

EXPLORING L1 LISTENING COMPREHENSION IN HIGHER EDUCATION—IS IT LANGUAGE, STRATEGY OR IS IT PERSONAL?

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Abstract

Although lectures are central to higher education, research on first-language (L1) academic listening comprehension remains limited. Drawing on Bachman and Palmer's (2010) model of communicative language ability, this study explores factors influencing students' comprehension of lectures delivered in their L1. Communicative language ability comprises language knowledge and strategic competence, and is influenced by attributes related to the language user. In this study, language knowledge was operationalized through general and academic vocabulary size, strategic competence through metacognitive awareness, and attributes related to the language user through educational and sociolinguistic background. The study was conducted at a university college in Flanders, Belgium, where Dutch is both the language of instruction and the predominant first language. A total of 167 students completed a listening comprehension task, vocabulary size tests, a metacognitive awareness questionnaire, and a background survey. Results showed that general and academic vocabulary were strongly associated with listening comprehension. Academic vocabulary predicted performance for lower-proficiency listeners, while general vocabulary was significant for higher groups. Metacognitive awareness was not a significant predictor overall, though potentially relevant for weaker listeners. The relatively low explained variance suggests that L1 academic listening is a multifactorial skill, influenced by linguistic, strategic, and personal factors.

Keywords: L1 academic listening, communicative language ability, vocabulary knowledge, metacognitive awareness, higher education

1. INTRODUCTION

The lecture remains one of the most common teaching methods in higher education and is applied in a wide range of fields for multiple functions (Klein et al., 2023; Tronchoni et al., 2022). Its longstanding tradition, scalability and reliability in teaching factual-based content within a restricted timeframe contribute to its continued appreciation by both students as institutions (Hartman, 2007; Killen 2011; Ó Cofaigh & Rodgers, 2025). Given the centrality of lectures in academic contexts, effective listening skills become essential, as students' ability to comprehend and engage with lecture content directly depends on their listening competence. Findings even suggest that listening may account for up to 55% of all communication time in educational and general communicative environments (Emanuel et al., 2008; Mendelsohn, 1994), making it a cornerstone of academic communicative language ability which "enables language users to create and interpret discourse" (Bachman & Palmer, 2010, p. 33).

Yet, students face significant challenges with lectures. As part of a larger audience, students listen to a speaker who delivers complex, often unfamiliar content using academic and professional language. They aren't expected to continuously offer replies or show active listening for the speaker to continue, nor do the listeners have control over the input, for example the accent or speed. As Graham (2011) puts it, "[the listener] cannot 'rewind' to sections that were not understood or pause if the speech is too fast". Besides rapid pace and lack of control, the extended duration and linguistic difficulty of lectures contribute to students' cognitive overload and frustration. Students further attribute the difficulty in listening comprehension to their inadequate competence, a challenge which is further compounded by their perception that listening is a skill in which making progress is particularly difficult (Bozorgian & Pillay, 2013; Lynch, 2011; Qian & Lin, 2019). The challenges are confirmed by staff who estimate that the language demands for listening are higher than those for speaking and writing (Deygers, 2017). Not only for language, but also for content do many students experience needs to ask clarification questions (Hellekjær, 2024). The challenges pertain to both an L1 as L2 context: "changing the language of instruction [...] merely exacerbates difficulties already present in the L1 lectures" (Hellekjær, 2024). Thus, it is unwise to assume that listening comprehension in L1 lectures is unproblematic. As this study looks at lectures, it focuses on uni-directional listening and excludes interactive forms of listening which involve reciprocal communication, such as class discussions, seminars, or advisory meetings (Lynch, 2011).

Despite the centrality of lectures in higher education and the challenges faced by students, academic listening comprehension has received relatively little attention in research. Listening remains "the least researched of all four language skills" in L2 (Vandergrift, 2007, p. 191) with even less attention for academic listening (Lynch, 2011). Listening is particularly challenging to research due to its inaccessibility—listening rarely has an observable product—and its inherently complicated nature

which goes beyond linguistic knowledge and requires non-linguistic information, such as knowledge of the world (Wang & Treffers-Daller, 2017). Besides listener-related variables, comprehension is affected by a wide range of elements such as speaker characteristics, the nature of the text, and the surrounding context (Lynch, 2011). Despite efforts in the realm of English for academic purposes, there is much to explore in the field of L1 academic listening which research suggests involves different types of components than in L2 academic listening (Karalık & Merç, 2019).

This article aims to unpack academic listening comprehension specifically in L1 departing from Bachman and Palmer's (2010) model of communicative language ability. According to Bachman and Palmer, communicative language ability comprises language knowledge and strategic competence. For language knowledge this study includes general and academic vocabulary knowledge. For strategic competence this study includes metacognitive awareness. Bachman and Palmer further emphasize that language ability does not operate in isolation but interacts with attributes related to the language user: topical knowledge, cognitive strategies, affective schemata, and personal attributes. For attributes related to the language user, this study includes personal attributes from the educational and sociolinguistic background. Through this broad perspective, the study aims to deepen our understanding of listening comprehension as an essential but often overlooked skill in higher education especially when the language of instruction and local L1 coincide.

2. THEORETICAL BACKGROUND

2.1 *Academic listening comprehension*

Listening comprehension is often underdefined in research (Gottardo et al., 2018). In its most broad sense, listening comprehension is defined as the ability to comprehend spoken language (Mendelsohn, 1994) and is often approached from two perspectives: a knowledge-based perspective and a process-based perspective. Buck (2001) illustrates this duality in his definition of listening comprehension as "an active process of constructing meaning [...] by applying knowledge to the incoming sound" (p. 31).

