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From Professional Practices in Oral Easy-to-Understand Content to Prosody in Easy Language: Speech Rate and Pauses in Catalan

Marina Pujadas Farreras

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UNIVERSITAT AUTÒNOMA DE BARCELONA

Departament de Traducció i d'Interpretació i d'Estudis de l'Àsia Oriental

Doctorat en Traducció i Estudis Interculturals

From Professional Practices in Oral Easy-to-Understand Content to Prosody in Easy Language: Speech Rate and Pauses in Catalan

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ABBREVIATIONS GLOSSARY

AD	audio description
AVT	audiovisual translation
E2U	Easy-to-Understand
EL	Easy Language
EL+	Easy Language Plus
ER	Easy Read
ID	intellectual disabilities
L2	second-language
PL	Plain Language

CHAPTER 1: INTRODUCTION

In today's digital society, access to online information is essential for all. Guaranteeing this access for people with functional, cultural, or linguistic diversity means that content should be made available, translated, and published in both standard and alternative formats by default, rather than only in response to requests or legal obligations (Rodríguez Vázquez & Torres-del-Rey, 2019). Recent years have seen growing attention to accessible communication in Spain, reflected in the development of Easy Language (EL) initiatives across different modalities. Ongoing examples include the online news programme *Planeta Fácil*[1] and the growing production of audiobooks in EL[2], while earlier initiatives include the easy audio guides at Burgos Cathedral[3] and the easy news programme *Sinxelo*[4] from Galician television.

EL is a variety of natural language that has been maximally enhanced for comprehensibility and is intended to address people with communication impairments or difficulties, regardless of whether they have disabilities (Maaß, 2020b). It can be situated within the language continuum of Easy-to-Understand (E2U) Languages, an umbrella term encompassing a range of language varieties designed to enhance comprehensibility, including Plain Language (PL) and EL itself (Perego, 2020b).

In contrast to EL, PL is closer to standard language and primarily targets readers for whom standard texts are too complex, such as in expert-lay communication, rather than those with communication impairments, who may find PL insufficiently accessible (Maaß, 2020f). Easy Language Plus (EL+) has been conceived as an intermediate variety between EL and PL, combining the functional accessibility of EL with features that reduce potential social stigma, effectively bridging EL and PL (Maaß, 2020e). This model is illustrated in Figure 1.1.

[1] https://planetafacil.plenainclusion.org/formato/television/
[2] https://repositori.lecturafacil.net/ca/taxonomy/term/58
[3] https://www.miguiavisual.com/CatedralBurgosAccesible/
[4] https://www.extradigital.es/galicia-a-crtvg-lanza-o-proxecto-de-rsc-sinxelo-en-colaboracion-coa-uvigo/

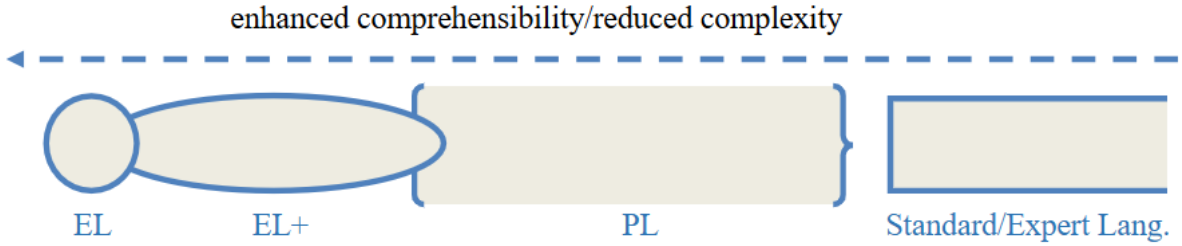


Figure 1.1: Easy Language model. Source: Maaß (2020d)

However, despite the growing attention to EL and accessible communication, there remains a need for more empirical research on this language variety (Bredel & Maaß, 2024; González-Sordé & Matamala, 2023; Rastelli, 2025; Rivero-Contreras et al., 2021; Sutherland & Isherwood, 2016). Within multimodal content, particularly webpages, Rodríguez Vázquez et al. (2022) highlight the continued lack of standardisation of best practices, as evidenced by the heterogeneity in the design and content of the materials analysed in their study. Looking at audio content, while some existing guidelines provide a few recommendations for implementing EL in audio formats, these are often vague and have not been tested (Pujadas-Farreras & Matamala, 2025). In Spain, and specifically in Catalan and Spanish language contexts, no prior empirical studies have tested prosodic recommendations in EL, leaving the provided recommendations without an evidence-based foundation.

This thesis aims to partially fill this gap through two main approaches. First, it examines practices in the creation of E2U Language audio and audiovisual content through interviews with professionals, as this was a relatively underexplored practice at the start of the study. This is considered a first step towards the main focus of the thesis and central approach: it empirically investigates two prosodic elements, speech rate and pauses, in Catalan EL audio materials. The study evaluates whether modifying these elements improves comprehension, whether users find slower speech or longer pauses acceptable, and what preferences users express. Two distinct user groups were the focus: individuals with intellectual disabilities (ID) and neurotypical second-language (L2) learners, together with a control group of neurotypical native speakers.

The present work was carried out within the PhD program in Translation and Intercultural Studies at the Department of Translation, Interpreting, and East Asian Studies at the Universitat Autònoma de Barcelona. It was conducted within the

framework of the WEL project (PID2022-137058NB-I00)[5] and received funding from the Catalan Government (2022FI_B 00097).

1.1. Objectives and hypotheses

This dissertation pursues three main objectives:

I. To investigate professional practices in the creation of audio and audiovisual E2U Language content.
II. To evaluate speech rate within the framework of EL in Catalan.
III. To evaluate pauses within the framework of EL in Catalan.

In order to achieve these objectives, each was further divided into a series of more specific aims. With regard to the first objective, the first aim was to map the linguistic strategies used by professionals in the creation of oral E2U Language content. The second aim was to identify the prosodic strategies employed in audio and audiovisual modalities. The third aim was to analyse the use of paratextual elements within these contents. For this first aim, the focus on E2U Language was chosen because, at the start of this investigation, research on E2U Language and its varieties in audio and audiovisual content was very scarce. Therefore, the goal was to achieve a general overview without focusing on a specific variety, before focusing more specifically on EL in the remaining objectives.

The second and third objectives were structured around three aims each. The first aim was to evaluate whether these two prosodic features demonstrably enhance comprehension. The second aim was to assess the extent to which these prosodic modifications are perceived as acceptable. Finally, the third aim was to identify user preferences regarding these two prosodic features. To address these aims, two experimental studies were conducted with three participant groups: a control group of neurotypical Catalan native speakers and two user groups: one of native speakers with ID and one of neurotypical language learners.

Based on these objectives and aims, the following hypothesis were formulated:

H1. Linguistic practices in E2U audiovisual content are expected to closely align with established recommendations for the written modality.

[5] https://webs.uab.cat/wel/en/

H2. Prosodic strategies in E2U audiovisual content are expected to vary depending on the type of content.

H3. Paratextual elements in E2U audiovisual content are expected to vary depending on whether the content is created from scratch or adapted.

H4. Slowing the speech rate in EL audios will significantly improve comprehension.

H5. Lengthening pause durations in EL audios will significantly improve comprehension.

H6. User groups will view the prosodic modifications as acceptable, while the control group will not.

H7. Preferences across all participant groups will be strongly associated with their perceived acceptability of the prosodic practices.

Figure 1.2 offers a summary and visual representation of the relationships between each hypothesis and its corresponding objective, as well as indicating the chapters in which each is addressed.

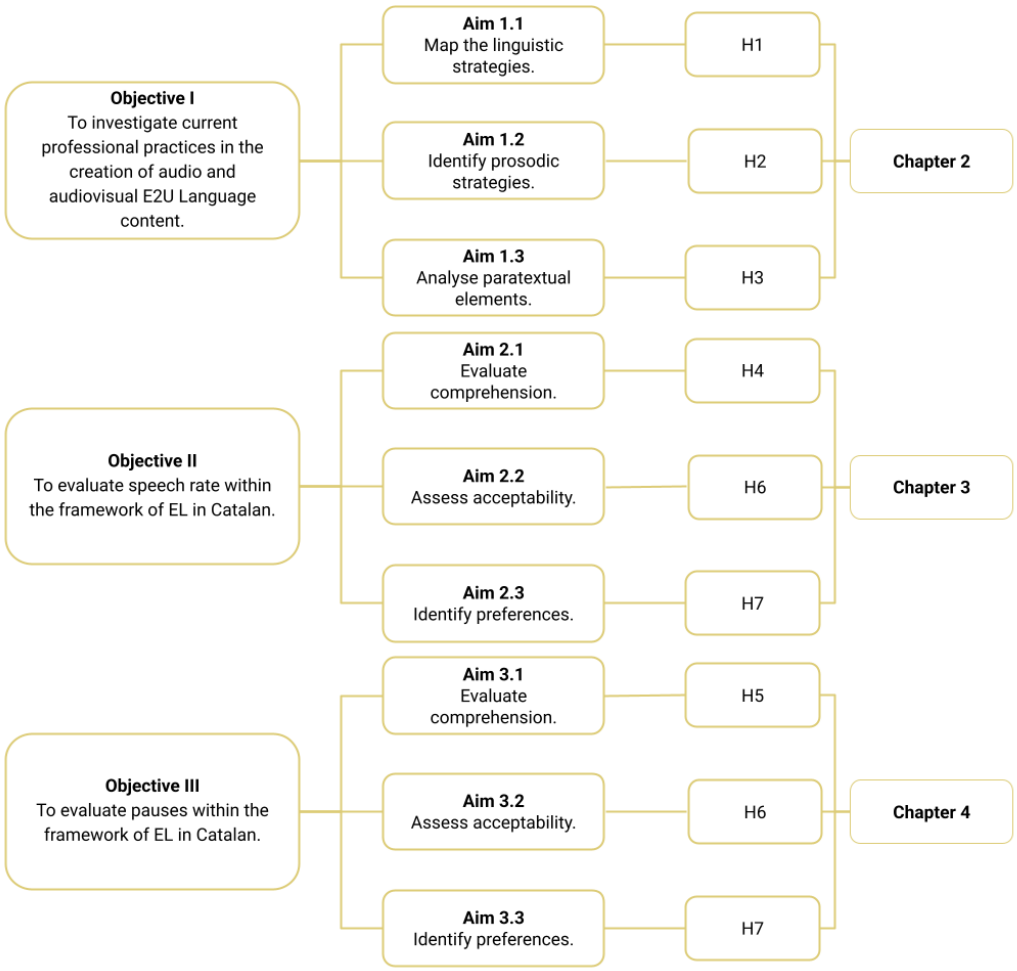


Figure 1.2: Overview of objectives and corresponding hypotheses

1.2. Theoretical framework

This section provides a cohesive overview of the theoretical framework of this thesis. It first introduces accessible communication, followed by a discussion of the transition from written to oral EL, with a dedicated subsection that outlines relevant projects in the field of EL in audiovisual contents. The section continues with a review of research on EL, covering both neuroscientific perspectives and empirical studies, and proceeds to examine key prosodic aspects, particularly pauses and speech rate. It concludes with a focus on EL in Catalonia, including its target groups and its institutional and legal framework.

As this thesis is a compendium of articles, each chapter also contains its own theoretical framework, which develops the concepts introduced here in greater detail and in relation to the specific focus of the chapter.

1.2.1. Accessible communication

Accessible communication refers to communication that is accessible and usable by people with different communication needs (Hansen-Schirra et al., 2021b). It can include any form of simplified communication designed to make information understandable and prevent exclusion in the communication process. Such communication can benefit all audiences by presenting information in a way that is accurate, clear, direct, precise, and easy to understand (Perego, 2020a).

Accessible communication can be implemented through a range of techniques aimed at making information more accessible. These include, for example, EL translation, speech-to-text interpreting, subtitling for the Deaf and Hard of Hearing, Augmentative and Alternative Communication and feedback systems, audio description, Sign Language interpreting, and community interpreting (Hansen-Schirra et al., 2021a).

Building on this perspective, Maaß's model (2020d) conceptualises EL as part of a broader continuum of E2U Language varieties, which also include PL and EL+. Within audiovisual translation, however, the range of options for EL and PL forms is more limited if these are not implemented from the outset. In particular, if the original audiovisual text is not created in EL or PL, the use of EL in translation may entail a higher risk of stigmatising users (Maaß & Hernández Garrido, 2020).

Failures in communication, whether verbal or written, can result from a variety of barriers. Maaß and Rink (2024) present a graphic listing ten types of communication barriers, based on the work of Schubert (2016), Rink (2019), and Lang (2021), and further discussed by Rink (2024). These barriers, explained below, are motor barrier, media barrier, sensory barriers, cognitive barriers, language barriers, expert language barriers, expert knowledge barriers, cultural barriers, and motivational and emotional barriers.

1. **Motor barriers** arise when physical or motor limitations interfere with a person's ability to access content. For example, in online environments, users with restricted mobility may struggle to use standard input devices such as keyboards or mice, making alternative input methods necessary. Motor impairments can also co-occur with other communication challenges, such as cognitive difficulties, which may require additional accommodations to ensure comprehension and

interaction (Rink, 2019). Accessibility standards, such as WCAG 2.2, address these barriers by recommending support for assistive technologies, including alternative keyboards, switch devices, or other pointing devices, to ensure that all users can effectively navigate and interact with digital content.

2. **Media barriers** can take multiple forms, affecting the code, mode, or medium through which information is conveyed (Rink, 2024). At the mode level, it overlaps with sensory barriers, occurring when auditory, visual, or haptic channels are unavailable or impaired, preventing recipients from perceiving the message. Graphical or textual media barriers can also arise, affecting individuals who may not have sensory impairments but struggle to decode written symbols, images, or complex text structures, such as functional illiterates or people with cognitive limitations (Rink, 2019). The medium itself, the technical carrier of information, can constitute a barrier when access is limited for users with disabilities, or when the necessary devices and skills to use digital materials are lacking (Lang, 2021; Rink, 2024; Weidenmann, 2002).
3. **Sensory barriers** occur when a person's ability to see, hear, or otherwise sense information is reduced, making it difficult to access spoken, written, or nonverbal messages (Condessa et al., 2020; Crowe et al., 2020; Gonzalez-Carrasco et al., 2019; J. Griffiths, 2008; Heine & Browning, 2002). As Rink (2024, citing Schubert, 2016) explains, communication relies on different modalities of perception, and if one of these channels is substantially impaired, information transmitted through it cannot be received successfully. When a message depends on a sensory modality that is not accessible to the user, a sensory barrier occurs. Accessibility services such as audio description, subtitles for the Deaf and Hard of Hearing, speech-to-text interpreting and EL texts, when designed to enhance perceptibility, can help overcome this type of barriers (Maaß & Hernández Garrido, 2020).
4. **Cognitive barriers** are encountered when a message is linguistically or conceptually too complex for recipients to process effectively. This can happen when information is presented indirectly, when ideas are negated, or when concepts are communicated indirectly, making it difficult for the audience to follow the reasoning (Schubert, 2016, cited in Rink, 2024). These cognitive barriers can stem from various factors such as aging (Randhawa & Varghese, 2025; Salthouse, 2019), neurological conditions such as brain injury (MacDonald, 2017; Togher et al., 2023) or even everyday situations such as distractions or stress (Morava et al., 2024; Navarro et al., 2020; Peelle, 2018). EL helps mitigate these barriers by bringing presuppositions and implicit meanings to the surface, simplifying content, and reducing information overload for users with special needs (Maaß & Hernández Garrido, 2020).

5. **Language barriers**, also referred to as code barriers (Mittal, 2018), arise when the sender and receiver do not share a common language, hindering the communication process. As Rink (2024, citing Weidenmann, 2002; Fröhlich, 2015) notes, these barriers are especially evident when the recipient's first language differs from that of the sender. Even when a language is shared, differences in language proficiency between sender and receiver can impede understanding. In oral communication, variations in accent or pronunciation may also create obstacles (Mittal, 2018). In the context of audiovisual accessibility, language barriers can be addressed through interlingual translation services such as dubbing, subtitles, voiceovers, supertitles, or film interpreting. EL also contributes to overcoming this barrier by limiting the text to core vocabulary and simple grammatical structures, making it easier for diverse audiences to comprehend (Maaß & Hernández Garrido, 2020).
6. **Expert language barrier**, also referred to as the vocabulary barrier (Mittal, 2018), is encountered in specialized communication when the sender uses terminology that the receiver does not know. Although the general language of the text may be understandable, the specialized terminology carrying the essential content is often not grasped (Mittal, 2018; Rink, 2024). Schubert (2016, as cited in Rink, 2024) notes that the expert language barrier and the expert knowledge barrier can occur simultaneously, but they are not necessarily linked. EL helps to overcome this barrier by minimizing specialized terminology and systematically building the required knowledge rather than assuming it (Maaß & Hernández Garrido, 2020).
7. **Expert knowledge barrier** arises when a topic is specialized, as the reader may be unable to understand the content without the necessary prior knowledge (Rink, 2024, citing Schubert, 2016; and Kalverkämper, 1998b, 1998a). Mittal (2018) refers to this as the background barrier, noting that effective communication requires the sender and receiver to share common background and assumptions. When this shared background is lacking, comprehension becomes difficult, creating a barrier to understanding. This barrier is also relevant to knowledge translation, which refers to the process of transferring knowledge from one individual or group to another. Beyond merely communicating information, knowledge translation involves reshaping and adapting knowledge so that the recipient can accurately comprehend and use the message (Bratianu & Garcia-Perez, 2023; Carlile, 2004). EL helps to overcome this barrier by reducing specialized terminology and systematically building the required knowledge rather than assuming it (Maaß & Hernández Garrido, 2020).
8. **Cultural barriers** come into play when the sender and receiver do not share the same cultural background, as communication can be hindered by culture-specific terms or references (Mittal, 2018). Vermeer (1990, cited in Rink, 2024) defines

culture broadly as the collection of conventions that shape a society. When such barriers are present, the reader may lack the cultural knowledge needed to interpret the text properly, including understanding discourse structures, text types, and their linguistic, media, and conceptual elements (Schubert, 2016, cited in Rink, 2024). These differences in culture may stem from a variety of sources, such as nationality (Podrug et al., 2023) or generational perspectives, such as those between Gen Z and Alpha (Wibisono et al., 2025). EL can reduce the impact of cultural barriers by clearly explaining cultural assumptions and making implicit references explicit (Maaß & Hernández Garrido, 2020).

9. **Motivational barriers** occur when a recipient's willingness to engage with a text is reduced, limiting comprehension and the likelihood of acting on the information. It affects the acceptability of the text and, depending on their intensity, can hinder either the recipient's ability to act on the information or the overall comprehension process (Lang 2021, Rink 2020). Studies by Ma and Zhao (2025), Sümer and Ceylan (2025), Kuşdemir and Bulut (2018), or Miyamoto, Pfost and Artelt (2019) and others have found correlations between improved reading comprehension and motivation in groups such as young students, language learners, and persons with learning disabilities.
10. **Emotional barriers** are closely linked to the specific reception situation and the individual's mental or emotional state. Factors such as the reader's mood, prior experiences, and expectations of the text can interact with certain text characteristics, potentially clashing with the reader's inner attitude and reducing cognitive, normative, or conative acceptance (Lang, 2021). Similarly, the emotional states of both the sender and the receiver can influence communication, with feelings such as anxiety, fear, lack of trust, or rivalry creating obstacles to understanding and engagement (Mittal, 2018). Research also supports the broader impact of negative emotional states, with studies by Bisson (2017), Pascoe et al. (2020) and Wunsch et al. (2021) showing that stress and depression can impair academic performance and cognitive functioning, illustrating how emotional barriers can significantly hinder effective communication and learning.

The barriers described above can affect different stages of the accessible communication process, as outlined in the Hildesheim School's model proposed by Maaß (2020a, 2019). According to Maaß and Rink (2024), this model can be understood as a series of steps, similar to a staircase, that guide the design of accessible texts. First, the information must be retrievable, meaning that users are able to access it. Second, it must be perceptible, allowing users to perceive the content through the sensory channels available to them. Third, the information should be comprehensible, enabling users to understand the content. Fourth, it must be

linkable, so that users can connect the information to their existing knowledge and recall it when needed. Fifth, the communication must be acceptable, presented in a manner that users can engage with and accept. Finally, the information should be action-enabling, providing users with the means to act on the content effectively Maaß (2019, 2020a).

Figure 1.3 illustrates the relationship between each step of the accessible communication model and the communication barriers discussed above, based on the representation provided by Maaß and Rink (2024).

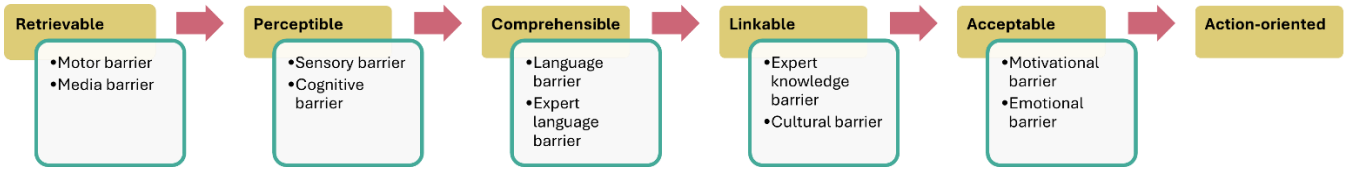


Figure 1.3: Relationship between accessible communication and communication barriers. Source: Adapted from Maaß and Rink (2024)

1.2.2. From written to oral Easy Language

When EL research shifts from the written to the oral modality, it is necessary to examine the corresponding concepts of legibility and readability in writing, and intelligibility and listenability in speech (Machuca & Matamala, 2025). Legibility refers to the visual perception of textual elements such as typography and layout, whereas readability relates to how easily a text can be understood, depending on factors such as linguistic complexity, organisation, style, and the reader's prior knowledge, skills, and motivation (DuBay, 2007). In parallel, Machuca and Matamala (2025) define intelligibility as the degree to which a listener can accurately recognise speech sounds, while listenability refers to the linguistic features that make spoken language easier to understand for both native speakers and language learners.

There are various formulas and tools designed to assess readability, such as the Flesch-Kincaid Grade Level (Flesch, 1948) and the Gunning Fog Index (Gunning, 1952), among others. In general terms, readability in written texts is often considered to correspond to listenability in spoken language (Machuca & Matamala, 2025). However, the extent to which readability and listenability correlate remains unclear (Denbow, 1975; Eastwood & Snook, 2012; Kotani et al., 2014). Within listenability research, Rubin (2012) proposes a Listenability Scale Guide, which focuses primarily on sentence structure, vocabulary, conversational features such as contractions, and listener-oriented aspects such as summarisation. However, this scale does not consider key characteristics of spoken language, which Matamala and Machuca (2025)

expand upon by identifying articulation, pitch, volume, voice quality, speech rate, and pauses as key features of listenability.

Building on the transition from written to oral modalities, the following subsection presents an overview of projects that have explored the application of EL in audiovisual communication and summarises their main findings.

1.2.2.1. Projects

The EASIT project (Easy Access for Social Inclusion Training, 2018–2021)[6] had several objectives: mapping existing E2U Language practices and training initiatives across Europe, exploring their application in audiovisual, defining new professional profiles and skills, designing curricula, producing open-access resources, and investigating certification strategies (Matamala, 2022). Regarding the application of E2U Language in audiovisual content, the focus was on subtitling, audio description, and audiovisual news (Bernabé-Caro, 2019; Matamala, 2022). E2U Language in subtitling was found to be particularly relevant and feasible for educational materials, television formats (news, documentaries, advertisements, debates, legal content, talk shows), and informational content (civic instructions, transport guidance, weather forecasts, and cultural event announcements) (Bernabé-Caro, 2019). Although Bernabé-Caro (2019), in line with Maaß and Hernández Garrido (2020), acknowledges that adding explanatory information can overload subtitles, the report also argues that certain simplification strategies inherent to E2U Language are already integral to subtitling practice.

A problem of applying E2U Language to audio description can create an inconsistency with the unsimplified dialogues (Maaß & Hernández Garrido 2020). Additionally, findings from the EASIT project (Arias-Badia & Matamala, 2020; Bernabé-Caro, 2019) suggest that standard audio description and E2U Language audio description may be conceptually different, with the latter adopting a more explanatory and informative approach, which could be referred to as audio adaptation. Regarding audiovisual news, the project noted challenges due to condensed formats and assumed prior knowledge but concluded that producing content in PL or EL is generally feasible (Bernabé-Caro, 2019).

The SELSI project (Spoken Easy Language for Social Inclusion, 2022–2024)[7] focused on developing oral strategies to make spoken communication more accessible. Its goal was to formulate adaptable recommendations for professional speakers in

[6] https://webs.uab.cat/easit/en/
[7] https://selsi.eu/en/

producing comprehensible content, both in one-way communication (e.g., presentations or broadcasts) and two-way interactions. To achieve this, the project mapped existing spoken EL resources and user needs across Europe, developed and tested a set of strategies, and integrated them into a multilingual online tool for practitioners (Perego & Brumen, 2023).

The strategies identified (Perego & Brumen, 2023; SELSI, 2023) were grouped into five categories: (1) textual and conversation-facilitating strategies, (2) linguistic strategies, (3) non-linguistic strategies, (4) listener-engagement strategies, and (5) strategies involving supporting materials. Among these, the most valued were avoiding excessively fast speech, also recommended in existing guidelines and standards (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023; North Yorkshire County Council, 2014), and giving listeners enough time to process information and, in interactive situations, sufficient time to respond, which is also consistent with guidelines advocating the use of pauses (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023). In line with standard EL guidelines (ISO, 2023; UNE, 2018), professionals also preferred strategies such as using the active voice, offering explanations for difficult words, and employing positive sentence constructions.

The following table summarizes the results of testing strategies for one-way communication. Testing was conducted through focus groups in radio news contexts in Latvia and audiobook contexts in Sweden. In Latvia, two participant groups were involved, individuals with ID and individuals with dementia, while participants in Sweden had a range of cognitive conditions (SELSI, 2024).

Recommendation	Testing	Result
Present information in smaller portions and explicitly signal transitions between topics.	Latvia	Participants with ID: approved. Participants with dementia: not approved.
Follow a natural chronological order of events.	Latvia	Approved by both groups.
Use common and everyday words.	Latvia	Approved by both groups.
Replace abstract concepts with concrete words.	Latvia	Approved by both groups.
Avoid using synonyms (two words with the same meaning) for the same concept in one conversation/ speech.	Latvia	Approved by both groups.
Avoid names or titles that are not essential.	Latvia	Approved by both groups.
Replace large numbers and percentages with simpler words and approximations.	Latvia	Approved by both groups.

Recommendation	Testing	Result
Make pauses between texts or parts of the text.	Latvia	Approved by both groups.
Make pauses between speech units.	Sweden	Approved between clauses or sentences, but not between words.
Make pauses to add emphasis to key points.	Latvia	Approved by both groups.
Replace rare international words with their corresponding words in your language or explain the international words in an easier language.	Latvia	Participants with ID: not approved. Participants with dementia: approved.
Speak in short sentences.	Latvia	Approved by both groups.
When possible, use active voice.	Latvia	Participants with ID: approved. Participants with dementia: not approved.
Talk slowly and clearly, but naturally.	Latvia and Sweden	Latvia: approved by both groups. Sweden: non-conclusive.
Avoid speaking in a monotone voice.	Latvia and Sweden	Approved by all groups.
Speak slower to emphasise important information.	Sweden	More appropriate for facts, instead of a story.
Avoid speaking too emotionally.	Latvia and Sweden	Latvia: approved by both groups. Sweden: non-conclusive.
Use natural voice (and not speech synthesis) in audio recordings.	Sweden	Quality of the voice is more important.

Table 1.1: Summary of SELSI results on one-way communication. Source: Adapted from SELSI (2024)

The WEL project (From Written to Oral Texts in Easy Language: Easy Audios in Cultural Visits and Video Games, 2023–2026) pursues three main objectives: (1) mapping practices in oral EL, including creation processes, user groups, and typical features; (2) evaluating selected oral EL features in terms of comprehension, user preferences, and acceptability; and (3) investigating how easy audio formats can be developed within existing accessibility services, using video games and cultural-leisure visits as case studies (Machuca & Matamala, 2025).

The first two objectives will be addressed in this thesis (see Chapters 2, 3, and 4). Regarding video games, the project conducted a literature review, focus groups, and

user testing, though results from the latter are not yet published. The review shows that cognitive accessibility in games has received limited attention, partly due to the diversity of players and the varying cognitive barriers they encounter (Oliva-Zamora, 2025). Based on an analysis of academic literature and industry guidelines, Oliva-Zamora and Mangiron (2025) suggest using uncluttered interfaces, offering adaptive controls, presenting information via multiple channels (visual, auditory, textual), enabling pausing or rewinding, providing help functions, allowing text and font customization, clearly stating objectives, offering adjustable difficulty, motivating players through discoveries, supporting saving and tutorials, and clearly communicating accessibility features.

Focus groups with players, particularly those with dyslexia, revealed that while games are generally immersive and enjoyable, key accessibility issues can make them feel excluded. Players with dyslexia reported difficulties with processing written text, remembering information and controls, and coping with fast gameplay. Text-heavy games were especially challenging, leading participants to prefer action-oriented or faster-paced, intuitive games (Oliva-Zamora & Mangiron, 2025).

The ENACT project (Easy-to-Understand News for Collaborative Transformation, 2024–2026)[8] builds on the EASIT project and focuses on E2U news. Its objectives are to map the current state of E2U journalism across web, radio, and television in Europe, foster knowledge exchange among professionals and end users, and develop recommendations for best practices (Cuitavi-Martín & Matamala, 2026; ENACT, 2025). The mapping showed a growing interest and expertise among European news organizations (Cuitavi-Martín & Matamala, 2026).

Survey results (Cuitavi-Martín & Matamala, 2026; ENACT, 2025) suggest that E2U journalism still mainly targets written texts and traditional audiences, such as individuals with cognitive disabilities, though awareness is increasing that a wider range of users could benefit. While engaging with target audiences is valued, this typically focuses on feedback and validation rather than involving users in content creation. Respondents also highlighted a lack of specialized training and experts in E2U Language within journalism.

According to Tomažin (2025), user research and testing conducted at RTV Slovenia within the project indicate that participants prefer slightly slower speech rates and a stable rhythm delivered by trained voice talent. Key strategies identified for effective oral communication include using simple words and short sentences, addressing one

[8] https://project-enact.eu/

topic at a time with a clear structure, and supporting key points with visuals or brief on-screen text. Explanations should focus on essentials, as overly detailed textual E2U explanations in audiovisual formats were sometimes found excessive or even amusing. These results are generally consistent with findings from the SELSI and WEL project.

Besides the audio and audiovisual-focused projects, several other initiatives explore EL in different domains. The IDEM[9] project investigates applications in artificial intelligence, while VISUALECT[10] and TALENTO[11] focus on visual elements and language simplification in the context of cultural heritage. The LeiSA[12] project examined the use of PL in workplace settings, and Easy Reading: elaboration and distribution of texts and analysis of user experience[13] developed an interactive platform for web services and content in EL. EasyTalk is a system that uses natural language processing to help low-literate users generate EL texts interactively (Steinmetz & Harbusch, 2021). Additionally, the Train2Validate[14] project focused on developing certification programs for Easy-to-Read validators and facilitators, and Capito! Compris! Understood! Verstanden![15] expanded the capito method into multiple languages.

1.2.3. Easy Language: written and oral research

This subsection reviews the results of empirical studies on EL recommendations conducted to date, with a focus on studies involving user testing. As noted earlier, there remains a general lack of empirical evidence regarding the benefits of EL and E2U Languages more broadly (Bredel & Maaß, 2024; González-Sordé & Matamala, 2023; Rastelli, 2025; Rivero-Contreras et al., 2021; Sutherland & Isherwood, 2016). Consequently, this subsection considers studies covering both written and oral modalities. Furthermore, there are studies in neuroscience that, although not specifically focused on EL, examine the impact of linguistic elements on comprehension that are also recommended in EL. These are explored first, followed by studies specifically on EL.

[9] https://idemproject.eu/en
[10] https://www.upo.es/investiga/comintrad/visualect/
[11] https://tracce.ugr.es/talento/
[12] https://research.uni-leipzig.de/leisa/
[13] https://www.uv.es/uvweb/interdisciplinary-research-structure-reading/en/projects/completed-projects/easy-reading-elaboration-distribution-texts-analysis-user-experience-1285895418725/ProjecteInves.html?id=1285899574680
[14] https://plenainclusionmadrid.org/train2validate/
[15] https://www.capito.eu/en/capito-goes-international-kickoff-meeting/

1.2.3.1. Neuroscientific perspectives

A common EL recommendation is to use common words and simple sentences (ISO, 2023; UNE, 2018). According to surprisal theory, less predictable words require more processing time (Hale, 2001; Levy, 2008). Studies applying this framework have shown that unexpected or unfamiliar words activate broader and more intense neural networks, indicating increased processing demands compared to familiar words (Brouwer et al., 2021; Kuperberg, 2007; C. J. Price et al., 1996). Likewise, sentences with higher syntactic complexity or unexpected structures also increase cognitive load, as shown by increased activation in frontal and temporal brain regions and longer processing times (Obrig et al., 2024; Shain et al., 2022; Vogelzang et al., 2020).

