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UNDERSTANDING LISTENING COMPREHENSION PROCESSING AND CHALLENGES ENCOUNTERED: RESEARCH PERSPECTIVES

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ABSTRACT

This paper investigates research done on academic listening for the past 30 years from published research articles found available online. It includes an introduction emphasizing the critical role listening skills have in academic settings. The paper then reviews the three models of listening comprehension processes, namely the bottom-up processing, the top-down processing, and the interactive model that illustrate how information is processed while language learners listen to spoken language. Key factors will also be analyzed. The linguistics factors, the cognitive factors and the affective factors greatly affect learners' listening comprehension processing. From a deep analysis of literature review, the paper concludes with suggested research perspectives related to brain functions, stress and anxiety in listening studies as well as pedagogical implications which help researchers and teachers find the right paths for their research implementation in the future. One listening model that suits students of all levels while doing academic activities seems unworkable, the paper suggests a rhizomatic approach to help language learners construct their own rhizomatic personal learning environments to resolve any individual challenges and develop their listening skills at their own pace and for their own taste.

Contribution/ Originality: The paper is the first logical analysis of listening comprehension processing. Looking into the challenges students encounter while performing academic listening, it proposes research perspectives scholars and teachers can refer to for their future studies related to English listening skills. Findings from this article have pertinent pedagogical implications because an understanding of factors affecting listening can significantly help teachers' select appropriate methods in teaching various listening skills and thus enhance a student's motivation towards academic listening.

1. INTRODUCTION

Listening has long been considered one of the most important skills that a language learner needs to master in order to use a language competently (Flower & Miller, 2005; Miller, 2003; Puakpong, 2005). However, when searching for literature related to this skill, listening is neglected even though a language learner spends most of his or her time in class on listening (Canh, 1999; Thinh, 2006; Tomlinson & Dat, 2004; Van, 2007; Wright, 2002). Research conducted by Burley-Allen (1995) and by Flower and Miller (2005) confirmed that language students in general have to spend most of their time in class practicing their listening (40%, for listening compared to 35% for speaking, 16% for reading and only 9% for writing).

In the Asian context, Vietnamese researchers and educators found that the way listening is being taught in Vietnam is not producing good results for language learners. Despite the need for oral communication skills, especially for students who will participate in the workforce after school, teachers continue to apply grammar-translation methods in English classes (Canh, 1999, 2011; Tomlinson & Dat, 2004). In both secondary and tertiary levels, the curriculum designed by the Vietnamese Ministry of Education and Training (MOET) is examination-driven. That causes English teachers to focus their assignments on preparing students for tests and examinations (Hiep, 1999; Tuy, 1999). Tuy (1999) and Hiep (1999) stressed that with this examination-driven and teacher-centered language teaching method, the Vietnamese produce students who may achieve the highest grades in tests and examinations, but fail to communicate effectively in real-life situations. Although there are different opinions, most researchers agree that the majority of English teachers in Vietnamese universities teach English for success on tests or examinations. Vietnamese teachers tend to use the Grammar-Translation teaching method in their classes due to large-class size, mixed-level classes, poor teaching resources, limited teaching hours, and grammar-based examinations. As a result, the misuse of ELT teaching methods which emphasize grammar and translation practice may prevent Vietnamese students in gaining success in their listening performance.

This paper provides a brief overview of listening comprehension processes and challenges encountered by language learners while performing their academic tasks. The paper also suggests research topics that researchers and teachers can implement in classrooms, as well as pedagogical implications that assist teachers and teacher trainers, with focusing on appropriate methods for listening training and listening practice.