A first perspective focuses on the knowledge required. Researchers agree that listeners rely on two key sources of knowledge to give meaning to an utterance: linguistic and non-linguistic (Stæhr, 2009; Wang & Treffers-Daller, 2017). Linguistic knowledge includes phonological, lexical, syntactic, semantic, and pragmatic elements, while non-linguistic knowledge encompasses contextual, topical, and knowledge of the world. A second perspective emphasizes the process-oriented nature of listening comprehension. Fischer and Farris (1995) describe listening comprehension as "the active use of a flexible set of cognitive processing strategies which enable listeners to construct a personally meaningful mental representation of their understanding of a linguistic text" (p. 16). Within this perspective, two complementary modes are commonly discussed: bottom-up processing, which

involves decoding linguistic elements such as vocabulary, morphology and syntax, and top-down processing, which leverages prior knowledge and contextual cues to interpret meaning (Hue, 2019).

When listening comprehension is further dismantled, research reports on components like working memory, nature of the text, motivational aspects, attentional control, listening purpose, and higher-order reasoning (Bourdeaud'hui et al., 2021; Shohamy & Inbar 1991; Vandergrift, 2008). A meta-analysis by Karalík and Merç (2019) categorized the key components of listening comprehension in both first and second language contexts into three domains: linguistic (e.g., vocabulary, grammar), cognitive (e.g., working memory, metacognitive strategies), and affective (e.g., anxiety, motivation).

This study examines listening comprehension through Bachman and Palmer's (2010) framework of communicative language ability. The framework distinguishes between language knowledge and strategic competence. As this aligns closely with both linguistic and non-linguistic knowledge as well as with bottom-up and top-down processes, it effectively bridges the two perspectives discussed above. This paper operationalizes language knowledge as vocabulary knowledge and strategic competence as metacognition.

When considering academic listening comprehension, so listening in the context of higher education, this study focuses on listening to lectures. As such, it focuses on uni-directional listening and excludes interactive forms of listening which involve reciprocal communication, such as class discussions, seminars, or advisory meetings (Lynch, 2011).

2.2 Vocabulary knowledge

Vocabulary knowledge functions as a good proxy for language knowledge and is widely regarded as a strong indicator of overall (academic) literacy (Milton, 2013; Read, 2015). Furthermore, vocabulary knowledge, said to be at "the heart of the two receptive skills" (Qian & Lin, 2019), is frequently employed as a proxy for listening comprehension in both L1 and L2 (Karalík & Merç, 2019; Laufer & Ravenhorst-Kalovski, 2010; Noreillie et al., 2018; Qian, 2002). It constitutes the best predictor of L2 listening comprehension (Vandergrift & Baker, 2015, 2018) and has links to other measures of language knowledge linked to listening comprehension such as morphological awareness and syntactic knowledge (Gottardo et al., 2018). Specifically in L1 contexts, vocabulary seems to be a more effective measure than grammar knowledge (Karalík & Merç, 2019).

Vocabulary knowledge is often unraveled in two components. Depth, the first component, refers to how proficiently words are known (Schmitt, 2014). Depth facilitates comprehension as it refines the listeners' vocabulary, specifically in more abstract and challenging language contexts like higher education (Luo et al., 2021; Qian, 2002). The second component, size, refers to the number of words a speaker knows (Schmitt, 2014). The degree of lexical coverage affects listening

comprehension (Durbahn et al., 2024). A large vocabulary size is crucial to obtain a lexical coverage of at least 95% needed for general understanding (Laufer & Ravenhorst-Kalovski, 2010; Van Zeeland & Schmitt, 2013). Additionally, a large vocabulary size helps in “inferring the meaning of unknown words” (Teng, 2016) relevant in the context of higher education where specific, often new vocabulary constitutes a substantial proportion of academic texts (Warnby, 2023). Both size and depth are correlated to listening comprehension but remain distinct components that can account for unique explanatory variance (Li & Kirby, 2015; Li & Zhang, 2019; Teng, 2016; see Schmitt, 2014 for more details). Teng (2016) even pleads for an integrated approach as they found “that a combination of breadth and depth of vocabulary knowledge correlates better with successful listening comprehension”. Although some studies found evidence in favour of depth over size (Dabbagh, 2016; Han, 2017; Teng, 2014, 2016), size seems to trump depth as the better indicator for listening comprehension with more explanatory power or a stronger correlation (Khajavy & Aghaee, 2023; Li & Zhang, 2019; Stæhr, 2009).

This study opts for vocabulary size. Vocabulary size has been shown to be a reliable and valid measure (Gottardo et al., 2018). It relates best to receptive knowledge and seems to be the basic dimension of a learner’s lexical repertoire (Qian & Lin, 2019; Wang & Treffers-Daller, 2017) with vocabulary knowledge evolving from size to depth. Additionally, size is easier to approach from a theoretical and practical perspective (Qian & Lin, 2019; Schmitt, 2014).

Besides a general vocabulary size screening test, the study also includes an academic vocabulary size screening test. Academic vocabulary is one of two sets of specific vocabulary complementing high-frequent words in higher education, next to domain-specific, specialist vocabulary (Coxhead, 2000). For L1 speakers entering different fields of higher education, including academic vocabulary in the language of instruction enhances the relevance of the screening (Masrai & Milton, 2021). Adequate comprehension is also related to the type of spoken texts (Teng, 2016). Accordingly, Dang and Webb (2014) hinted at the need for a larger vocabulary of spoken academic English than for more informal varieties.

2.3 *Metacognition*

Besides language knowledge or to compensate for a lack of it (Stæhr, 2009), listeners also rely on strategic competence. As an indicator of strategic competence, this study includes metacognition. Within the cognitive, top-down processes, metacognition has gained increasing attention, especially in L2 contexts (Vandergrift, 2008). Flavell (1976) originally described metacognition as “the active monitoring and consequent regulation and orchestration of [information processing activities] in relation to the cognitive objects or data on which they bear, usually in service of some concrete goal or objective” (p.232). Gradually, metacognition was conceptualized as comprising two basic components: metacognitive knowledge—information acquired about your learning—and metacognitive strategies—general skills to manage, direct, regulate

and guide your learning (Brown, 1987). Both components are distinctly reflected in Winne and Perry's (2000) definition of metacognition within the context of higher education: "the awareness learners have about their general academic strengths and weaknesses, cognitive resources they can apply to meet the demands of particular tasks, and their knowledge about how to regulate engagement in tasks to optimize learning processes and outcomes" (p. 533).