Another usual guideline is to avoid using verbs in nominal forms (UNE, 2018). ERP studies indicate that the neural processing of nouns and verbs depends not only on their lexical category but also on their syntactic role and contextual use. Federmeier (2000) and Piciucco et al. (2022) found that when verbs or nouns are used in unusual ways, such as verb nominalizations, the brain requires greater cognitive effort to process them. Another recommendation is to avoid using abstract words (UNE, 2018), which neuroscience appears to support, as studies show that concrete nouns are processed faster, more accurately, and with less cognitive effort than abstract nouns. This effect is observed across tasks such as recall, recognition, lexical decision, and learning (Bucur & Papagno, 2021; Fahimi Hnazaee et al., 2020; Hemati & Hossein-Zadeh, 2018; Montefinese et al., 2025).

It is also recommended to use affirmative sentences when possible (UNE, 2018). Studies using neuroimaging and electrophysiology show that negative sentences elicit greater activation in brain regions associated with cognitive control, working memory, and inhibition (e.g., left premotor cortex, anterior temporal pole, dorsal anterior cingulate cortex). Event-related potentials (ERPs) such as the N400 and P600 also show increased amplitudes or delayed responses for negative sentences, indicating higher processing effort (Carpenter et al., 1999; Christensen, 2009; Haase, 2024; Huang et al., 2022).

Finally, using images is another common strategy in EL texts (ISO, 2023; UNE, 2018). Studies such as Asilestari et al. (2025), Schwamborn et al. (2011) and Fariqul Haq and Madany, (2025) show that adding visual elements like infographics, diagrams, or pictures can reduce cognitive load and enhance comprehension, particularly when the visuals are clearly structured and directly support the accompanying text. Furthermore, Wu et al. (2024) findings indicate that simple typographic enhancements, such as highlighting a word in a different colour, can also

improve processing efficiency by directing attention and facilitating the integration of information into the sentence context.

1.2.3.2. Empirical studies on Easy Language

Moving onto specific EL empirical studies, beginning with those focused on lexical simplification, Deilen (2020, 2021, 2023) and Deilen et al. (2022) investigates whether visually segmenting German compounds, using hyphens or middle dots, supports comprehension across different reader groups. The 2020 study with students who have prelingual hearing impairments or deafness found no evidence that segmentation facilitated lexical access to opaque compounds; in fact, hyphens sometimes led to more mistakes. However, later studies (2021, 2022, 2023) showed that segmentation can benefit readers with lower literacy skills, who processed segmented compounds more efficiently. In contrast, skilled readers and unimpaired adults did not profit from segmentation and, in some cases, hyphenation even slowed overall processing. Complementing these findings, Pappert and Bock (2020) also report that segmentation benefits readers with ID and those who are functionally illiterate.

Fajardo et al. (2013, 2014, 2022) conducted a series of studies with students with ID to investigate whether lexical simplification could enhance comprehension. In an early study (2013), they found that neither word frequency nor word length improved understanding: using more high-frequency words did not help participants make inferences, and adding connectives failed to enhance inferential comprehension. A subsequent study (2014) likewise found no link between word frequency and either literal or inferential comprehension. Additionally, they noted that sentences containing numerous connectives were linked to poorer literal comprehension, likely because such sentences tend to be longer, more grammatically complex, and less natural. Word length again showed no significant effect. More recently, a study with younger students (2022) revealed that those with higher reading-comprehension skills actually gained more from non-simplified blog posts than from simplified ones. Students with lower comprehension skills, on the other hand, did not benefit from either simplification or a video-blog format, although the performance gap between higher- and lower-skilled readers was slightly reduced under simplified or video conditions.

In contrast, Frondén and Kaakinen (2023) found significant effects of word length and word frequency in both adults with ID and the control group, with the effects being notably stronger in the target group. The impact of word repetition, however, was less consistent. The study also showed that comprehension in the target group

was generally poor, despite the benefits of word length and frequency, suggesting that the texts may still have been too difficult for full understanding. Similarly, a study by Rello et al. (2013) involving participants with dyslexia found that using higher-frequency words led them to read significantly faster, while shorter words improved their text comprehension. Another study involving individuals with dyslexia, by Rivero-Contreras et al. (2021), found that visual support and lexical simplification aided sentence processing, potentially by facilitating lexical-semantic access. The study also reported that participants with lower print exposure and smaller vocabularies benefited more from word-level lexical simplification. In a later study by the same authors (2023), which included adults with both low and high education levels, lexical simplification was found to facilitate sentence processing in both groups. Adults with lower education processed sentences significantly more slowly than those with higher education; however, lexical simplification specifically sped up processing for the lower-education group.

Regarding linguistic simplification, Reichenberg (2010) examined Deaf and Hard of Hearing participants, categorized as good or poor readers based on test performance. Overall, good readers scored significantly higher than poor readers. Surprisingly, the Easy-to-Read texts were more beneficial for good readers than for the poor readers they were intended to support. The author suggests that because the simplified texts were much shorter, they contained more implicit information and fewer causal connectors, forcing readers to rely heavily on prior knowledge to understand the content. Reichenberg (2013) also tested individuals with dyslexia and a control group, finding that the dyslexic group showed no significant improvement in comprehension with Easy-to-Read texts, while the control group performed better with standard texts than with the simplified versions. Similarly, Buell et al. (2020) found that adults with ID showed significant improvement only when simplified language was combined with mediation; neither linguistic complexity nor mediation alone significantly affected comprehension. Volčanjk (2020), on the other hand, reports that students with ID understood Easy-to-Read audio better than standard language audio. With migrants, Canut et al. (2024) found significantly better comprehension for simplified texts on administrative, medical, and legal topics, noting that text length had no impact on comprehension. Similarly, Javourey-Drevet et al. (2022) found that young children comprehended simplified texts significantly better, with the greatest benefits seen in poor readers and those with weaker cognitive skills, compared to good readers and children with stronger abilities.

Borghardt (2022, 2023) and Schmutz et al. (2019) report on studies with neurotypical individuals. Borghardt (2022) compared complex causal clauses with "because" to restructured sentences using "therefore" in German EL and found no difference in

processing between the two forms. Borghardt (2023) expanded on this by including ratings of perceived causality, response times, and multiple conditions (with/without connectors, congruent/non-congruent). It similarly found no difference between "because" and "therefore" sentences, but showed that sentences with connectors were rated as more causally coherent and processed slightly faster. Both studies suggest that restructuring causal clauses does not substantially aid comprehension. Borghardt (2023) further highlights the general importance of connectors for clarity and causal coherence. Schmutz et al (2019) found that neurotypical participants processed information more effectively when reading simplified texts. However, linguistic simplification also increased reading time, likely because simplified texts contained more characters, and decreased text liking among these users. Reichrath and Moonen (2022) studied individuals with low literacy skills using "Language for All," which they describe as a more accessible variant of PL with some features of EL, aligning to Maaß (2020e) and Hansen-Schirra and Maaß's (2020a) EL+. They found that information written in Language for All was significantly better understood, more readily accepted, and preferred over the original version. Finally, González-Sordé et al. (2026) tested subordinate clauses with adults with ID and a control group, finding that the inclusion of subordinate clauses did not reduce comprehension scores or increase perceived difficulty among participants.

Regarding the use of visual support, Rivero-Contreras et al. (2021) reports that it facilitates sentence processing in adults with dyslexia. However, the authors note that it remains unclear whether images improve overall text comprehension or affect reading accuracy for this group. A later study (2023) with adults of both low and high education levels also found that visual support aided processing. Similarly, research with neurotypical university students (2025) showed that visual support improved sentence processing, with participants who viewed images before sentences demonstrating a lower likelihood of regressions. Examining studies with individuals with ID, Hurtado et al. (2014) observe that, although pictures were not harmful, their results did not support the use of images alongside text for conveying information, particularly for individuals with milder disabilities. Similarly, González-Sordé et al. (2025) found that including visual support had no impact on comprehension, and that the type of visual support, photographs or illustrations, made no difference. Furthermore, the type of visual support also did not affect participants' perceived difficulty of the text. Supporting these findings, Saletta et al. (2019) reports that adding illustrations to stories did not improve reading comprehension for individuals with intellectual or developmental disabilities. In contrast, Sugiura and Fujisawa (2021) found that the manga-style illustrations paired with simplified text in their

study improved readability, although further adjustments may be needed to enhance overall comprehensibility.

Schatz et al. (2017) tested visual support with standard language and EL texts in both younger and older adults, also including versions of standard language, EL, and PL texts without visual support. For older adults, PL was the most comprehensible, while Easy-to-Read Language provided no advantage over the standard version and even reduced performance in younger adults. The effects of visual support were inconsistent: it improved comprehension for the standard version but offered no benefit when paired with Easy-to-Read Language. For younger participants, adding pictures to Easy-to-Read Language appeared to counteract the drop in performance observed with the Easy-to-Read version alone.

Finally, two studies have examined typography and text formatting in EL texts. Sieghart (2023) found that, although larger fonts and sans-serif types are commonly recommended, fonts with serifs were read slightly faster and a 12-point size was sufficient. Sommer (2020) investigated emphasizing negation words with bold or uppercase letters and found that, while such emphasis affected reading times, it did not improve accuracy or response speed.

Looking at the reading support, Karreman et al. (2007) found that website adaptations were beneficial for participants with ID, while users without such disabilities performed equally well on both adapted and non-adapted sites. Saüberli et al. (2023), also studying adults with ID, reported no difference in comprehension when reading EL texts on paper versus on an iPad, although reading speed was slightly faster on the iPad.

In terms of prosody, Wei et al. (2016), Prafiyanto (2020) and Prafiyanto et al. (2018) studied Easy Japanese with non-native speakers. They found that speech rate did not affect intelligibility, although Prafiyanto (2020) and Prafiyanto et al. (2018) report that participants preferred a slower rate of around 360 morae per minute, compared to the Japanese average of 450–570 morae per minute. Regarding pauses, Prafiyanto (2020) and Prafiyanto et al. (2018) reported that pause length had little effect on intelligibility. However, inserting pauses in natural locations based on Japanese dependency relations made sentences easier for non-native speakers to follow, while inserting too many pauses hindered comprehension. A pause length of around 200 ms, similar to that of native speakers, was preferred.

Finally, Sparks and Waddell (2024) investigated whether readability influences perceptions of news credibility in neurotypical adults. Contrary to the study's

hypothesis that easier-to-read content would be seen as more credible, the results show no difference in credibility ratings between easy-to-read and hard-to-read texts across two sets of stimuli.

Table 1.2 presents an overview of the studies discussed in this subsection.

Author	Test	Participants	Comprehen-sion results
Deilen (2020)	lexical simplification	students with prelingual hearing impairments or deafness	No effect
Deilen (2021)	lexical simplification	readers with lower literacy skills	Positive results
Deilen (2023)	lexical simplification	readers with lower literacy skills	Positive results
Deilen et al. (2022)	lexical simplification	readers with lower literacy skills	Positive results
Pappert and Bock (2020)	lexical simplification	readers with ID	Positive results
Fajardo et al. (2013)	lexical simplification	students with ID	No effect
Fajardo et al. (2014)	lexical simplification	students with ID	No effect
Fajardo et al. (2022)	lexical simplification	students with ID	No effect
Frondén and Kaakinen (2023)	lexical simplification	adults with ID	Positive results
Rello et al. (2013)	lexical simplification	individuals with dyslexia	Positive results
Rivero-Contreras et al. (2021)	lexical simplification	individuals with dyslexia	Positive results
Rivero-Contreras et al. (2023)	lexical simplification	adults with low and high education levels	Positive results
Reichenberg (2010)	linguistic simplification	Deaf and Hard of Hearing individuals	Mixed results
Reichenberg (2013)	linguistic simplification	individuals with dyslexia	No effect
Buell et al. (2020)	linguistic simplification	adults with ID	Mixed results
Volčanjk (2020)	linguistic simplification	students with ID	Positive results
Canut et al. (2024)	linguistic simplification	migrants	Positive results

Author	Test	Participants	Comprehen-sion results
Javourey-Drevet et al. (2022)	linguistic simplification	children	Positive results
Borghardt (2022)	linguistic simplification	neurotypical individuals	No effect
Borghardt (2023)	linguistic simplification	neurotypical individuals	No effect
Schmutz et al. (2019)	linguistic simplification	neurotypical individuals	Mixed results
Reichrath and Moonen (2022)	linguistic simplification	individuals with low literacy skills	Positive results
González-Sordé et al. (2026)	linguistic simplification	adults with ID	No effect
Rivero-Contreras et al. (2021)	visual support	individuals with dyslexia	Positive results
Rivero-Contreras et al. (2023)	visual support	adults with low and high education levels	Positive results
Rivero-Contreras et al. (2025)	visual support	neurotypical university students	Positive results
Hurtado et al. (2014)	visual support	individuals with ID	No effect
González-Sordé et al. (2025)	visual support	adults with ID	No effect
Saletta et al. (2019)	visual support	adults with ID	No effect
Sugiura and Fujisawa (2021)	visual support	adults with ID	Positive results
Schatz et al. (2017)	visual support	younger and older adults	Mixed results
Sieghart (2023)	visual support	readers with undisclosed disabilities	No effect
Sommer (2020)	visual support	neurotypical individuals	No effect
Karreman et al. (2007)	reading support	individuals with ID	Positive results
Saüberli et al. (2023)	reading support	adults with ID	No effect
Wei et al. (2016)	**speech rate**	**non-native speakers**	**No effect**
Prafiyanto (2020)	**speech rate**	**non-native speakers**	**No effect**
Prafiyanto et al. (2018)	**speech rate**	**non-native speakers**	**No effect**
Prafiyanto (2020)	**pauses**	**non-native speakers**	**No effect**
Prafiyanto et al. (2018)	**pauses**	**non-native speakers**	**No effect**

Author	Test	Participants	Comprehen-sion results
Sparks and Waddell (2024)	credibility	neurotypical adults	No effect

Table 1.2: Overview of the literature review

1.2.4. Pauses and speech rate research

Within prosodic studies, speech rate and articulation rate are both defined as the number of linguistic units produced per unit of time. The two measures differ in how pauses are treated: pause intervals are included when calculating speech rate but excluded from articulation rate (Tsao et al., 2006). These measures are typically based on counts of linguistic units such as phones per second, syllables per second, or words per second. A common feature of these units is that they can be identified in the acoustic signal and have temporal boundaries that do not overlap (Tilsen & Tiede, 2023).

Among these possibilities, words per minute are frequently used in research on Catalan speech and are therefore adopted as the unit of measurement in this thesis. Previous research provides an indication of typical speech rates in Catalan. Canals et al. (2006) report an average speaking speed between 120 and 150 words per minute, while Albaladejo (2020) recommends approximately 150 wpm for oral discourse. However, analyses of real broadcast speech often reveal higher rates. For example, a report by the Institut d'Estudis Catalans ('Institute for Catalan Studies') (2023) analysing weather forecasts found an average rate of 189 wpm, and Cabeza-Cáceres (2013) reports an average of 198 wpm in audio description.

As observed in the previous section, studies examining speech rate in EL are still very scarce. However, research on speech rate in standard language has produced mixed findings, with both positive and inconsistent results reported across studies. As Zhao (1997) notes, these differences are likely due to methodological variations, including differences in testing procedures and in how individual studies classify speech rates as "slow" or "fast".

In addition to speech rate, pauses constitute another key prosodic feature that can influence speech processing and comprehension. Pauses refer to brief interruptions or moments of silence that occur during speech or reading (Mestres et al., 2019). They can be used by speakers to indicate the structure of an utterance by marking groups of words or prosodic units and by varying both the placement and duration of these pauses (Gustafson-Capkova & Megyesi, 2001; Swerts & Geluykens, 1994). However, there is no clear consensus regarding the minimum duration required for

a silence to be considered a pause (Fauth & Trouvain, 2018; Trouvain & Werner, 2022). Different authors propose different thresholds, such as 100 ms (Trouvain, 2004), 200 ms (Cucchiarini et al., 2002; Lennon, 1990), or 400 ms (Tavakoli, 2011).

In this thesis, the average duration of pauses reported for Catalan by Cantin and Ríos (1991) was used as a reference. Their study identifies an average duration of 590 ms for inter-sentence pauses and 250 ms for intra-sentence pauses. Inter-sentence pauses occur at boundaries between sentences and typically coincide with sentence-ending punctuation, whereas intra-sentence pauses occur at boundaries between clauses or phrases (Whitfield & Gravelin, 2019).

1.2.5. Easy Language in Catalonia

In Spain, EL has been closely associated with organisations working with people with intellectual disabilities, with Plena Inclusión playing a central role (García Muñoz & Matamala, 2021). The beginnings of EL in the country can be traced back to the report by Mayol and Salvador (1999), which examined the situation in Catalonia and across Europe and proposed initial recommendations for implementing EL in the Catalan context. Later, in 2001, the Col·legi Oficial de Bibliotecaris-Documentalistes de Catalunya ('Official College of Librarians and Documentalists of Catalonia'), the Fundació Jaume Bofill ('Jaume Bofill Foundation'), and the Biblioteca de Catalunya ('National Library of Catalonia') established an EL Committee. In 2003, the Associació Lectura Fàcil ('Easy-to-Read Association') was founded. Since then, this organization has actively promoted EL through symposia and a wide range of initiatives, including the organization of EL literary awards, the promotion of reading practices using EL materials, and collaboration in the development and amendment of accessibility legislation. As of 2024, its EL catalogue comprises more than 500 titles, including works in minority languages of Spain such as Aranese and Galician (Associació Lectura Fàcil, n.d.).

Within the wider Spanish context, the development of recommendations and guidelines has continued (García Muñoz & Matamala, 2021) with the translation of the second edition of the IFLA guidelines and the Inclusion Europe guidelines into Spanish, the publication of a handbook on the writing and assessment of EL (García Muñoz, 2012), as well as the development of an evaluation handbook (Gallardo Rayado et al., 2018). Finally, in 2018 there was the approval of UNE 153101:2018 EX (UNE, 2018).

1.2.5.1. Target groups in Catalonia

Accessible communication is not limited to people with disabilities, as everyday communication often involves experts using highly specialized language, as well as many poorly designed texts that fail to present information in a way users can easily understand or apply (Maaß, 2020a).

Comprehension barriers linked to linguistic, cognitive, or sensory factors may affect many individuals, including those with low literacy, ID, dyslexia, aphasia, temporary cognitive impairments, limited language proficiency (such as L2 learners, immigrants, or displaced persons), and Deaf and Hard of Hearing individuals (Saggion, 2024). Furthermore, Lindholm and Vanhatalo (2021) note that situational factors, such as illness or fatigue, can also make comprehension more difficult. In these cases, EL can provide significant support, which leads the authors to argue that the intended target group for EL is for "everyone."

Looking more closely at potential users of EL within Catalonia, older adults are an important group, as they may experience significant cognitive, physical, or sensory decline with age (Arch, 2009; Beard et al., 2016; Murman, 2015). This is reflected in the steadily increasing aging index reported by the Institut d'Estadística de Catalunya ('Statistical Institute of Catalonia') (2025b), which reached 133.5 in 2022, 136.9 in 2023, 142.6 in 2024, and 148.4 in 2025.

Another report from the Statistical Institute of Catalonia (2025a) on the number of recognized individuals with disabilities shows that in 2024 there were 91,623 people with ID, 15,445 with multiple physical and ID, and 135,982 with mental health conditions. These categories are defined as follows in the methodology of the report:

- Intellectual disability: A disability present in individuals who, due to congenital or acquired causes, exhibit below-average intellectual functioning and reduced comprehension and information-processing abilities.
- Mental health condition: A disability affecting individuals with cognitive, affective, or behavioural disorders.

Finally, the most recent report on language policy (Departament de Cultura, 2023), using data from 2022, indicates that on 1 January 2023, 14.6% of the population in Catalonia had been born in other Spanish autonomous communities, while 22.5% had been born outside of Spain. This suggests that at least 37.1% of the population does not have Catalan as their native language, not including individuals born in Catalonia to non-Catalan-speaking families. Looking specifically at the population not born in Catalonia, regardless of age (Institut d'Estadística de Catalunya, 2023),

approximately 35.1% of foreign-born residents report difficulty understanding Catalan, while among those born in other Spanish autonomous communities, about 4.6% report difficulty.

These data highlight a significant proportion of individuals in Catalonia who could regularly or occasionally benefit from EL materials, not including situational factors such as those mentioned by Lindholm and Vanhatalo (2021).

1.2.5.2. Institutional and legal context in Catalonia

Starting with the broader context, access to information is widely recognized as a fundamental human right. Article 19 of the United Nations's Universal Declaration of Human Rights guarantees freedom of expression and the right "to seek, receive and impart information" on any subject (UN General Assembly, 1948). Furthermore, UNESCO (2022) emphasizes that open and inclusive access to information is a cornerstone of democratic, knowledge-based societies, enabling transparency, the rule of law, and social participation. Access to information is also fundamental to achieving the 2030 Agenda for Sustainable Development and is particularly central to Sustainable Development Goal 16, which promotes "just, peaceful and inclusive societies" (UN, 2015). In addition, Article 9 of the United Nations Convention on the Rights of Persons with Disabilities establishes that States Parties shall implement appropriate measures to ensure equal access for persons with disabilities to the physical environment, transportation, and information and communication systems, including digital technologies.

At the national level in Spain, Ley 6/2022, de 31 de marzo amends Real Decreto Legislativo 1/2013, de 29 de noviembre in order to incorporate and regulate cognitive accessibility. This law recognizes the right to understand environments, products, and services, thereby promoting the autonomy and inclusion of people with cognitive difficulties. Under Ley 6/2022, a new public centre was created within the Real Patronato sobre Discapacidad to establish guidelines and regulate the implementation of cognitive accessibility, the CEACOG ('Spanish Center of Cognitive Accessibility')[16]. In addition, Real Decreto 193/2023, de 21 de marzo establishes the basic conditions of accessibility and non-discrimination in goods and services available to the public or of public interest, and reinforces the obligation of public administrations to guarantee "universal accessibility."

[16] https://www.ceacog.es/

At the regional level, in Catalonia Llei 13/2014, del 30 d'octubre, Articles 26, 32, and 33 establish the use of EL for public service provision, communication within the educational sphere, and communication between public administrations or service providers and citizens, specifying that EL materials and information must be made available to all individuals who require them. Additionally, Article 35 extends the use of E2U Language to accessibility in cultural, sports, and leisure activities, requiring that communication employs this simplified language to ensure comprehension and facilitate participation for all users.

Furthermore, the recently implemented Accessibility Code in Catalonia (Decret 209/2023, de 28 de novembre) also explicitly references EL. For instance, it states that elements such as information signs for routes and locations, signage systems, and information related to transport tickets and transport accessibility must follow the UNE 153101:2018 EX (UNE, 2018) EL standard.

In light of the discussion presented in this theoretical framework section, this thesis is situated at the intersection of a growing social and legal demand for EL materials and a still limited body of empirical research in the field, particularly in relation to the Catalan language and audio and audiovisual modalities. Within this context, it adopts Maaß's (2020d) model of EL as its theoretical basis

1.3. Methodology

This section will describe the methodology followed during the development of this thesis and the studies therein. Although each article already has a methods section describing study-specific procedures, the present section provides an overview to enhance cohesion and clarity, with particular attention to elements not fully detailed in the individual articles due to space limitations.

In the first study (see Chapter 2), a series of interviews were conducted with creators of E2U Language audio and audiovisual content. These semi-structured interviews were conducted online in English or Spanish during the first year of the thesis, between September and October 2022, and recorded for later analysis. Participants were selected to represent a wide range of content types and E2U Language practices, as the aim was to obtain a general overview of the state of practice rather than focus on a specific E2U Language variety or content type. Accordingly, the number of participants was kept small to allow for in-depth interviews that could be analysed thoroughly. The interview schedule included questions covering a variety of topics, such as the participants' professional experience, the type of content and E2U Language variety they worked with, the guidelines and standards they followed, how

and where their content was made available, the creation process, and any validation practices applied.

The second and third studies (Chapters 3 and 4, respectively) were designed based on the results of these interviews. Among the relevant prosodic aspects identified, slowing the speech rate and using pauses emerged as important strategies. However, as discussed in the literature review, there is a lack of empirical evidence supporting these recommendations, as studies on prosodic features in EL audio or audiovisual content remain very limited.

As described in the corresponding chapters, both studies tested comprehension, acceptability, and preferences for different speech rates and pause durations in Catalan EL audio. In the speech rate study, the speeds 130, 150, 170, and 190 wpm were selected following the methodology proposed by Rodero (2016), decreasing each subsequent stimulus by 20 wpm. The starting speed was set at 190 wpm, corresponding to the average speech rate reported for Catalan news programmes (Institut d'Estudis Catalans, 2023). In the pause study, the methodology proposed by Prafiyanto et al. (2018) was followed, increasing pause durations by 150 ms in each stimulus. Initial pause durations were set at 590 ms for inter-sentence pauses and 250 ms for intra-sentence pauses, corresponding to the averages reported for Catalan by Cantin and Ríos (1991).

Figure 1.4 provides an overview of the methods used in the studies.

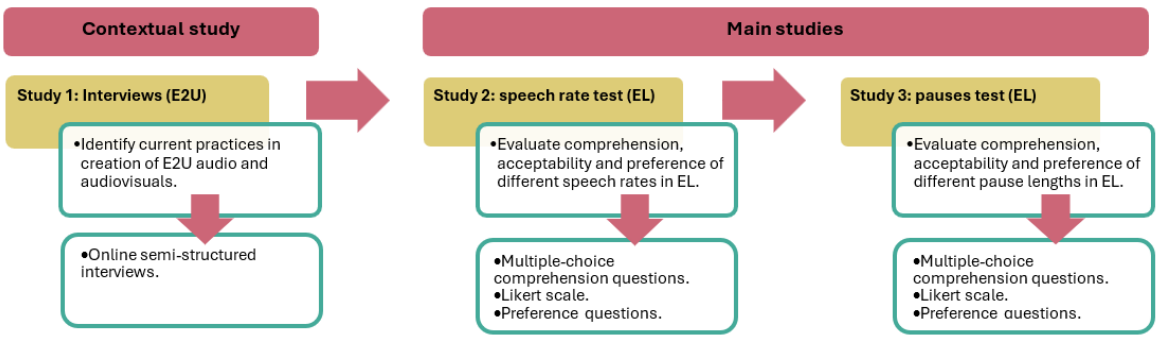


Figure 1.4: Studies' methods overview

For these studies, three participant groups were included: a control group of neurotypical native speakers, a group of native participants with ID, and a group of neurotypical language learners. The same participants took part in both studies, except for one participant with ID who was unable to complete both. All participants provided written consent in EL, approved by the university's Ethics Committee, and were screened using an abstract reasoning test (Raven, 1998). In both studies, participants were exposed to the stimuli in different orders to ensure that the results

were not influenced by presentation order. Figure 1.5 illustrates the procedure followed in Studies 2 and 3 for the three participant groups.

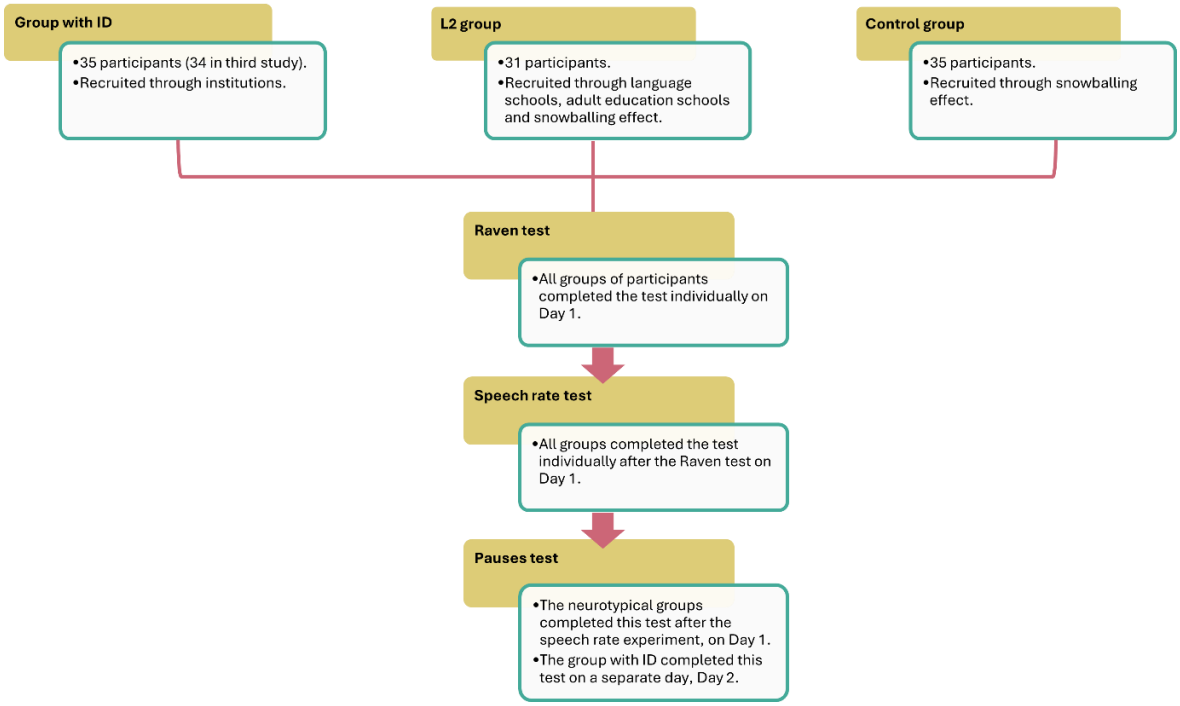


Figure 1.5: Procedure of studies two and three

1.3.1. Creation of the stimuli

The texts used in the audio stimuli were taken from the EL book *Com tenir cura del planeta* ('How to Take Care of the Planet') (Peralta, 2023) and adapted to ensure similar length and difficulty. The texts were also adapted so that each excerpt could be understood independently, without relying on information presented in the others.

Before recording the audio materials, the texts were revised through several rounds of expert judgement (Cabero Almenara & Llorente Cejudo, 2013; Escobar-Pérez & Cuervo-Martínez, 2008) to ensure consistency in content difficulty and adherence to EL principles.

For the validation process, an initial internal revision was conducted by an expert within the research group. After incorporating the feedback received, an external revision was carried out by specialists from the Associació Lectura Fàcil. Four experts participated in this stage, with the number determined following Cabero Almenara and Llorente Cejudo's (2013) recommendation to consider practical constraints, such as the availability of qualified professionals in the field, when selecting the panel of experts.

In line with their individual assessment approach, the evaluation was conducted independently and without direct communication among the experts. They were provided with an evaluation questionnaire designed according to the methodology proposed by Robles Garrote and Rojas (2015). Using a Likert scale ranging from 1 to 4, they assessed the ease of the grammar, vocabulary, and structure of the texts, as well as their adherence to EL recommendations (see Annex 7.5).

Finally, following ISO/IEC 23859:2023 recommendations for EL validation, the texts underwent a readability assessment using the Flesch-Szigriszt index, a tool frequently used to evaluate Catalan texts (Pérez Colomé, 2011).

After validation, the audio materials were recorded by a professional Catalan voice actor with an F0 of 218 Hz. A deeper voice was selected based on findings from the interviews conducted in the first study, as well as recommendations reported in Machuca and Matamala (2022) and the Accessible Information Working Group (2011). The recordings were then modified to create the different stimuli with varying speech rates and pause durations using the free software Audacity.

1.3.2. Ethics and Data Management Plan

All studies conducted within this thesis were approved by the Ethics Committee of the Universitat Autònoma de Barcelona. The protocol (CEEAH 6026), encompassing all three studies, was approved on 17 June 2022.

All participants in the studies have been anonymized using unique codes to ensure their privacy. Each study has an associated dataset (see Annex 7.3), including replicability data for the experimental studies and transcripts for the interview study. These datasets (Pujadas-Farreras & Machuca, 2026b, 2026a; Pujadas-Farreras & Matamala, 2026) have been uploaded to the CORA RDR repository, a federated and multidisciplinary data repository that publishes FAIR datasets in accordance with EOSC guidelines and is used by Catalan universities.

Due to repository policy, the audio recordings used in the studies have not been included, as voice is considered biometric identifiers and therefore personal data, which cannot be publicly shared.

1.4. Thesis structure

This doctoral dissertation is presented as a compendium of publications, where each research chapter consists of an article that has been published or accepted for publication in a peer-reviewed journal indexed in international databases or

recognised lists, in accordance with the regulations governing this type of PhD submission. The thesis is structured into six chapters, each of which is outlined below.