2. UNDERSTANDING LISTENING COMPREHENSION PROCESSING

Listening is a very complicated process as it requires students to engage in the process of multi-tasking. When performing academic listening, university students have to discriminate sound to make meaning from spoken messages. In order to build speech recognition of similar sounds, Flower and Miller (2005) state that language learners should be exposed for a certain amount of time to the target language so that their cognitive abilities for speech recognition can develop. This is a process where language learners retain and retrieve stored information. However, a language learner's methods of processing exposed information can vary from individual to individual. It depends on factors such as the speech environment and memory capacity. They will make sense of the world very differently. The act of understanding the world and communicating with people around us varies from individual to individual, depending on past history and world knowledge. According to Lian and Pineda (2014), these "operational histories" cause individual learners to understand spoken messages delivered to them in different ways. They say that the functions of the brain like decoding, editing and retrieving incoming information can vary and should be further investigated. Bourne, Dominowski, and Coftus (1979) mentioned the so-called "individuals' human information processing system" in which information processing can be done differently from each factor of the whole system and this process of retrieving information or idea is described in the following chart:
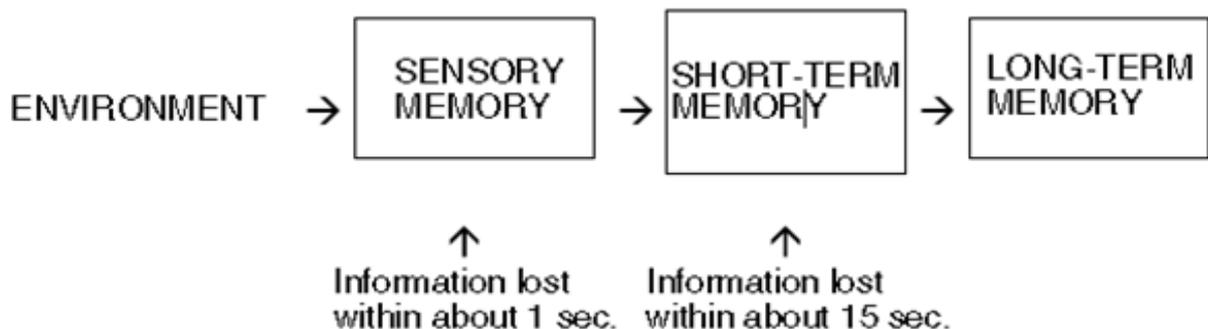

Figure-1. The human information-processing system.

Source: Flower and Miller (2005).

Figure 1 shows a model called the Human Information-Processing System developed by Bourne et al. (1979) in which signals are stored in one of three places: (1) sensory memory, (2) short-term memory, and (3) long-term memory. Spoken messages are first received by the sensory memory from the environment around us. The sensory memory receives an auditory message, then either passes the signals on to short-term memory or loses them. In the short-term memory, the message is consciously processed in less than 15 seconds before giving out signals to the listener to decide what to do. The listener goes through a very complicated process of analyzing or categorizing speech signals (Flower & Miller, 2005). Perhaps the capacity of working memory is limited and cannot store certain units, or chunks of information (Miller, 1956). When segments are long or when there are vast quantities of new information, working memory capacity cannot encode it all at one time. Previous research (e.g. Call, 1985; Cook, 1996; Glicksberg, 1963; Lado, 1965; Rivers, 1980) on the memory span of people who are not native English speakers showed that "the auditory memory span for foreign-language material of non-native speakers of English is considerably shorter than for native-language material, probably on a ratio of nine words to fifteen" (Call, 1985). Cook (1996) points out the same evidence of the memory span in second language learners. Cook maintains, "In a second language, memory span is reduced" (Cook, 1996 as cited in Puakpong 2005). Therefore, when delivering spoken language to students, particularly to non-native speakers, those speaking should carefully select the listening input that can help these students reduce memory load in order to understand the coming spoken messages. If long listening texts are introduced to students, they may not have adequate cognitive memory to process the information. In their study, Merlet (2000) and Celce-Murcia (1995) emphasized that the listening process involved in foreign language comprehension of non-native speakers is much slower than the listening process of native language speakers. Non-native speakers of English require more demanding cognitive resources and their memory is considered one of the determining factors whether they succeed or fail.

3. THREE MODELS OF LISTENING COMPREHENSION PROCESSING

When listening to an oral message, language learners fins different ways to handle the incoming information. They have to decode the information to evaluate whether the incoming information is relevant or not. The incoming message is best comprehended when it has been heard before. Listeners will also pay more attention to the spoken message if the incoming information is useful, important or relevant to them. The information that language learners store usually serves a purposes or goals. The listeners have to go through a process of *comparing*, *contrasting* and *contest* to understand the incoming messages from a speaker (Lian, 2003). The message will then be connected and checked based on the listeners' knowledge. When listening to an oral message, the listeners have to construct visual or spatial images in their heads. The listeners also have to connect ideas and build some kind of pattern or discourse to make it easier for them to understand the spoken message. Prediction or anticipation while listening to a spoken message is then important. Good listeners use prediction to anticipate what the speaker is going to say (Field, 2005).