Research in higher education has shown that stronger developed metacognitive knowledge as well as metacognitive strategies lead to higher learning achievements (De Backer et al., 2017; Nietfeld et al., 2005). Positive correlations were also found between students' metacognitive awareness and their listening comprehension ability, albeit with sometimes only a small percentage of explained variance (Andringa et al., 2012; Kassem, 2015; Stæhr, 2009; Vandergrift et al., 2006; Vandergrift & Baker, 2015; Zuo, 2013). These results especially apply to L2 where metacognitive strategies seem to play a more relevant role than L1. Karalík & Merç (2019) demonstrated a positive correlation with L1 and L2 listening comprehension with smaller strengths of association for L1 compared to L2 listening comprehension. Non-native speakers seem to rely more on metacognitive reasoning abilities than native speakers (Andringa et al., 2012).

2.4 Attributes related to the language user

As discussed above, Bachman and Palmer's model (2010) considers how language ability is influenced by attributes related to the language user. Attributes related to the language user are also part of metacognition, together with task factors and strategy selection (Flavell, 1979). These attributes vary across participants whereas task factors like speaker characteristics, the nature of the text, and the surrounding context (Lynch, 2011) remained the same in the set-up. Bachman and Palmer (2010) mention four attributes related to the language user: personal attributes, topical knowledge, affective schemata, and cognitive strategies. This study incorporates personal attributes. Considering the other attributes related to the language user, the research design tried to control for topical knowledge and affective schemata through the selection of the audio material in the instrument for listening comprehension (see 4.3.1). In this study, we did not include a way to monitor cognitive strategies that are used when listeners try to comprehend information.

Personal attributes provide direct insight into individual differences in academic listening and could shed light on the interaction with language ability. The personal attributes incorporated in this study encompass attributes from the educational and sociolinguistic background of the language user: age, gender, disability, and educational and linguistic background. These attributes are known to relate to language knowledge and strategic competence (Brysbaert et al., 2014; Flavell, 1976) as they are associated with individuals' opportunities—time, context, people—to get acquainted with, develop and practice (academic) language usage as well as relevant metacognitive strategies.

A relevant note relates to the pragmatic nature of the personal attributes included. These attributes are often part of institutional records which do not require any extra test instruments. Including these attributes is appropriate within the exploratory nature of the research, as they contribute to a more nuanced understanding of the mechanisms underlying L1 listening comprehension.

3. RESEARCH QUESTION

Starting from Bachman and Palmer's (2010) model of communicative language ability, this research aims to explore academic L1 listening comprehension in the context of lectures. As such, we formulate the following research question:

To what extent do receptive vocabulary size, metacognitive awareness, and personal attributes related to the language user, as components of Bachman and Palmer's (2010) model of communicative language ability, influence academic L1 uni-directional listening comprehension among students?

By examining these connections, we seek to unravel what elements impact academic listening in lectures where the primary language of instruction is the predominant first language of the student population.

4. METHOD

4.1 Context and participants

This research was conducted at a university college in Flanders, Belgium, where higher education features open access, with standardized entrance exams required only for Medicine, Dentistry, and Veterinary Medicine. Approximately 15,000 students are enrolled in predominantly bachelor's and associate degrees in five fields: Education, Health and Care, Business and Management, People and Society, and Communication, Media and Design. Dutch is both the primary language of instruction and the predominant first language (L1) of the student population. At the time of the intervention 12.8% had Dutch and another language as L1s and 1.6% of the students had only another language as L1. For them, Dutch was considered an L2.

The sample comprised 167 students. Participants were recruited through a support initiative designed to assist students with following lectures. Participation was voluntary. The initiative was offered on different occasions during five weeks, from the week preceding the official start of the academic year to the end of the first month of the first academic term.

The sample consisted of 74 incoming students without prior experience and 93 students with prior experience in higher education. Prior experience ranged from 1 to 12 semesters ($n=93$, $M=4.71$, $SD=2.492$) with 12 participants who already held a bachelor's degree. The majority of the participants ($n=162$) were enrolled in a

bachelor's programme and represented all five fields within the institution. The remaining participants (n=5) were not enrolled in the organising institution. Three were enrolled in a master's programme, two did not indicate their programme of study.

With respect to parental educational background, 53 participants reported that neither parent held a tertiary education degree. In contrast, 106 participants had at least one parent with a higher education qualification: 62 reported both parents held such a degree, 21 reported only the mother did, and 23 reported only the father did. Seven participants indicated that they did not know whether their parents had obtained a degree. The majority of participants completed either General or Technical Secondary School. Table 1 shows the distribution of participants based on the form of prior education in secondary school ranging from General Secondary School (ASO) focusing on general academic education preparing for higher education, over Technical Secondary School (TSO) that combines general education with technical/theoretical training for further studies or technical careers, and Vocational Secondary School (BSO) which is more practice-oriented preparing directly for specific jobs, to Art Secondary School (KSO) combining general education with artistic training for creative studies or professions.

Table 1. Percentage of participants divided per form of prior education

<i>Form of prior education</i>	<i>Number of participants</i>	<i>Percentage of participants</i>
General Secondary School (ASO)	84	50.2%
Technical Secondary School (TSO)	63	37.7%
Vocational Secondary School (BSO)	12	7.2%
Art Secondary School (KSO)	5	3.0%
Secondary degree from the Netherlands	3	1.8%
Total	167	100%

Of the 167 participants, 113 identified as female and 54 as male. Participants had a mean age of 21 years ($M=21.11$, $SD=4.86$), with ages ranging from 17.81 to 53.19 years. With regard to language background, the majority (n=136) reported Dutch as their first and only native language. Eighteen participants identified both Dutch and another language as their L1s, while ten reported a language other than Dutch as their sole native language, indicating that Dutch, the language of instruction, was a foreign language for them. Three participants did not report on their language background. Thirty participants reported having a disability, which included physical, developmental, behavioral, emotional, and sensory impairments. The most frequently reported disabilities were dyslexia or dysorthography (n=13) and attention deficit disorder (n=6).

