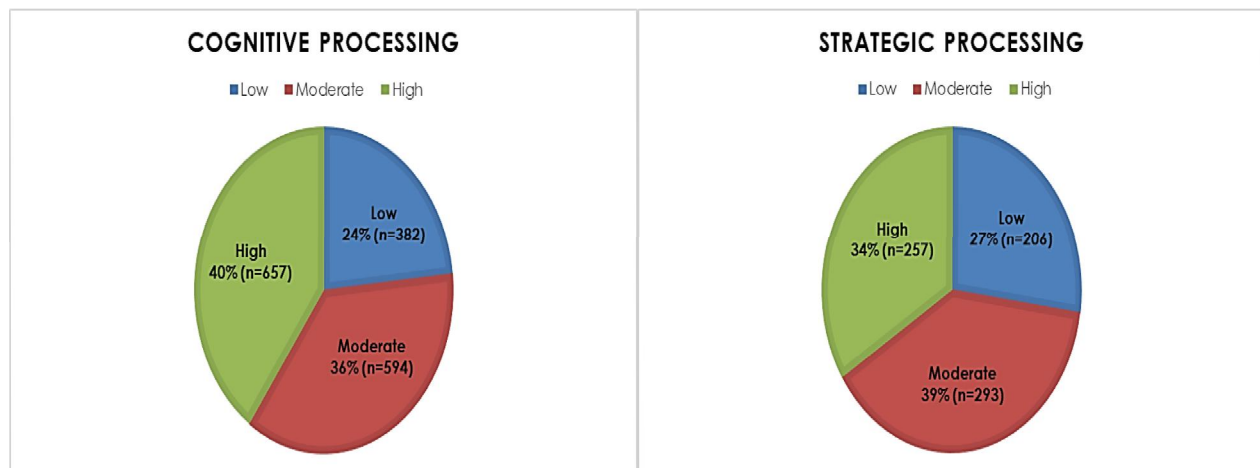


**When comparing degrees of listening achievement, differences in cognitive processes and tactics used.**

According to the research, listeners must engage in lower-level and higher-level processing to comprehend hearing materials correctly. To better understand, “it analyzed the listening processes triggered by participants at three different performance levels (low, average, and high).” To this end, “the 24 participants' total scores were ranked in ascending order, and six participants with scores in the top 25% were classified as high scoring participants, six participants with scores in the bottom 25% as low scoring participants and six participants with scores in the middle as moderate scoring participants.” Six people on the periphery of

each cut-off point were omitted from the study to emphasize usual patterns and borderline background instances. The comparison demonstrates that individuals with varying degrees of performance used essentially identical processes and techniques (see Figure 6). However, it was shown that each group engaged a different percentage of methods and strategies. People with the highest scores (40%) were involved in cognitive processes the most often, followed by participants with a moderate or low score (40%) and a low score (40%), respectively (36% and 24% respectively). Participants with an intermediate score (39%) resorted to tactics the most, followed by those with a high or low score (34% & 27%, respectively).

*Figure 6. “The proportion of cognitive processes and strategies used by individuals with varying degrees of performance”*



When the processes and strategies were considered, it was discovered that varied numbers of participants with varying degrees of performance engaged three distinct forms of listening processing at varying speeds (see Figure 7). “Individuals with a high or moderate

score triggered higher-level cognitive processing (semantic and pragmatic processing) about three times more often than participants with a low score.” “The fact that higher-level processing is necessary for listeners to comprehend the central message of the texts may explain why the two former groups performed better on the test.”