There are various models explaining how the listening process functions in language learners, and these are arguably the most convincing models that are recognized in literature: "the bottom-up process", "the top-down process" and "the interactive process".

3.1. The Bottom-Up Processing

This model was developed by researchers in the 1940s and 1950s. According to the model, information deemed "meaningful" is processed through the listener's analysis of the acoustic message based on the smallest units of the spoken language such as individual sounds or phonemes. Then these sounds are combined into large units such as words which in turn will make up the transmission of information. Comprehension begins at the bottom of the language such as sounds, words, and phrases (Vandergrift, 1997).

Signal
Transmitted

Signal
Received

SOURCE ⇨ ENCODER ⇨ CHANNEL ⇨ DECODER ⇨ DESTINATION
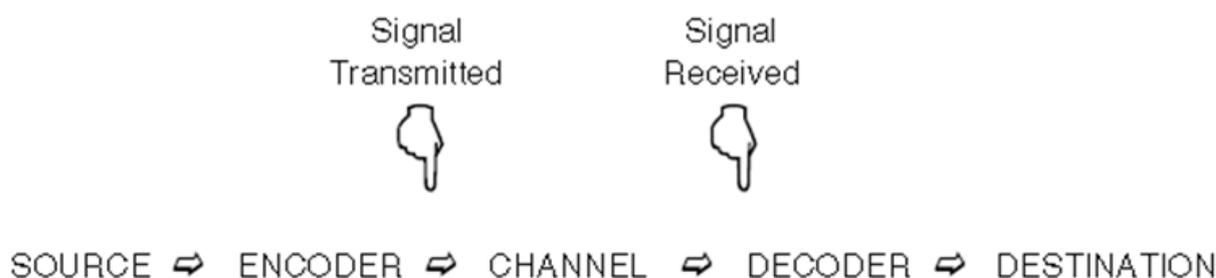
Figure-2. A transmission view of communication.

Source: Flower and Miller (2005).

Figure 2 is adapted from Shannon and Weaver (1949). It is a representation of this model. With this model, language learners need grammar, sounds, words and body language to help them understand the oral language. Some critics say that the bottom-up model is suitable for beginner listeners of a target language. Beginner listeners can only comprehend small chunks of spoken messages, and they need a great amount of conscious attention to comprehend the spoken inputs. This model has a smaller capacity for higher level operations. According to the bottom-up process, the speaker encodes a message, which passes along the communication channel in the form of a signal, and is then decoded by the listener. Understanding of the spoken message only takes place if the speaker and the listener are using the same code. Successful communication then occurs. Communication can take place without much reference to the speaker, hearer, or wider context. With the bottom-up process, people believe that understanding of individual sounds, knowledge of meaning of words, and knowledge of grammar are important to help listeners determine the speaker's meaning (Richards & Burns, 2012).

3.2. The Top-Down Processing

Opposite to the bottom-up process is the top-down process which does not rely on individual sounds or words to create meaningful information. This process uses previous knowledge to comprehend the meaning of the sounds or words from the given context. Prediction plays a key role in predicting sounds or words that give meaning to the text (Carrell, Devine, & Eskey, 1988). Flower and Miller (2005) considered the fact that listeners cannot identify sounds in isolation. Listeners have to apply contextual knowledge to interpret the utterance. They have to use "patterns of knowledge" and "discourse structure" which are both stored in their long-term memory. These pre-established patterns are often referred to with terms such as *schema, frame, script,* and *scenario,* while *schema* is often used as a cover term (Ross, 1975; Tannen, 1997). Although different terms are used to refer to "schema", the researchers still agree that "schema" represents knowledge or experience listeners have gained which helps listeners predict the spoken messages in wider contexts (Schank & Abelson, 1977; Van Dijk, 1997). Celce-Murcia (1995) says the top-down model is suitable for proficient listeners who merely use little conscious attention to understand the meaning of separate sounds and words. They have a larger capacity of higher-level operations that they use to understand bigger chunks of information while sorting out important, useful information from the auditory messages they receive.