4.2 Procedure

The support initiative commenced with a screening session during which all instruments were administered. Participants received a set of paper-based materials, including an informed consent form, instructions for the listening comprehension task, writing paper, a general and academic vocabulary size screening test, the adapted Metacognitive Awareness Listening Questionnaire, and a survey capturing personal and educational characteristics. All components of the screening were completed in a single session, following a fixed sequence: listening comprehension tasks were administered first, followed by the vocabulary tests, the metacognitive questionnaire, and finally the personal and educational background survey.

4.3 Instruments

4.3.1 Listening comprehension

To assess listening comprehension, we worked with the test 'Educatief Startbekwaam', a standardized test from the internationally recognized Certificate of Dutch as a Foreign Language (Certificaat Nederlands als Vreemde Taal, CNaVT). The test has the ALTE (Association of Language Testers in Europe) Q-label.

The test 'Educatief startbekwaam' is designed for adolescents or adults who intend to pursue higher education in Dutch (Educatief Startbekwaam (STRT) - B2, n.d.). The test evaluates and certifies Dutch language proficiency of non-native learners at the B2 level of the Common European Framework of Reference for Languages (Council of Europe, 2001), which is widely accepted as the minimum threshold for university admission across Europe (Deygers et al., 2018). It is implicitly assumed that individuals who pass this exam possess the linguistic competence necessary to follow academic courses, comprehend complex texts, and produce clear and detailed written work in Dutch.

The listening comprehension part consists of two sections. For each section, the topic is introduced together with clear instructions. Then candidates are exposed to a listening prompt, during which they are allowed to take notes. In the first section, candidates listen to an audio fragment of around 4 minutes mimicking a radio interview. They can hear the fragment only once. Afterwards they receive 25 minutes to write a paper based on the listening prompt. In the second section, candidates listen to an audio fragment of around 8 minutes mimicking a lecture. They can hear the fragment twice. Afterwards candidates receive 30 minutes to write a summary based on the listening prompt. This makes the test 'Educatief Startbekwaam' an integrated-skills test: the test measures listening through writing. This part is scored on content (i.e., listening) and form (i.e., writing).

This research used the second section as it mimics the lecture. We selected one listening prompt on the topic of 'algae'. The fragment contains ten key points that

candidates are expected to register and include in their writing. The task requires learners to demonstrate several key listening comprehension skills. These include identifying the main idea and following the speaker's line of reasoning in spoken texts, as well as understanding detailed information such as arguments, viewpoints, and conclusions. Additionally, learners must be able to select relevant information, arguments, and perspectives from the spoken material (Educatief Startbekwaam (STRT) - B2, n.d.). A candidate is awarded a point when correctly including a key point in their summary. At the basis for the analysis here are the scores for content, not for form.

The choice is not without fault. Listeners can hear the fragment twice, which is not like the context of higher education. Although candidates can take notes and the correction splits writing and listening skills, students have to write an open-ended response requiring working memory and expressive language skills (Stæhr, 2009).

Yet, we decided to use this instrument as it is validated, of high standards and gives access to higher education. Moreover, the section of the listening comprehension part simulates the context of higher education. The qualitative audio material eliminates many elements that make listening particularly challenging like speaker characteristics (e.g., accent) and the surrounding context (e.g., background noise, visual distractions) (Lynch, 2011). Asking to write a summary of the main points avoids directed listening prompted using a set of questions (Keenan et al., 2008).

Finally, the topic of 'algae' was selected for two reasons. First, we tried to control for topical knowledge (Keenan et al., 2008; Lynch, 2011; Wang Treffers-Daller, 2017), one of the attributes related to the language user from Bachman and Palmer's (2010) model. Algae is a topic which we expected few or none of the participants to be (very) familiar with. Upon consulting academic disciplines of the students, only four students were in a programme with a focus on biology. Second, we tried to control for affective schemata, another attribute related to the language user from Bachman and Palmer's (2010) model. The topic as well as the delivery of the text on algae is not controversial or prone to trigger any emotions influencing the listening experience.

All participant submissions were reviewed by a single experienced assessor who had completed the formal training provided by the Certificate of Dutch as a Foreign Language testing institute. The assessor applied the official assessment rubrics, which included minimum requirements as well as explanatory guidelines and examples of correct responses.

4.3.2 *Vocabulary size*

To measure vocabulary size, we used two XLex checklist screening tests. For general vocabulary, we used a screening test developed by Brysbaert, Stevens, Mander and Keuleers (2014). For academic vocabulary, we used a screening test developed by Bonne and Casteleyn (2025). Each screening test involves a lexical decision task

where participants indicate words—either general or academic—they know or can use based on 100 sequences of letters shown per test. Seventy-seven sequences constitute actual words; 23 are pseudowords included to discourage guessing. The resulting score, expressed as a percentage, considers the number of correctly identified actual words, adjusted for the number of pseudowords checked. The test is unspeeded and typically takes between five to ten minutes to complete.

To assess internal consistency of the general and academic vocabulary size screening tests, Cronbach's alpha was calculated based on the 167 participants and each of the 100 items. There were no items with zero variance. Cronbach's alpha of $\alpha=.87$ for the general vocabulary size screening test and Cronbach's alpha of $\alpha=.89$ for the academic vocabulary size screening test indicate a good internal consistency among the items.

4.3.3 *Metacognitive awareness*

Metacognition is frequently assessed through self-reported measures like metacognitive awareness (Fleming & Lau, 2014). The Metacognitive Awareness Listening Questionnaire (MALQ) (Vandergrift et al., 2006) is a widely used instrument designed to measure metacognitive awareness for listening (from now on metacognitive awareness) and the perceived use of listening strategies among L2 learners. As described in its design paper, the MALQ can be used as a diagnostic tool for educators. It consists of 21 items rated on a 6-point Likert scale (from "strongly agree" to "strongly disagree"). The questionnaire is organized into five type scales: problem-solving (6 items), planning-evaluation (5 items), mental translation (3 items), person knowledge (3 items), and directed attention (4 items). In'nami, Cheung, Koizumi, & Wallace found that the scales of the MALQ "are related enough to be modeled with an underlying higher-order factor of overall metacognitive awareness" (2023). As such, a final score is calculated on 6 as the average of all questions, two of which need the score reversed due to the phrasing.