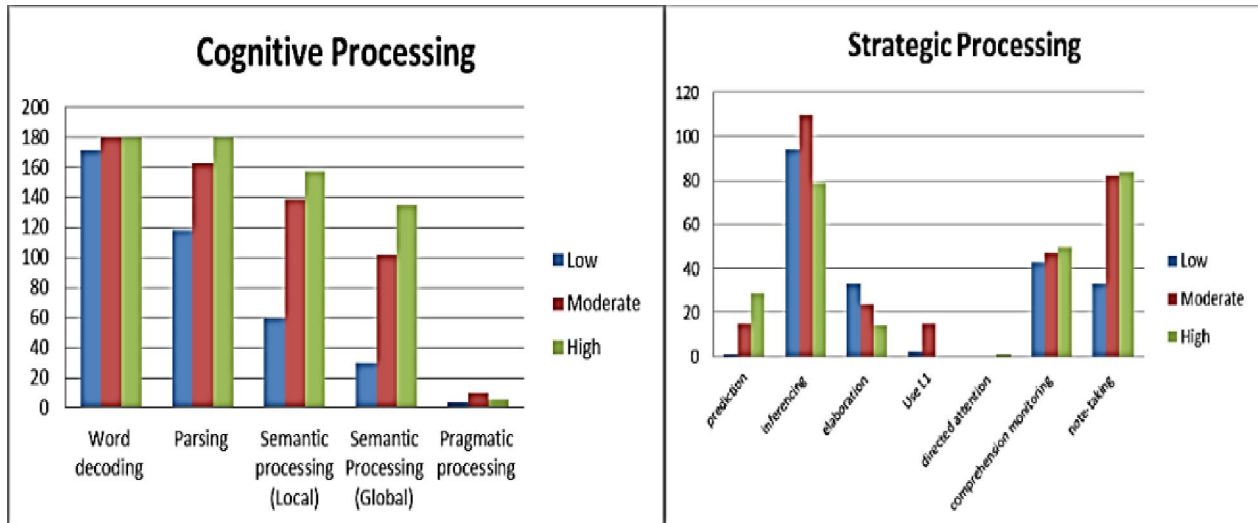


Figure 7. Comparing listening processes amongst individuals with varying levels of performance

Concerning the “activation of strategic processing, the study reveals that three kinds of strategies were trendy among the participants:” inferencing, note-taking (one frequency count per note), and comprehension monitoring. Inferencing was the most commonly employed strategy by participants with an average score and the least frequently used technique by people with a high score. On the other hand, the high-scoring group made the most frequent use of comprehension monitoring and note-taking, while the low-scoring group made the fewest. It is critical to emphasize that, “in addition to cognitive and strategic processing, the low-scoring individuals utilized three distinct kinds of test-related strategies:” option deletion, word matching, and blind guessing.

### The complex interplay of cognitive processes and strategies for listening comprehension processing

The preceding section summarizes participants' cognitive processes and tactics in a list of specific sub-skills to offer an overview of the mental methods and strategies used. However, it is critical to emphasize that those cognitive processes and techniques were discovered to be interconnected and interacting. “The coupling of lower-level cognitive processes (acoustic-phonetic processing, word recognition, and parsing) with inference and elaboration methods were often found.” As an example, consider the following:

#### Excerpt 1

I was debating if it was a 'coat' or a 'coach.' I'm not sure whether he [the speaker] was shopping for a coat or a coach...here, the speaker said that he was 'heading to the hotel' and 'going to purchase anything. Perhaps he was looking to purchase a new coat. Um...it might also be a 'coach' if he wanted to go downtown. I'm not certain, but I believe he requested transportation. 'Is the hotel close to downtown?' I overheard here. I'm assuming he's a tourist who's staying at a hotel. I believe it's about 'how to get downtown.' I'm not sure he's interested in purchasing a new coat. I believe he has dressed appropriately for a tourist. [4th Participant, 1st Listener]

As seen in this example, the participant detected words/chunks in the speech stream “such as 'a coat', 'a coach,' 'going to the hotel,' or 'going to purchase something.” However, based on the information given to him, he could not determine the text's primary message.

He was unsure if the phrase 'a a coat' or 'a coach' was used in the hearing and so had to infer using other bits of information he could comprehend, e.g., 'is the hotel close here .'Additionally, he had to depend on his prior understanding that a tourist often sleeps in a hotel and travels by coach to determine that the correct term should be 'coach' rather than 'coat .'He subsequently assumed that the speaker was inquiring about 'how to go downtown' rather than 'where to get a new coat .'This person obtained the correct answer using all of these procedures.