3.3. The Interactive Model

The interactive model is the third model that is synthesized from the bottom-up model and the top-down model. It is said that Rumelhart (1975) developed this model (cited in Flower and Miller, 2005). Although Rumelhart developed the interactive model for reading, it fits well with listening. The interactive model believes that language is processed simultaneously at different levels. Listeners have to use their phonological, syntactic, semantic, and pragmatic knowledge to decode information. This is a parallel process. Rumelhart asked students questions to check their understandings of a written text, and by this method, Rumelhart assumed that the students of his research used schemata to make predictions as they read. An advantage of the interactive model is that it suits

various learning styles and personal or group needs. As this model is a synthesis of the bottom-up model and the top-down model, language learners or listeners can select the appropriate model for their language processing.

These three models of information processing the bottom-up model, the top-down model and the interactive model have been used extensively to teach listening skills. However, some researchers do not believe these models cater to the complexities of all listening comprehension tasks that university students face in their academic pursuit, students are differently individuals and their listening processes have still not been fully investigated.

4. CHALLENGES ENCOUNTERED WHILE LISTENING TO A SPOKEN LANGUAGE

4.1. Features of Spoken Language and Factors Affecting L1 and L2 Listening

As discussed in section 1, listening is an important skill that students at tertiary level need to master when attending university. Students need listening skills in order to listen to academic lectures, debates, class or group discussions. However, research points out that university students are facing difficulties with listening in general and in academic listening in particular. This is due to the features of spoken English and the factors that affect their listening comprehension process.

4.2. Typical Features of Academic Spoken Language

When talking about typical features of spoken English, researchers often think that by finding out about typical features of a spoken language, they can help students understand the language, especially when students have to listen to the language in an academic context. However, real world situations have shown that is a real challenge for many researchers or scholars, they struggle with providing satisfactory answers to these questions.

Research has shown that academic spoken language and academic written language have some common features, yet spoken language has some typical features that vary from written language. Literature shows that spoken and written languages are quite different in the following areas: (1) grammar, (2) text length, (3) vocabulary, (4) variation of speech, and (5) discourse structures.

Research shows that the academic spoken language is often less grammatically complex than the academic written language, but spoken texts are longer than written texts (Buck, 2001; Osada, 2004). Willis (2003) and Willis and Willis (2007) point out in their studies that academic speakers usually use a lot of repetition when they deliver their talks to students and this makes their talks longer and harder to understand as compared to written language. Willis (2003) explains that when reading independently we can refer back to the text if we have not understood something. Clearly, we cannot re-read spoken language. This idea is supported by Rupp, Garcia, and Jamieson (2001) and Buck (2001). Rupp et al. (2001) says that long sentences usually contain complex syntactic structures that make it difficult for language learners to process successfully spoken messages. Buck points out that speech happens in "real-time", and speech is linear without any chance to be reviewed. Therefore, if speech has complex structures, language learners need more time and effort to process the meaning of a message. Perhaps these are the various reasons why speech contains redundancies and repetition. It makes it easier for listeners to understand spoken messages. This is the reason speakers often build in redundancy by repeating parts of their message. Though speech and writing are variants of the same linguistics system, they are different from each other. In speech, speakers often use phrases, clauses or sentences that tend to be more colloquial and less formal than in writing (Osada, 2004). Willis and Willis (2007) further point out that spoken messages often contain non-standard grammar as speakers often omit words or phrases when they deliver their talks. Vocabulary from spoken texts contain colloquial words and phrases or slang (Buck, 2001; Osada, 2004) making it difficult for listeners to comprehend. Osada (2004) confirms this idea when stating that speakers use "many words or phrases often used in speech, never in writing." (p. 59)

As mentioned above, speech is delivered in "real-time". Flowerdew (2004) recognizes that "listening texts exit in real-time rather than space" (p. 10). That means listeners have to pay great attention to speech when it is uttered.

Listeners have to "involve attention to stream of speech which is not under the control of the listeners" (McDough, 1995). Therefore, listeners often have to listen carefully to the speaker's ideas if they do not want to lose important information. If a speech is long and unpredictable, listeners have to sit for long hours, tiredly listening to the speech. Moreover, in speech, listeners have to phonologically recognize unit boundaries which bear the speaker's meanings or ideas while in written language such as in reading texts, the boundaries are visually and clearly marked by punctuation. So in academic written language, people can control what they read, while in academic listening, listeners have difficulty in finding out word or sentence boundaries from the speaker's presentation (Ferrera & Anes, 1994; Lund, 1991; Rost, 1990). Listeners to speech have to punctuate a flow of speech by recognizing the speaker's "pausing, false starts, hesitation, stress, and intonation patterns" (Osada, 2004).