The MALQ enjoys high validity (Goh & Hu, 2014) and its internal reliability estimates range from 0.68 to 0.78 (Vandergrift et al., 2006). Later uses also showed lower reliability like Cronbach's alpha of 0.62 (Vandergrift & Baker, 2015).

We adapted the MALQ for usage in the context of Dutch L1. The questionnaire was translated into Dutch and adapted to fit the context of academic L1 language usage. This resulted in two main changes. First, 'in French' was rephrased to 'to a lecture'. This affected three items, all from the scale person knowledge. Second, when there was a reference to 'translate' we rephrased it to capture the idea of moving from academic language to 'your own words'. This affected 3 items, all from the scale mental translation.

To assess internal consistency of the adapted MALQ, Cronbach's alpha was calculated based on each of the 21 items and the 166 participants who completed the MALQ entirely. There were no items with zero variance. Cronbach's alpha of

$\alpha=.582$ indicates an unacceptable reliability. Further analysis revealed four items whose deletion would improve internal consistency, as shown in Table 2.

Table 2. Overview of items, scales and Cronbach's Alpha if item deleted

<i>Item</i>	<i>Scale</i>	<i>Cronbach's Alpha if deleted</i>
I find that listening to a lecture is more difficult than reading, speaking or writing in an academic context	Person knowledge	.603
I feel that listening to a lecture is a challenge for me	Person knowledge	.596
I don't feel nervous when I have to listen to a lecture	Person knowledge	.584
When I have difficulty understanding what I hear, I give up and stop listening	Directed attention	.632

When deleted, each item of the person knowledge scale adds to a higher consistency. This scale captures students' metacognitive awareness of how they approach lecture comprehension. However, almost half of our participants have no prior lecture experience. Their responses likely reflect anticipated rather than experiential knowledge which seems to confound the scale. Additionally, all these items were affected by the revision to an academic L1 context. When this scale is deleted, the reliability rises to Cronbach's alpha of $\alpha=.639$ which approaches the common reliability estimates from 0.68 to 0.78 (Vandergrift et al., 2006) and supersedes the reliability of Cronbach's alpha of 0.62 in their 2015 paper (Vandergrift & Baker, 2015).

Interestingly, the MALQ without the scale person knowledge has a higher reliability across all participants, than when split across participants with or without experience in higher education. As shown in Table 3, this was not the case for the complete MALQ.

Table 3. Overview of Cronbach's alpha for participants with and without experience in higher education for the complete MALQ (21 items) and the MALQ without the scale person knowledge (18 items)

	MALQ	MALQ without scale person knowledge
All participants (n=166)	$\alpha=.582$	$\alpha=.639$
Participants without experience in higher education (n=73)	$\alpha=.560$	$\alpha=.618$
Participants with experience in higher education (n=93)	$\alpha=.595$	$\alpha=.633$

In sum, as an indicator of metacognition, we used the adapted MALQ without the scale person knowledge.

4.3.4 Attributes related to the language user

A survey of 16 questions gathered self-reported information on age, location, gender, experience in higher education, prior education, language, disability and background information of the parents. Some of these personal and educational characteristics of the participants, like age, prior education or parental education, are known to influence language skills and academic success in higher education (Brysbaert et al., 2014; Irvin & Blankenship, 2022; Heeren et al., 2021; Willems et al., 2025).

4.4 Method of analysis

To determine the correct statistical tests, a check of assumptions was performed. Normality was checked by performing Shapiro-Wilk. As shown in Table 4, Shapiro-Wilk showed that the distribution of the scores of the academic vocabulary size screening test, the adapted MALQ and the listening comprehension test departed significantly from normality. Consequently, non-parametric tests were used.

Table 4. Overview of results of test of normality

	Statistic	Shapiro-Wilk	
		df	Sig.
General vocabulary size screening test	.992	167	.530
Academic vocabulary size screening test	.967	167	<.001*
MALQ	.982	166	0.029*
Listening comprehension test	.877	167	<.001*

Note. Significance ($p < 0.05$) is indicated by *

To determine the relationships between listening comprehension and attributes related to the language user, Spearman's Rank Correlation Coefficient, Mann Whitney U tests and Kruskal-Wallis tests were used. To determine the relationship between listening comprehension and vocabulary size, and between listening comprehension and metacognitive awareness, correlations were calculated using Spearman's Rank Correlation Coefficient. To assess the extent to which academic vocabulary size, general vocabulary size and metacognitive awareness influence listening comprehension, a quantile regression analysis was calculated. A calculation of a variance inflated factor (VIF) score was performed to see if the tests were collinear. All data was processed using IBM SPSS version 24.

5. RESULTS

5.1 Descriptive statistics and correlations

Descriptive statistics were calculated for general vocabulary size, academic vocabulary size, metacognitive awareness, and listening comprehension. Table 5 presents the means, standard deviations, and score ranges for each of the instruments administered.