Chapter 1 introduces the context of the thesis, presents its objectives and hypotheses (Section 1.1), outlines the theoretical framework within which the study is situated (Section 1.2), and gives an overview of the methodology followed in each study (Section 1.3).

Chapters 2 to 4 consist of the research articles that comprise this thesis. The chapters reproduce the published or accepted articles with only formatting changes, and the bibliography has been updated where publication details have become available.

Chapter 2 includes Article 1 (Pujadas-Farreras & Matamala, 2025), which corresponds to the first study of the thesis. It examines practices in creating and adapting or translating audiovisual materials into E2U Languages through interviews with expert professionals. The mapped practices cover linguistic, prosodic, and paratextual elements, as well as validation and evaluation procedures.

Chapter 3, corresponding to the second study, consists of Article 2 (Pujadas-Farreras & Machuca, 2025), which reports on an experiment conducted with persons with intellectual disabilities, neurotypical Catalan learners at an initial level, and a control group of neurotypical native speakers. The experiment examined speech rate in EL audio materials, testing comprehension, acceptability, and preference for different speeds.

Chapter 4, corresponding to the third study, features Article 3 (Pujadas-Farreras & Machuca, 2026), which constitutes the second part of the previous experiment. This study focuses on the comprehension, acceptability, and preference of pause length in EL audio materials, adjusted to the speech rate identified as most suitable in the earlier experiment. The participants were the same individuals who took part in the previous study.

Chapter 5 includes a summary of the studies and the main results of the thesis in Catalan EL, English, Catalan and Spanish.

Finally, Chapter 6 discusses the findings of the various studies, presents the conclusions, and proposes directions for future research in the field.

These chapters are followed by the bibliography section, listing all references cited throughout the thesis and the annexes. Annex 1 presents the articles included in the thesis in their published format, as they appear in their respective journals. Annex 2

includes the data management plan formulated for this PhD, detailing the procedures for handling and storing research data. Annex 3 provides information on the datasets for each study. Annex 4 contains the consent forms used throughout the research, ensuring ethical compliance. Annex 5 shows the validation forms used in the validation process for the texts in studies two and three. Finally, Annex 6 includes the materials developed for participant recruitment in the experiments. Figure 1.6 illustrates the overall structure of the thesis.

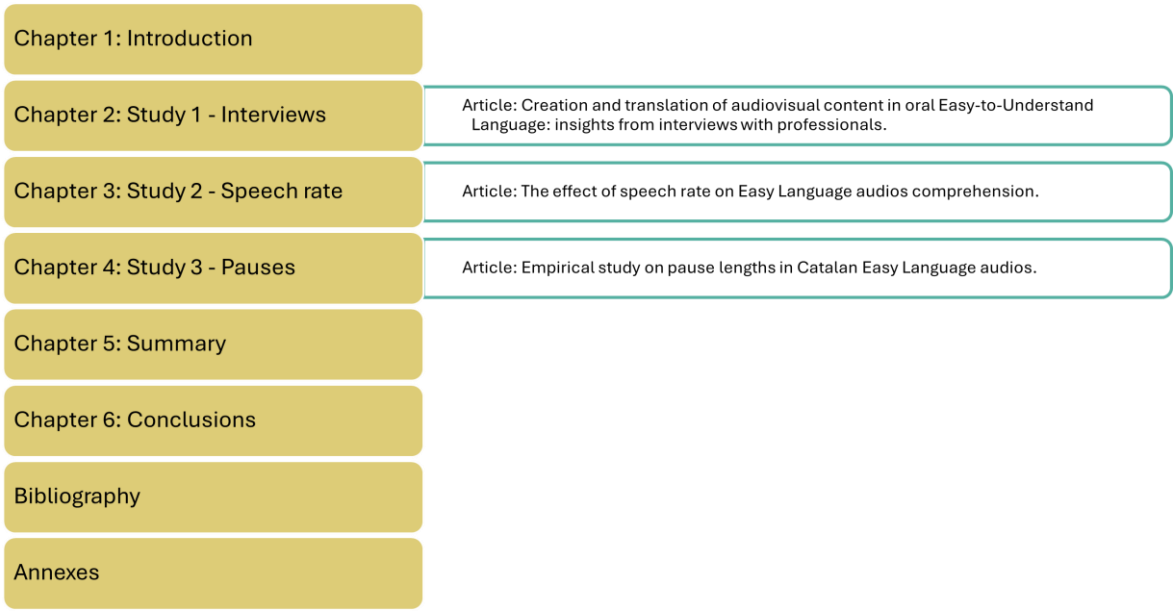


Figure 1.6: Thesis structure overview

CHAPTER 2: STUDY 1 - INTERVIEWS

Pujadas-Farreras, M., & Matamala, A. (2025). Creation and translation of audiovisual content in oral Easy-to-Understand Language: insights from interviews with professionals. *Hermēneus. Revista de traducción e interpretación, 27*, 447-481.

2.1. Introduction

Easy-to-Understand (E2U) Language refers to any language variety which enhances comprehensibility. Until now, research and practice in this area have focused mostly on written texts (Matamala, 2022, 2023). Guidelines and standards on E2U Language have few recommendations regarding audiovisual content in which oral E2U Language is used and, even then, suggestions are rather vague (Accessible Information Working Group, 2011; ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023). The impact of different prosodic aspects on comprehension has been studied, although not focusing on E2U contexts (Blau, 1990; Brookshire & Nicholas, 1984; Henderson & He, 2022; Pashek & Brookshire, 1982; Reid, 2003; Schaeffer et al., 2022; Schafer, 1997; Yoon et al., 2016). There has also been research in how to apply E2U Language in audiovisual content (Bernabé-Caro, 2020a, 2020b; Bernabé-Caro & Orero, 2020; Maaß & Hernández Garrido, 2020; Matamala, 2023). However, this research is still limited. Our investigation aims to partially fill this gap and tries to give an answer to the following research question: What are the current practices and challenges when using oral E2U Language in audiovisual content?

To answer the research question, the article reports on interviews with professionals experienced in creating audiovisual content in oral E2U Language. The interviews aim to shed light on the specificities of oral E2U Language and its relationship with written E2U Language. To narrow down our research, the focus will be exclusively on one-way communication settings.

To begin with, the article defines key concepts and provides an overview of existing recommendations and research on oral E2U Language. It then presents the methodology and discusses the results. The article concludes with a summary of our main findings and suggestions for future research. Our research is grounded in audiovisual translation studies (AVT) and accessibility studies.

2.2. Easy-to-Understand Language

The ISO/IEC 23859:2023 standard defines E2U Language as "any language variety which enhances comprehensibility". Two well-established varieties are Easy Language (EL) and Plain Language (PL), but there can be intermediate varieties such as Easy Language Plus (EL+) (Maaß, 2020f, p.232).

EL (also known as Easy-to-Read) is a language variety that aims to facilitate reading and comprehension, following specific guidelines for wording, structure, design, and evaluation (ISO, 2023; Lindholm and Vanhatalo, 2021, p. 11). While traditionally

targeted towards persons with cognitive disabilities, EL can also address persons with learning disabilities, functional illiteracy, and non-native speakers (Centre for Inclusive Design, 2020; Lindholm & Vanhatalo, 2021, p. 14). The ISO standard prioritises user needs instead of adopting a medical approach and considers EL to address persons with reading comprehension difficulties for any reason.

Conversely, PL uses clear wording, structure, and design to ensure users can easily understand and use the information the first time they read or hear it (Centre for Inclusive Design, 2020; ISO, 2023). The target users are the general public (Centre for Inclusive Design, 2020).

EL+ is an intermediate variety of EL and PL. It has a "high level of perceptibility and comprehensibility", although not as high as EL, while the layout is closer to standard language (Maaß, 2020f, p. 232).

In this article we will refer to "Easy Language", "Plain Language" and "Easy Language Plus" as "EL", "PL" and "EL+", but we will use "Easy Read", "ER", in direct quotations or when referring to terminology used by certain authors.

2.2.1. Oral E2U Language recommendations

Some EL (García Muñoz, 2012; IFLA, 2010; NHS England, 2018; UK Department of Health, 2009, 2010; UNE, 2018) and PL (Cutts, 2020; Health Service Executive et al., 2010) guidelines and recommendations suggest audio or video as alternatives or complements to written language but lack specific recommendations on oral aspects. A few provide recommendations regarding voice with slightly different approaches, as described next.

In EL, some guidelines recommend using low-pitched voices (Accessible Information Working Group, 2011), voices that are neither too high nor too low (Inclusion Europe, 2009) and allowing to choose the timbre if text-to-speech is used (ISO, 2023). Speakers should speak clearly (Inclusion Europe, 2009; ISO, 2023; North Yorkshire County Council, 2014) and make pauses (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023). Speech speed should be suitable (ISO, 2023) and speaking slower is recommended (Inclusion Europe, 2009; North Yorkshire County Council, 2014), but not too slowly (ILSMH-EA, 1998). The voice should not be strongly accented, and it should express emotions (Inclusion Europe, 2009), while ISO/IEC 23859:2023 states that users should be able to choose their preferences. Voices should match on-screen characters (i.e. a male voice for a male character) (Inclusion Europe, 2009) and, for longer audios, multiple voices are recommended

(ILSMH-EA, 1998). Content duration should be 20-30 minutes maximum (Inclusion Europe, 2009).

The guidelines recommend using precise and relevant visual elements (Accessible Information Working Group, 2011; Inclusion Europe, 2009) and allowing sufficient processing time (ILSMH-EA, 1998; Inclusion Europe, 2009; UK Disability Unit, 2021). Explanations should be given for charts, graphs, and drawings, and on-screen text may be used to provide supplementary information (Accessible Information Working Group, 2011).

Finally, the script should be clear and logical (Accessible Information Working Group, 2011; ILSMH-EA, 1998; UK Disability Unit, 2021), the audio should be high quality (Accessible Information Working Group, 2011; Inclusion Europe, 2009; ISO, 2023), and long words should be explained (North Yorkshire County Council, 2014). Background noise and music should be avoided as well (UK Disability Unit, 2021).

PL recommendations are to keep the content short and to clearly indicate the audio ending. Numbers should be pronounced consistently (i.e. "zero" and not "oh") (MENCAP, 2000) and acronyms should be spelled out (Centers for Disease Control and Prevention, 2009).

Beyond E2U, but related to a better comprehension, there are recommendations on improving "listenability", which aims to reduce cognitive demands on listeners and enhance comprehension. The Listenability Scale Guide (Rubin, 2012) recommends using simple language, repetition, and clear messaging. It also suggests using coordinating conjunctions instead of subordination, moderate clause length, verb forms to express actions, common words and contractions, and signalling transitions between topics. Additionally, it advises to tell listeners what will be discussed, using internal summaries.

2.2.2. E2U in AVT and accessibility

Bernabé-Caro (2020b), Bernabé-Caro and Orero (2019), Maaß and Hernández Garrido (2020), and Matamala (2023) have explored the relationship between E2U Language and AVT and accessibility. Bernabé-Caro and Orero (2019) and Bernabé-Caro (2020b) propose hybrid accessibility services that merge E2U Language with existing services, including E2U audio comment, audio description (AD), audio explanation, audio intertitles, audio introduction, audio subtitles, audio summary, audio surtitles, remake, sight translation, voice-over, and consecutive and simultaneous interpreting. These new easy access services should follow text

simplification recommendations, recommendations governing the access service (e.g. audio description guidelines), and digital accessibility guidelines.

Matamala (2022, 2023) presents an overview of E2U Language in AVT and accessibility, focusing on oral easy access services. These include easy AD, audio introductions and audio guides, audio subtitling, interpreting, voice-over and off-screen dubbing, and audio explanations or easy audios.

Maaß and Hernández Garrido (2020) explore the integration of E2U Language in different AVT modalities, finding EL and PL unsuitable for dubbing, as they would change the original language variety and make synchronisation more challenging. In voice-over, PL would be acceptable if the content is originally accessible, and it is also a more appropriate variety for film interpreting. Although E2U film interpreting has not been attempted yet (Matamala, 2023), EL simultaneous interpreting has been already performed (Nahón Guillén, 2020; Schulz et al., 2020; Yalon-Chamovitz & Avidan-Ziv, 2016). These studies suggest that, despite the name, the results are closer to PL, which Maaß and Hernández Garrido (2020) support by noting that PL is easier to produce spontaneously as it is less rule-governed than EL. However, it is unclear if EL cannot be produced spontaneously because interpreting samples in Nahón Guillén (2020) are closer to EL.

Concerning AD, Maaß and Hernández Garrido (2020) consider EL/PL AD useful only if the entire audio track is in those language varieties; otherwise, the final product would have different language difficulties. While Matamala (2023) proposes extended AD, in which visuals could be paused to provide longer explanations and potentially make the AD more acceptable to users, the issue of differing language difficulties is not addressed. Arias-Badia and Matamala (2020) also note that users may be reluctant to use simplified AD, finding it patronising and a hindrance to the imaginative process. They propose offering "audio adaptation" apart from standard AD and note that theatre plays, opera, dance, or museum AD could incorporate E2U Language more easily. Taylor and Perego (2020) support this by stating that ER could enhance museum accessibility by reducing the complexity and volume of information in AD. Bernabé-Caro and Orero (2020) observe that simplified AD should follow EL, AD, WCAG 2.1 (W3C, 2018), and sound mixing guidelines.

Finally, Bernabé-Caro and Orero (2019) mention "easy listening" or "easy to listen", which considers the choice of vocabulary, syntax, rhythm, and intonation, but it has yet to be researched. This concept is complementary to clean audio, which improves speech intelligibility by reducing the ambient noise, music, and sound effects. It can also be linked to the concept of "listenability", which has not been studied with

persons with cognitive disabilities, although there are studies regarding the effects of prosodic elements in comprehension (Blau, 1990; Brookshire & Nicholas, 1984; de-la-Mota & Rodero, 2011; Henderson & He, 2022; Kotani et al., 2014; Pashek & Brookshire, 1982; Prafiyanto, 2020; Prafiyanto et al., 2018; Reid, 2003; Schaeffer et al., 2022; Schafer, 1997; Yoon et al., 2016).

2.3. Methodology

This paper discusses the results of eleven individual semi-structured interviews, one of which was a group interview with two participants who create content together.

The interviews were conducted online in September and October 2022, with a maximum duration of 1 hour each. After a brief presentation by the researcher, participants signed informed consent forms. The interviews followed the schedule outlined in Table 2.1 and concluded with the researcher thanking the interviewees for their participation.

Given the limited existing research on easy audiovisual content creation, the selected interview questions aimed to map current practices concerning linguistic and prosodic aspects, paratextual elements, and validation processes. This approach provided a holistic view of current practices across various content types. Additionally, employing semi-structured interviews allowed interviewees the flexibility to introduce other relevant topics beyond the initial questions.

①. What background or experience do you have creating easy audiovisual content?
②. What type of content do you simplify?
③. Who is this simplified content, this xxxx [term they use], addressed to?
④. Where is this simplified content, this xxxx [term they use], offered?
⑤. When did this simplified content, this xxxx [term they use], start to be offered (in your country, if necessary)?
⑥. I would like to learn more about how this simplified content, this xxxx [term they use], is done. I would also like to focus on four aspects: creation/translation, language, content, and other elements.
   a. Do you create easy content, or do you translate already existing easy content?
   b. How do you simplify the language (vocabulary, grammar)?
   c. Some people say that there are different levels of simplification: from Easy Language (what was traditionally called easy-to-read) to Plain

Language, closer to standard language. Is your simplification closer to Easy or Plain Language?

d. In terms of prosody (speed, pronunciation, etc.), do you take any specific aspect into account?
e. How does the genre/content type influence the production of your easy content?
f. Are there any time restrictions and, if so, how do you deal with them?
g. How do you use other additional elements, if any: visuals, supplementary materials, etc.?
h. Do you follow any existing guidelines, recommendations, or standards, if available?
i. Do you take any other aspects that we have not mentioned into account when creating or translating easy content?

⑦.Do you involve end users in the evaluation of the easy content? If so, how?

⑧.Is there anything else you would like to add?

Table 2.1: Interview Schedule

2.3.1. Participants

Research and recommendations on oral E2U Language are scarce. To provide a broader view of how different easy content types are created, participants experienced in a wide range of content were targeted: E2U news, conference interpreting, educational material, and AD were some of the areas identified in the literature as current practices (Arias-Badia and Matamala, 2020; Maaß and Hernández Garrido, 2020; Matamala, 2023; Schulz et al., 2020). In line with the qualitative nature of this study, purposive sampling was employed to recruit participants with expertise covering the different areas identified in the literature review. The decision to interview a smaller number of participants (12 interviewees) was deliberate, aimed at facilitating in-depth and detailed interviews, as well as thorough subsequent analysis.

The interviewees' profiles are presented in detail in the background subsection. The participants are anonymised using codes (P1, P2, P3, etc.).

2.3.2. Analysis of the interviews

The interviews were transcribed using Teams' automatic transcription feature and later postedited. However, in two cases the transcript was done manually due to technical problems. The transcripts were coded with Atlas.ti through a deductive process by using a premade code list, and an inductive process by modifying the list

while examining the materials (Ballestín González & Fàbregues, 2018). The final list of codes is detailed in Figure 2.1:

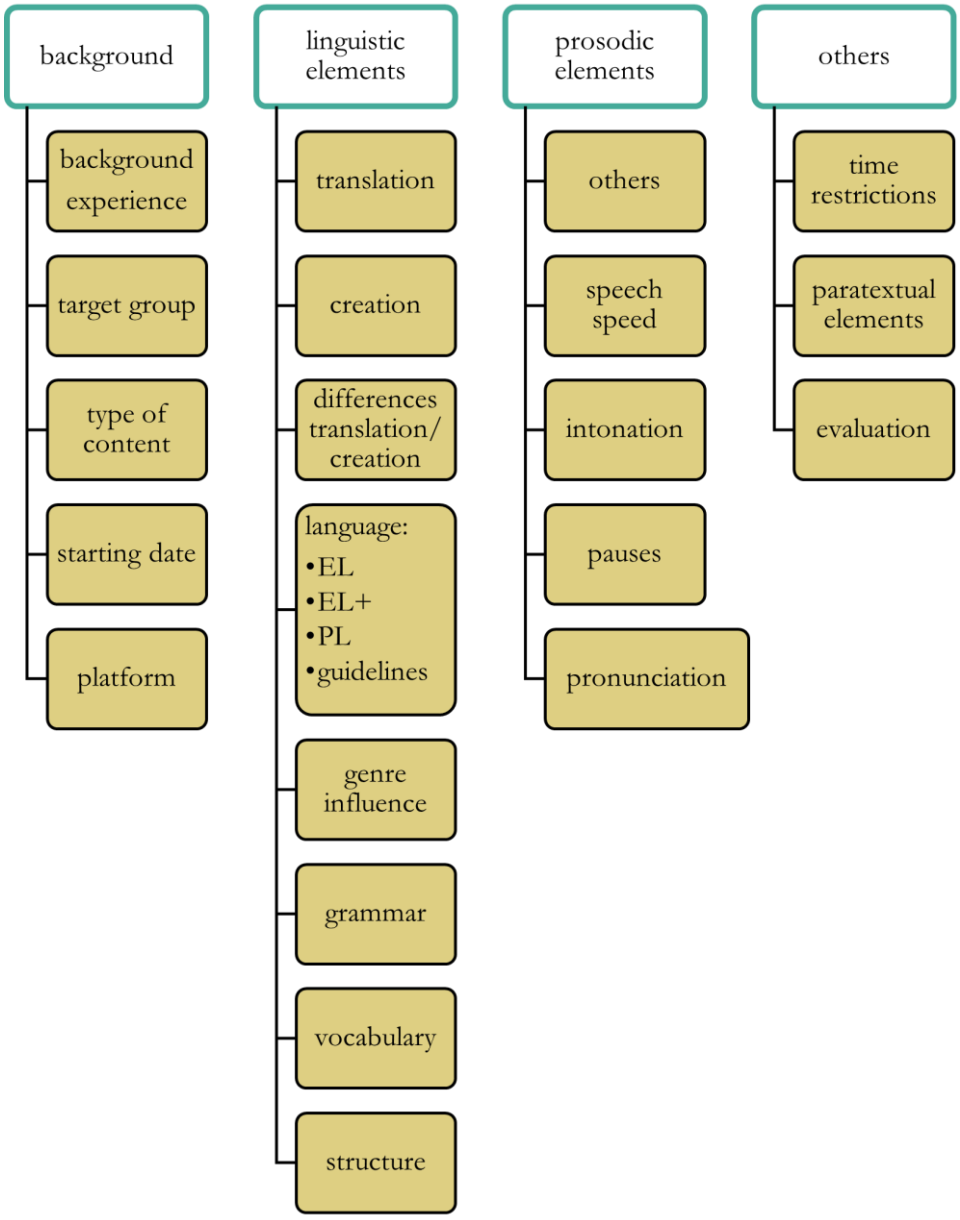


Figure 2.1: Code list

Twenty-five codes were used, divided into four categories: "background", "linguistic elements", "prosodic elements", and "others". "Background" includes interviewee experience, basic parameters of content, and when content creation started. Interviewees were also asked when the type of content started being offered in their country. "Linguistic elements" covers vocabulary and grammar simplification, structure, genre influence on simplified content, language variety (EL, EL+, PL), and guidelines used.

It also has codes for creation and translation processes, although parameters such as time restriction may also be influenced by these processes. "Prosodic elements" encompasses relevant prosodic features, such as speech speed, intonation, pauses, and pronunciation. Finally, the "others" category includes other less common features such as time restrictions, paratextual elements, and evaluation processes.

After coding, the information was compared to identify patterns and similarities across different types of content.

2.4. Analysis and results

This section contains six subsections: background and context (covering background, target groups, content type, starting date, precedents, country, and platform), linguistic elements (including grammar, vocabulary, guidelines, and content simplification), prosodic elements, time restrictions, paratextual elements, and validation and evaluation.

2.4.1. Background and context

Table 2.2 provides a summary of each participant's background, detailing the type of easy audiovisual content they create or have created, along with information on their target audience, start date, and language variety.

Participant code	Content	Target users	Starting date	Platform	Country/ language/ variety
P1	News interpreting	adults with a low or medium level of intellectual disability with schooling	2009	Television	Argentina / Spanish EL+
P2 and P3	Easy news	people with intellectual disabilities	2020	News web portal (enostavno.info)	Slovenia / Slovenian EL+
P4	News interpreting	adults with a low or medium level of intellectual disability with schooling	2009	Television	Argentina / Spanish EL+
P5	Educative course for validators	people with reading disabilities	2020	Google Classroom	Romania, Austria, Germany, Italy, Slovenia and Spain / English (and

Participant code	Content	Target users	Starting date	Platform	Country/ language/ variety
					will be translated into national languages) EL
P6	Mediation	people with intellectual disabilities	2020	Online	Argentina / Spanish EL
P7	Informative and institutional videos	non-native Finnish and Swedish speakers, people with loss of cognitive abilities and neurobiological linguistic difficulties	2007-12	Institutional webpages	Finland / Finnish and Swedish EL
P8	Films AD	people with intellectual disabilities	2005-7	Live sessions at the cinema	Brazil / Portuguese EL and PL
P9	Easy Swedish newscast	originally non-native Swedish speakers, later people with intellectual and cognitive disabilities as well	2016	Television and online	Sweden / Swedish EL
P10	Informative and institutional videos	people with intellectual and reading disabilities, and non-native Swedish speakers	2010	Websites	Sweden / Swedish EL
	Training for EL interaction	people with intellectual disabilities	2022	Workshop	
P11	Conference interpreting	people with cognitive disabilities	2016	Online and in-person	Germany and Austria / German EL

Participant code	Content	Target users	Starting date	Platform	Country/ language/ variety
P12	Informative video	people with intellectual disabilities or cognitive decline, prelingual hearing loss, low literacy level and non-native speakers	2016	Asociación Española de Fundaciones Tutelares web page	Spain / Spanish EL
	Audio explanation		2011		

Table 2.2: Summary of background information

Looking at the type of content created by the interviewees, four main areas can be identified: news contents, informative and educative content, conferences and meetings interpreting and mediation, and AD and audio explanations.

Starting with news contents, P1 and P4, from Argentina, participate in live news intralingual interpreting addressed to adults with a low or medium intellectual disability who have been through the education system. This service started in response to a 2009 law requiring television content to be accessible to individuals with hearing, visual, and intellectual disabilities. P2 and P3 are Slovenian journalists who produced an easy news video pilot in 2020 that is available online. In their interview, they stated they would start translating audiovisual content into EL in 2023, being the first to produce such content for national TV and radio in Slovenia, despite the existence of other organisations working with EL in the country. Finally, P9's master's thesis focused on Sveriges Television's Easy Swedish newscast, which launched in 2016. The programme reuses news videos and adds a voice-over to make them more accessible to non-Swedish speakers, including refugees and immigrants, and people with intellectual and cognitive disabilities.

Regarding informative and educative content, P5 from Spain was developing an educational course for validators with reading disabilities under the Train to Validate project (2020-2023), parallel to a course for facilitators. At the time of the interview, it was said that the course would be available on Google Classroom after the project's completion. Currently, it can be found on the webpage of Plena Inclusión Madrid[1]. A precedent in Spain for this type of content could be the programme Planeta Fácil TV. P7 from Finland has also created institutional and informative videos in EL for municipalities, organisations, and enterprises, available on their websites, targeting

[1] See https://plenainclusionmadrid.org/train2validate/easy-to-read-academy/

non-native Finnish or Swedish speakers and people with cognitive impairment and neurobiological linguistic difficulties.

This type of content started being created around 2007-2012. In addition, P10 in Sweden creates and translates institutional videos into EL since 2010, available on institutional websites. Furthermore, they conducted workshops for politicians in 2022 under the My Choice project, led by an NGO study organization since 2014, teaching politicians to speak in EL so that people with intellectual disabilities could vote confidently. An important difference P10 notes between translated and created content is that translated content often lacks a clear target group, as translation is often an afterthought. Finally, P12 from Spain translated a short video into EL in 2016 on establishing guardianship for adults, available on the webpage of the Asociación Española de Fundaciones Tutelares.

Turning to conferences and meetings interpreting and mediation, P6 offers online intralinguistic mediation into EL for persons with intellectual disabilities in both national and international meetings since 2020, being the sole provider of this service in Argentina. Additionally, P11 provides simultaneous conference interpreting in EL for people with cognitive disabilities in Germany and Austria since 2016, both online and in-person. They often have familiarity with their users' education level and the subject they will interpret. Similar services have been offered in Germany since 2010-2013.

Finally, P8 initiated Brazil's International Disability Film Festival in 2003. Around 2005-2007, they introduced special sessions for people with intellectual disabilities with live AD translated into EL and PL, depending on the film. This was unprecedented in Brazil. P12 also created EL audio explanations for theatre plays as part of an accessible theatre project that started in 2011. This content targets people with intellectual disabilities, cognitive decline, prelingual hearing loss, low literacy levels, and non-native speakers.

2.4.2. Linguistic elements

Table 2.3 summarises the content types, language variety, and guidelines followed by the interviewees, which will be explained in this section.

Participant code	Content	Language variety	Guidelines	Language
P1	News interpreting	EL+	Internal guidelines UNE standards	Spanish
P2 and P3	Easy news	EL+	Inclusion Europe	Slovenian

Participant code	Content	Language variety	Guidelines	Language
			Zavod Risa	
P4	News interpreting	EL+	Internal guidelines UNE standards	Spanish
P5	Educative course for validators	EL	Internal guidelines Plena Inclusión	English (national languages in the future)
P6	Mediation	EL	Easy-to-read Fundación Visibilia IFLA guidelines UNE standards	Spanish
P7	Informative and institutional videos	EL	Easy Finnish Indicator 2.0 Instructions for interaction in oral PL	Finnish and Swedish
P8	Films AD	EL, PL	---	Portuguese
P9	Easy Swedish newscast	EL	IFLA guidelines Inclusion Europe	Swedish
P10	Informative and institutional videos Training for EL interaction	EL	Swedish Centre for Easy-to-Read	Swedish
P11	Conference interpreting	EL	Capito Netzwerk Leichte Sprache University of Hildesheim	German
P12	Informative video Audio explanation	EL	Inclusion Europe	Spanish

Table 2.3: Summary of linguistic elements

While all interviewees simplify language by following basic recommendations for written EL, such as using short sentences, common vocabulary, and avoiding subordination, they each mentioned specific strategies tailored to their content.

Starting with P1 and P4, they simplify live news for two channels using "simplified PL", which we classify as EL+. In one TV channel, they simplify all content by following a subject-verb-complement sentence structure, avoiding technicisms or abstract concepts but explaining them when necessary. They avoid foreign words, abbreviations and acronyms, as well as childish vocabulary, and use repetition to

reinforce ideas. However, in the other channel, they only provide an oral explanation for difficult words or concepts and allow users to hear journalists speaking in standard language when they do not speak. Although the interpreters follow an internal guideline based on UNE standards (AENOR, 2018), the specific interpreting styles were chosen by the TV channels.

In contrast, in P2 and P3's easy news pilot the information is already given in EL+, following the Inclusion Europe (2009) and Zavod Risa's guidelines (Haramija & Knapp, 2019) for Slovenian, thereby eliminating the need of interpretation. Their aim is to convey "one or two [pieces of] information per sentence" and "maintain [their] standards" as journalists for accuracy, which means they cannot change certain difficult words or expressions. Instead, they use precise words, numbers, and quantities, while explaining them as simply as possible.

Similarly to P1 and P4, P5 also uses internal project guidelines to create educational videos for validators in EL, although they use Plena Inclusión (2018) for validation. According to P5, structuring and planning the content to be read aloud is key. For example, subordinate sentences should be avoided, as P5 considers them more difficult to understand orally than in written texts. As complex vocabulary cannot always be avoided or adapted in educational contents, it is important to contextualise and explain it without using vulgar or colloquial language.

P6 mediates in conferences and meetings following EL guidelines from Fundación Visibilia, IFLA (2010), and UNE (2018). Their mediation strategies are similar to P1 and P4's interpreting approaches, as P6 may choose to explain or contextualize difficult concepts in some meetings while completely simplifying the entire speech in others. They also adjust their vocabulary depending on the context of the meeting, using common Argentinian Spanish words in regional meetings, and finding a common word across dialects in Latin American meetings.

P7 follows the Easy Finnish Indicator (Finnish Centre for Easy Language, 2022) and recommendations for interaction in oral PL that have been recently revised. Most recommendations align with basic written EL ones, with specific guidelines for Finnish, such as avoiding non-finite clauses and structures. They mention that since EL videos can be "of different kinds", the EL guidelines they follow are more "loose". Furthermore, P7 also observes that "in the videos, you can be more compact with the language than in a text" because an image "can carry the understanding".

In contrast to other interviewees, P8 did not know about EL or PL and AD when they started translating film AD into E2U Language, so they do not follow any

specific guidelines or recommendations. To make an easy AD, they use shorter sentences than in standard AD, although P8 also mentions that in standard AD they usually avoid "difficult, rare language" due to time restrictions and aim for precise language because "[the] audience has to understand in a few words", which aligns with basic EL recommendations.

According to P9, the Easy Swedish newscast mostly follows IFLA (2010) and Inclusion Europe (2009) guidelines. Although the programme tries to follow basic recommendations, as with P5, it is not always possible to use common vocabulary due to the topic of the news. Like P7, images in the news programme are used to help explain the content and avoid time constraints. However, P9 found no significant differences when comparing easy and standard news, possibly because standard news are generally reported in PL.

Turning to P10, they follow the Swedish Centre for Easy-to-Read's guidelines when creating informative and institutional videos and training for politicians. Besides basic EL recommendations, they pay special attention to numbers and statistics, as those can be difficult to understand. As an example, P10 says that "80 million is a lot, but if it's 80 million out of 300 billion, it's very little". Furthermore, when training politicians, they also advise using synonymous words if they have different political nuances, such as "globalisation" and "internationalisation", while explaining them. Finally, P10 also refers to the structure of ER translations, which often must be changed substantially and end up being longer.

Regarding P11, they are familiar with the three main schools of easy German (Capito, Netzwerk Leichte Sprache, and the University of Hildesheim) to provide easy interpreting. Since P11 considers grammar the main comprehension barrier in oral German, they use short, clear sentences, minimise subordinate clauses, and use a more verbal language instead of substantivised words. In terms of vocabulary, they consider the target users' level of education and knowledge when selecting it. For instance, at the Special Olympics, P11 does not explain specific terminology like acronyms because the users understand them.

They also avoid foreign words or explain them if they are widely used. Finally, they avoid compound words by saying "the x of the..." since, although in written Easy German, compound words can be separated with a dash (-) or a middle dot (·), this approach cannot be transferred to oral Easy Language.

Lastly, P12 follows Inclusion Europe guidelines (2009) to create their EL content. As happens with easy AD for P8, audio explanations must be very short due to time constraints. They also avoid using literary techniques typical of theatre plays.