4.3. Factors Affecting L2 Listening

Listening has long been recognized as an important skill among the four language skills that students at the tertiary level need to master. Although listening is important, it is a neglected skill that researchers only recently began to recognize as compared to speaking, reading and writing (Kavaliauskiene, 2008; Mendelsohn, 1994; Morley, 1991; Nunan, 1997; Vandergrift, 1997). A review of previous research regarding the four language skills used by EFL students indicates that listening is a skill that students are often not good at. This claim is in agreement with some recent research studies (e.g. Abedin, 2010; Alam, 2009; Kavaliauskiene, 2008) which show that most students have problems in EFL listening comprehension. Studies reveal that if typical factors affecting language learners' listening comprehension are recognized, students can overcome the difficulty faced in comprehending listening tasks. Depending on the purpose of the research, factors influencing L2 listening can be grouped in different categories labelled with different names. The researchers in this thesis would like to group factors influencing language learners in three categories: linguistic factors, cognitive factors and affective factors recommended by Kurita (2012) because it seems by grouping this way, factors that affect students' listening comprehension process can be easily identified.

4.3.1. Linguistic Factors Affecting L2 Listening Comprehension

Researchers have conducted various studies on linguistic knowledge such as vocabulary, phonology, syntax, semantics, and discourse structure that contribute to listening comprehension (Buck, 2001). Linguistic knowledge is viewed as "linguistic cues" to understand spoken English (Anderson, 2009; Buck, 2001; Mecartty, 2000; Nation, 2006; Stahr, 2009). For lexical knowledge, researchers looked at vocabulary that contributes to comprehension. Researchers confirmed that the size of vocabulary knowledge that language learners need for satisfactory comprehension of a spoken text is very important. Nation (2006) asserts that language learners need an 8,000–9,000 word-family vocabulary to understand a written text, and 6,000–7,000 word families for a spoken text. Clearly from Nation (2006) study, in spoken language people use more high-frequency words than in written language. Stahr (2009) also found a correlation between vocabulary size and vocabulary knowledge for the understanding of spoken language. He says that "vocabulary size is the basic element of vocabulary knowledge in listening comprehension". Stahr (2009) study also revealed that vocabulary is needed to understand spoken language. With 5,000 word families, learners can achieve a score of 72.9% in a listening comprehension test. For a score of 80% in a listening test, learners need to know 10,000 word families. These researchers' findings prove that vocabulary knowledge helps understand spoken language. However, these researchers also recognized that language learners might have difficulty with word perception in spoken texts even if they have enough vocabulary knowledge. Researchers suggest that it is important to select appropriate spoken texts that suit language learners' lexical knowledge when delivering lectures. Studies by Stahr (2008), Stahr (2009), and Hilde and Schmitt (2012) recognized the contribution of vocabulary in listening comprehension.

Secondly, phonological modification and prosody have been studied as important factors for L2 learner's word perception. Researchers have studied how L1 phonology limits the L2 perception at the phoneme level (Field, 2008). The results of the Altenberg (2005) study indicated that L1 learners are better than L2 learners at using acoustic phonetic cues, and that some types of stimuli from spoken language are easier for language learners to identify than others. Altenberg's findings suggest that stress and intonation patterns should be paid great attention when lectures are delivered, especially when speakers deliver speech at fast rates (Buck, 2001). In listening to an English speech, intonation patterns should also be closely watched as they are related to the structure and the meaning of the text (Buck, 2001). Intonation is used to indicate clausal boundaries and questions. These patterns might help listeners to identify a constituent structure, a basic phrase, or unit in a sentence (Anderson, 2009; Wong & Waring, 2010). Eastman (1993) produced evidence that L2 learners have more difficulty in distinguishing content words and function words than L1 learners. However, the recent study by Field (2008) revealed that L2 learners identified content words more easily that function words. From the results of the study, he argued it is not because learners are unfamiliar with the English phonology or not familiar with the rhythmic characteristics of L1. He concluded that it might depend on the way in which L2 listeners pay their attention when they listen.