Another example of interaction usage of cognitive processes and strategies was the “employment of higher-level cognitive processes (semantic and pragmatic processing)” in conjunction with inferencing, elaboration, and comprehension monitoring procedures. One person, for example, remembered the following:

Excerpt 2

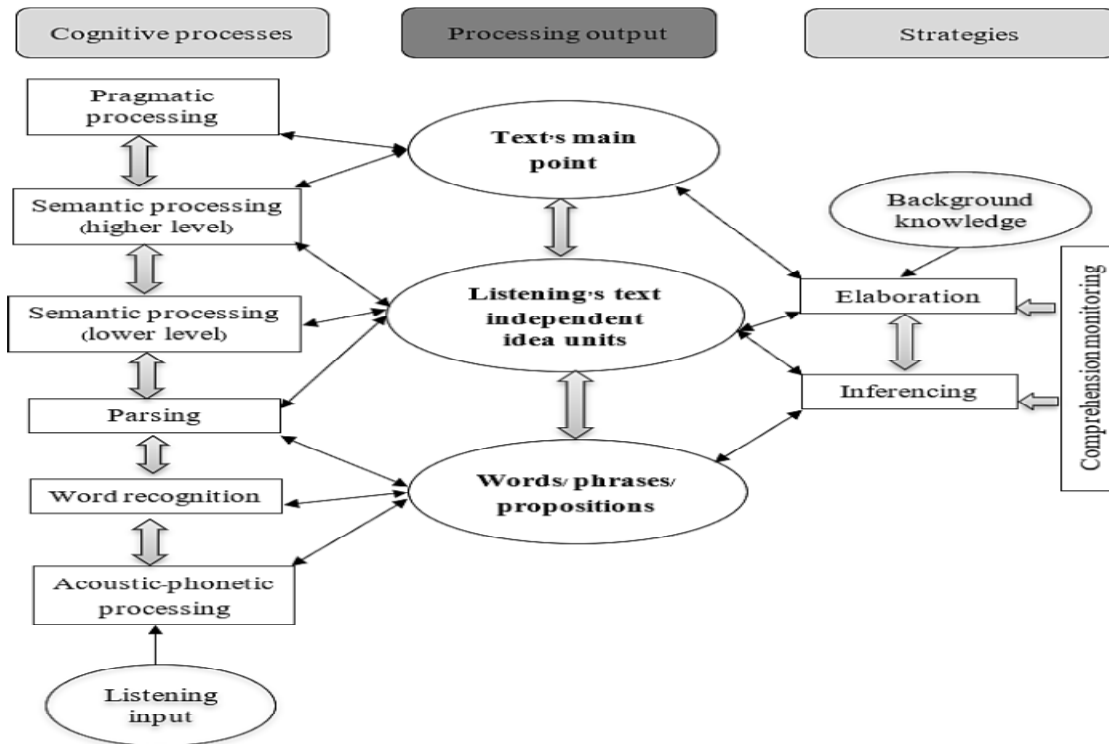
I was attempting to ascertain the location of the speakers and the purpose of their chat in this instance. I'm not sure where it was held. It was almost certainly in their university-assigned housing. They were not conversing at a grocery, as far as I know. There was no such hubbub as one could hear when shopping. I believe the lady was an office worker, not a buddy, based on how they spoke. I listened to the sound of a bus, and then the lady said that it was difficult to get the kind of apartment the guy desired for the money he had available. 'It was insufficient,' she replied. The guy then said, 'I am self-sufficient.' I believe the gentleman was averse to sharing a room with another person. To conclude, I think the guy spoke with apartment management or police officer about obtaining a place to remain alone. [Participant number 2, Listening number 2]

This participant drew on various sources of information and participated in different cognitive processes and tactics to comprehend the conversation's message. To begin, she relied on background noise to gauge the likely subject of the talk by recognizing where the speakers were and their connection. She correctly conceptualized the conversation's primary argument by relying on the idea units she had parsed, namely 'it was too little' and 'living on my own.' Simultaneously, the techniques of inference and elaboration were employed to connect the participant's separate concept units, and comprehension monitoring was utilized to track all processes and strategies engaged in this process.

To summarize, the findings indicate that listening comprehension is a collaborative and interdependent process involving various cognitive functions and techniques. Although the activation of mental processes and strategies varies according to the objective of each listening session, e.g., to comprehend particular details or to identify the listening text's primary point, a visualization of the standard processes and tactics employed by participants may be constructed (see Figure 8). In terms of cognitive processing, the findings indicated that participants participated in activities consistent with Zarrabi, (2020) cognitive processing paradigm for listening, which was taken from Drose & Prediger (2021). The majority of participants began their listening process by decoding information included in continuous speech. Whichever method they used—acoustic-phonetic decoding, word identification, or parsing—was determined by their lexical and syntactical expertise. The lower-level processing results were then employed to do higher-level text processing (semantic and pragmatic). At this level, listeners connect disparate bits of information to grasp the message's overall meaning. To complete this task successfully, listeners had to infer missing connections between the different concept units they had acquired (inferencing).