Table 5. Scores on the general vocabulary size screening test, the academic vocabulary size screening test, the adapted Metacognitive Awareness Listening Questionnaire and the CNaVT listening comprehension section

	<i>M</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
General vocabulary size screening test (on 100)	78.93	5.48759	62.99	92.87
Academic vocabulary size screening test (on 100)	84.75	7.30196	61.43	98.70
The adapted MALQ (on 6)	3.8455	0.42965	2.55	4.80
Listening comprehension test (on 10)	8.1976	1.56867	3.00	10.00

Table 6 offers an overview of correlations and group comparisons of the listening comprehension scores. For the listening comprehension scores, no significant correlations were revealed for age (Spearman coefficient) nor for gender or disability (Mann-Whitney U tests). Significant differences were revealed through Mann-Whitney U tests regarding experience in higher education (as well as for already holding a degree) and parental education. More detailed Mann-Whitney comparisons of listening comprehension scores by parental education background showed significant differences between no parent with a higher education degree and only the mother at $p=.012$, and between no parent with a higher education degree at $p=.048$. A Kruskal-Wallis test indicated that there was a significant difference in listening comprehension among participants from different branches of secondary education. Further investigation through Mann-Whitney U tests revealed significant differences between Vocational Secondary School (BSO) and respectively General Secondary School (ASO) at $p=.001$ and Technical Secondary School (TSO) at $p=.028$. A Mann-Whitney U test found a significant difference in listening comprehension between participants who (also) spoke another language than Dutch at home compared to participants who only identify Dutch as native language. A Kruskal-Wallis test revealed a significant difference in listening comprehension among participants based on only Dutch, also Dutch and only a different mother tongue. Further analysis revealed a significant difference between Dutch as only native language and also Dutch as native language at $p=.005$. There were no significant differences with participants with only another different native language.

Table 6. Correlations and group comparisons of listening comprehension scores

Attribute	Groups	n	M	SD	Test Statistic	p
Age	17.81 to 53.19 years	167	8.20	1.57	r = .056	.470
Gender	Men	54	8.07	1.81	z = -0.035	.972
	Women	113	8.26	1.44		
Disability	With	30	7.73	1.64	z = -1.818	.069
	Without	132	8.29	1.52		
Experience in higher education	No experience	74	7.77	1.67	z = -3.204	.001*
	≥1 semester	93	8.54	1.40		
Already higher education degree	Yes	12	9.10	1.16	z = -2.213	.027*
	No	155	8.13	1.58		
	No (none) ¹²	53	7.70	1.90		
	Yes (mother) ¹	21	8.81	1.36		
Parental education	Yes (father)	23	8.26	1.54	z = -2.414	.016*
	Yes (both) ²	62	8.43	1.25		
	I don't know	7	8.14	0.90		
	General ¹	84	8.57	1.27		
Branches of Flemish secondary education	Technical ²	63	8.03	1.74	χ ² (5,167)=13.568	.019*
	Vocational ¹²	12	6.75	1.86		
	Art	5	7.60	1.14		
Only Dutch at home	Yes	136	8.36	1.41	z=-2.894	.004*
	No	28	7.29	1.96		
	Only Dutch ¹	136	8.35	1.41		
Language background	Also Dutch ¹	18	7.39	1.58	χ ² (5, 164)=8.748	0.013*
	No Dutch	10	7.10	2.60		

Note. Significance (p<0.05) is indicated by *

5.2 Correlation analysis

To determine the relationship of listening comprehension with general and academic vocabulary size, and metacognitive awareness, correlations were calculated using Spearman's Rank Correlation Coefficient. As shown in Table 7, significant correlations were found between listening comprehension and both measures of vocabulary size, as between both measures of vocabulary size themselves. No significant correlations were found with metacognitive awareness.

Table 7. Correlations between listening comprehension, general and academic vocabulary size, and metacognitive awareness (n=167)

		Listening comprehension	General vocabulary size	Academic vocabulary size	Metacognitive awareness
DV	Listening comprehension		.231	.207	.018
IVs	General vocabulary size		.003*	.007*	.820
	Academic vocabulary size			.306	-.094
	Metacognitive awareness			<.001*	.229
					-.045
					.567

Note. Significance ($p < 0.05$) is indicated by *

5.3 Regression analysis

To assess the extent to which academic vocabulary size, general vocabulary size and metacognitive awareness influence listening comprehension, a quantile regression analysis was calculated. The model's explanatory power varied across different performance levels, with the strongest predictive ability observed for students in the lower and middle ranges of listening comprehension. As shown in Table 8, the model explained approximately 6.9% of the variance for students at the 25th percentile and 6.5% for those at the 50th percentile. The model's effectiveness diminished substantially for students at the 75th percentile, explaining only 1.1% of the variance.

Table 8. Explained variance of listening comprehension per model

Quantile	0.25	0.50	0.75
Pseudo R Squared	.069	.065	.011
Mean Absolute Error	1.3820	1.1208	1.3880

Quantile regression analyses were conducted to examine the relationship between vocabulary measures and metacognitive awareness with listening comprehension performance across different points of the performance distribution. As shown in Table 9, results revealed varying parameter estimates which increased substantially across quantiles. General vocabulary size showed differing coefficient estimates for the different percentiles with the stronger association observed at the 50th percentile (.081) and 75th percentile (0.51). Academic vocabulary size demonstrated a decreasing pattern across quantiles. Metacognitive awareness exhibited a shift from positive to negative associations across the performance distribution with coefficients of 0.135 at the 25th percentile, -0.012 at the 50th percentile, and -0.037 at the 75th percentile.

At the 25th percentile, academic vocabulary size emerged as the only statistically significant predictor ($p = .018$). General vocabulary size emerged as the only statistically significant predictor at the 50th ($p = .004$) and 75th percentile ($p = .035$).