Thirdly, the importance of grammar knowledge for listening comprehension was also studied. There has been minimal researching into grammar (Grabe, 2004). In the field of cognitive psychology, Anderson (2009) asserts that knowledge of the English structure allows language learners to comprehend the meaning of a sentence in the listening comprehension process. VanPatten (1990) reveals that learners feel it is difficult to recognize both form and content while listening. Field (2008) concludes that listeners did not pay much attention to function words, because they said function words were about grammar while content words carried meaning.

These findings in recent linguistic research reveal that vocabulary knowledge is an important factor affecting students' listening comprehension. Listeners often pay attention to content words, stress and intonation rather than function words and grammar. It is important to know the research on how linguistic knowledge plays a role in understanding spoken language. These findings might be helpful to both language learners and language teachers who are having difficulty in learning and teaching vocabulary.

4.3.2. Cognitive Factors Affecting L2 Listening Comprehension

Recent cognitive studies have helped us better understand the listening comprehension processing. Many researchers in SLA have paid attention to the top-down processing and the bottom-up processing that language learners perform in listening comprehension. Research shows that when listening, individuals have to use both linguistic knowledge and world knowledge to create a mental representation of what they have heard (Hulstijn, 2003). Larry (2007) said that using top-down processing or bottom-up processing help listeners make meaning of spoken input. In order to understand the meaning of a word, listeners use different kinds of knowledge, including knowledge of the world around them to predict what they hear. Buck (2001) said while language learners are listening, they always have their hypothesis about what is likely to be spoken next. For those who have limited processing ability and less linguistic knowledge, they will predict what they are going to listen to. In this context, listeners use metacognitive knowledge and listening strategies to help them recognize meanings of words. Using contextual, visual or paralinguistic information, world knowledge, cultural information can help listeners predict the points the speakers want to make (Larry, 2007). Thus, listeners can use listening techniques suggested by the top-down and bottom-up processes to cope with listening tasks. For instance, the top-down process suggests exercises which require learners' ability to use key words to construct the schema of a discourse, guess a discourse setting, think of the role of the participants, and their goals in the setting while the bottom-up process includes exercises which helps language learners to recognize key words, clause boundaries, and key transitions in a discourse (Richards, 2008).

Working memory is another factor of interest that researchers focused on (Baddeley & Hitch, 1974; Daneman & Carpenter, 1980; Engle, 2002; Novick, Trueswell & Thompson-Schill, 2005). Bloomfield et al. (2010) pointed out "working memory is a process that listeners use to listen, store and process incoming speech in L1 or L2" (p. 6).

Miyake and Friedman (1998) reviewed a study done by Osada (2004) which looked at the causal relations between working memory and L2 listening comprehension. The result revealed there is a correlation between working memory and syntactic processing. For instance, the researchers said L2 listeners with "higher working memory capacity" were able to make better use of syntactic information when comprehending the L2. They also showed "a level of sensitivity to particular syntactic cues that was near native listener levels". The authors concluded that working memory span helps L2 listeners recognize important spoken signals and successfully make meaning from these signals during their listening process.

McDonald (2006) investigated the correlation between L2 listeners' working memory and memorization of L2 spoken sentences. The study found that the performance on L2 working memory correlated significantly with the accuracy of grammatical judgments of spoken L2 sentences. In his second experimental study, McDonald asked L1 listeners to remember 7-digit numbers by memory. He found that L1 listeners with reduced working memory "used selective impairments in their judgments". The two experiments on L1 and L2 listeners' working memory and memorization of spoken sentences brought out similar results: both groups of research participants used their induced working memory to memorize the spoken sentences for the accuracy of grammaticality judgments.

Other researchers have looked at working memory even though their field of study is related to reading comprehension, working memory and storage capacity in TOEFL grammar and reading (Harrington & Sawyer, 1992; Juffs, 2004; McDonald, 2006; Walter, 2004). Though their fields of study were in other fields of language learning, not directly related to listening, the results of their research studies show that there is a strong correlation between working memory and L2 comprehension (Bloomfield et al., 2010).