As mentioned as well by P5 and P9, in informative videos, technical terms that cannot be replaced by an easier synonym must be explained, described, or used in a context that makes the meaning obvious. P12 also notes that prosodic elements make it easier to "control the length of the sentences".

As seen, linguistic aspects in oral EL language do not vary much from written recommendations, with a preference for using short and clear sentences with common vocabulary when possible.

2.4.3. Prosodic elements

Regardless of content type, most participants agree that a slower speech speed is crucial. However, among the twelve interviewees, only P1 mentions a specific speed, around 125 words per minute in Spanish. P2 and P3 are less specific, aiming to use a speed that is a quarter of the standard Slovenian speed, while P12 recommends a speed that allows the content to be listened to "comfortably" and without "an excessive effort". P5 also notices the importance of using cadence "in a way that attracts attention" and warns against slowing speech in an unnatural or robotic way. P6 mentions the need to anticipate speech while mediating if the speakers are too fast to not lose information.

Speed also impacts modulation and pronunciation, something that is important to keep in mind, as interviewees also agree that pronunciation must be clear. For instance, P1 highlights the impact a faster speed has, as "you can't modulate the words properly", reducing comprehension. Similarly, P12 comments that "you can't speak too fast" because "pronunciation must be very clear". Furthermore, the Easy Swedish newscast aims for an "easier" pronunciation according to P9, while P2, P3, and P12 believe that it should be "more eloquent" and clear than standard speech, though this is already the practice in audio and television content in their countries.

Several interviewees also use intonation to highlight key information to make the content easier, which aligns with the observation put forth by Yoon et al. (2016) that stress and intonation aid in interpreting information. P8 highlights meanings in easy AD by "exaggerating more" to help understand character emotions. In easy interpreting, P11 adopts the speaker's voice and highlights information with intonation, while using less emphasis in standard interpreting. In contrast, P2, P3, and P12 follow existing intonation standards for standard content.

Pauses are another prosodic element noted in reviewed standards and guidelines (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023) and by interviewees. Moreover, research by Blau (1990), Prafiyanto et al. (2018), and Yoon et al. (2016) also emphasises that pauses are crucial for higher comprehension. This is echoed by P10 and P11, who note that pauses help users process information. Concerning the use of pauses, P5 employs them to mark "when you change from one topic to the other" to show "progression". Similarly, P7 suggests making longer pauses "between the so-called prosodic contents", but not between individual words. In easy interpreting, P11 also observes that pausing is encouraged, unlike in standard interpreting.

The use of expressivity and emotivity differs depending on the content. For news programmes, P4 mentions the simplified version should follow the standard version to help users identify with the speaker. However, both P5 and P6, working on educational video content and mediation respectively, consider important not to be "boring", and P6 explains that the speech should be more like "storytelling" instead of monotonous.

Finally, live interpreter P11 mentions that users prefer a "deeper voice" than a very high one, aligning with the Accessible Information Working Group's (2011) recommendation and the findings in an AD study done by (Machuca & Matamala, 2022, pp. 684, 685). P12, who works with theatre and video content, also adds that voices should match characters on screen. For example, a female character should have a female voice.

2.4.4. Time restrictions

Strategies for managing time constraints vary based on content type and whether it is live or pre-recorded.

During live news interpretation, users rely on the images, which must align with the discourse. Because of this, P1 notes that if the news item changes, the interpreters must switch as well, even if the previous interpretation was unfinished. However, P1 observes that journalists often repeat themselves in standard language, allowing interpreters to convey all the necessary information.

For easy AD, P8 considers the length of the films (30 minutes or less) and the gaps for AD between dialogues. Furthermore, the narrators are actors who can improvise if necessary. In "quick and difficult scenes", narrators "simplify more" depending on temporal and contextual requirements.

In conference and meetings interpreting and mediation, P6 and P11 agree that summarising is key. For example, if a speaker talks too fast or provides too much information, P11 may only provide key points or just explain some of the examples given to avoid overwhelming users. Conversely, P6 sometimes waits for the speaker to complete an idea before summarising everything.

Finally, P12 explains that the audio explanations for a theatre play were created considering the time available. A sound technician was present during the play to ensure timing, and the actors tried to not take too many "licenses" to avoid overlaps.

Regarding pre-recorded content, P9 explains that in the Easy Swedish newscast, which lasts 5 minutes, there are two or three in-depth news items and some shorter ones lasting 15 seconds. However, this occasionally results in complex news items that are not easier than the standard due to insufficient time for detailed explanations. P9 also notes that "it's also difficult to just have five minutes when you are targeting groups that need more time". Similarly, P2 and P3's easy news pilot has a duration of around 1 minute to 1 minute and a half, following news and informative programme standards. However, they mention that their content might be "longer", but they will "test it".

P5 educational videos are also around 5-6 minutes long so as not to overwhelm users, compared to the 8-10 minutes for standard users. Additionally, P5 mentions that the content "needs to be shorter" than the standard version or else users may become distracted. As videos are mostly created from scratch, there are fewer time restrictions, but when standard videos must be translated, P5 relies on summarising information. P7 also creates informative videos and prefers to make them "short", although they do not have time restrictions nor duration limits.

Finally, P10 does not report any time constraints in their informative videos.

To summarise, two main discussion areas emerge: the maximum duration of simplified E2U content and the synchronisation of the simplified audio with the visuals, which is especially challenging in translated content. Time constraints are solved by summarising information and, where possible, preselecting the content to be translated.

2.4.5. Paratextual elements

Table 2.4 summarises the paratextual elements used by the interviewees, which will be explained in this section.

Participant code	Content type	Images and video	Subtitles or transcripts	Others
P1	News interpreting	standard video		
P2 and P3	Easy news	-adapted -must be concrete -correlation between audio and image	closed captions	news article
P4	News interpreting			
P5	Educative course for validators	-the speaker is visible -images strengthen comprehension		transcription, bibliography, teacher guides and exercises
P6	Mediation	the mediator is invisible		
P7	Informative and institutional videos	images help explain and shorten narration		
P8	Films AD	film video	untranslated subtitles	untranslated voice-over, discussion session
P9	Easy Swedish newscast	-standard video -correlation between all content elements	-for foreign languages, strong dialects, and bad audio quality -audio subtitles on the website	
P10	Informative and institutional videos		-subtitles with text-to-speech -translated and untranslated	
	Training for EL interaction			
P11	Conference interpreting			brief summary, red card
P12	Informative video	correlation between audio and image	untranslated subtitles	
	Audio explanation			

Table 2.4: Summary of paratextual elements

Most of the content the interviewees work with include videos and/or images. In news content, the interviewees report different practices regarding this visual support. P1 and P4 cannot change the images in their live news interpreting, while P2 and P3 can modify the standard content for their easy news. P2 and P3 try to use "concrete" photos or "the best approximation possible" to correspond with the audio elements. However, ensuring a "balance" between being concrete and not repetitive is difficult since using the same image repeatedly can make the content less dynamic. P9 also emphasises the importance of all content elements, "verbal, non-verbal, visual, and non-visual", cooperating to create the news, which is challenging to achieve. P9 notes that in easy news, this cooperation is sometimes lacking, and the video is not as integrated in the narration as in standard news.

To create informative and educative videos, P12 collaborated with an illustrator who was "knowledgeable about facilitating comprehension" to create an informative video where the images closely followed the audio steps. Regarding this, P7 and P9 also acknowledge that images can be used to explain information and reduce narration. However, P5 and P6 disagree on whether the speaker should appear on screen. P5 adds a small window for a "human connection", while P6 believes a mediator should be "hidden" unless requested. P5 also incorporates PowerPoint presentations, often with images to enhance comprehension and make the information more appealing.

Subtitles and transcripts are another support element present. P2 and P3 use closed captions for the whole video, but not transcripts, which they find "not so easy to read". On the other hand, P9 says the Easy Swedish newscast only uses subtitles for foreign languages, strong dialects, or bad audio quality. Furthermore, although they mention that there are audio subtitles on the website, these do not work well as users hear the easy narration and the audio subtitle simultaneously. For institutional videos, P10 uses subtitles with a text-to-speech function that are either a "shortened version" of the audio or untranslated, while P12's subtitles for informative videos are untranslated. Finally, P5 prefers transcripts instead of subtitles, as they find them "easier" for users.

As a final point, several of the interviewees mentioned other elements they use as support for users. For example, P5 offers further bibliography on the topic of the videos, teacher guides, and exercises for the students to supplement the educative videos, while P2 and P3 have considered using easy news articles to supplement the

easy news videos. The dialogues in P8's films are also voiced-over live, but not translated into E2U Language as is the case with the AD.

However, despite potential mixed language difficulties (Maaß & Hernández Garrido, 2020, p. 151), P8 does not report such problems. They add that a post-film debate session can clarify any confusion, and P8 can provide additional information about the film and plot upon request before the screening. In conference interpreting, P11 comments that sometimes a brief summary of the ideas discussed is offered every half an hour or hour to reinforce them. Furthermore, for in-person interpreting, P11 gives users a red card they can raise to signal they need further clarification or contextualisation.

2.4.6. Validation and evaluation

Validation is a crucial element in the Spanish UNE standard (AENOR, 2018), where a group of validators collaborates with a facilitator to "evaluate the comprehensibility of a document" in EL. The ISO/IEC 23859:2023 standard (ISO, 2023) broadens this concept and refers to "evaluation", which includes expert and user evaluations "to determine whether content is easy to read and easy to understand". However, the ISO standard acknowledges that it may not always be possible to evaluate content with users before its release, so expert evaluation may be relied upon. User feedback can still be gathered after publication to improve existing practices and evaluate content.

Three different validation/evaluation processes were identified among the interviewees.

Firstly, there are the cases in which some content is not validated due to time constraints but can receive feedback for future improvement. For instance, P1 and P4 do not validate their live news interpreting due to the lack of a unified organisation representing people with intellectual disabilities in their country. P1 and P4 can receive "comments" through television channels and the organisation Defensoría del Público; however, not many are received due to the service being unknown to the target group.

Although P2 and P3's content is not live, they also mention that they cannot wait to make the easy news available to users, so they cannot validate the content before publishing it. Nonetheless, they plan to receive "feedback" with questionnaires through user organisations, as they do in easy news articles, to improve future content.

In simultaneous conference interpreting, P11 uses a red card system for "pseudo-verification" during the conference and afterwards, if possible, speaks to users "to receive feedback". They also use users' expressions to gauge comprehension when possible.

Finally, although P8 works with visually impaired "validators" for the standard AD, they do not do the same yet with the easy AD. However, they mention that they receive feedback for the easy AD after the screening sessions and they plan to work with "persons with intellectual disabilities" to validate the easy AD in the future.

Secondly, validation is part of the creation process in some instances. P9 notes the Easy Swedish newscast "evaluates" the content with Swedish language learners but not with additional target users, although P9 is not aware of what the evaluation entails. P5's educational course will also be "evaluated" in each of the local languages with a "facilitator" who will go through a "battery of common questions" with validators. P10's training workshop "works closely" with the Swedish Association for Children, Youth and Adults with Intellectual Disabilities, with whom they hold focus groups. Finally, P12 usually works with 3-8 validators who "review" the content with a facilitator but, in the past, they have also worked with a person with an intellectual disability during production.

Thirdly, some content is not validated nor receives feedback. P7 notes that while they recommend using "test users" or involving users in production, it is not required, and it is often not done. P10 is also unsure if institutional and informative videos are validated.

Participant code	Content type	No validation, but feedback	Validation or inclusion of target group	No validation nor feedback
P1	News interpreting	X		
P2 and P3	Easy news	X		
P4	News interpreting	X		
P5	Educative course for validators		X	
P6	Mediation			
P7	Informative and institutional videos			X
P8	Films AD	X		
P9	Easy Swedish newscast		X	

Participant code	Content type	No validation, but feedback	Validation or inclusion of target group	No validation nor feedback
P10	Informative and institutional videos			X
	Training for EL interaction		X	
P11	Conference interpreting	X		
P12	Informative video Audio explanation		X	

Table 2.5: Summary of validation and evaluation procedures

2.5. Conclusions

This article reports on data obtained from eleven semi-structured interviews with experts who use oral E2U Language in audiovisual content. This has allowed us to address our research question and map current practices and challenges regarding linguistic and prosodic aspects, paratextual elements, and validation processes.

The results show that most interviewees find written E2U Language recommendations (such as using short and active sentences, common vocabulary, and avoiding subordination, metaphors, and abstract concepts) appropriate for oral content, although they note that technical or complex concepts may be difficult to avoid. Prosodic features like slower speech speed, pauses, and good pronunciation are important regardless of content type. However, only two specific speed rates are mentioned: 125 words per minute for Spanish, and a quarter of the standard speed in Slovenian. Intonation is used to highlight information, and naturalness is also important, according to the interviewees. Time constraints in translated content is mostly managed through summarisation. Easy news, educational and informative videos, and live easy AD do not exceed the recommended maximum of 30 minutes (Inclusion Europe, 2009), while the duration of news and conference interpreting, mediation, and theatre audio explanation is unknown. Images and videos must be precise and correlate with the audio, in line with existing guidelines (Accessible Information Working Group, 2011; Inclusion Europe, 2009). However, research on enhancing comprehension in written content with images shows unclear results (Rivero-Contreras et al., 2021; Schatz et al., 2017; Sutherland and Isherwood, 2016). Interviewees' opinions differ on using transcriptions or translated or untranslated subtitles. More research is needed in this area, in line with the studies by Bernabé-Caro et al. (2020), Bernabé-Caro and Cavallo (2021), and Oncins et al. (2020). Finally,

validation and evaluation practices vary, but interviewees stress time constraints that impede or difficult this process before publication.

According to the interviewees, genre affects linguistic aspects, such as vocabulary and word precision, content narration, and emotivity. The Slovenian easy news follows journalistic standards for accuracy in vocabulary and expressions. Similarly, educative and informative videos sometimes must use complex terminology. During training for politicians, using different synonyms for political terms is suggested, if they are well explained. Simplification strategies vary: news interpreting and mediation involve either complete simplification of speech or contextualisation of complex concepts depending on the TV channel or meeting. Conversely, in live easy film AD, the simplification level is adjusted based on time restrictions. Finally, in news interpreting, emotivity should match the standard, but in educational videos and mediations, it is important to avoid being boring.

This study has several limitations. Firstly, the focus is mainly on EL or EL+ since only one interviewee reports using PL. Secondly, rather than focusing on one genre or country, the research has looked at diverging types of content which nonetheless share one key aspect: the use of oral E2U Language in audiovisual one-way communication settings. Each content has its own specificity and would merit independent research, but this article provides a first contrastive approach and serves as a basis to understand how oral E2U Language is currently being used in audiovisual settings.

New research directions have also been identified in relation to oral E2U Language. In prosodic aspects, research is needed to determine the optimal speech speed, keeping in mind that it may vary between languages. Additionally, pauses should be studied to determine their effectiveness, as well as their optimal length and position. Researching the preferred type of emphasis could also be studied. Finally, emotivity also requires further research, as the interviewees have diverging views. Research like Blau (1990), de-la-Mota and Rodero (2011), Prafiyanto et al. (2018), or Yoon et al. (2016) could be used as a basis to expand into research with people with cognitive disabilities as a target group. Effectiveness of transcriptions versus translated or untranslated subtitles remains uncertain as well. Investigating the impact of orality on the efficacy of shorter sentences would be valuable. This is particularly relevant, as an interviewee mentioned using prosodic elements to control sentence length, and Kotani et al. (2014) discovered that sentence length had no significant influence on listenability, in contrast to written texts.

Additionally, it is worth exploring whether the favoured grammatical structures in written language are equally understandable in oral texts. All in all, research possibilities are manifold because, as indicated in the introduction, investigations in this field are still limited.

CHAPTER 3: STUDY 2 - SPEECH RATE

Pujadas-Farreras, M., & Machuca, M. J. (2025). The effect of speech rate on Easy Language audios comprehension. *Language & Communication, 104*, 140-155.

3.1. Introduction

According to ISO/IEC 23859, Easy Language is a language variety that applies specific recommendations on wording, structure, design, and evaluation to ensure information is accessible to people who have reading comprehension difficulties for any reason. Although this language variety is often referred to as "Easy-to-Read language" (ISO, 2023), the term "Easy Language" has become widely used (J. Fuchs, 2024) due to its applicability to not only written texts, but other formats as well (ISO, 2023). In practice, it has already been applied to oral and audiovisual formats, such as Easy Language interpreting, easy news programmes, and easy audio descriptions (Maaß, 2020c; Miyazaki, 2007; Nahón Guillén, 2020; Pujadas-Farreras & Matamala, 2025; Rubanovsky-Paz et al., 2024; Schulz et al., 2020; Yalon-Chamovitz et al., 2019). In the academic field, projects like EASIT[1], SELSI[2] and WEL[3] have also begun to explore the possible applications of Easy Language on oral and audiovisual formats, and various authors have also examined and theorised about its application across different audiovisual accessibility modalities, including easy audio descriptions, easy audio subtitles and easy audio guides (Arias-Badia & Matamala, 2020, 2023; Bernabé-Caro, 2020b, 2020a; Bernabé-Caro & Cavallo, 2021; Bernabé-Caro & García Muñoz, 2019; Bernabé-Caro & Orero, 2019, 2020; Diab et al., 2024; Maaß & Hernández Garrido, 2020; Matamala, 2023; Perego, 2024; Randaccio, 2022; Rodríguez, 2014; Rubanovsky-Paz et al., 2024; Taylor & Perego, 2020). Specifically, one of the aims of the WEL project (From written to oral texts in Easy Language: easy audios in cultural visits and video games) is to study the practices of oral Easy Language in relation to the creation processes, users, and their main characteristics (WEL project, 2024).

However, the number of guidelines and standards that give recommendations to create audio, video, or multimodal content in Easy Language is quite limited (Accessible Information Working Group, 2011; ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023; North Yorkshire County Council, 2014; UK Disability Unit, 2021). Furthermore, these guidelines often lack clarity, particularly in their recommendations regarding prosodic features such as pauses, intonation, and speech rate (Pujadas-Farreras & Matamala, 2025), leaving significant room for interpretation and potential ambiguity. An example of such vagueness is recommending the use of a suitable (ISO, 2023), slower speech rate (Inclusion Europe, 2009; North Yorkshire County Council, 2014) that is not too slow (ILSMH-EA, 1998). Furthermore, academic research that validates the effectiveness of the oral recommendations

[1] https://webs.uab.cat/easit/en/
[2] https://selsi.eu/en/
[3] https://webs.uab.cat/wel/en/

provided remains limited (González-Sordé & Matamala, 2023; Hansen-Schirra & Maaß, 2020a; Sutherland & Isherwood, 2016).

This article focuses on one key prosodic recommendation, using a slower speech rate (Pujadas-Farreras & Matamala, 2025), by examining participants' comprehension, acceptability, and preferences regarding Catalan Easy Language audios at varying speeds. In this study, acceptability refers to participants' assessment of which speech rates they consider suitable, indicating the speeds they would find acceptable for listening. Preference, on the other hand, refers to the specific speech rate participants favour or prefer the most, reflecting their personal choice among the options presented. In Easy Language studies, it is important to assess these two factors as well, as it has been shown that acceptability can influence the cognitive processing costs associated with reading Easy Language texts (Gutermuth, 2020).

The study includes three participant groups: Catalan native speakers with intellectual disabilities, neurotypical second-language learners of Catalan at the A1/A2 level of the Common European Framework of Reference for Languages, and a control group of neurotypical native Catalan speakers.

The article is organised as follows: Sections 2 and 3 present a brief overview of Easy Language and speech rate studies. Section 4 introduces the materials and methods used in the experiments, while Section 5 presents the results of the experiments. Finally, Section 6 discusses the results and Section 7 presents the key conclusions drawn from the study.

3.2. Easy Language users and recommendations

Although Easy Language was initially designed for adults with intellectual disabilities (Maaß et al., 2021), its potential beneficiaries have since expanded (J. Fuchs, 2024). Bredel and Maaß (2016) categorise these groups into primary and secondary target audiences. Primary target groups depend on Easy Language due to their limited or non-existent access to standard language texts. Conversely, secondary target groups are able to comprehend standard language but choose to make use of Easy Language as well. Lindholm and Vanhatalo (2021) note that, in addition to individuals with "clear cognitive impairments", various other target groups are recognised in each country. These groups may include people with learning disabilities, neurocognitive disorders, functional illiteracy, second-language learners, children in specific circumstances (such as needing medical treatment instructions), and even the general public facing challenges like illness or fatigue.

Some key linguistic characteristics of Easy Language are using everyday vocabulary, avoiding technical, abstract, and complex terms when possible, using simple verb forms, and avoiding long and complex sentences (ISO, 2023). While specific linguistic recommendations for the oral format are not given, professionals working with Easy Language in audiovisual formats have reported that these written recommendations are useful for the oral format as well and generally do not require adaptation (Pujadas-Farreras & Matamala, 2025). This could be due to the fact that the principles of Easy Language often naturally coincide with the characteristics of spoken language. Furthermore, these principles also reflect general recommendations aimed at improving listenability for the general public (Rubin, 2012). However, upcoming research from the WEL project may provide further insights into this relationship.

Prosodic recommendations for Easy Language outlined in guidelines and by professionals (Pujadas-Farreras & Matamala, 2025) include using low-pitched voices (Accessible Information Working Group, 2011), avoiding strong accents (Inclusion Europe, 2009), and speaking at a suitably slower pace (Inclusion Europe, 2009; North Yorkshire County Council, 2014). Moreover, pauses should be used (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023) and speech should be clear (Inclusion Europe, 2009; ISO, 2023; North Yorkshire County Council, 2014).

However, when applying these recommendations, it is essential to account for the diverse cognitive characteristics not only across different target user groups but also within each individual group (Foster-Cohen & Bysterveldt, 2020; J. Fuchs, 2024). This makes it crucial to not only empirically validate the existing Easy Language recommendations but also to evaluate them with diverse groups. At the moment, empirical research on this topic is still lacking (González-Sordé & Matamala, 2023; Hansen-Schirra & Maaß, 2020b; Sutherland & Isherwood, 2016), but a literature review by González-Sordé and Matamala (2023) identified studies evaluating visual support (Rivero-Contreras et al., 2021; Schatz et al., 2017), linguistic simplification (Buell et al., 2020; Schmutz et al., 2019), word frequency (Fajardo et al., 2013, 2014; Rivero-Contreras et al., 2021), literacy mediation (Buell et al., 2020; Schmutz et al., 2019), connectives (Fajardo et al., 2013, 2014), co-references (Fajardo et al., 2014), and number of sentences, text length, and word length (Fajardo et al., 2014; Schmutz et al., 2019). Since that review, additional studies have emerged addressing these areas (Borghardt, 2022; Canut et al., 2024; Deilen, 2022, 2023; Deilen et al., 2022; Frondén & Kaakinen, 2023; Rivero-Contreras et al., 2023), as well as new topics such as font size (Sieghart, 2023), the credibility of simplified texts (Sparks & Waddell, 2024), and the effectiveness of digital versus paper-based Easy Language content (Säuberli et al., 2023).

Studies on prosodic recommendations for Easy Language are even less prevalent, with only two studies identified so far (Prafiyanto et al., 2018; Wei et al., 2016) on Easy Japanese.

3.3. Speech rate and comprehension

According to Canals et al. (2006), the average speaking speed in Catalan is around 120 to 150 words per minute (wpm). Similarly, Albaladejo (2020) recommends a speed of 150 wpm for oral discourse. However, a report by the Institut d'Estudis Catalans (2023) analysing the linguistic quality of weather forecasts notes an average speech speed of 189 wpm, with individual speakers ranging from 134 to 222 wpm. Similarly, a study by Cabeza-Cáceres (2013) found an average of 198 wpm (or 17 characters per second) in audio description, where reducing the speed to 14 characters per second resulted in a nearly 9% improvement in comprehension.

Studies in other Romance languages provide additional context regarding speech rates and comprehension. In Spanish, Hills (1987) suggests a speed of 160 words per minute in radio broadcasts, while Rodero (2016) determined that a speaking speed of 170 to 190 wpm was the most comprehensible. Interestingly, the often-recommended speed of 150 wpm proved to be notably more challenging for listeners to understand. Similarly, in Italian, guidelines for audio description recommend not exceeding 160 wpm (Blindsight Project, 2014). Bendazzoli's (2010) research highlights an average speech rate of 130 wpm for interventions in the European Parliament in Italian and 152 wpm for interventions in Spanish.

Research on speech rate and comprehension has yielded varying results. Lasky et al. (1976) and Pashek and Brookshire (1982) found that aphasic individuals demonstrated improved comprehension when exposed to slower speech rates of around 120 words per minute. In contrast, other authors (Blanchard & Prescott, 1980; Brookshire & Nicholas, 1984; Nicholas & Brookshire, 1986) report inconsistent results regarding comprehension improvement with reduced speech rates. Additionally, several studies (Blumstein et al., 1985; McCroskey & Thompson, 1973; Small, Andersen, et al., 1997; Small, Kemper, et al., 1997; Tomoeda et al., 1990) have found no significant improvement in comprehension for individuals with Alzheimer's disease, aphasia, or specific language impairments when speech rates were slowed. Similarly, research involving second-language learners also presents mixed findings. Some studies report that slower speech rates enhance comprehension (Brindley & Slatyer, 2002; Chaudron, 1988; Chiu & Chen, 2023; R. Griffiths, 1990; McBride, 2011; Zhao, 1997), while others have found no significant benefit (Blau, 1990; Sugai et al., 2016). The two identified studies testing speech rate in Easy

Language also involved L2 and non-native participants and found non-significant effects on comprehension (Prafiyanto et al., 2018; Wei et al., 2016).

This variation in results can occur because the classification of speech rate as "fast" or "slow" is subjective and dependent on the context of each experiment. Different studies may use different benchmarks or standards to define what constitutes a "fast" or "slow" speech rate (Zhao, 1997). Factors such as the population being studied, the purpose of the experiment, or even cultural differences in speech perception can influence these categorisations. As a result, the same speech rate might be perceived differently in varying experimental settings, leading to different results.

3.4. Materials and methods

This study aimed to assess the effect of different speech rates in the comprehension of Easy Language audios among two Easy Language target groups: persons with intellectual disabilities and neurotypical second-language learners, as well as with a neurotypical control group of Catalan native speakers. The study sought to answer two key questions:

I. Does speech rate affect comprehension of oral Easy Language texts?
II. What speech rate do participants find most acceptable and preferable?

This research was approved by the Ethics Committee of the Autonomous University of Barcelona.

3.4.1. Participants

This study involved a total of 101 participants, divided in three groups: (1) a control group of native Catalan speakers, (2) a group of Catalan second-language learners (L2 group), and (3) a group of individuals with intellectual disabilities (ID group), also native Catalan speakers.

Participants in the control group were recruited through snowball sampling using social media and posters in public spaces. For the L2 group, in addition to snowball sampling via the Consorci de Normalització Lingüística and UAB Idiomes school, three adult education schools (CFA Madrid, CFA Torre Romeu, and CFA Gavà) participated by involving their students in the experiment as part of a class activity. Finally, the ID group was recruited through two associations: SOM Fundació and Fundació Asproseat Proa Esplugues. Participation in all cases was voluntary, and no economical compensation was offered. Those who took part in the experiment as a class activity had the option to decline without any impact on their class marks.

Each participant underwent an intelligence screening test, the Raven's Progressive Matrices (Raven, 1998). This test, explained in more detail later, was performed to ensure a homogeneous participant sample for each group. For participants with intellectual disabilities, a first screening was conducted by the associations they belonged to.

The control group included 35 neurotypical participants, all adult native Catalan speakers. The mean age of the control group was 46.31, with a mean Raven test score of 34.14 (out of 36). The L2 group comprised 31 neurotypical adult participants without intellectual disabilities, 18 of whom were learning at the A1 level of the CEFR and 13 at the A2 level. The mean age of the L2 group was 38.65, and their mean Raven test score was 33.39. Most L2 participants (26 out of 31) had Spanish or other Romance language as their native language. Finally, the ID group included 35 native Catalan-speaking adults. The mean age of this group was 45.66, while the mean Raven test score was 21.31 (see Table 3.1 for an overview). None of the participants reported hearing difficulties. There are no significant age differences among the three groups ($p = .137$). However, the ID group scored significantly lower on the Raven test compared to the neurotypical groups ($p < .001$).

	Control	L2	ID
Age (Years)	46.31 (±16.51)	38.65 (±13.52)	45.66 (±14.58)
Raven test	34.14 (±1.85)	33.39 (±1.84)	21.31 (±6.91)
Catalan level	Native	A1 18 A2 13	Native

Table 3.1. Participants demographics

3.4.2. Stimuli

For these experiments, four texts in Catalan Easy Language were created by adapting excerpts from the book *Com tenir cura del planeta* (*How to Take Care of the Planet*) (Peralta, 2023). This book is written in Catalan Easy Language and explains various concepts regarding the environment and climate change. The excerpts were selected to ensure that each text was independent—that is, no text contained information necessary to understand the others—since their order was randomised across participants. Each excerpt was also modified to be similar in length and difficulty.

Each text consisted of 130 words, with a low text complexity, and did not include low-frequency words. Based on the Flesch-Szigriszt readability index, all four texts were rated as "very easy," with scores ranging from 80 to 87. This index was used because it has been adapted for Spanish (Barrio Cantalejo, 2007) and is also often used for Catalan (Pérez Colomé, 2011). The texts and comprehension questions were

also externally validated through expert judgment, with each expert providing their individual opinions independently and without direct communication, following one of the methodologies proposed by Cabero Almenara and Llorente Cejudo (2013).

The texts were recorded by a professional female voice actor with a F0 of 218 Hz. A deeper voice was chosen based on the findings from interviews conducted by Pujadas-Farreras and Matamala (2025), as well as recommendations from Machuca and Matamala (2022) and the Accessible Information Working Group (2011).

Each audio recording was adjusted to produce four different speeds: 190, 170, 150, and 130 wpm, to be able to randomise the stimuli. For example, one participant might listen to Text A at 150 wpm, while another participant might listen to it at 130 wpm. The initial speed of 190 wpm was selected based on the average speech rate found in Catalan news programmes (Institut d'Estudis Catalans, 2023). To establish the remaining three speeds, Rodero's (2016) methodology was followed, decreasing each subsequent stimulus by 20 wpm. This approach allowed for the examination of speech speeds at 150 wpm, recommended in Catalan (Albaladejo Mur, 2020), and 130 wpm, which is near one of the speeds suggested by professionals in Pujadas-Farreras and Matamala (2025). The audio recordings ranged in length from 40 seconds to 1 minute, depending on the speed of the audio.

The audios were also adjusted to ensure that pauses in speech adhered to the standard durations in Catalan (590 ms for intra-sentence and 250 ms for inter-sentence pauses) (Cantin & Ríos, 1991), ensuring that pause length did not influence the results.

3.4.3. Evaluation methods

As previously mentioned, participants were screened using Raven's Progressive Matrices (Raven, 1998), a non-verbal intelligence test commonly employed to evaluate general human intelligence and abstract reasoning abilities. This test serves as a non-verbal indicator of fluid intelligence (Bilker et al., 2012). In this study, the Raven Coloured Progressive Matrices version was utilised, specifically designed for young children aged 5 to 11, individuals with intellectual disabilities, and the elderly (Domino & Domino, 2006). The test had a total of 36 questions. Each question presented a geometric design with a missing piece, requiring participants to select the correct piece from a set of six options. An example can be seen in Figure 3.1.

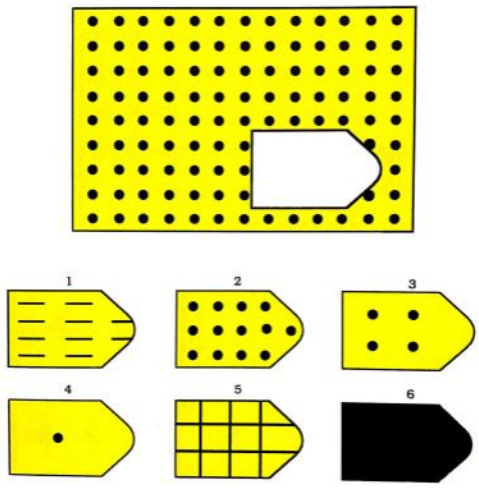


Figure 3.1. Raven test example

Comprehension was evaluated using multiple-choice questions, with each audio accompanied by three questions offering three answer choices. These questions measured comprehension at the literal level, that is, only referring to information that is specified in the audio (Herber, 1970). Therefore, for each speed, participants could achieve a maximum score of 3 by answering all questions correctly or a minimum score of 0 if none were answered correctly. The comprehension questions were validated using the same process applied to the audios.

Acceptability of each speed rate was measured using a five-point Likert scale through which participants shared their perception of each speed: too fast, fast, suitable, slow, or too slow.