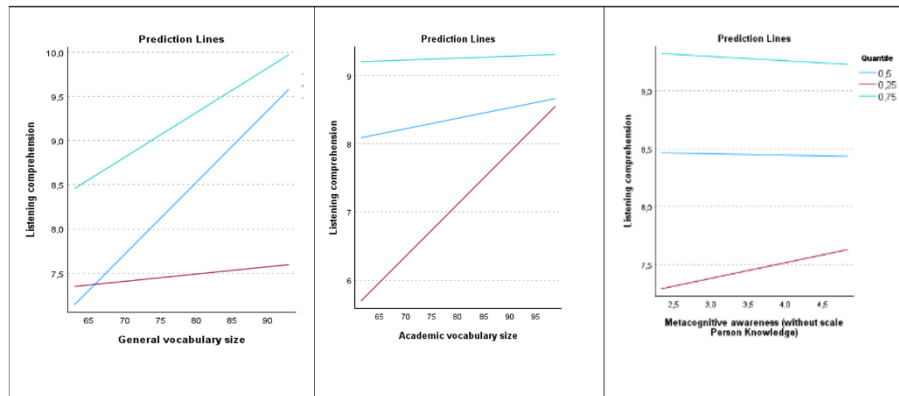
Table 9. Quantile regression coefficients for predictors of listening comprehension

Quantiles	Coefficients	Std. Error	t	df	p
Quantile 0.25					
Intercept	-.150	4.1892	-.036	162	.972
General vocabulary size	.008	.0426	.193	162	.847
Academic vocabulary size	.076	.0319	2.394	162	.018*
Metacognitive awareness	.135	.5044	.268	162	.789
Quantile 0.50					
Intercept	.759	2.7190	.279	162	.780
General vocabulary size	.081	.0277	2.943	162	.004*
Academic vocabulary size	.015	.0207	.741	162	.460
Metacognitive awareness	-.012	.3272	-.037	162	.970
Quantile 0.75					
Intercept	5.172	2.3408	2.209	162	.029
General vocabulary size	.051	.0238	2.123	162	.035*
Academic vocabulary size	.003	.0178	.158	162	.874
Metacognitive awareness	-.037	.2818	-.131	162	.896

Note. Significance ($p < 0.05$) is indicated by *

Figure 1 displays the quantile regression lines for the relationship between listening comprehension and respectively general vocabulary size, academic vocabulary size, and metacognitive awareness. All but two prediction lines show positive slopes across the quantiles, indicating a generally positive association between each predictor and listening comprehension. General and academic vocabulary size function as performance amplifiers: students with stronger vocabulary knowledge tend to benefit more. Academic vocabulary is especially relevant for the 25th percentile. Finally, metacognitive awareness shows slightly declining slopes for the 50th and 75th percentile. The only increasing slope for metacognitive awareness is at the 25th percentile.

Figure 1. Quantile regression lines for the relationships between listening comprehension and respectively general vocabulary size, academic vocabulary size and metacognitive awareness



6. DISCUSSION

The goal of this article was to unpack L1 academic listening comprehension by means of Bachman and Palmer's (2010) model of communicative language ability which incorporates language knowledge, strategic competence, and attributes of the language user. Our findings highlight the significance of language knowledge—here conceptualized as general and academic vocabulary size—and contextual experience. Although strategic competence—here conceptualized as metacognitive awareness—does not appear to be a determining factor, it warrants further investigation, particularly among less proficient listeners.

Our findings highlight the importance of language knowledge, as evidenced by the significant role of vocabulary size. Both general and academic vocabulary size demonstrated significant, positive correlations with listening comprehension and were the only significant factors in our regression models. Interestingly, these models suggest that academic vocabulary might be a foundational skill that struggling students particularly lack. General vocabulary size outperforms academic vocabulary size in higher performers. Stronger listeners might benefit from a plateau effect on academic vocabulary in spoken communication where additional gains in academic vocabulary do not lead to further improvement and may even slightly diminish in effect. Spoken academic language, like lectures, contains only roughly half as much academic vocabulary as academic written text (Dang, 2022; Mecartty, 2000). It also illustrates that the relationship between vocabulary knowledge and listening proficiency changes along with the development of a learner's proficiency (Qian & Lin, 2019). The importance of language knowledge is also supported by the attributes related to the language user linked to native language. This reinforces the idea that listening in L2 is a bigger challenge than in the mother tongue (Karalık & Merç, 2019).

Strategic knowledge, here conceptualized as metacognitive awareness, seems less relevant in L1 academic listening comprehension. Unlike evidence in L2 research (Karalík & Merç, 2019; Zuo, 2013), we did not find strong indications for the importance of metacognitive awareness with no significant correlations with listening comprehension nor as a significant factor in our regression models. Metacognitive awareness doesn't reliably predict listening comprehension at any performance level. Although not significant, we found a hint of relevance with metacognitive awareness for the lowest proficiency level, showing the largest positive coefficient and a positive slope of the prediction line. With a lack of academic vocabulary, weaker performers might face a larger learning task requiring them to use more strategies (Karalík & Merç, 2019). Yet, for L1 listeners this challenges the idea that more proficient listeners use a wider range of cognitive and metacognitive strategies (top-down) (Vandergrift, 2003a, b; Chamot, 2005) and less proficient listeners use more bottom-up clues, like vocabulary (Stæhr 2009). Of course, if they lack many of these bottom-up clues, it seems they have to resort back to strategic knowledge, indicating the interplay of both.

Incorporating attributes related to the language user indicates that listening comprehension relies on more than just vocabulary knowledge and hints at the importance of experience with the academic context. The attributes related to education (parental education, prior schooling, experience in higher education) are associated more strongly with listening comprehension than personal attributes like gender, age and disability. The personal factors like age and disability, frequently correlated to vocabulary size (Bonne & Casteleyn, 2025), did not significantly correlate with listening comprehension. This absence of an age effect might also indicate that the domain-specific listening comprehension test (on algae) avoided the influence of more general life experience.

Considering the educational attributes, both prior education and experience in higher education contributed to better listening comprehension. Although we expected a difference between students from general and technical secondary education, given that the former prepares more explicitly for higher education, we only found significant differences when comparing general and technical secondary education with vocational secondary education. The difference between general and technical secondary education was not statistically significant, although the effect was close to significance ($p=.087$). Our research highlights that educational attributes of the parents, particularly the mother, also contribute to the participants' listening comprehension. This influence extends beyond vocabulary knowledge alone. While some studies have found a link between maternal education and vocabulary size (Heeren et al., 2021), others have not (Bonne & Casteleyn, 2025; Warnby, 2023). These mixed findings suggest that listening comprehension involves more than vocabulary knowledge, with educational attributes of both the listener as the parent playing an additional role. The specificities of the academic context seem to matter especially for weak performers (25th percentile) where our regression models were stronger, where academic vocabulary was significantly correlated with

listening comprehension, and where metacognitive awareness, although not significant, showed the largest positive coefficient and the only positive slope.