4.3.3. Affective Factors Affecting L2 Listening Comprehension

Alongside linguistic and cognitive factors, affective factors also greatly affect students' listening comprehension. Researchers focused their studies on the anxiety caused by language learning environments or language testing conditions (Clark, 1989; Hussey, Teubner-Rhodes, Dougherty, & Novick, 2010; Preiss & Wheeless, 1989; Wheeless, 1975). Hussey et al. (2010) found that anxiety may be caused by a learner's inability to understand spoken language, even in a native language. Other factors may contribute to language anxiety are "listening to new information, trying to sort conflicting information, listening to seemingly illogical passages" (Clark, 1989; Preiss & Wheeless, 1989; Wheeless, 1975) cited in Bloomfield et al. (2010).

Elkhafaifi (2005) examined anxiety when students took an Arabic course and performed listening comprehension tasks. The study results showed that anxiety created when studying a foreign language and anxiety created by taking a listening test are correlated with negative achievement. The study suggested that in both situations, student anxiety could be reduced if students are provided with a less stressful classroom environment. However, the researcher notes that anxiety is created by listening tasks themselves, and as a result, anxiety can easily interrupt the listening process. Noro (2006) used data obtained from Japanese college students' questionnaire and oral interviews to clarify the nature of listening anxiety. According to Noro (2006) when students feel frustrated or unable to concentrate, they want to give up the listening activities. They do not feel confident and cannot listen well. Chang (2008) found that listening supports can reduce language learners' anxiety. Chang and Read (2006) investigated the effects of four types of listening support that could reduce the effects of listening anxiety, they came up with the following: topic preparation, repeated input, vocabulary input and previews of the questions. The results of the study indicated that listening supports affect individual differently. A metacognitive approach seems to be the approach that helps reduce students' listening anxiety the most.

Motivation is another important affective factor that researchers such as Rost (2001) looked at. Research has shown that there is a positive relationship between motivation, use of metacognitive strategies and listening success (Vandergrift, 2005). Students with low levels of motivation seemed to engage less in listening activities than students with high levels of motivation. Kemp (2010) also studied motivation in learning autonomy. The result showed that a learners' listening log or listening diary motivated them to engage with the activities and reflect on their experiences. Kemp (2010) discovered that keeping a listening diary or a listening log enables an individual to notice their own language development. A listening diary helps develop listeners' schemata, raise their metacognitive awareness, motivation and involvement in listening comprehension.

5. RESEARCH PERSPECTIVES AND PEDAGOGICAL IMPLICATIONS

By reviewing research done over the last 30 years on academic listening, the following topics need to be a focus of future research:

5.1. Listening Research Perspectives

Most papers researched the linguistic aspects of listening, while other aspects of listening comprehension were neglected. For instance, cognitive and affective factors are research areas that have not been focused on by researchers. Perhaps this is a gap where researchers and scholars can conduct their future studies. How the brain functions while listening is another gap that needs researching. Particularly, literature and research from Asia does not reveal much about the functions of the left and right hemispheres of the brain. Hopefully, with time this issue will be investigated in the future.

Another research perspective is also needed to take into consideration: How do stress and anxiety affect listeners' outcomes? Does motivation bring out good results in listening? These questions have not been answered clearly, and the prominent, effective models for listening improvements have also lacked research.

5.2. Pedagogical Implications

Since listening comprehension is a complex process that combines both a top-down and bottom-up information processing or a combined interactive processing, listening education needs to be taught and practiced in the three processes previously mentioned. Also, as literature has indicated, while listening, individuals have to perform a complicated process of coding and recoding important relevant information; therefore, teachers need to carefully select appropriate materials for language learners to practice with. Importantly, it needs to be based on the learners' listening levels. One teaching method for listening training may not be adequate for all learners at all ages. Using only one listening model for students of all levels while doing academic listening performance is unworkable. Perhaps then a rhizomatic approach or rhizomatic learning can be used to solve listening problems. This sounds like a good start for helping language learners construct their own rhizomatic personal learning environments where they can study at their own pace as recommended by Van Harmelen (2006), Lian (2014) and Trang (2018).

6. CONCLUSION

This article reviewed a variety of studies that focused on academic listening and comprehension over the last 30 years as available on the Internet. As stated, there are three factors that influence a learner's ability to comprehend spoken languages. They are linguistic factors, cognitive factors, and affective factors. Listening comprehension processes were also reviewed, as well as suggestions of further topics of study related to academic listening.

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