Along with the linguistic information gleaned through listening, it seemed as if listeners used their prior knowledge or understanding of the subject to serve as a foundation for text conceptualization (elaboration) to ascertain the text's major argument. However, it is critical to highlight that while listening to unknown texts or subjects, listeners engage the lowest level of language processing, acoustic-phonetic processing, attempting to detect phonemes and then identifying probable words based on the output. Some listeners structure their listening thoughts using parsable text concepts and contextual information with a more known text.

*Figure 8. Interactive use of cognitive processes and strategies for EFL listening comprehension derived from Zarrabi (2020) and Hinz et al. (2021)*



Although numerous tactics were mentioned by participants, the most often utilized were inferencing, elaboration, and comprehension monitoring. When listeners had difficulty comprehending specific material in the text due to gaps in their knowledge, they returned to the input or referred to the lower-level output to attempt to resolve their issues. As shown by stimulated data, what regulated this processing was comprehension monitoring or learners' knowledge of their efforts to fix their own difficulties with comprehension. Comprehension monitoring was seen in this research to include participants assessing the significance of certain unfamiliar words and selectively participating in inferencing to grasp the meaning of words. Inferencing was another tactic extensively used by listeners to perform their listening responsibilities. The participants inferred the answers to almost every question on the exam using the parsed data. Stimulated recall results indicated that listeners assumed based on the hearing information decoded during the listening session. Additionally, the results showed that inferencing was highly engaged, especially when listeners wanted to comprehend specific

details, which were critical aspects utilized to construct a global knowledge of the listening text.

### PEDAGOGICAL IMPLICATION

The findings indicated that most participants relied primarily on lower-level cognitive processes, mainly while listening to brief conversations and responding to a few comprehension questions, indicating that this group of EFL listeners strongly favors bottom-up processing. According to Zarrabi (2020), this may also be viewed as a sign of a "restricted language repertoire and an inability to automatically process the text to a higher level to understand the message's overall meaning." While some seemed to engage in top-down processing, using previous or subject knowledge to compensate for missing information or construct the definition of what they heard, they were not practical. This is primarily because their word decoding and parsing operations, which serve as a foundation for subsequent processing, were not always applicable. Occasionally, they mistook what they believed to be the proper (important) words throughout

the listening. It is thus critical to assist listeners with these difficulties in expanding their language vocabulary to enhance their listening performance. The following are some tips for improving EFL listening education effectiveness.

### **Organizing activities before the listening session**

As various language educators have proposed (Hinz et al., 2021), one strategy for assisting EFL listeners in expanding their linguistic knowledge is through well-designed listening training. That is, before assigning students to listen to an input text, instructors should spend some time discussing the text's linguistic features, both written and spoken, to provide the basis for students to refer to when listening. Certain fundamental activities, like dictation or gap filling, in which learners are expected to hear, examine the script, and fill in missing words, are necessary to get learners acquainted with the sounds and linguistic elements in the listening input.

### **Introducing authentic texts**

A well-supported use of lengthy, complex, and authentic input texts is critical in L2 listening training, while caution should be used due to possible difficulties. Because the pace and complexity of such inputs may quickly overwhelm learners, they must be scaffolded by introducing appropriate language aspects such as vocabulary, essential structures, and subject knowledge during pre-listening exercises. Suppose learners establish this foundation and develop an emotional connection to the text before being asked to listen; their odds of success rise. Subsequently, they are motivated to work harder to engage in more complicated forms of processing (Rost, 2011). "To promote higher levels of hearing processing," "such as semantic and pragmatic processing, listening inputs of varying sorts" (such as conversations, announcements, dialogues, and advertising) and durations should be included in listening courses. As this research discovered, listening to brief texts (conversations lasting one or two rounds) seemed to stimulate primarily lower-level cognitive processing, but using more extended, more complicated, and genuine texts triggered more excellent global processing. A similar discrepancy was noticed when

techniques were used to enhance listening performance. Kim and Petscher (2021) and Hinz et al. (2021) all emphasize the importance of metacognitive strategies or tactics used to regulate or ignore comprehension processes. It was discovered in this research that when participants were exposed to inputs of varying durations, they engaged in a variety of techniques and tactics. "When presented with inputs less than one minute in length, listeners seemed to depend substantially on word decoding, parsing, and inferencing." "With a lengthier input text, 1.5 minutes, participants seemed to engage in prediction, focused attention, comprehension monitoring, and note-taking, all of which are necessary for real-world listening." As a result, "it is critical for listening training to include lengthier input texts." Besides providing input consisting of various text kinds and durations, strategy training is vital. According to Vulchanova & Kjølstad Lervåg (2021), to incorporate strategy training into listening classes, instructors should first make learners aware of beneficial strategies via explanation and modeling and then debate with them when it is appropriate to employ each approach before and after listening.