The results show a direction for further research to develop L1 academic listening comprehension more effectively as “listening is a skill and any help we can give students in performing that skill will help them to be better listeners” (Harmer, 1998, p. 98). Maybe integrating vocabulary instruction and metacognitive strategies also in L1 lectures to support adopting the skill, especially for weaker learners, can be part of effective lecturing behavior (Klaassen, 2002). Also strategy instruction led to significant improvements in oral comprehension (Carrier, 2003; Ross & Rost, 1991; Thompson & Rubin, 1996). Finally, supporting academic integration through building familiarity with the format could yield interesting results. As a closing remark, it is worth mentioning that listening comprehension could also be a prerequisite for success, allowing students to progress. This merits specific research.

To conclude, the relatively low overall variance explained across all quantiles indicates that listening comprehension is a complex skill influenced by numerous variables beyond those examined in this study. Yet, the elements of Bachman and Palmer’s (2010) model of communicative language ability help to unpack L1 academic listening comprehension. L1 academic listening comprehension benefits more from language knowledge than strategic competence, which aligns with other research (Karalík & Merç, 2019). Small indications do show that research in metacognition in L1 academic listening should merit more attention especially for weaker listeners to make them active participants in their own performance (Wenden, 1998). Finally, the attributes related to the language user reinforced the importance of language knowledge while also extending its scope to include educational factors.

7. LIMITATIONS

Our exploration is not without limitations. First, although we followed the established test procedure for the listening fragment, this setup does not fully replicate real lecture conditions. Participants were exposed only to audio and could listen to the fragment twice. While limiting input to audio arguably increases the difficulty, it also omits the visual dimension that is integral to authentic lectures. Research has shown that visual cues substantially affect comprehension and should therefore be incorporated into listening assessment (Feak & Salehzadeh, 2001; Sueyoshi & Hardison, 2005). Including multimodal input enhances the content validity of listening-comprehension measures (Lynch, 2011). Furthermore, allowing a second listening may make the task too easy for native speakers, as suggested by their high scores on the fragment. This transitory nature of oral input can heighten listening anxiety (Graham, 2011) and thus represents a key difference between our test and the real-world academic context. We decided to adhere to the standard procedure to preserve comparability and validity with the high-stakes test on which access to higher education is based for non-native speakers.

Second, our exploration focused on listening comprehension, yet vocabulary knowledge was measured in written rather than spoken form. Recognizing a word in print does not guarantee recognizing it in continuous speech (Lynch, 2011; Stæhr, 2009). At the time of data collection, no suitable test of phonological L1 academic vocabulary size in Dutch was available. Previous studies have shown that aural vocabulary scores predict listening performance more strongly than written vocabulary scores (Han, 2017; Qian & Lin, 2019), suggesting that future research should employ or develop aural vocabulary measures to better capture the relationship between vocabulary knowledge and listening comprehension.

Third, the MALQ, as measure of metacognitive awareness used in this study, was originally developed for L2 listening contexts. Although adapted for the L1 academic context, the instrument may not fully capture the nuances of metacognitive awareness in our target population. Limited experience with lectures and limited self-awareness may also obscure participants' self-reported metacognitive skills. Future research should therefore refine or develop context-specific tools to assess metacognitive awareness of listening among novice L1 students in academic settings. An interesting starting point here would be to unravel the different subscales of the MALQ in relation to L1 listening comprehension.

Overall, this study employed existing instruments in a novel context. We recommend that future research develop and pilot tools specifically designed to assess listening and related constructs in L1 academic settings. Such context-sensitive instruments are likely to yield more valid, reliable, and nuanced insights into the listening processes of first-language students entering higher education.

A final limitation concerns the composition of the sample with respect to language background. While the study is framed in terms of L1 listening comprehension, the sample includes ten participants for whom Dutch is a foreign language, alongside students who only and also speak Dutch at home. Although we chose to retain these participants in order to reflect the linguistic diversity of the actual student population in Flemish higher education and to ensure that findings remain actionable for practitioners, we acknowledge that this introduces variability that complicates a strictly L1-based interpretation of the results.

8. CONCLUSION

Despite the centrality of lectures in higher education and the challenges faced by students, academic listening comprehension in the first language (L1) remains an underexplored area. This study applied Bachman and Palmer's (2010) model of communicative language ability to deepen our understanding of the factors underpinning L1 academic listening. Results indicate that L1 academic listening comprehension is more strongly associated with language knowledge than strategic competence. Listening comprehension correlated significantly with general and academic vocabulary size knowledge. Regression analysis revealed that academic vocabulary size was the sole significant predictor at the lowest quartile, while

general vocabulary size was significant for both the middle and higher quartiles of proficiency. No statistically significant relationship was observed between listening comprehension and metacognitive awareness overall, although the lowest proficiency group demonstrated the largest positive coefficient for metacognitive awareness and a positive slope of the prediction line, suggesting possible relevance at this level. In addition, the attributes related to the language user such as educational experience, parental education, type of secondary education, and native language highlighted the extended significance of language knowledge to encompass broader educational variables.

To conclude, the predictive strength of the model was most pronounced for students in the lower and middle proficiency ranges, suggesting that efforts to improve listening may be particularly beneficial for these groups. At the same time, the relatively low overall explained variance across all quartiles underscores that L1 academic listening comprehension is a complex skill shaped by many factors beyond those examined in this study. These findings highlight the need to further research factors within strategic competence and attributes related to the language user when seeking to understand listening comprehension.

DECLARATIONS OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institution where the research was carried out. Informed consent was obtained from all individual participants included in the study.

JUSTIFICATION OF TECHNOLOGY USE

The authors used AI-based generative technologies for the production of this study. The authors certify that the output of this service was carefully checked and they take full responsibility for the contents of this manuscript. Microsoft Copilot was used for language and grammar revision.

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