Finally, a preference question was posed, asking participants to select their preferred speech rate, if they had one.

3.4.4. Procedure

The experiment took place over a single day in a quiet room, with each session lasting no more than an hour. Participants began by signing a written informed consent and were given the chance to ask any questions or share concerns about the experiment. They also answered demographic questions and indicated whether they had prior knowledge of the audio topics: sustainability and climate change.

After completing the Raven test, which was administered individually or in small groups, participants proceeded to the individual listening comprehension test. First, a volume test was conducted to ensure the audio was at an optimal level for each participant. During the comprehension test, each participant listened to four audios,

each set at a different speech rate, without any accompanying transcript. After hearing each audio, participants answered three multiple-choice comprehension questions orally. Each audio was played twice, and the comprehension questions were asked after each listening. Responses from both rounds were recorded.

After each audio speed was played twice, participants were also asked for the acceptability of that specific speech rate. Once all speeds were completed, participants were asked to select their preferred speed, if they had one.

To control for potential extraneous factors, participants were exposed to the speech rates in varying orders, since previous studies have indicated that exposure to slower speech rates may cause subsequent temporal information to be perceived as relatively faster, while exposure to faster speech rates can result in the same temporal information being perceived as relatively slower (Ainsworth, 1974; Fujisaki et al., 1975; Summerfield, 1981).

3.4.5. Data analysis

Data analysis was conducted using SAS v9.4 software, with a confidence level of 95%. Bivariate tests were selected based on variable types and distributions. For two qualitative variables, distribution homogeneity tests were applied (Chi-Square, Fisher's Exact, or Likelihood Ratio), depending on criteria compliance. When analysing one quantitative and one qualitative variable, the assumptions for normality (Shapiro-Wilk) and variance homogeneity (Levene's test) were first assessed. Based on these results, either parametric tests (t-Test or ANOVA) or non-parametric tests (Kruskal-Wallis) were used. For one ordinal and one qualitative variable, a generalised linear model with a binomial distribution was employed. For two quantitative variables, Pearson's correlation coefficient assessed the linear association. For ordinal quantitative variables, non-parametric tests (Kruskal-Wallis) were applied. Significant findings in these tests prompted post-hoc pairwise comparisons, with p-values adjusted for Type I error using Tukey or Bonferroni corrections as required.

3.5. Results

This section will present the comprehension results for each speech rate, along with user acceptability ratings and final speed preferences for each group.

3.5.1. Comprehension results

A first analysis to ensure the different variables in each group were not affecting the comprehension results shows that the order in which each speed was presented did

not significantly impact comprehension for any of the groups. Similarly, comprehension of the different speeds within the groups was not significantly associated with Raven test scores either. Age was generally not a significant factor either, with two exceptions. In the ID group, a positive trend emerged at the 130 wpm speed, where older participants performed better. Similarly, in the L2 group, a comparable trend appeared at the 170 wpm speed, again showing improved performance with increasing age. However, age was not a significant factor at other speeds for these groups. Finally, language level for the L2 group was significant only at the 150 wpm speed, where A2-level participants demonstrated significantly higher comprehension ($p = .02$).

Having addressed the background variables, we can now examine the main comprehension outcomes in detail. Starting with the fastest speed, 190 wpm, there is a significant difference in comprehension between the control group and both the ID and L2 groups ($p < .001$). The control group achieved a mean score of 2.91 (±0.28), while the ID group scored 2.03 (±0.86) and the L2 group scored 2.29 (±0.82) (Figure 3.2). Although the L2 group's score is slightly higher than the ID group's, this difference is not significant ($p = .166$), suggesting that both groups experience similar difficulty comprehending at the highest speed.

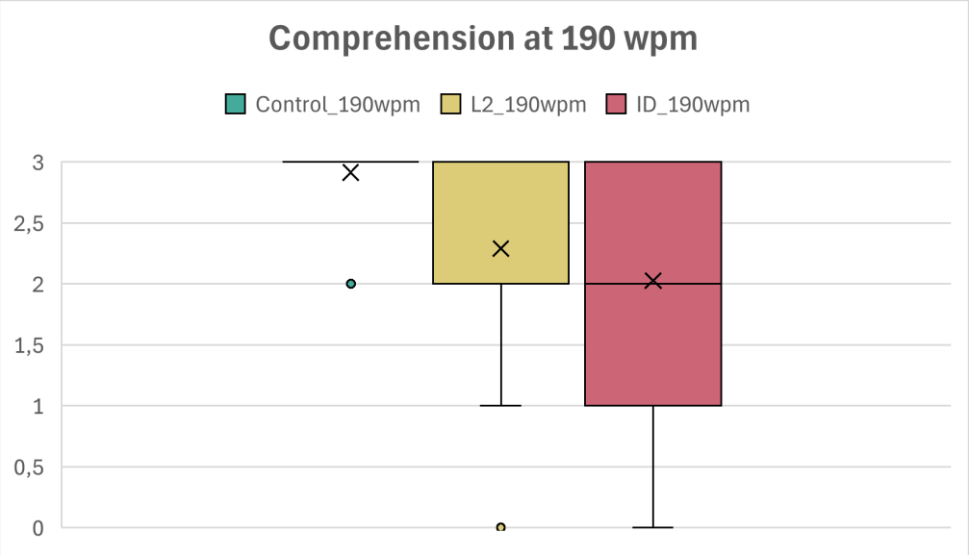


Figure 3.2: Comprehension results at 190 wpm

The results at 170 wpm are mixed (Figure 3.3). The control group achieved a mean score of 2.80 (±0.41), while the ID group scored 1.80 (±0.99). In both cases, the mean score was lower than the scores obtained at 190 wpm, though the difference was not statistically significant. In contrast, the L2 group shows some improvement, with a mean score of 2.45 (±0.68).

A comparison of the three groups shows that, although the L2 group's comprehension improves at 170 wpm, their performance is still significantly behind the control group ($p = .021$). However, the difference between the L2 and ID groups also becomes significant ($p = .006$). This indicates that while the reduction in speed did not fully bridge the gap with the control group comprehension levels, it did benefit the L2 group enough to set them apart from the ID group in comprehension performance.

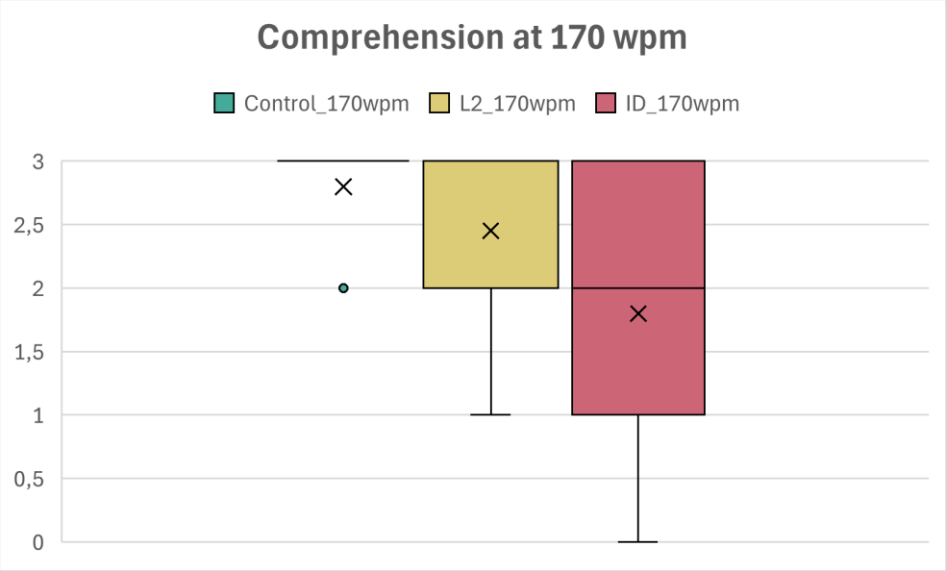


Figure 3.3: Comprehension results at 170 wpm

The comprehension results at 150 wpm reveal further unexpected patterns (Figure 3.4). Unlike the improvement seen at 170 wpm, the L2 group did not maintain a higher level of comprehension at this speed, achieving a score of 2.29 (±0.82), the same as their performance at 190 wpm. Meanwhile, the ID group showed a slight improvement compared to the previous speed, with a score of 1.97 (±0.92), although this remains lower than their score at 190 wpm. The control group is the only one to show a slight improvement to their previous best speed, with a score of 2.97 (±0.17).

Comparing the groups shows that the gap in comprehension between the L2 and ID groups, which had become significant at the 170 wpm speed, is no longer significant ($p = 0.147$), while the difference between these two groups and the control group remains significant ($p < .001$).

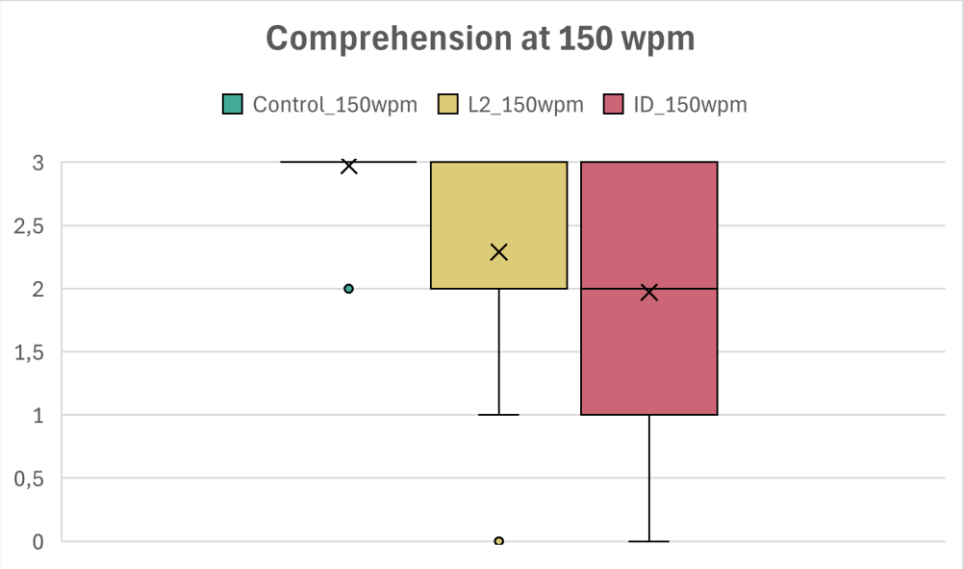


Figure 3.4: Comprehension results at 150 wpm

Finally, the slowest speed, 130 wpm, shows an increase in comprehension for both the L2 and ID groups (Figure 3.5). The ID group achieved their highest score at this speed, with a mean score of 2.31 (±0.80), while the L2 group scored 2.39 (±0.80), although this does not exceed their score at 170 wpm. The control group's score of 2.91 matches their result at 190 wpm, but with a higher standard deviation (±0.37), indicating that the group's performance is less consistent than at the faster speed.

Despite the slight increase in comprehension for the L2 and ID groups, the difference between these groups and the control group remains significant ($p < .001$). This indicates that, even at the slowest speed tested in the study, the L2 and ID groups did not reach a comprehension level comparable to that of the control group.

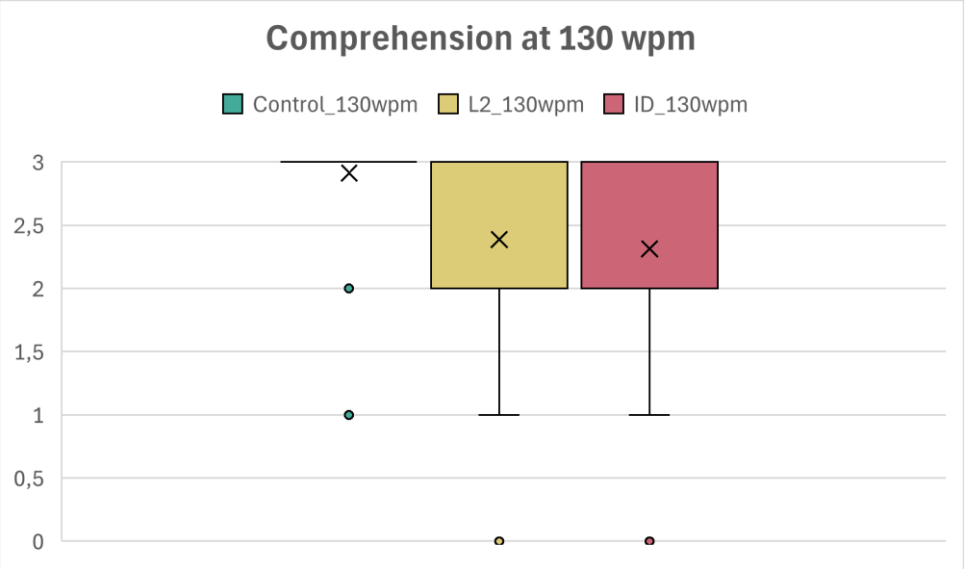


Figure 3.5: Comprehension results at 130 wpm

Notably, despite the variation in comprehension across different speeds, the differences are not statistically significant in any of the three groups, suggesting that speech rate might not be as relevant to comprehension as previously thought.

3.5.2. Speed acceptability

As noted in Section 4, acceptability was assessed using a five-point Likert scale, with the following ratings: 1 = too slow, 2 = slow, 3 = suitable, 4 = fast, and 5 = too fast.

Starting with the acceptability results from the control group, the order in which the faster speeds, 170 wpm and 190 wpm, were presented significantly influenced their ratings. When 170 wpm was presented as the second speed after 130 wpm, it was rated as "too fast." However, when it was heard as the last speed, it was considered "suitable." Similarly, 190 wpm was rated as "too fast" when presented at the end but was described as "fast" when heard in the second position. It indicates that perceptions of speech rate are relative and depend on the context provided by previously heard speeds, rather than being absolute judgments.

Figure 3.6 shows the error bars indicating how consistent the participants' ratings are for each speech speed. Shorter error bars mean the ratings were more consistent among participants, while longer error bars indicate greater variability in their responses. Overall, the speed rated closest to 3 ("suitable") is 150 wpm, with an average score of 2.94, closely followed by 170 wpm, which received a slightly higher score of 3.11. In contrast, 130 wpm was rated at 1.86, indicating that it was generally perceived as slow, while 190 wpm was rated as "fast" with an average score of 4.09.

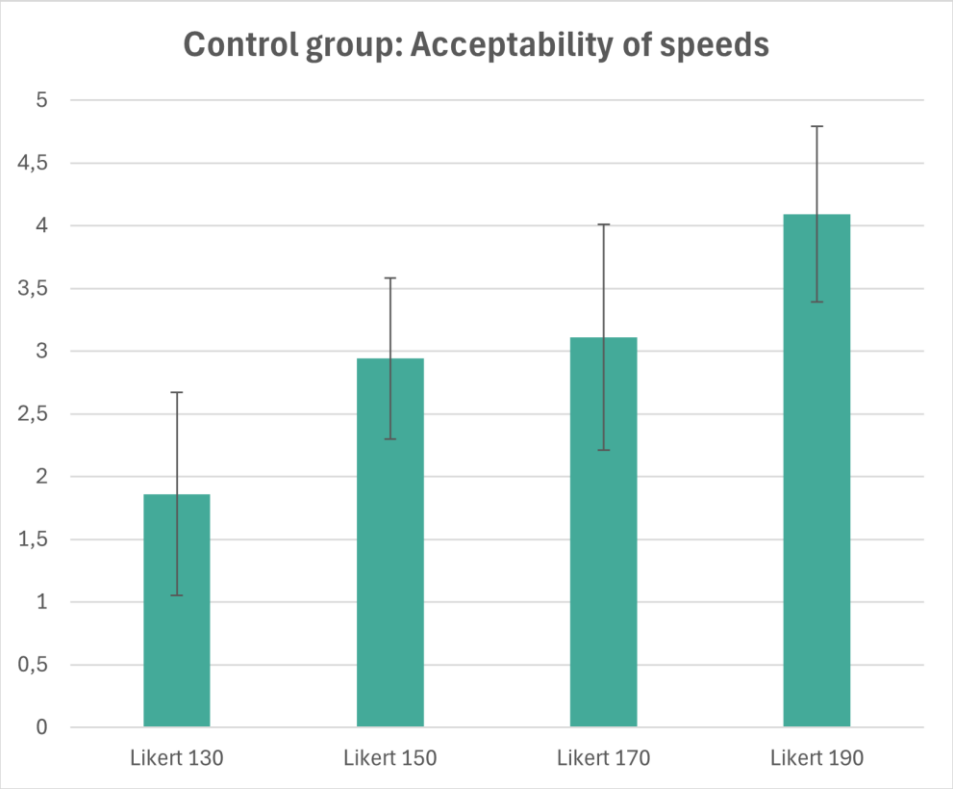


Figure 3.6: Control group: Acceptability of speeds

In the L2 group, the level of Catalan significantly influenced the ratings of the speeds, with the exception of 170 wpm. Considering first the results for the group as a whole (Figure 3.7), the 150 wpm speed is rated closest to a score of 3, with an average of 3.03. This is followed by 170 wpm, which has a rating of 3.61, leaning closer to being considered "fast." The 130 wpm speed is generally perceived as "slow," with an average score of 2.29, while 190 wpm is rated as "fast," with a score of 4.19.

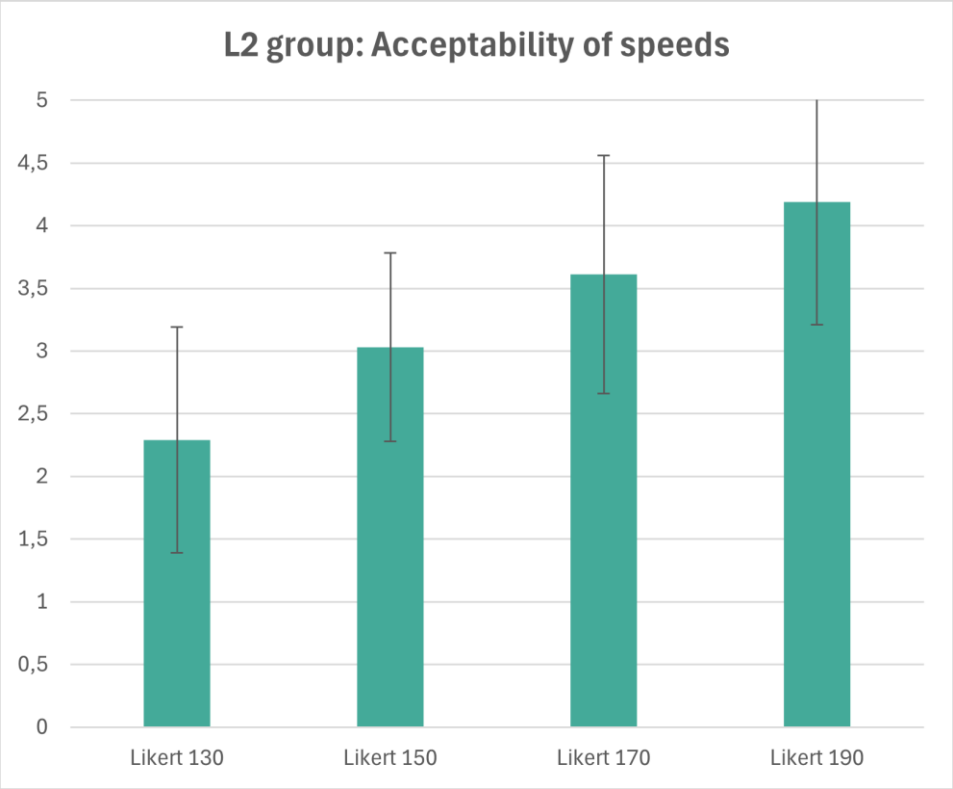


Figure 3.7: L2 group: Acceptability of speeds

When examining the results by language level (Figure 3.8), both A2 and A1 learners rated 150 wpm as the speed closest to "suitable," with scores of 2.69 and 3.28, respectively. However, Catalan language level significantly influenced these ratings ($p = .006$), with more A1 learners perceiving it as fast, while A2 learners tended to find it slower. For A2 participants, the next speed closest to "suitable" was 170 wpm, with a score of 3.46, which A1 participants generally found fast. Conversely, for A1 participants, the second speed closest to a "suitable" score was 130 wpm, with an average score of 2.67, while A2 learners considered this speed too slow, with a score of 1.77.

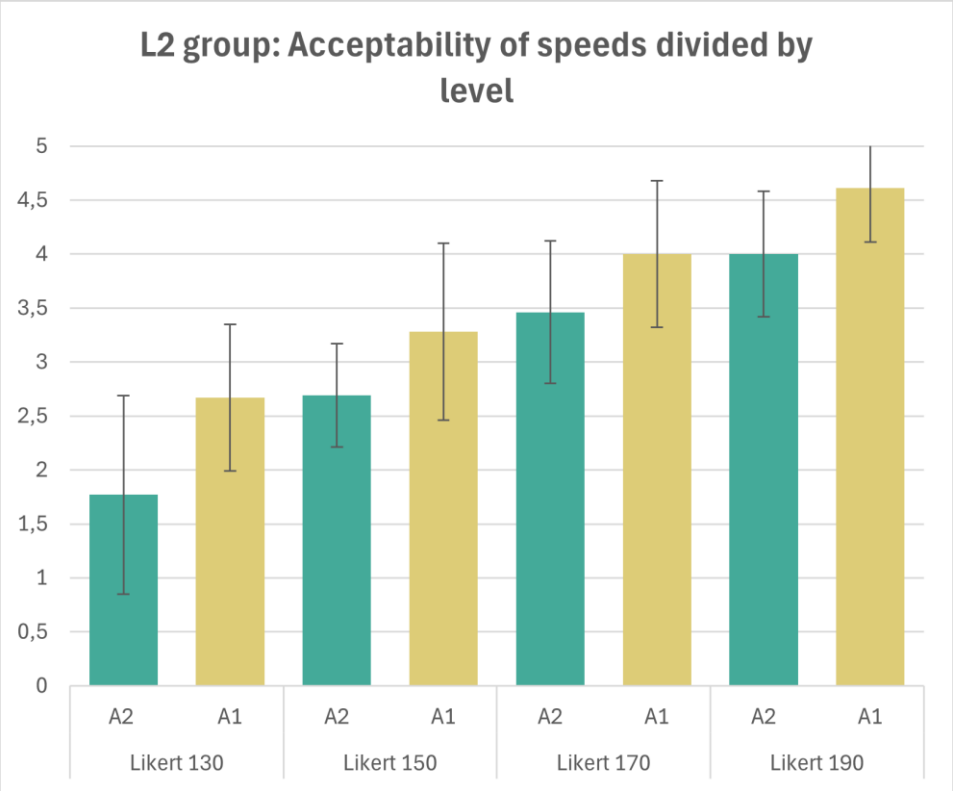


Figure 3.8: L2 group: Acceptability of each speed by Catalan level

Finally, looking at the acceptability results from the ID group (Figure 3.9), it is important to note that while the order in which the speeds were presented and the Raven test scores did not influence the results, participant age had a significant impact at the 170 wpm speed. Younger participants rated the speed as "fast," while older participants considered it "suitable."

In the ID group, 150 wpm received a score of exactly 3. This is followed by 170 wpm, which scored 3.23. The 130 wpm speed, while close to 3, was still considered somewhat slow by the group, with an average score of 2.74. On the other hand, the 190 wpm speed received a higher score of 3.57, suggesting that more participants found it either "fast" or "too fast."

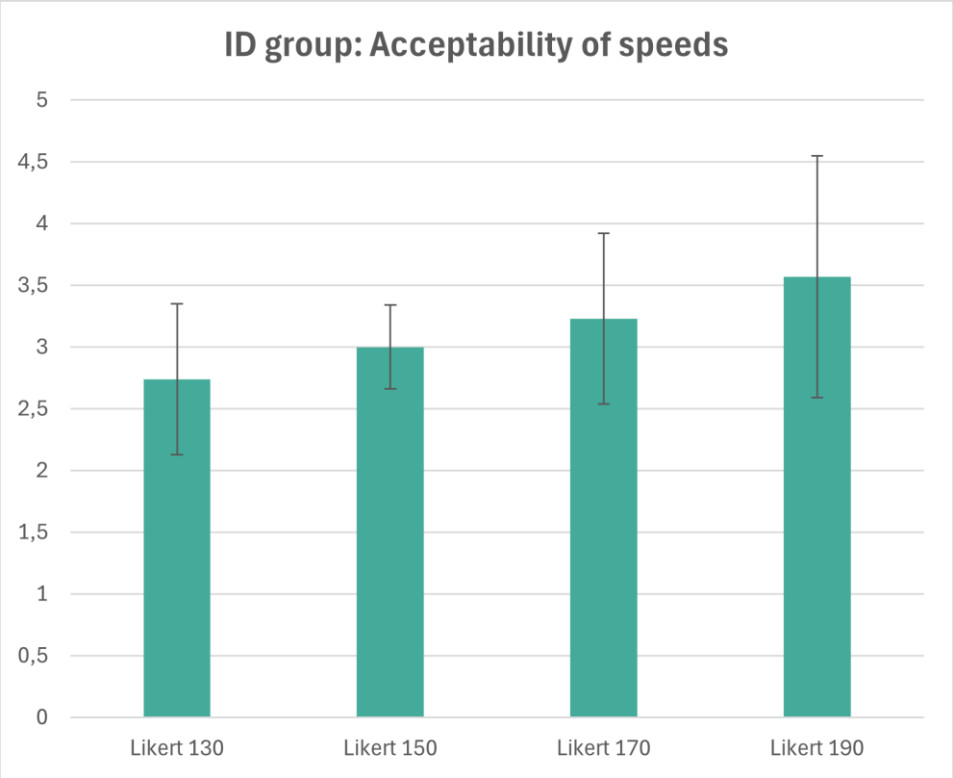


Figure 3.9: ID group: Acceptability of speeds

Interestingly, all three groups rate 150 wpm as the most acceptable speed, with no significant differences in scores between the groups ($p > .05$). Generally, the next most accepted speed across the groups is 170 wpm, provided the L2 group is not divided by language level. However, a significant difference exists in the ratings of 170 wpm between the L2 and ID groups ($p < .001$), with more L2 participants rating it as fast. Similarly, the perception of the 190 wpm speed also differs significantly between these groups ($p < .001$), with the L2 group finding it "fast" on average, while the ID group rates it as "suitable."

3.5.3. Speed preference

Final speech rate preferences were determined by asking participants to select a single speed they preferred. To help participants remember, each audio was paired with an image that was also displayed to them during the selection process. The results reveal varied patterns across the groups (Figure 3.10). In the ID group, the largest proportion of participants (28.6%) opted not to answer, expressing uncertainty or a lack of specific preference, although it is also possible that participants found it difficult to remember each speed. Among those who did choose, 170 wpm emerged as the most selected speed (22.9%), followed closely by both 130 wpm and 150 wpm (20% each). In contrast, all L2 participants provided a specific preference, with 150 wpm being the most popular choice (45.2%), followed by 170 wpm (35.5%).

Similarly, the control group showed preferences closely aligned with those of the L2 group, but with a slight difference: 170 wpm emerged as the most favoured speed (45.7%), while 150 wpm was a close second, preferred by 42.9% of participants.

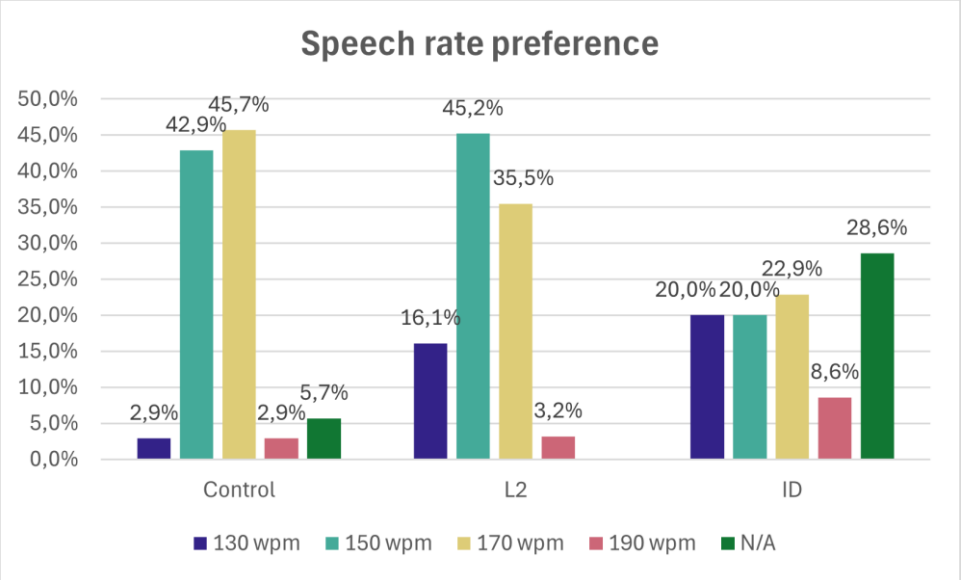


Figure 3.10: Speech rate preference selection

3.6. Discussion

This study explored the role of speech rate as a prosodic feature in oral Easy Language, examining its impact on comprehension. The research involved three participant groups: individuals with intellectual disabilities, neurotypical second-language learners, and a neurotypical control group. Four distinct speech rates were evaluated (130 wpm, 150 wpm, 170 wpm, and 190 wpm) to address the two central research questions.

I. Does speech rate affect comprehension of oral Easy Language texts?

Current professional practices and recommendations (Inclusion Europe, 2009; North Yorkshire County Council, 2014; Pujadas-Farreras & Matamala, 2025) suggest that adopting slower speech rates improves comprehension for Easy Language users. However, when comparing the comprehension results across different speech rates, the differences in comprehension are found to be not statistically significant for any of the groups. This result aligns with findings from other studies on Easy Language, which have similarly found "non-conclusive and non-generalisable" results (González-Sordé & Matamala, 2023; Prafiyanto et al., 2018; Wei et al., 2016). Likewise, other listening comprehension studies have yielded mixed results, with several showing no significant effect of speech rate on comprehension for participants with cognitive disabilities (Blumstein et al., 1985; McCroskey &

Thompson, 1973; Small, Andersen, et al., 1997; Small, Kemper, et al., 1997; Tomoeda et al., 1990) and second-language learners (Blau, 1990; Sugai et al., 2016).

Additionally, the effect of speech rate on comprehension varies across groups. The neurotypical control group achieved the highest scores at a speed of 150 wpm, which aligns with Albaladejo's (2020) recommendation to maintain this speed for oral discourse. In contrast, the ID group performed best at the slower speed of 130 wpm, suggesting that this group might benefit slightly from a slower pace, as indicated by previous recommendations. The L2 group, on the other hand, performed best at 170 wpm. This could be explained by the fact that most of this group were native Spanish speakers, and Catalan and Spanish are quite similar languages in terms of rhythm. The results for this group also align with Rodero's (2016) findings in Spanish, where speech rates between 170 to 190 wpm were found to be most comprehensible for radio broadcasts. Interestingly, the control group of neurotypical Catalan native speakers performed the worst at 170 wpm. This suggests that the typical speech rate of a participant's native language may influence comprehension, as Spanish is generally spoken at a slightly faster pace than Catalan, despite the similarities between the two languages (Coupé et al., 2019).

Finally, it is important to note that a comparison of the comprehension results across the groups shows that none of the speech rates improve comprehension enough for either of the Easy Language user groups (ID and L2) to close the significant gap in comprehension between them and the control group.

II. What speech rate do participants find most acceptable and preferable?

While the three groups exhibit few commonalities in comprehension results, they show more alignment regarding the acceptability ratings of each speech rate. All three groups agree that 150 wpm is the most acceptable speed, followed by 170 wpm. However, the ID group demonstrates a distinct tendency to rate all speeds as "suitable," with their highest-scoring speed being 190 wpm at 3.57. This tendency might occur due to several interconnected factors. Individuals in the ID group may have a diminished sensitivity to differences in speech rates (Gautam & Singh, 2016; Lense et al., 2021; Wynn et al., 2018), which could lead them to perceive a wide range of speeds as equally acceptable or "suitable." This reduced sensitivity to varying speech rates could explain why the group focused less on speed and more on the overall comprehensibility of the speech. So, as long as the speech remained intelligible for them, they were likely to rate the speed positively, even at faster speeds.

Another contributing factor could be the positive response bias often exhibited by individuals with intellectual disabilities, which has been extensively researched (for

example, Hartley and MacLean (2006), and Emerson et al. (2013). This bias, characterised by a tendency to give favourable ratings regardless of true preferences, might serve as a social strategy to conform or please the evaluators. Furthermore, this reluctance within the ID group to rate faster speeds as "fast," in contrast to the other two groups, may stem from a desire not to be perceived as different. As it has been pointed out, there is a risk of stigmatisation in Easy Language texts and conventions (Hansen-Schirra & Maaß, 2020a; Maaß, 2020c; Pedrini, 2023), which can lead primary target groups, such as individuals with intellectual disabilities, to avoid using these materials for fear of being stigmatised (Hansen-Schirra & Maaß, 2020a; Maaß, 2020c; Pedrini, 2023). This tendency to rate all speeds as "suitable" might also reflect an underlying effort to avoid such stigmatisation by not rating the different speeds "negatively."