### **Reconsidering testing and assessment policy and practices**

Finally, although efforts are made to incorporate listening instruction into classroom settings, such actions may be futile if no changes are made to testing and evaluation at the same time. A shift in high-stakes testing procedures is necessary to enact a change in classroom practice, as stated in the L2 and EFL testing literature (SATORI, 2021). This is because most instructors' effectiveness in the classroom is determined by their students' test scores. O-NET (Ordinary National Educational Test) results are used to assess the educational management quality at all levels of compulsory education. This is a positive washback effect in language testing (Bourdeaud'hui et al., 2021). While listening skill is critical for real-world communication, high-impact English language examinations (e.g., English O-NET) have not yet incorporated any kind of listening capacity assessment. It is proposed that all levels include a direct listening evaluation to promote more practice in teaching listening. This would bring

testing more in line with the Common European Framework of Reference (CEFR), which is currently used as a guideline for English education and assessment (Wang et al., 2021) and emphasizes L2 users' ability to receive and produce in both spoken and written form. It will be critical to employ communicative tasks that incorporate listening as an input, "such as those that require test takers to listen to input and retell its key points," summarize it, or discuss an issue it raises, to reflect the reality of communication in which listening does not occur in isolation but as part of a more extensive process to achieve this goal (Zou & Ou, 2020).

### CONCLUSION

"This study aimed to examine the cognitive processes and techniques employed by EFL listeners during their listening comprehension test and to compare their utilization across performance levels." The results indicated that to comprehend the texts delivered to them, listeners relied heavily on lower-level text processing, word recognition, and parsing to decode words, phrases, and chunks of information from the texts, indicating that the learners' knowledge of the target language is insufficient to continue processing at higher levels. Additionally, listeners utilized inferencing, elaboration, and comprehension monitoring procedures more often than other strategies while comprehending the text's primary argument. However, applying these processes and methods was not linear but rather complicated in various ways. While one process was running, other techniques or strategies were triggered to resolve issues and monitor the listening processes. The findings suggest that a primary goal of listening instruction should be to increase listeners' linguistic knowledge of the target language and familiarize them with lexical chunks and how the words or fragments are naturally delivered in a communicative setting. Additionally, it is critical to educate listeners about effective listening practices and train them in their usage.

This research discovered that the activation of cognitive processes and strategies is very complex and interactive. While cognitive processes are primarily engaged in decoding words, sentences, and chunks of information, critical tactics such as inferencing, elaboration,

and comprehension monitoring were employed to bridge listeners' knowledge gaps, assist and monitor the listening process. The limited understanding of the target language was reflected in the frequent use of two cognitive processes, word decoding, and parsing, aided by inferencing and elaboration tactics. The frequency with which tactics are used seems unrelated to performance levels. The participants indicated that they used a significant number of inferencing and comprehension monitoring procedures. However, an examination of their responses revealed that not all of them effectively did this without participating in global semantic processing. Based on these findings, "it is necessary to emphasize that a study that attempts to isolate strategy use and investigate the relationship between independent use of each strategy and performance" success may not adequately represent the nature of language processing, which involves multiple cognitive processes and strategies concurrently. It has been advised to examine verbal data elicited while doing a task to elucidate the nature of listening processing. Despite its meticulous design, this research is not without constraints. One has connected to the listening activities utilized, namely the multiple-choice questions about listening comprehension. "There are different types of listening assignments (e.g., the tasks which require listeners to retell, summarize, or discuss what they listen orally may provide different results)."  
"Second, since the nature of the data collecting procedure (a stimulated recall conducted one-on-one)," this research involved just 24 individuals. While the results gained were enlightening, their generalizability may be restricted owing to the small number of participants and the study's confined context in a test setting. A larger sample of individuals practicing English listening in a real-world setting should be employed to understand the listening process better.

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