All these factors are also likely to be the reason behind the final preference results, in which a large proportion of the ID group preferred not to answer. In contrast, the L2 and control groups show preference for the 150 wpm and 170 wpm speeds, consistent with the results found in the acceptability and comprehension scores.

3.7. Conclusions

The results obtained in this study indicate that comprehension did not vary significantly across different speech rates within each group of participants. This suggests that comprehension in the context of Easy Language remains unaffected by variations in speech rate, at least within the range of speeds tested in this study. However, further research using longer audio samples may be needed to confirm whether this holds true for more extensive listening tasks.

Acceptability and preference are important factors to consider, as they can impact the cognitive ease with which listeners process information, even if speech rate variations do not affect comprehension. Research has shown that acceptability can influence the cognitive effort needed to process Easy Language texts, suggesting that similar dynamics may apply to listening. Participants generally found 150 wpm to be the most acceptable and preferable speech rate, as this rate was consistently rated as the most or second-most favoured across all groups. As such, given its high acceptability and preference, 150 wpm is recommended as the optimal speech rate for producing oral Easy Language content, at least in Catalan. Further research would be needed to determine whether this metric is universal or varies across different languages.

However, the study's design also presents limitations, particularly the brevity of the audio samples (130 words). This short length might not fully capture the impact of speech rate on comprehension over extended listening periods. Future research could replicate the experiment using longer audio segments to explore whether comprehension patterns remain consistent or change when listeners are exposed to more substantial content. This would provide deeper insights into the interplay between speech rate, acceptability, and comprehension in real-world applications of Easy Language.

In conclusion, this study empirically investigates the prosodic feature of speech rate in Easy Language, an area that has been underexplored in previous research. By exploring its impact on comprehension, acceptability, and preference, the study offers valuable insights into the design of Easy Language audio content, enhancing our understanding of how prosodic features affect Easy Language and advancing the broader goal of improving communication and accessibility for diverse audiences.

CHAPTER 4: STUDY 3 - PAUSES

Pujadas-Farreras, M., & Machuca, M. J. (2026). Empirical study on pause lengths in Catalan Easy Language audios. *XLinguae, 19*(2), 327-353.

4.1. Introduction

Easy Language is a simplified language variety designed to improve accessibility to information through specific recommendations regarding wording, structure, and design for individuals with comprehension difficulties (ISO, 2023). These difficulties may arise from various causes: intellectual disabilities, neurocognitive disorders, learning disabilities, second language learners, or functional illiteracy, among others (Lindholm & Vanhatalo, 2021).

In recent years, Easy Language has started to extend into oral and audiovisual formats, such as easy audio descriptions, easy news programs, and Easy Language interpreting (Maaß, 2020c; Nahón Guillén, 2020; Pujadas-Farreras & Matamala, 2025; Rubanovsky-Paz et al., 2024; Schulz et al., 2020; Yalon-Chamovitz et al., 2019). Among the various recommendations given for these formats, a recurring one in several Easy Language guidelines is the use of pauses (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023), which professionals also advocate for, emphasising that longer pauses can aid in information processing (Pujadas-Farreras & Matamala, 2025; SELSI project, 2023).

However, these guidelines lack specificity, offering no clear instructions on the length or placement of pauses. Research on pauses in Easy Language also remains limited, with few studies identified to date, specifically for Japanese (Prafiyanto, 2020; Prafiyanto et al., 2018). This lack of research means it remains unclear whether the recommendation to use pauses is actually effective in improving comprehension. Moreover, because existing guidelines are so vague, practitioners are left without concrete parameters for implementation, which can lead to inconsistent and subjective applications in practice. This ambiguity creates challenges for professionals who must decide when, where, and how long to pause without evidence-based guidance. In addition, because each language has its own prosodic characteristics, research on pauses should be conducted within specific linguistic contexts. This is essential for developing locally relevant guidelines, especially since pause length within a sentence can significantly impact a speaker's communicative effectiveness (J. M. Price, 2021). Furthermore, it is also relevant to empirically test these recommendations with various groups of users, as different user profiles might require different pause lengths. In the identified studies, only language learners were considered.

This study aims to investigate whether longer inter-sentence and intra-sentence pauses in Catalan Easy Language audios impact comprehension. It also examines the acceptability of these pauses and users' preferences, involving three participant

groups: a control group of neurotypical Catalan native speakers, a group of Catalan native speakers with intellectual disabilities, and a group of second language learners of Catalan. In this study, both objective measures (comprehension) and subjective measures (acceptability and preferences) are assessed, as previous Easy Language research has shown that acceptability can influence the cognitive effort involved in processing read content (Gutermuth, 2020).

4.2. Silent pauses in speech

The term 'hesitations' refers to various occurrences, including pauses, that interrupt the natural flow of spoken language and are typically regarded as not contributing to the semantic content of the message (Baqué & Machuca, 2023). Pauses are interruptions or stops during speech or reading (Mestres et al., 2019) that speakers can use to highlight the information structure by indicating groups of words or prosodic phrases and manipulating the distribution and length of these pauses (Gustafson-Capkova & Megyesi, 2001; Swerts & Geluykens, 1994).

Pauses can be categorised into filled pauses, which involve vocalisations like [əː] or [əm], and unfilled pauses, also known as empty or silent pauses, which are pauses without any filler particles (Maclay & Osgood, 1959). However, some studies have observed that the concept of pauses should be expanded, because the term 'silent pauses' fails to consider the acoustic characteristics of inhalation and exhalation during speech pauses (Belz & Trouvain, 2019; Trouvain et al., 2016). Silent pauses are often categorised into longer pauses, often accompanied by inhalation, to indicate higher syntactic-prosodic breaks and shorter pauses, predominantly non-breath pauses, for breaks within sentences (S. Fuchs et al., 2013; Gee & Grosjean, 1983; Grosjean et al., 1979; Grosjean & Collins, 1979; Trouvain et al., 2016; Werner et al., 2022).

As Fauth and Trouvain (2018) and Trouvain and Werner (2022) mention, there is not a consensus regarding how long a pause must be to be considered a pause. For example, Trouvain (2004) establishes the minimum length at 100 ms, Cucchiarini et al. (2002) and Lennon (1990) establish it at 200 ms, and Tavakoli (2011) at 400 ms.

Pauses can also show a high variability in duration (Campione & Véronis, 2002). For example, Campione and Véronis (2002) suggest a categorisation of brief (<200 ms), medium (200-1000 ms) and long (>1000 ms) pauses, the latter only occurring in spontaneous speech, based on their study with five languages (English, French, German, Italian, Spanish). In French, Grosman et al. (2018) find in their study that 50% of pauses had a duration of 250-600 ms. Gustafson-Capkova and Megyesi

(2001) find an average of 271 ms for professional readings of Swedish radio news and 561 ms for non-professionals. In spontaneous Spanish, Rebollo Couto (1998) finds that silent pauses have a duration from 42 to 1344 ms. Finally, Cantin and Ríos (1991) identify an average duration of 590 ms for inter-sentence and 250 ms for intra-sentence pauses in Catalan. Llisterri et al. also (2024) have conducted an in-depth analysis of the methodological issues regarding how to establish the duration of silent pauses.

All these previous studies were conducted on standard language varieties, as Easy Language or other simplified language varieties are yet to be studied.

4.2.1. Comprehension facilitated by pauses

Research on the role of pauses in comprehension has highlighted their potential to enhance understanding, particularly in individuals with brain damage, by improving the identification of prosodic boundaries and overall content processing.

Studies with subjects with brain damage have generally found that longer pauses increased accuracy in prosodic boundaries identification and comprehension (Aasland & Baum, 2003; de Beer et al., 2022; Lasky et al., 1976; Liles & Brookshire, 1975; Park et al., 2002; Sheppard et al., 2019), but these findings are not uniform. For example, Aasland and Baum (2003) and Park et al. (2002) observed improved comprehension with intra-sentence pauses up to 500 ms. With longer inter-sentence pauses Lasky et al. (1976) and Liles and Brookshire (1974) also reported an improvement, using 1-second pauses and 5 second pauses respectively. However, in a later study, Brookshire and Nicholas (1984) found inconsistent results while using 4-second pauses. Similarly, Blanchard and Prescott (1980) also found a non-significant improvement when pause durations were expanded by factors of 1.25, 1.5, and 1.75. Furthermore, Blumstein et al.'s (1985) study tested pauses from 250 ms to 3000 ms, and while it found that adding pauses at syntactically salient points were particularly effective for Wernicke's aphasics, intra-sentence pauses actually significantly impaired comprehension performance.

Similar variability appears in studies with L2 learners, as positive effects have been reported using inter-sentence pauses of 3 seconds (Blau, 1990; Leeser, 2004) and 1–2 seconds (Kano & Saito, 1997), and intra-sentence pauses ranging from 200–800 ms (Sugai et al., 2007) and 200–450 ms (Sugai et al., 2016). However, Leeser (2004) reports on the findings of Sagarra (1998) and Chaudron and Richards (1986), noting that neither study found significant results, despite Sagarra also employing 1-2 second inter-sentence pauses.

Finally, studies involving native speakers (Fortunato-Tavares et al., 2023; Henderson & He, 2022; Tanaka et al., 2011) also show an improvement in comprehension when longer pauses are used in prosodic boundaries. Fortunato-Tavares et al. (2023) reported improvements using 100–300 ms intra-sentence pauses, while Tanaka et al. (2011) observed benefits from 0–400 ms inter-sentence pauses.

Nonetheless, none of these studies were conducted using Easy Language. Prafiyanto (2020) and Prafiyanto et al. (2018), the only studies focusing on Easy Language identified, reported non-significant results in their research on Japanese Easy Language when using 200-800 ms inter-sentence pauses.

Research also indicates that varying pause lengths can influence listeners' perceptions and comprehension, with longer pauses often aiding in the identification of prosodic boundaries (Wright, 2021). Furthermore, studies have shown that the duration of a pause is influenced by the length of an upcoming utterance, suggesting that speakers plan the upcoming speech during pauses (Krivokapić et al., 2022).

Easy Language standards and guidelines recognise pauses as an important feature in the creation of audios in Easy Language. However, as noted by Pujadas-Farreras and Matamala (2025), the available standards that address prosody remain limited, and their recommendations are often vague and nonspecific. The ISO standard (2023), for example, advises the use of 'adequate' pauses between words and sentences to convey sentence and text structure, but it does not define what constitutes adequacy. Similarly, the ILSMH-EA guidelines (1998) mention the need to pause briefly between sentences but offer no further detail on the duration. Finally, the Inclusion Europe guidelines (2009) stress the importance of pausing at logical points to allow listeners time to process information before introducing new content. As observed, these recommendations do not explain how long such pauses should be to aid comprehension or how they should be applied specifically, remaining quite general.

Professional creators of Easy Language audios and videos adopt practices that closely align with these recommendations. Interviews with professionals (Pujadas-Farreras and Matamala, 2025) showed that they believe pauses are useful for helping users process information. They also used the pauses to signal transitions between topics and to indicate progression. Additionally, a recommendation mentioned in these interviews was to make longer pauses between prosodic units, rather than between individual words. Similarly, a report from the SELSI project (2023), which focuses on oral Easy Language, highlighted that both professionals and users consider long pauses between words, sentences, clauses, and different subjects to be effective strategies.

Nonetheless, some professionals have also mentioned that the use of pauses in Easy Language may not always align with practices in standard language. For example, it was noted that in standard language interpreting, pauses are not typically encouraged, whereas in Easy Language interpreting, pauses are more commonly used to support comprehension (Pujadas-Farreras & Matamala, 2025).

However, as previously noted, there is a lack of empirical evidence supporting these recommendations and practices. To date, only the studies conducted by Prafiyanto (2020) and Prafiyanto et al. (2018) have specifically examined this issue, and they reported non-significant results.

4.3. Methods

This study aimed to research whether longer inter-sentence and intra-sentence silent pauses in Catalan Easy Language audios significantly impact comprehension. The second objective was to assess the acceptability of different pause durations and participants' preferences. Based on the study objectives, the following research questions have been formulated:

I. Does the duration of inter-sentence and intra-sentence silent pauses in Catalan Easy Language audios significantly impact comprehension?
II. Which inter-sentence and intra-sentence pause duration do participants find most acceptable and preferable?

The protocol for this study was approved by the Ethics Committee of the Autonomous University of Barcelona.

4.3.1. Participants

Participation in this study was entirely voluntary, and the participants were not compensated economically. Prior to their involvement, all participants provided written consent using a consent form designed in Easy Language to ensure accessibility. Participants were free to withdraw at any point during the study if they chose not to continue for any reason.

The participant sample for this study overlapped with a previous study (Pujadas-Farreras & Machuca, 2025) which involved three groups: (1) a neurotypical control group of native Catalan speakers, (2) a group of neurotypical second-language learners of Catalan (L2 group), and (3) a group of native Catalan speakers with intellectual disabilities (ID group). The only difference was that one participant from

the ID group opted not to participate in this study, resulting in a total of 100 participants.

Participants in the ID group had mild to moderate intellectual disabilities, according to the associations through which they were recruited, and were familiar with Easy Language materials, as some of them participated in validation sessions for these materials or used them themselves. No formal assessments of their language skills were conducted within the study itself; instead, the associations identified individuals who, in their judgment, possessed sufficient language abilities to participate.

The L2 group consisted of participants with A1 or A2 proficiency levels in Catalan. Their first languages included Spanish (n = 19), English (n = 3), Portuguese (n = 3), Italian (n = 2), Russian (n = 1), Urdu (n = 1), French (n = 1), and Romanian (n = 1). All had lived in Catalonia for five years or less, with most having arrived either in the same year as the study or the year before. Their primary exposure to Catalan came through language classes, although three participants reported additional exposure via work or intentional engagement with Catalan-language media. However, due to the widespread tendency of locals to switch to Spanish when addressing non-native speakers, overall exposure to Catalan in daily life was minimal unless actively sought out. None of the L2 participants had prior experience with Easy Language materials.

Finally, all participants in the control group had at least completed a bachelor's degree or an equivalent level of education.

All participants in the three groups also completed the Raven's Coloured Progressive Matrices test (see Section 3.3) to ensure homogeneity within the groups.

Table 4.1 displays the participants' demographic information, including their age and Raven test scores (score out of 36), with slight adjustments to reflect the updated participant total.

	Control	L2	ID
Count	35	31	34
Age (Years)	46.31 (±16.51)	38.65 (±13.52)	45.97 (±14.68)
Raven test	34.14 (±1.85)	33.39 (±1.84)	21.35 (±7.01)
Catalan level	Native	A1 (n=18)/A2 (n=13)	Native

Table 4.1: Participants demographics

The control group was recruited through snowball sampling, with outreach conducted through social media and public posters. The L2 group mainly consisted of students from three adult education centres (CFA Madrid, CFA Torre Romeu, and CFA Gavà), where participation was part of a class activity. Additionally, information

about the study was shared with students through the UAB Idiomes school and the Consorci per la Normalització Lingüística ('Consortium for Language Normalisation'). Finally, the ID group was recruited through two associations: Som Fundació and Fundació Asproseat Proa Esplugues.

4.3.2. Materials

The audio materials for this study were recorded by a professional voice actor with an F0[1] of 218 Hz, reflecting recommendations and studies that found that listeners favour lower-pitched voices (Accessible Information Working Group, 2011; Machuca & Matamala, 2022; Pujadas-Farreras & Matamala, 2025). As previously noted, acceptability can influence the cognitive effort required to process a text (Gutermuth, 2020). Similarly, using a voice with high acceptability may enhance listenability (Machuca & Matamala, 2025), which is why this specific voice was chosen for the stimuli.

The articulation rate, which does not count pauses (Dowding et al., 2024), was adjusted to be at 150 words per minute in each audio, aligning with the speed identified as the most acceptable across the participant groups in a previous study (Pujadas-Farreras & Machuca, 2025).

The recordings were also modified to include varying pause durations. Inter-sentence pauses began at 590 ms and intra-sentence pauses at 250 ms, which correspond to the average durations for each pause type in Catalan, as reported by Cantin and Ríos (1991). Each pause was then incrementally extended in 150 ms intervals, following the methodology proposed by Prafiyanto et al. (2018). Table 4.2 shows the durations used in each audio.

Audio 1	Audio 2	Audio 3	Audio 4
Inter: 590 ms	Inter: 740 ms	Inter: 890 ms	Inter: 1040 ms
Intra: 250 ms	Intra: 400 ms	Intra: 550 ms	Intra: 700 ms

Table 4.2: Overview of stimuli

The scripts for each audio were 130 words long and adapted from the book *Com tenir cura del planeta* ('How to Take Care of the Planet') (Peralta, 2023). Both the scripts and the corresponding comprehension questions underwent validation by professionals affiliated with the Easy-to-Read Association to ensure the texts were properly written in Catalan Easy Language. This process followed one of the expert judgment

[1] F0 corresponds to the vibration rate of the vocal folds during voiced sounds and it indicates the speaker's tone of voice.

methodologies outlined by Cabero Almenara and Llorente Cejudo (2013). Additionally, the scripts were analysed using the Flesch-Szigriszt readability index, achieving scores between 80 and 91, which classify them as 'very easy' (Barrio Cantalejo, 2007). This analysis further helped ensure that all texts were of an equivalent level of difficulty.

Table 4.3 provides an example of the comprehension questions used in Catalan, along with its English translation.

Original in Catalan	Translation
Quin altre regal recomana l'àudio? a) Els objectes de plàstic. b) Els objectes de vidre. c) Els objectes de fang.	What other gift does the audio recommend? a) Plastic items. b) Glass items. c) Clay items.

Table 4.3: Example of a comprehension question from Audio 3

4.3.3. Procedure

The experiment took around 40 minutes and was carried out individually in a quiet room. Participants had previously completed the Raven's Coloured Progressive Matrices test (Raven, 1998) as part of an earlier study, and the data from that assessment was reused for this experiment. The Raven's test is a widely used non-verbal intelligence assessment that evaluates general intelligence and abstract reasoning skills, serving as a measure of fluid intelligence (Bilker et al., 2012).

After completing a brief volume test, participants listened to all the audios presented in different orders. Each audio was played twice, with participants answering three orally presented multiple-choice comprehension questions after each playback. However, for the purpose of this study, only responses from the first listening were analysed. The second-listening data will be examined in a follow-up study that will explore the effects of repeated exposure, potential priming, and self-correcting strategies among participants.

Following the comprehension task, participants evaluated the acceptability of each pause using a six-point Likert scale: 0 (not noticeable), 1 (too short), 2 (short), 3 (suitable), 4 (long), and 5 (too long). To assist with this evaluation, participants listened to short excerpts featuring different pause durations, one at a time. After each excerpt, they rated the acceptability of the pause using a Likert scale. Participants provided their ratings based entirely on their own judgment, without any prior training or anchoring examples to calibrate their responses on the Likert scale. Once all four pause durations for one type of pause (either intra-sentence or inter-sentence) were rated, participants were asked to select their preferred duration, if any, to assess

user preference. This process was then repeated for the other type of pause. The order in which participants heard the pause durations during the evaluation matched the order presented in the comprehension task; however, to control for order effects, each participant experienced a different sequence, as previously described.

4.3.4. Data analysis

The choice of bivariate tests depended on the types and distributions of the variables. For comparisons involving two qualitative variables, tests for distribution homogeneity (chi-square or likelihood ratio) were applied. When examining one quantitative and one qualitative variable, normality (Shapiro-Wilk) and variance homogeneity (Levene's test) were first assessed. Depending on these results, either parametric methods (t-test or ANOVA) or non-parametric alternatives (Mann-Whitney U or Kruskal-Wallis) were employed. For comparisons between one ordinal and one qualitative variable, a generalised linear model with a binomial distribution was used. When significant results were found, post-hoc pairwise comparisons were conducted, with p-values adjusted for Type I error using either Tukey or Bonferroni corrections. Data analysis was performed using SAS v9.4 software, with a confidence level of 95%. The analyses were carried out by the Statistics Division of the Autonomous University of Barcelona.

4.4. Results

This section will present the comprehension results for each pause duration, as well as the acceptability ratings and participants' preferences.

4.4.1. Comprehension results

To assess whether the order in which stimuli were presented influenced participants' responses, a non-parametric two-way analysis was conducted using the Scheirer-Ray-Hare test, examining the interaction between participant group and presentation order. The results (the R1 variables refer to the pauses analysed) indicated that the interaction effect was not statistically significant ($H = 3.41$, $p = 0.75$ for R1_590_250; $H = 4.82$, $p = 0.56$ for R1_740_400; $H = 3.92$, $p = 0.68$ for R1_890_550; $H = 3.76$, $p = 0.70$ for R1_1040_700), suggesting that the effect of order did not vary significantly across groups.

Furthermore, an analysis within groups suggests that, in general, comprehension results are also not significantly influenced by the order in which the audios were presented, participants' age, Raven test scores, or, for the L2 group, their level of Catalan. However, there are two exceptions. In the ID group, participants with higher

Raven scores show better comprehension for the audio with 890 ms and 500 ms pauses. In the L2 group, Catalan proficiency becomes significant for the results of the longest pauses, 1040 ms and 700 ms. These findings are detailed in Table 4.4.

Pause	Group	Order	Age	Raven	Catalan
R1_590_250	**ID**	p=0.936	p=0.259	p=0.097	
	Control	p=0.952	p=0.916	p=0.856	
	L2	p=0.228	p=0.219	p=0.810	p=0.418
R1_740_400	**ID**	p=0.614	p=0.832	p=0.166	
	Control	p=1.000	p=0.247	p=0.980	
	L2	p=0.228	p=0.345	p=0.092	p=0.844
R1_890_550	**ID**	p=0.060	p=0.705	p=0.032 *	
	Control	p=0.707	p=0.924	p=0.859	
	L2	p=0.818	p=0.785	p=0.387	p=0.696
R1_1040_700	**ID**	p=0.387	p=0.475	p=0.610	
	Control	p=1.000	p=0.628	p=0.230	
	L2	p=0.109	p=0.416	p=0.350	p=0.005 *

Table 4.4: Comprehension results according to different factors: order, age, Raven test, and Catalan proficiency ($p < 0.05$)*

Starting with the audio featuring the shortest pauses, with 590 ms for inter-sentence pauses and 250 ms for intra-sentence pauses (Figure 4.1), both the L2 and ID ($t=4.77$, $p < .001$) groups show a significant difference in comprehension compared to the control group. Additionally, there is no significant difference between the L2 group and the ID group ($t=2.24$, $p = .070$). The control group achieved a mean result of 2.91 (±0.05), while the L2 group scored 2.35 (±0.13) and the ID group, 1.91 (±0.14). Interestingly, the standard errors for both groups are quite similar, indicating comparable precision in their mean estimates.

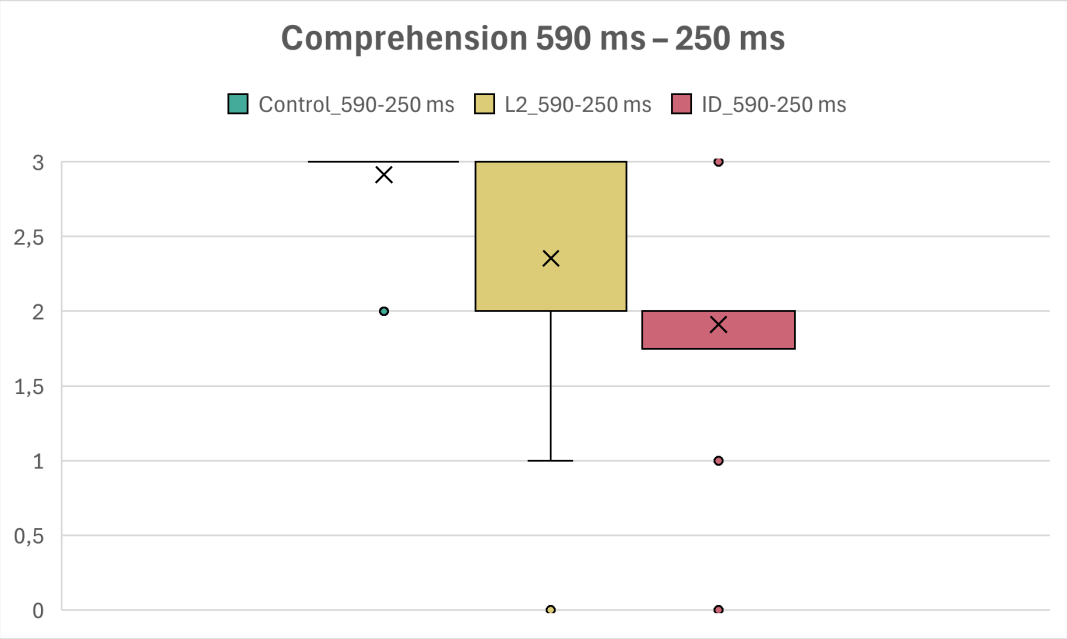


Figure 4.1: Comprehension results with 590 ms-250 ms pauses

Turning to the audio with 740 ms inter-sentence pauses and 400 ms intra-sentence pauses (Figure 4.2), the comprehension results show a mean score of 1.94 (±0.14) for the ID group, 2.35 (±0.13) for the L2 group, and 2.94 (±0.04) for the control group. The improvement in comprehension compared to the shorter pauses is minimal, with mean scores remaining nearly unchanged across all groups. The control group shows a slightly smaller standard error in this condition, indicating a marginally more precise estimate of the mean score. However, both the L2 and ID groups have the same standard error as before, indicating that the precision of their average scores did not improve with longer pauses. This may imply that lengthening the pauses to these durations does not meaningfully aid processing for L2 and ID listeners.

The difference in comprehension between the target groups and the control group remains statistically significant (Control vs. L2 group: $t = 3.5$, $p = .002$; Control vs. ID group: $t = 4.49$, $p < .001$), while the difference between the two target groups ($t=2.11$, $p < 0.1$) is only marginally significant.

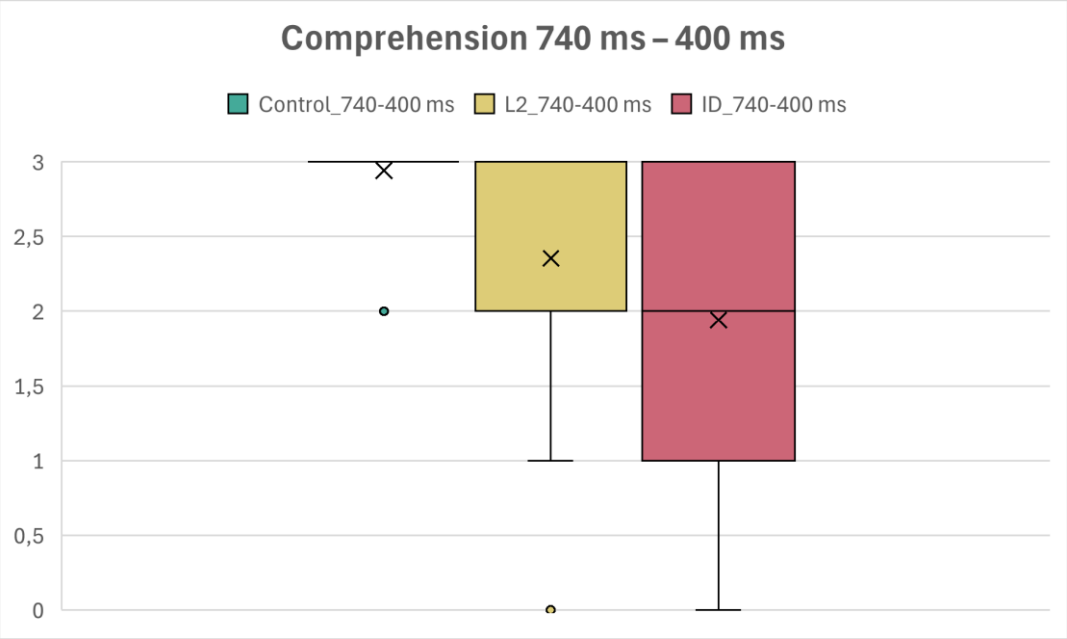


Figure 4.2: Comprehension results with 740 ms-400 ms pauses

In the audio with 890 ms inter-sentence pauses and 550 ms intra-sentence pauses (Figure 4.3), the L2 group shows an increase in comprehension, scoring 2.48 with a slightly lower standard error (±0.12), indicating a marginally more precise estimate of their mean compared to earlier conditions. These pauses correspond to the highest mean performance and the lowest standard error observed for the L2 group across all conditions. In contrast, both the control group and the ID group show their worst results with these pauses, with scores of 2.86 (±0.06) for the control group and 1.85 (±0.14) for the ID group.

Unlike the previous pause durations, significant differences emerge between all groups: between the L2 and control groups ($t=2.67$, $p = .024$), the L2 and ID groups ($t=3.19$, $p = .005$), and the ID and control groups ($t=5.02$, $p < .001$).

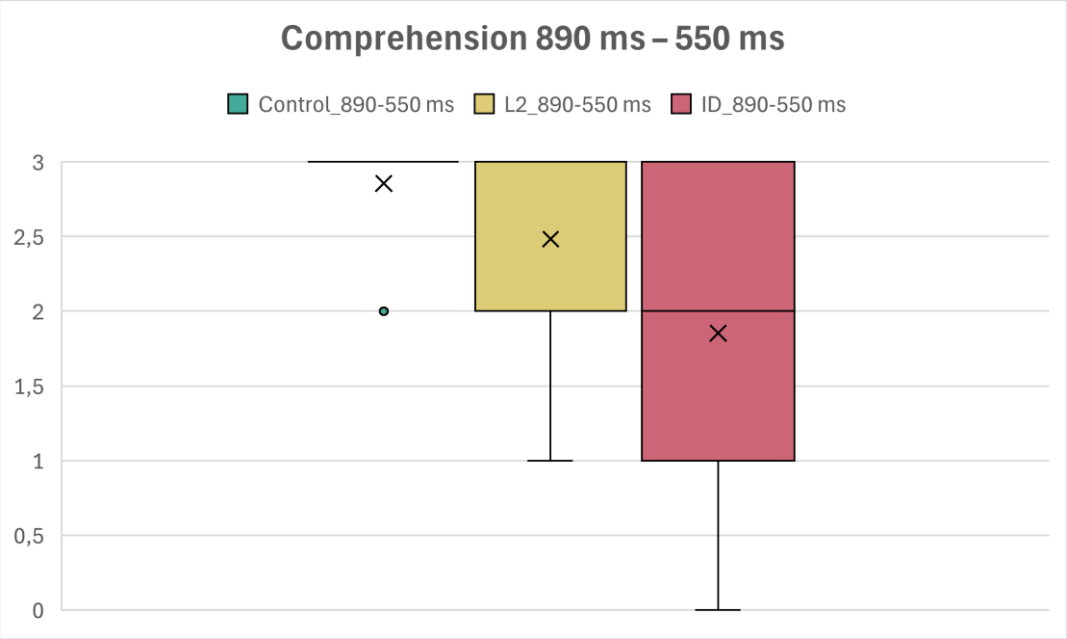


Figure 4.3: Comprehension results with 890 ms-550 ms pauses

Finally, the audio with the longest pauses, 1040 ms for inter-sentence and 700 ms for intra-sentence (Figure 4.4), shows the lowest mean score for the L2 group, 2.23 (±0.14), while the control group scores 2.89 (±0.06) and the ID group scores 1.88 (±0.14). Notably, despite the improvement seen with the earlier pause, this longer pause does not show the same results for the L2 group. However, when separated by proficiency, the A2-level participants maintain the improvement ($F=9.41$, $p=0.005$), with a mean score of 2.77 (±0.13), while A1-level participants show lower results, with a score of 1.83 (±0.20).

These pauses also show no significant difference in comprehension between the target groups ($t=1.71$, $p = .091$). Moreover, the comprehension differences between both target groups and the control group remain statistically significant ($t=3.86$ and 4.93, $p < .001$).

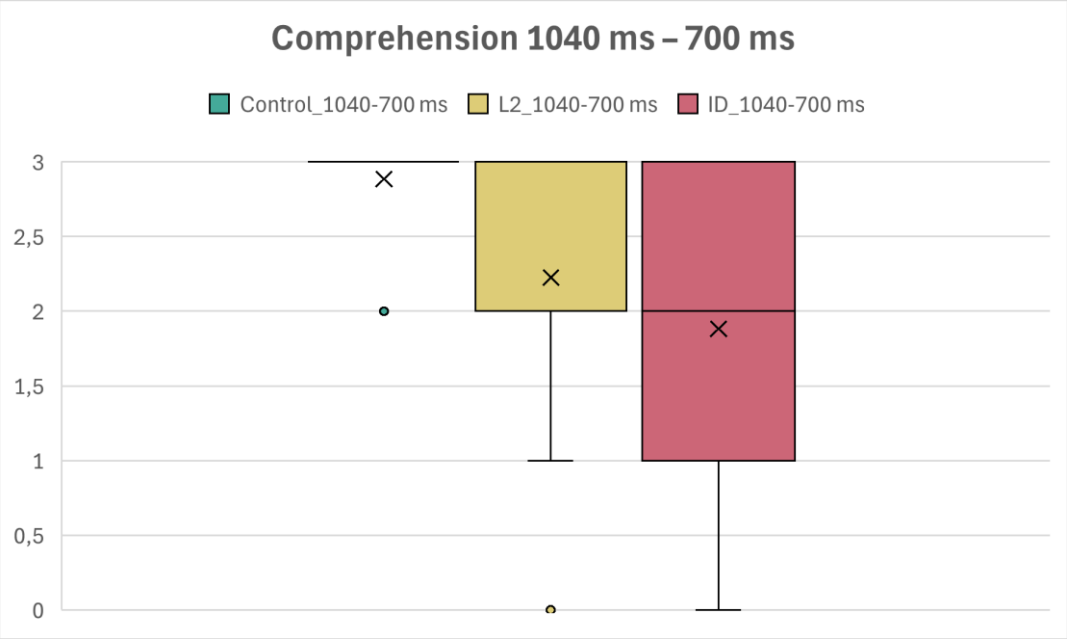


Figure 4.4: Comprehension results with 1040 ms-700 ms pauses

It is also worth noting that, within each group, differences in comprehension across the various pause conditions are not statistically significant. Specifically, no effect of pause was found for the L2 group ($F(3, 388) = 0.67$, $p = .568$), the control group ($F(3, 388) = 0.47$, $p = .702$), or the ID group ($F(3, 388) = 0.07$, $p = .976$). This indicates that, despite some variation in performance, no specific pause length significantly improves or hinders comprehension within any group.

4.4.2. Acceptability results

As mentioned in Section 3, acceptability was evaluated through a six-point Likert scale, with the following ratings: 0 = not noticeable, 1 = too short, 2 = short, 3 = suitable, 4 = long, and 5 = too long.

4.4.2.1. Inter-sentence pauses

Starting with the control group, the Raven test results did not influence the acceptability ratings. However, the order in which the 740 ms pause was presented had an effect, with it being rated as 'long' when heard in the second or last audio. The participants' age only affected the rating of the 1040 ms pause, which older participants considered 'too long'. These findings are detailed in Table 4.5.

Inter-sentence pauses	Group	Order	Age	Raven	Catalan
590 ms	ID	p=0.258	p=0.836	p=0.336	
	Control	p=0.380	p=0.826	p=0.151	
	L2	p=0.267	p=0.438	p=0.328	p=0.119

Inter-sentence pauses	Group	Order	Age	Raven	Catalan
740 ms	**ID**	p=0.078	p=0.124	p=0.426	
	Control	p=0.006 *	p=0.695	p=0.515	
	L2	p=0.476	p=0.702	p=0.448	p=0.264
890 ms	**ID**	p=0.046 *	p=0.260	p=0.549	
	Control	p=0.650	p=0.239	p=0.282	
	L2	p=0.037 *	p=0.619	p=0.379	p=0.054
1040 ms	**ID**	p=0.025 *	p=0.391	p=0.613	
	Control	p=0.325	p=0.041 *	p=0.256	
	L2	p=0.998	p=0.379	p=0.558	p=0.059

Table 4.5: Acceptability results in inter-sentence pauses according to different factors: order, age, Raven test, and Catalan proficiency ($p < 0.05$)*

Figure 4.5 illustrates the error bars, which represent the consistency of participants' ratings for each pause duration. Smaller error bars reflect a higher level of agreement among participants, while larger error bars indicate greater variability in their responses. In the control group, the pauses with the highest ratings, closest to 3 ('suitable'), are 740 ms, with a score of 3.14, and 890 ms, with a score of 3.20. These are followed by the 590 ms pause, which is regarded as somewhat short, receiving a rating of 2.77, and the 1040 ms pause. Nonetheless, this last pause is still considered 'suitable', with a score of 3.49, indicating that participants generally find it acceptable as well. In this group, the differences are significant ($\chi^2 = 14.3$, $p = 0.003$) between the 590 ms pauses (with the lowest mean) and the 1040 ms pauses (with the highest mean). However, these differences do not depend on order, age, or Raven scores ($p > 0.05$).

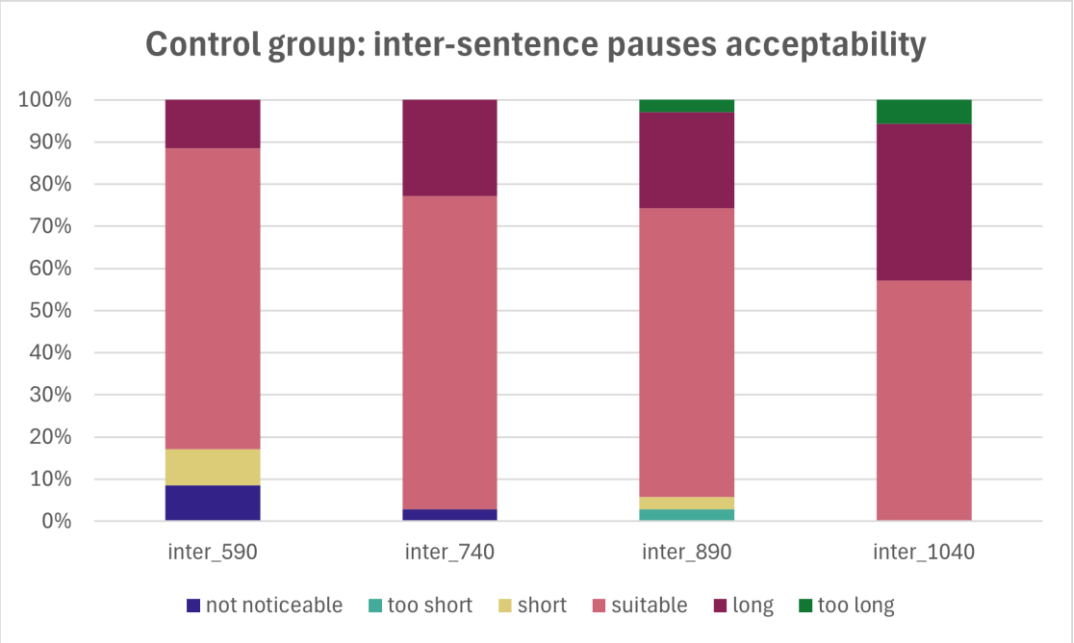


Figure 4.5: Acceptability of inter-sentence pauses, control group

In the L2 group (Figure 4.6), the results are quite different, with 590 ms being the better-rated pause at 2.94, followed surprisingly by the 890 ms pause at 3.13, and the 1040 ms pause at 3.19. Interestingly, the 740 ms pause is rated lower than 590 ms, at 2.71, indicating that on average it is perceived as shorter. Language level does not significantly affect these ratings, nor does the age or the Raven scores of the participants, but when the 890 ms pause is heard in the third audio, fewer participants consider it 'suitable'.

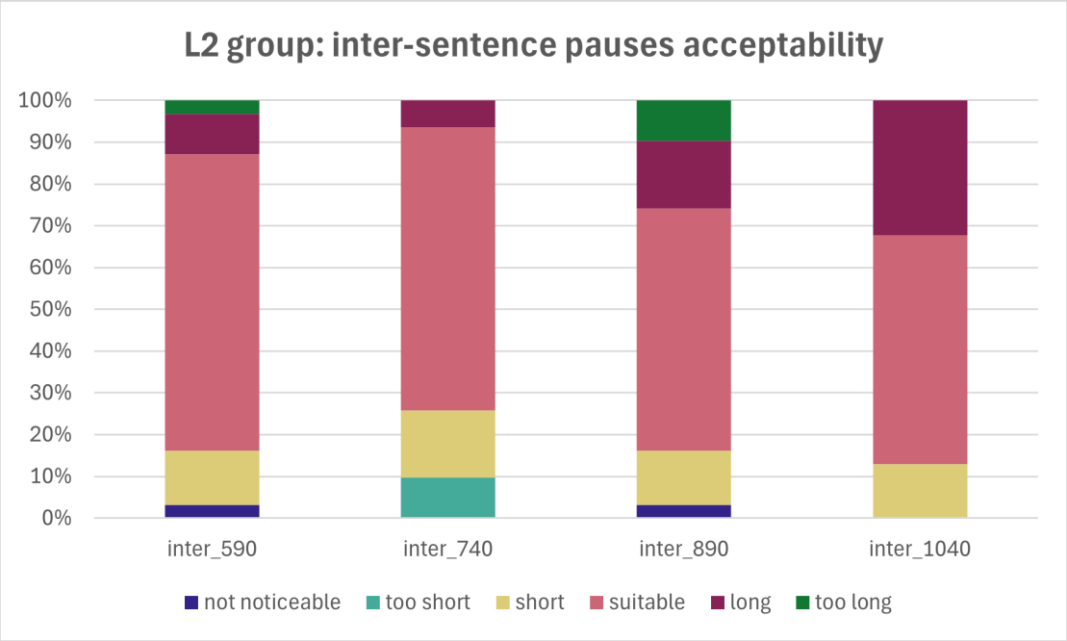


Figure 4.6: Acceptability of inter-sentence pauses, L2 group

Finally, the age and Raven test scores of the ID group did not influence the acceptability results. When the audio with the 890 ms pause was heard in the third audio, participants rated it as 'too short'. Similarly, the 1040 ms pause was rated as 'too short' when heard in the first audio, but as 'short' when heard in the third one. However, no significant differences are observed ($p > 0.05$).

Notably, the ID group (Figure 4.7) does not find any of the pauses close to 'suitable' on average. Among the options, the 1040 ms pause is rated the best, with a score of 2.38, though this still indicates it is generally considered short by the group. This is followed by the 740 ms pause, rated at 2.24, and the 590 ms pause at 2.12. The 890 ms pause receives the lowest rating at 2.09, suggesting the group perceives it as shorter than both the 590 ms and 740 ms pauses. However, no statistically significant differences were observed ($\chi^2 = 1.05$, $p = 0.790$).

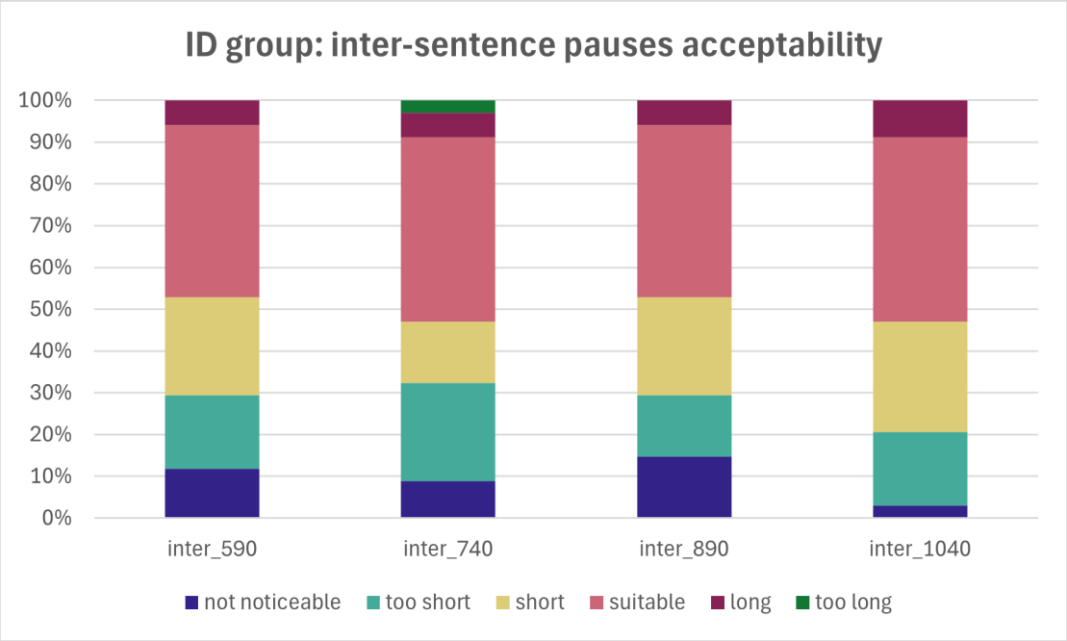


Figure 4.7: Acceptability of inter-sentence pauses, ID group

While the groups differ in their ratings of the pauses, the 1040 ms pause, rated best by the ID group, is also rated as 'suitable' by both the L2 and control groups, with the control group leaning slightly towards 'long', with a score of 3.49. However, there is a significant difference in the perception of this pause between the ID group and the other two groups ($p < .001$). Similarly, significant differences are observed in the ratings of the other pauses, with the ID group generally finding them short compared to the L2 and control groups, who rate them as more acceptable overall.

4.4.2.2. Intra-sentence pauses

When examining the acceptability of intra-sentence pauses in the control group, the 550 ms pause was rated as 'long' or 'too long' when heard in the first audio. Neither age nor Raven test scores had an effect on the ratings, as shown in Table 4.6.

Intra-sentence pauses	Group	Order	Age	Raven	Catalan
250 ms	**ID**	p=0.258	p=0.356	p=0.713	
	Control	p=0.162	p=0.775	p=0.885	
	L2	p=0.356	p=0.985	p=0.742	p=0.109
400 ms	**ID**	p=0.592	p=0.412	p=0.174	
	Control	p=0.819	p=0.817	p=0.630	
	L2	p=0.184	p=0.671	p=0.399	p=0.194
550 ms	**ID**	p=0.696	p=0.727	p=0.292	
	Control	P<0.001 *	p=0.598	p=0.898	
	L2	p=0.511	p=0.553	p=0.010 *	p=0.163
700 ms	**ID**	p=0.278	p=0.920	p=0.137	

Intra-sentence pauses	Group	Order	Age	Raven	Catalan
	Control	p=0.281	p=0.323	p=0.874	
	L2	p=0.219	p=0.447	p=0.164	p=0.457

Table 4.6: Acceptability results in intra-sentence pauses according to different factors: order, age, Raven test, and Catalan proficiency ($p < 0.05$)*

The control group (Figure 4.8) rates the 250 ms pause most favourably, with a score of 2.94. This is followed by the 400 ms pause, which starts to lean towards 'long' with a score of 3.51, the 550 ms pause at 3.63, and finally the 700 ms pause, which is considered extremely close to being rated as 'long', with a score of 3.94 and a median of 4. Notably, despite these pauses being shorter than the inter-sentence pauses, none of the participants rated them as 'not noticeable. Furthermore, lengthening intra-sentence pauses appears to be less tolerated than lengthening inter-sentence pauses. Significant differences are observed according to the duration of the intra-sentence pause ($\chi^2 = 26.86$, $p < 0.001$). The score is lower for the 250 ms pause compared to the other pauses.

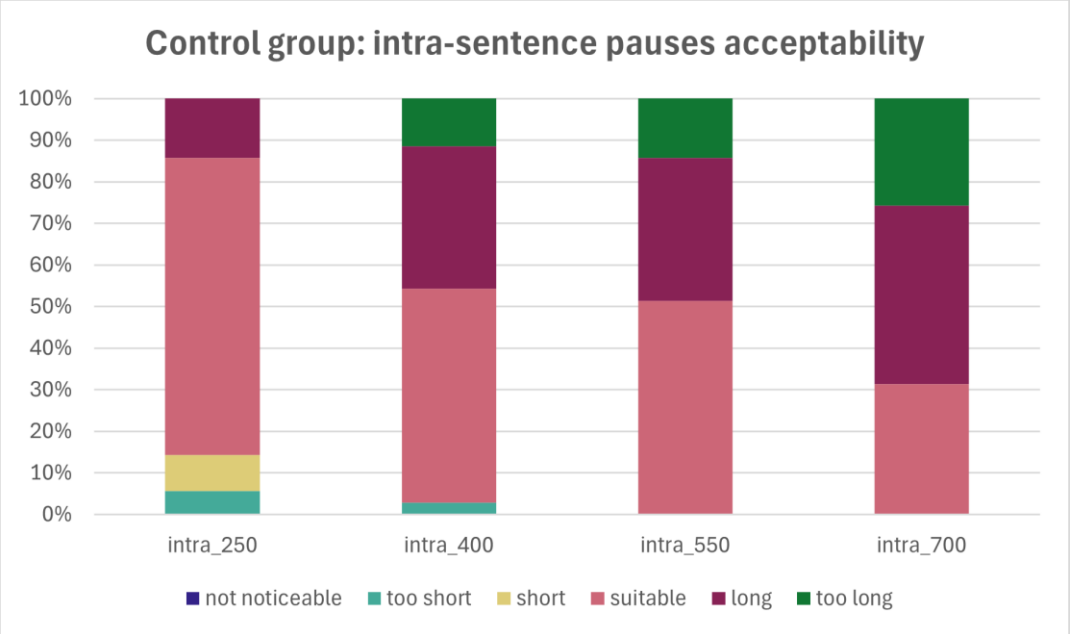


Figure 4.8: Acceptability of intra-sentence pauses, control group

The ratings in the L2 group were not significantly affected by the participants' age, Catalan level, or the order of the pauses. However, participants with lower Raven scores considered the 550 ms pause shorter than the other participants in the same group, although these differences are not statistically significant.

This group (Figure 4.9) rates the 400 ms pause with an average score of 3, followed by the 550 ms pause, which has an average of 2.97, and the 250 ms pause with a mean

rating of 2.77. In contrast to the control group, the L2 group is more accepting of longer pauses in the intra-sentence position, with only the longest pause (700 ms) receiving a relatively higher rating of 3.58.

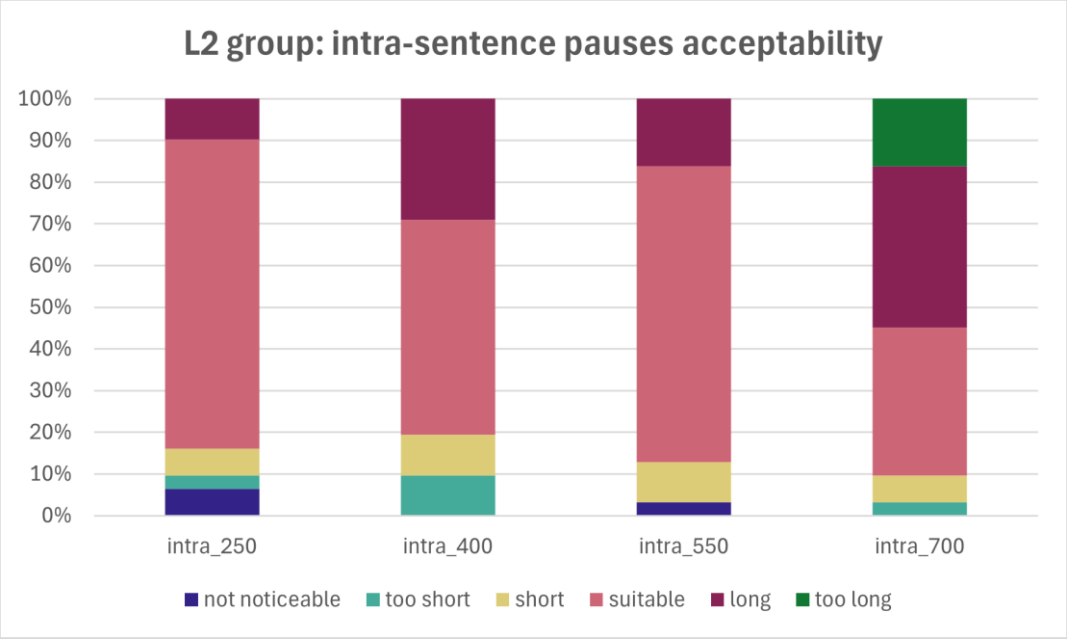


Figure 4.9: Acceptability of intra-sentence pauses, L2 group

Finally, the acceptability results for the intra-sentence pauses in the ID group were not affected by the participants' age, Raven test scores, or the order in which the pauses were presented. Although the ID group (Figure 4.10) rates the intra-sentence pauses more favourably than the inter-sentence pauses, their ratings still fall below 'suitable', as none of the pauses reach an average score close to 3. The best-rated pause is the longest, 700 ms, with a score of 2.71, followed by the 550 ms pause with an average of 2.59. The 400 ms pause is rated at 2.53, and the 250 ms pause receives a mean score of 2.24. Interestingly, while some participants considered the 400 ms and 550 ms pauses as 'too long', this was not the case with the 700 ms pause. However, no significant differences are observed according to the duration of the intra-sentence pause ($\chi^2 = 3.74$, $p = 0.291$).

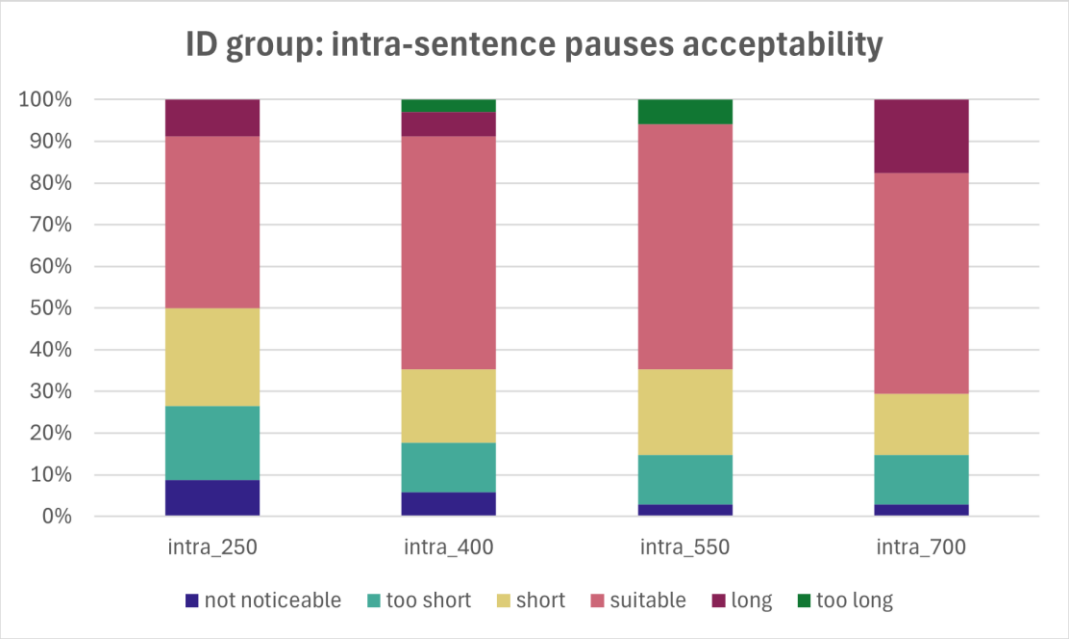


Figure 4.10: Acceptability of intra-sentence pauses, ID group

In general, there is a significant difference in the acceptability of the pauses across the three groups. The ID group tends to find the pauses short on average, while the control group generally perceives them as longer, and the L2 group considers most of them as acceptable. Focusing on the ratings from the L2 and ID groups, although their best rated pause does not coincide, the 550 ms pause stands out as the second most favourably rated by both groups.

4.4.3. Preference results

As previously mentioned, after rating each pause, participants were asked to indicate their preferred pause duration, if any, for both inter-sentence and intra-sentence pauses.

Preference ratings in the ID group were not influenced by age, Raven scores, or the order of the pauses. Similarly, the control group showed no effect of age, Raven scores, or order on their preferences. In the L2 group, age did not play a role, but participants favoured the 740 ms inter-sentence pause when it was presented in the last audio. Those in this group with lower Raven scores also tended to prefer the 700 ms intra-sentence pause.

The results for inter-sentence pauses (Figure 4.11) show that neither the L2 group nor the ID group had a clear preference, as the differences in votes between options were minimal, typically one or two votes. Additionally, in both groups, the most common response was to abstain, either due to a lack of preference or uncertainty

about how to answer. In the L2 group, the second most popular choice was 590 ms (22.6%), followed by 740 ms and 890 ms, which each received 19.4% of the votes. In the ID group, 740 ms (23.5%) and 890 ms (20.6%) were the next most selected options.

While the control group showed a somewhat clearer tendency, with 34.3% selecting 590 ms as their preferred pause duration and 25.7% opting not to answer, the overall distribution of preferences does not differ significantly between groups ($\chi^2 = 3.11$, $p = 0.927$).

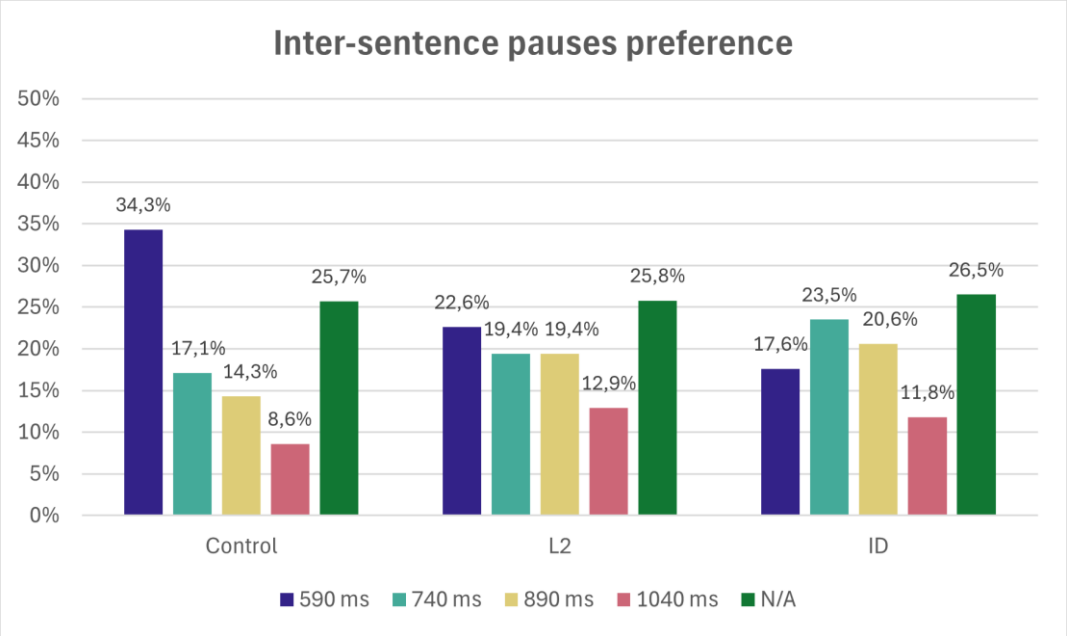


Figure 4.11: Inter-sentence pauses preference

For intra-sentence pauses (Figure 4.12), the ID group showed a preference for 400 ms pauses, which received 32.4% of the votes, followed by 250 ms pauses with 20.6%. In the L2 group, the most preferred duration was 250 ms (25.8%), followed closely by 550 ms pauses and abstentions, both at 22.6%. The control group showed the clearest preference, with 48.6% selecting 250 ms pauses, followed by 20% favouring 550 ms pauses. However, although there appears to be a notable visual difference, the result is not statistically significant ($\chi^2 = 12.4$, $p = 0.134$).

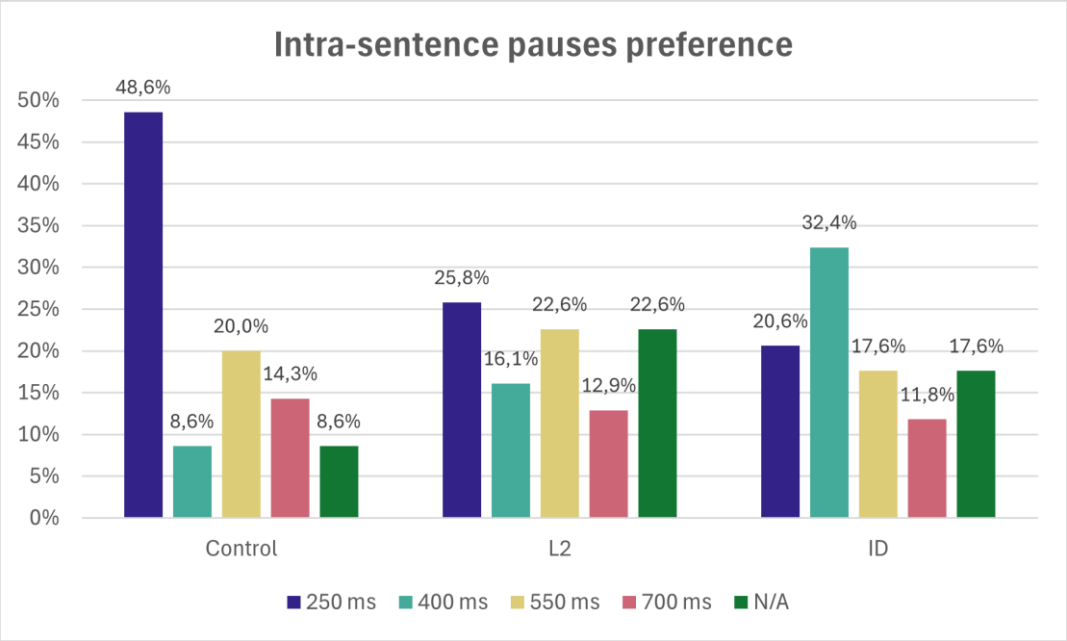


Figure 4.12: Intra-sentence pauses preference

4.5. Discussion

This study examined the impact of four inter-sentence (590 ms, 740 ms, 890 ms, 1040 ms) and four intra-sentence (250 ms, 400 ms, 550 ms, 700 ms) pause durations on the comprehension of Catalan Easy Language audios. Additionally, the acceptability of each pause and the participants' preferences were evaluated. The aim was to answer two central research questions:

I. Does the duration of inter-sentence and intra-sentence silent pauses in Catalan Easy Language audios significantly impact comprehension?
II. Which inter-sentence and intra-sentence pause duration do participants find most acceptable and preferable?

In response to the first question, although existing guidelines and practices in Easy Language recommend the use of longer pauses (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023; Pujadas-Farreras & Matamala, 2025; SELSI project, 2023), the comprehension results in this study do not align with these recommendations, as none of the participant groups demonstrated significantly better comprehension with any of the tested pause durations. Both the control group and the ID group show slightly better performance with shorter pauses. Conversely, the L2 group demonstrates improvement as pauses become longer, although this effect is more consistent among participants at the A2 level. However, the improvement is not statistically significant.

These findings are consistent with prior research (Prafiyanto, 2020; Prafiyanto et al., 2018), which also tested similar pause durations in Easy Language audios and found no significant effects. One possible explanation for the lack of significant improvement observed in these studies is the already simplified language used in the audios, which may render additional pauses unnecessary. Chaudron and Richards (1986) suggest that non-significant results in their L2 study might be attributed to the slower speech rate in their audios, which could make further pauses less impactful. Similarly, the combination of a 150 wpm speech rate and simplified language in the study presented in this article might account for the absence of significant improvement.

This could also explain why the studies using standard language generally found positive results despite employing similar pause lengths, such as Blumstein et al. (1985) and Sugai et al. (2007, 2016). Nonetheless, it is also interesting to point out that although the improvement observed in the L2 group was not statistically significant, it is consistent with the findings of Sugai et al. (2007, 2016), who reported enhanced comprehension in lower-intermediate L2 learners when longer pauses were incorporated.

However, studies by Blanchard and Prescott (1980), Sagarra (1998), and Chaudron and Richards (1986), which explored the effect of pauses on comprehension in standard language, also reported non-significant results.

It is also interesting to note that the length of the tested pauses does not appear to consistently correlate with the significance of the results found in other studies. For instance, Sagarra (1998) tested pauses ranging from 1 to 2 seconds and found no significant improvements, whereas Leeser (2004), who also tested 3 second pauses, reported a significant enhancement in comprehension. Similarly, Prafiyanto (2018), who examined pauses between 200 and 800 ms, observed no significant effects, but Aasland and Baum (2003), testing pauses up to 500 ms, did find significant improvements.

Another potential explanation could be that unusually long pauses are more difficult to process than those of typical duration. Lundholm Fors (2015) notes that extended pauses can create challenges in processing, which might help explain why the control and ID groups performed better with shorter pauses. These shorter pauses are closer to the average pause duration in Catalan, as measured by Cantin and Ríos (1991). Additionally, pause length can influence listeners' perceptions of speech, with longer pauses often leading to the impression of a slower speech rate, even if the actual rate is unchanged (Liu et al., 2022). This perceived slowness might affect comprehension,

as participants may find it harder to maintain concentration when they perceive the speech as too slow.

Furthermore, speakers who take longer pauses are often perceived as less knowledgeable or confident (Matzinger et al., 2023), which could increase the cognitive load on listeners as they attempt to interpret these cues. This added mental effort may divert attention from processing the content itself, potentially explaining the lack of improvement in comprehension observed in some of the groups.

Finally, overly long pauses are often perceived as less natural and less pleasant (Liu et al., 2022; Price, 2021), and unnatural pausing patterns can negatively affect speech intelligibility (Takayanagi et al., 1999). As a result, listeners may lose focus when they encounter pauses of unusual length, as they are not accustomed to such patterns. This could explain why the two groups with native speakers, the control group and the ID group, performed better with shorter pauses. In contrast, L2 learners, who are less accustomed to the nuances of pausing in their non-native language, might not be as affected by this. This could explain the slight improvement seen in the L2 group, as they may rely less on native-like pause patterns when processing speech.

It is important to note that the current study did not collect direct behavioural or qualitative measures (such as attentional drift, processing fatigue, or participant judgments of naturalness), which limits the ability to empirically validate some of the explanatory hypotheses proposed here. Therefore, some interpretations remain speculative. Future studies incorporating such measures would be valuable to substantiate these mechanisms.

In response to the second question, the findings of this study on the acceptability of different pause durations in Catalan Easy Language audios reveal notable differences across participant groups. Both the L2 and control groups generally consider all inter-sentence pause lengths acceptable, whereas the ID group tends to perceive them as too short. Interestingly, a connection emerges between each group's comprehension results and their pause acceptability ratings. For the control group, the 740 ms inter-sentence pause yields the best comprehension results and is also the most highly rated in terms of acceptability. Similarly, the L2 group shows a preference for the 590 ms and 890 ms pauses, which align with their strongest comprehension outcomes. Conversely, the ID group rates the 1040 ms pause most favourably, though they still perceive it as short overall, which does not coincide with the pause they performed the best with.

A comparable trend emerges with the intra-sentence pauses: the L2 group generally finds these pauses acceptable, with only the longest duration being perceived as slightly long. In contrast, the ID group consistently views most intra-sentence pauses as short, although the longer pauses are closer to being considered suitable. The control group displays a different pattern, where all pauses except the shortest one (250 ms) are perceived as leaning toward being 'long'. This indicates that while extended pauses are more tolerable in inter-sentence positions, they are less acceptable within sentences for this group, which aligns with findings in other studies (Liu et al., 2022). Furthermore, a similar correlation between acceptability and comprehension results is evident for intra-sentence pauses. The control group rated the 250 ms pause most favourably, which aligns with their second-best comprehension performance. Likewise, the L2 group preferred the 400 ms and 550 ms pauses, which correspond to their best comprehension outcomes. In contrast, the ID group again rated the longest pause (700 ms) most favourably, maintaining their pattern of preferring extended pauses.

The ID group's tendency to rate pauses as 'short' may be linked to the way they process prosodic features such as pauses. Research has shown that pauses are a key distinguishing feature in the speech patterns of individuals with intellectual disabilities compared to neurotypical individuals (Corrales-Astorgano et al., 2016), which suggests that pauses play a particularly significant role in how they interpret and organise speech. This could lead the ID group to perceive all pause durations as shorter than other groups do, as they may rely on these pauses more heavily to structure and make sense of spoken information. This might explain why they consistently rated the pauses as shorter, even when the pauses were deemed acceptable by the neurotypical groups.

Regarding the preference results, neither the L2 nor the ID group shows a strong preference for any specific inter-sentence pause, which may be explained by their acceptability ratings: the L2 group generally finds all pauses suitable, while the ID group perceives them all as short. In contrast, the control group demonstrates a clear preference for the shortest pause, 590 ms, over the others. A similar pattern emerges in the preference results for intra-sentence pauses, where the control group consistently favours the shortest pause. However, both the ID and L2 groups show more varied preferences, with the 400 ms and 250 ms pauses receiving the most votes, although the difference in votes between these pauses and the others is minimal.

4.6. Conclusions

This study explored the impact of different pause durations on comprehension, acceptability, and preference in Catalan Easy Language audios, involving three participant groups: individuals with intellectual disabilities, L2 learners of Catalan, and neurotypical control participants. The findings reveal that the duration of inter-sentence and intra-sentence pauses did not significantly affect comprehension across the groups, despite existing guidelines suggesting the use of longer pauses in Easy Language materials. Interestingly, the L2 group showed slight improvements with longer pauses, particularly among A2-level learners, although the effects were not statistically significant. In contrast, both the control and ID groups performed better with shorter pauses, likely due to a preference for more natural and familiar speech patterns. This suggests that pause length alone may not be a decisive factor in improving comprehension for the Easy Language target groups and that the combination of different prosodic parameters could be responsible for the improvement in comprehension.

Regarding acceptability, both the L2 learners and the control group found all inter-sentence pauses acceptable, including the longest ones, while the ID group generally found them all short. For the intra-sentence pauses this is repeated, as the ID group finds all the durations short, while the L2 group finds them all generally acceptable. In contrast, the control group is less accepting of longer pause duration in intra-sentence positions. In addition, neither the L2 nor the ID group showed a clear preference for any specific pause duration, whether for inter-sentence or intra-sentence pauses, when asked to choose their preferred length for each type. The L2 group had a slight inclination towards shorter intra-sentence pauses, however.

Considering these acceptability and preference results, longer inter-sentence pauses, such as 1040 ms, could be recommended, as they were generally well-received by all participant groups. For intra-sentence pauses, however, shorter durations, such as 550 ms, might be more suitable. This duration could accommodate both the L2 group's preference for shorter pauses and the ID group's tendency towards longer pauses, positioning 550 ms as a middle ground that both groups could find acceptable. However, as these recommendations are based on acceptability and preference only, they are solely intended as practical guidelines aimed at optimising listener experience, rather than directly enhancing comprehension.

This study has several limitations. First, the short length of the audio samples, each consisting of just 130 words. The brevity of the audios may not have fully captured the effects of pause length on comprehension over longer listening periods. Future

research could replicate this experiment using longer audio segments to explore whether comprehension and acceptability patterns remain consistent or evolve as participants engage with more substantial content. In particular, the L2 group, which showed a positive trend, may yield significant results with longer audio samples. It is also possible that longer inter-sentence pauses may become less acceptable with longer audio samples for the L2 and control groups. This could be explored in future studies to gain further insights into how pause length interacts with extended listening durations. Additionally, the study did not account for individual differences in auditory processing abilities, attention span, or prior familiarity with Easy Language conventions. While participants in the ID group were familiar with these conventions, those in the control and L2 groups were not.

Furthermore, other future research avenues could include empirically evaluating the benefit of multimodal reinforcement cues, such as images or videos. In written Easy Language, Rivero-Contreras et al. (2021) reported improvements in word-level processing with supportive images, although overall comprehension gains were inconclusive, and Schatz et al. (2017) found no significant benefit from images in Easy Language texts. In audio formats, it would be valuable to investigate whether on-screen images or video clips enhance listener comprehension and engagement.

Moreover, evaluating whether the simplification strategies used to create Easy Language texts, such as reduced syntactic complexity, high-frequency vocabulary, and active voice, are equally effective in audio delivery would be highly informative. This question is a central focus of the ongoing WEL project, which aims to determine how written Easy Language conventions can be adapted for spoken formats; its forthcoming findings may shed light on best practices for script design and audio production in Easy Language.

In conclusion, this study provides an empirical examination of pause duration as a prosodic feature in Easy Language, an area that has received limited attention in prior research. By analysing its effects on comprehension, acceptability, and preferences, the study contributes valuable insights for the design of Catalan Easy Language audio content. It also deepens the current understanding of how prosodic features shape communication in Easy Language and contributes to the broader effort of enhancing accessibility and fostering effective communication for a wide range of audiences.

CHAPTER 5: SUMMARY

5.1. Resum en lectura fàcil (català)

Què he investigat?

En aquesta tesi he investigat la lectura fàcil parlada.
He fet 3 estudis:

- Unes **entrevistes** amb gent que fa àudios i vídeos en lectura fàcil.
- Un **experiment sobre la velocitat quan parlem** en àudios en lectura fàcil.
- Un **experiment sobre les pauses** en àudios en lectura fàcil.

He fet entrevistes per a saber
com fan els professionals aquests àudios i vídeos.
He fet experiments per saber
si parlar més a poc a poc ajuda a entendre millor.
O si fer pauses més llargues fa els àudios més fàcils.

Què he après de les entrevistes?

He fet entrevistes a gent de llocs molt diferents.
Per exemple, Suècia, Eslovènia, Espanya o Argentina.

Per fer àudios i vídeos en lectura fàcil parlada,
fan el mateix que quan fan lectura fàcil escrita.
Per exemple, les frases són igual de llargues
i fan servir les mateixes paraules.

La gent de les entrevistes també ha dit que és important
parlar més a poc a poc, fer pauses i parlar molt clar.

Qui ha participat en els experiments?

Han participat en els experiments 3 grups de persones:

- El **grup de persones amb discapacitat intel·lectual**.
  En aquest grup hi havia 35 persones que parlen català.
- El **grup control**.
  En aquest grup hi havia 35 persones que parlen català
  i sense discapacitat intel·lectual.

- El **grup d'estudiants**.
  En aquest grup hi havia 31 persones que estudien el català.

Què he après de l'experiment de la velocitat?

En aquest experiment he provat quatre velocitats diferents.
Les **velocitats** eren:

- 130 paraules per minut (més lenta).
- 150 paraules per minut.
- 170 paraules per minut.
- 190 paraules per minut (més ràpida).

He descobert que parlant més a poc a poc
l'àudio no s'entén millor.
A més, als participants d'aquest experiment han dit
que els agrada més la velocitat normal.

Què he après de l'experiment de les pauses?

En aquest experiment he provat pauses diferents.
Les **pauses** eren:

- Pauses al final de les frases: 590, 740, 890 i 1040 mil·lisegons.
- Pauses a dins de les frases: 250, 400, 550 i 700 mil·lisegons.

He descobert que amb les pauses més llargues
l'àudio no s'entén millor.
A més, els participants troben bé
les pauses llargues **al final** de les frases.
Però hi ha participants que no els agraden les pauses llargues
dins de les frases.

5.2. Summary

This thesis explores Easy Language in the context of audio content. Easy Language is a simplified language variety that falls under the broader category of Easy-to-Understand languages. It is primarily intended for people with intellectual disabilities; however, it is increasingly being targeted to other groups as well, such as language learners, individuals with dyslexia or brain injuries, and elderly people among others. The studies presented in this thesis were conducted within the framework of the WEL project (PID2022-137058NB-I00).

This thesis has three main objectives. The first one is to map professional practices to understand how audio and audiovisual contents in Easy-to-Understand languages are created. Based on the results of this first objective, speech rate and pauses have been selected as the focus of the second and third objectives. The aim is to evaluate comprehension, acceptability, and user preferences for each prosodic element to determine whether slowing speech rate or lengthening pauses truly enhances understanding and is well-received by users.

To achieve these objectives, three studies were conducted. The first study, presented in Chapter 2, involved carrying out eleven semi-structured interviews with professionals from a variety of content formats, including news, conference interpreting, audio explanations, and educational materials. The interview participants also worked in different languages, such as Spanish, Slovenian, Swedish, and German, and used various Easy-to-Understand language varieties, including Easy Language, Easy Language Plus, and Plain Language. The interviews, carried out during September and October of 2022, aimed to explore their language simplification strategies, including vocabulary and grammar modifications, the role of prosodic features, potential time constraints due to the audiovisual nature of the content, and the use of supplementary elements such as visual materials or subtitles. Additionally, the study investigated the validation and evaluation practices employed by these professionals.

The key findings of this study indicate that, in terms of language use, professionals generally report following the same recommendations established for written Easy-to-Understand languages. Regarding prosody, three features were consistently emphasized: slower speech rate, the use of pauses, and clear pronunciation and enunciation. While the genre of the content influences vocabulary and simplification strategies, particularly in terms of the specificity of expressions and the level of detail provided, prosodic features remain largely unaffected by genre. Another unique challenge of audio and audiovisual content is time constraints, which are often

managed by summarizing information. However, when content is created in Easy-to-Understand language from the outset, these constraints do not appear. Finally, validation and evaluation practices vary widely; some professionals include target users in the validation process, while others do not. In some cases, validation is left to the clients, meaning that the creators do not know whether the content is ultimately validated or not.

Based on the key findings of these interviews, speech rate and pauses were selected as the prosodic features for the experiments on oral Easy Language with different groups of users. The experiments were conducted from February to July 2024 and involved three groups of participants: a group of persons with intellectual disabilities, a group of Catalan learners as a foreign language, and a control group of individuals without any disabilities or comprehension difficulties in Catalan. To assess comprehension, participants listened to all variations of speech rate and pauses and answered multiple-choice questions. Acceptability was assessed using Likert scales, while preference was determined by asking participants to choose one speech rate or one pause duration, depending on the experiment. The texts used for the audio recordings were validated through expert judgment to ensure that the Easy Language used was appropriate. Additionally, all participants took a Raven intelligence test to ensure that each group is homogeneous.

The first experiment, presented in Chapter 3, evaluated speech rate and was conducted with a total of 101 participants: 35 participants with intellectual disabilities, 31 learners of Catalan, and 35 participants in the control group. Four speech rates were assessed based on a literature review in Catalan, Spanish and English: 130 words per minute, 150 words per minute, 170 words per minute, and 190 words per minute. The key findings of this experiment show that none of the tested speech rates lead to significantly better comprehension in any of the groups. Nonetheless, the group of participants with intellectual disabilities achieves slightly higher comprehension results with a speech rate of 130 words per minute. The group of Catalan learners performs better at 170 words per minute, while the control group performs best at 150 words per minute. The acceptability results are similar across all three groups, with 150 words per minute being rated as the most acceptable, followed by 170 words per minute. However, the preference results for the group with intellectual disabilities are inconclusive, as most participants prefer not to choose a specific speed. In contrast, the Catalan learners prefer the same speeds they find most acceptable.

The second experiment, evaluating pause lengths, is included in Chapter 4. This study was conducted with 100 participants: 34 participants with intellectual disabilities, 31 Catalan learners, and 35 participants in the control group. Each audio recording

featured different lengths of inter-sentence and intra-sentence pauses: one included 590-millisecond inter-sentence pauses and 250-millisecond intra-sentence pauses, another had 740-millisecond inter-sentence pauses and 400-millisecond intra-sentence pauses, a third used 890-millisecond inter-sentence pauses with 550-millisecond intra-sentence pauses, and the last featured the longest pauses, with 1040-millisecond inter-sentence pauses and 700-millisecond intra-sentences pauses. As with the speech rate experiment, the comprehension results show that increasing pause length does not significantly improve comprehension, although language learners demonstrate a slight improvement trend with longer pauses. In terms of acceptability, all three groups generally find the longer inter-sentence pauses acceptable, but this is not the case for intra-sentence pauses, as the control group finds the longer pauses excessive. Regarding preference, the results for both the group with intellectual disabilities and the group of Catalan learners are inconclusive. However, based on the acceptability results, it can be concluded that using longer inter-sentence pauses in combination with shorter intra-sentence pauses might be a strategy that different groups find favourable.

5.3. Resum

Aquesta tesi versa sobre el llenguatge fàcil en el context dels continguts d'àudio. El llenguatge fàcil és una varietat lingüística simplificada que s'inscriu dins la categoria més àmplia dels anomenats llenguatges entenedors. Inicialment concebut per a persones amb discapacitat intel·lectual, ha començat a adreçar-se a altres col·lectius, com ara estudiants d'idiomes, persones amb dislèxia o lesions cerebrals, i persones grans, entre d'altres. Els estudis que es presenten en aquesta tesi s'han dut a terme en el marc del projecte WEL (PID2022-137058NB-I00).

Aquesta tesi té tres objectius principals. El primer consisteix a descriure les pràctiques professionals per tal de comprendre com es creen els continguts d'àudio i audiovisuals en llenguatges entenedors. A partir dels resultats d'aquest objectiu, s'han triat la velocitat de la parla i les pauses com a focus del segon i tercer objectius. La finalitat és avaluar la comprensió, l'acceptabilitat i les preferències dels usuaris de cada element prosòdic per tal de determinar si alentir la velocitat de la parla o allargar les pauses afavoreix la comprensió i saber si té bona rebuda per part dels usuaris.

A fi d'assolir aquests objectius, s'han dut a terme tres estudis. El primer, exposat al Capítol 2, va consistir a efectuar onze entrevistes semiestructurades amb professionals de diversos àmbits de producció de continguts, incloent-hi notícies, interpretació de conferències, audioexplicacions i materials educatius. Els participants treballaven en diferents llengües, com ara l'espanyol, l'eslovè, el suec i l'alemany, i empraven diverses varietats dels llenguatges entenedors, com el llenguatge fàcil, el llenguatge fàcil plus i el llenguatge planer. Les entrevistes, que es van dur a terme entre el setembre i l'octubre de 2022, tenien com a objectiu explorar les estratègies de simplificació lingüística, com ara pel que fa al lèxic i la gramàtica, el paper dels elements prosòdics en aquest tipus de continguts, les possibles limitacions temporals derivades de la naturalesa audiovisual del material i l'ús de recursos complementaris, com ara elements visuals o subtítols. Així mateix, s'hi van analitzar les pràctiques de validació i avaluació adoptades pels professionals entrevistats.

Els resultats principals d'aquest estudi indiquen que, pel que fa al llenguatge, els professionals segueixen, en general, les mateixes recomanacions establertes per als llenguatges entenedors escrits. Quant a la prosòdia, es destaquen tres pràctiques: parlar més lentament, fer servir pauses i pronunciar amb claredat. Tot i que el gènere del contingut influeix en el vocabulari i les estratègies de simplificació (especialment pel que fa a l'especificitat de les expressions i el grau de detalls que es proporciona), els aspectes prosòdics, en general, no es veuen alterats. Les restriccions temporals constitueixen un altre aspecte específic dels continguts d'àudio i audiovisual, que

suposen un repte. Aquestes dificultats se solen resoldre resumint la informació, però en els casos en què els continguts ja es creen en llenguatges entenedors des del principi, aquestes limitacions desapareixen. Finalment, les pràctiques de validació i avaluació són molt diverses: alguns professionals impliquen el seu grup meta en aquest procés, mentre que d'altres no ho fan. En certs casos, aquest procés depèn dels clients, de manera que els professionals no poden saber si el contingut s'ha validat o no.

A partir dels resultats principals obtinguts en aquestes entrevistes, es van seleccionar dos aspectes prosòdics, la velocitat de la parla i les pauses, per a la realització d'experiments de llenguatge fàcil oral amb diversos grups d'usuaris. Els experiments es van dur a terme entre el febrer i el juny de 2024 i van incloure tres grups de participants: un grup de persones amb discapacitat intel·lectual, un grup d'estudiants de català com a llengua estrangera, i un grup de control format per persones sense discapacitats ni dificultats de comprensió del català. Per tal d'avaluar la comprensió, els participants van escoltar les diferents variants de velocitat i pauses i van respondre preguntes de resposta múltiple. L'acceptabilitat es va mesurar a través d'escales de Likert, mentre que les preferències es van examinar demanant als participants que triessin una velocitat o durada de pausa específica, segons el cas. Els textos utilitzats per a les gravacions es van validar mitjançant el criteri d'experts per assegurar que el llenguatge fàcil emprat era adequat. A més a més, tots els participants van realitzar el test d'intel·ligència de Raven per garantir l'homogeneïtat dels grups.

El primer experiment, que es presenta al Capítol 3, va avaluar la velocitat de la parla i es va dur a terme amb un total de 101 participants: 35 persones amb discapacitat intel·lectual, 31 estudiants de català i 35 participants de control. Es van analitzar quatre velocitats de parla, definides a partir de la revisió bibliogràfica realitzada en català, castellà i anglès: 130 paraules per minut, 150 paraules per minut, 170 paraules per minut i 190 paraules per minut. Els resultats principals d'aquest experiment denoten que cap de les velocitats emprades ocasionen una millora de la comprensió significativa en cap dels grups. Tanmateix, el grup de participants amb discapacitat intel·lectual va obtenir millors resultats amb una velocitat de 130 paraules per minut, el grup d'estudiants de català amb 170 paraules per minut, i el grup de control amb 150 paraules per minut. Els resultats d'acceptabilitat són similars en els tres grups, amb 150 paraules per minut com la velocitat més ben valorada, seguida de 170 paraules per minut. D'altra banda, els resultats de preferència per al grup de persones amb discapacitat intel·lectual no són concloents, atès que la majoria dels participants no van triar una velocitat específica. En canvi, els estudiants de català van preferir les mateixes velocitats que van considerar més acceptables.

El segon experiment, que avaluava la durada de les pauses, es presenta al Capítol 4. Aquest estudi es va dur a terme amb 100 participants: 34 participants amb discapacitat intel·lectual, 31 estudiants de català i 35 participants de control. Cada àudio incloïa diferents durades de pauses interoracionals i intraoracionals: un amb pauses interoracionals de 590 mil·lisegons i pauses intraoracionals de 250 mil·lisegons; un altre amb pauses interoracionals de 740 mil·lisegons i pauses intraoracionals de 400 mil·lisegons; un tercer àudio amb pauses interoracionals de 890 mil·lisegons i pauses intraoracionals de 550 mil·lisegons; i l'últim àudio, amb les pauses més llargues, amb pauses interoracionals de 1040 mil·lisegons i pauses intraoracionals de 700 mil·lisegons. Seguint el mateix patró que l'experiment de velocitats, els resultats de comprensió mostren que allargar les pauses no millora significativament la comprensió, si bé els estudiants de català presenten una lleu tendència a millorar amb pauses més llargues. Pel que fa a l'acceptabilitat, en general, tots tres grups consideren les pauses interoracionals llargues com a acceptables, però no les pauses intraoracionals, que el grup de control considera excessives. Finalment, els resultats de preferència del grup amb discapacitat intel·lectual i el grup d'estudiants de català tornen a no ser concloents. No obstant això, a partir dels resultats d'acceptabilitat, es pot inferir que una estratègia que podria ser considerada satisfactòria per tots els grups seria l'ús de pauses interoracionals llargues combinades amb pauses intraoracionals més curtes.

5.4. Resumen

Esta tesis aborda el lenguaje fácil en el contexto de contenidos de audio. El lenguaje fácil es una variedad lingüística simplificada que se incluye dentro de la categoría más amplia del lenguaje fácil de comprender. Está dirigido principalmente a personas con discapacidad intelectual. Sin embargo, ha comenzado a dirigirse a otros grupos destinatarios, como estudiantes de idiomas, personas con dislexia o lesiones cerebrales, y personas mayores, entre otros. Los estudios presentados en esta tesis se han desarrollado en el marco del proyecto WEL (PID2022-137058NB-I00).

Esta tesis tiene tres objetivos principales. El primero consiste en describir las prácticas profesionales para comprender cómo se crean los contenidos de audio y audiovisuales en lenguajes comprensibles. A partir de los resultados de este objetivo, se ha elegido la velocidad del habla y las pausas como foco del segundo y tercer objetivos. La finalidad es evaluar la comprensión, aceptabilidad y preferencias de los usuarios de cada elemento prosódico para determinar si ralentizar la velocidad del habla o alargar las pausas favorece la comprensión y si tiene buen recibimiento por parte de los usuarios.

Con el fin de alcanzar estos objetivos, se han llevado a cabo tres estudios. El primero, correspondiente al Capítulo 2, consistió en la realización de once entrevistas semiestructuradas con profesionales de diversos ámbitos de producción de contenido, entre ellos noticias, interpretación de conferencias, audioexplicaciones y materiales educativos. Los entrevistados trabajan en distintos idiomas, como español, esloveno, sueco y alemán, y emplean diversas variedades de lenguaje fácil de comprender, incluyendo el lenguaje fácil, el lenguaje fácil plus y el lenguaje claro. Las entrevistas, realizadas entre septiembre y octubre de 2022, tenían como objetivo explorar las estrategias de simplificación lingüística utilizadas, tales como la selección de vocabulario y estructuras gramaticales, el papel de los aspectos prosódicos en este tipo de contenidos, las posibles limitaciones temporales derivadas de la naturaleza audiovisual del material y el uso de recursos complementarios, como materiales visuales o subtítulos. Además, se examinaron las prácticas de validación y evaluación empleadas por los profesionales entrevistados.

Los principales resultados de este estudio indican que, en lo que respecta al lenguaje, los profesionales, en términos generales, siguen las mismas recomendaciones establecidas para las variedades de lenguajes fáciles de comprender escritas. En cuanto a la prosodia, se destacan tres prácticas fundamentales: hablar más despacio, utilizar pausas y articular con claridad. Si bien el género del contenido influye en la elección del vocabulario y en las estrategias de simplificación (especialmente en lo

relativo a la especificidad de las expresiones y al nivel de detalle proporcionado), los aspectos prosódicos, en general, no se ven afectados. Las limitaciones temporales constituyen otro factor distintivo de los contenidos de audio y audiovisuales, lo que supone un desafío. Habitualmente, este problema se resuelve resumiendo la información; sin embargo, cuando los contenidos se producen directamente en lenguaje fácil de comprender, estas dificultades desaparecen. Por último, las prácticas de validación y evaluación varían considerablemente: algunos profesionales incluyen a su grupo destinatario en el proceso, mientras que otros no lo hacen. En ciertos casos, esta tarea recae en los clientes, lo que impide a los profesionales conocer si el contenido ha sido validado o no.

A partir de los principales resultados de las entrevistas, se seleccionaron dos aspectos prosódicos, la velocidad del habla y las pausas, para ser analizados en experimentos de lenguaje fácil oral con distintos grupos de usuarios. Estos experimentos se llevaron a cabo entre febrero y junio de 2024 y participaron tres grupos: personas con discapacidad intelectual, estudiantes de catalán como lengua extranjera y un grupo de control compuesto por individuos sin discapacidades ni dificultades de comprensión del catalán. Para evaluar la comprensión, los participantes escucharon diferentes variantes de velocidad y pausas y respondieron preguntas de opción múltiple. La aceptabilidad se midió mediante escalas de Likert, mientras que la preferencia se analizó pidiendo a los participantes que eligieran una única velocidad o duración de pausa, según el experimento. Los textos empleados en los audios fueron validados por medio de un juicio experto para garantizar su conformidad con los principios del lenguaje fácil. Además, todos los participantes realizaron el test de inteligencia de Raven con el fin de asegurar la homogeneidad de cada grupo.

El primer experimento, presentado en el Capítulo 3, evaluó la velocidad del habla y se llevó a cabo con un total de 101 participantes: 35 personas con discapacidad intelectual, 31 estudiantes de catalán y 35 participantes del grupo de control. Se analizaron cuatro velocidades del habla, establecidas a partir de una revisión bibliográfica en catalán, español e inglés: 130 palabras por minuto, 150 palabras por minuto, 170 palabras por minuto y 190 palabras por minuto. Los resultados principales de este experimento indican que ninguna de las velocidades empleadas produjo una mejora significativa en la comprensión en ninguno de los grupos. No obstante, el grupo de participantes con discapacidad intelectual obtuvo mejores resultados con una velocidad de 130 palabras por minuto, los estudiantes de catalán con 170 palabras por minuto y el grupo de control con 150 palabras por minuto. Los resultados de aceptabilidad son similares en los tres grupos, con 150 palabras por minuto como la velocidad mejor valorada, seguida de 170 palabras por minuto. En relación con la preferencia, los datos del grupo con discapacidad intelectual no son

concluyentes, ya que la mayoría de los participantes optó por no seleccionar una velocidad específica. En cambio, los estudiantes de catalán prefirieron las mismas velocidades que consideraron más aceptables.

El segundo experimento, descrito en el Capítulo 4, analizó la duración de las pausas en el habla. Este estudio se llevó a cabo con 100 participantes: 34 personas con discapacidad intelectual, 31 estudiantes de catalán y 35 participantes del grupo de control. Cada audio presentado en el experimento contenía diferentes duraciones de pausas interoracionales e intraoracionales. Se emplearon cuatro configuraciones: en la primera, las pausas interoracionales eran de 590 milisegundos y las intraoracionales de 250 milisegundos; en la segunda, las pausas interoracionales tenían una duración de 740 milisegundos y las intraoracionales de 400 milisegundos; en la tercera, las pausas interoracionales se extendían hasta 890 milisegundos y las intraoracionales hasta 550 milisegundos; finalmente, en la cuarta configuración, que presentaba las pausas más prolongadas, las interoracionales alcanzaban los 1040 milisegundos y las intraoracionales los 700 milisegundos. Siguiendo el mismo patrón que en el experimento sobre la velocidad del habla, los resultados en términos de comprensión indican que prolongar las pausas no supone una mejora significativa en la comprensión del discurso. No obstante, los estudiantes de catalán muestran una ligera tendencia a una mejor comprensión con pausas más largas. En lo que respecta a la aceptabilidad, en términos generales, los tres grupos perciben las pausas interoracionales prolongadas como aceptables. Sin embargo, las pausas intraoracionales largas no son tan bien recibidas, ya que el grupo de control las considera excesivas. Por último, los resultados sobre la preferencia de los participantes con discapacidad intelectual y de los estudiantes de catalán no son concluyentes. No obstante, a partir de los datos de aceptabilidad, se puede inferir que una estrategia potencialmente satisfactoria para todos los grupos consistiría en combinar pausas interoracionales largas con pausas intraoracionales más breves.

CHAPTER 6: CONCLUSIONS

Although interest in Easy Language (EL) has grown in recent years in the academic field, resulting in a range of research approaches, there is still a lack of empirical studies involving participants from diverse target groups (Bredel & Maaß, 2024; González-Sordé & Matamala, 2023; Sutherland & Isherwood, 2016). Furthermore, studies on prosodic elements of Easy Language are even scarcer, with only two studies identified to date (Prafiyanto, 2020; Prafiyanto et al., 2018; Wei et al., 2016) and none in Catalan.

To address this gap, the thesis had three main objectives:

I. To investigate professional practices in the creation of audio and audiovisual Easy-to-Understand (E2U) Language content.
II. To evaluate speech rate within the framework of EL in Catalan.
III. To evaluate pauses within the framework of EL in Catalan.

Each of these objectives has been accomplished and will be discussed in this chapter in relation to the hypotheses associated with each objective presented in Section 1.1. Each subsection of this chapter corresponds to one of the objectives, with the chapter concluding with a final subsection outlining the limitations of this study and potential avenues for future research.

6.1. Objective 1: professional practices

To investigate professional practices in the creation of audio and audiovisual E2U Language content.

This first objective was further divided into three aims: (1) mapping the linguistic strategies used by professionals in the creation of oral E2U Language content, (2) identifying the prosodic strategies employed in audio and audiovisual modalities, and (3) analysing the use of paratextual elements. To fulfil this objective, eleven semi-structured interviews were conducted with twelve professionals, two of whom participated in the same interview. These participants were selected with the aim of covering a wide range of content types, including news interpreting, news creation, educational and informative videos, mediation, audio description and conference interpreting. The mapped practices included linguistic, prosodic and paratextual elements, as well as validation and evaluation procedures.

H1. Linguistic practices in E2U audiovisual content are expected to closely align with established recommendations for the written modality.

The findings clearly support this hypothesis. Interviewees consistently reported relying on established standards, such as UNE 153101:2018 EX, IFLA (2010), and Inclusion Europe (2009), and, in some cases, on internal organisational guidelines adapted to their working languages. Notably, these professionals applied linguistic recommendations formulated for written EL to the production of oral content and perceived them as appropriate and sufficient. This mirrors the results of the SELSI project (SELSI, 2023), which also found that professionals tended to follow core written-language strategies, using active constructions, opting for positive formulations, explaining complex terms, and avoiding metaphorical expressions, even when using spoken EL in two-way and one-way communication.

> H2. Prosodic strategies in E2U audiovisual content are expected to vary depending on the type of content.

This hypothesis was only partially supported, as the main prosodic features mentioned were consistent across content types.

Interviewees highlighted several prosodic features as central to oral E2U Language, including ensuring clear pronunciation, using a slower speech rate, and incorporating pauses. These strategies were reported and recommended consistently, regardless of content type. However, some variation emerged depending on the type of content. For educational content, expressivity was preferred to engage listeners, whereas news programmes tended to follow standard news delivery practices.

Regarding speech rate, only two interviewees provided specific recommendations: one suggested approximately 125 wpm for Spanish, contrasting with the standard Spanish recommendation of 170–190 words per minute (Rodero, 2016), while another suggested roughly a quarter of the average speech rate in Slovenian. For context, the average speech rate in Slovenian ranges from 4.5 to 6.5 syllables per second (Tivadar, 2017), compared to around 8 syllables per second in Spanish (Coupé et al., 2019). Speaking at a quarter of this rate would appear to contradict ILSMH-EA's (1998) caution against speaking too slowly. Recommendations to slow speech align with the strategies collected in the SELSI report (SELSI, 2024), although testing showed non-conclusive results: users in Sweden did not consistently approve slower speech, whereas users with intellectual disabilities and dementia in Latvia did. Similarly, the use of pauses suggested by interviewees echoes SELSI findings (SELSI, 2023, 2024), which found that pauses were not acceptable between individual words but were useful between prosodic units.

Differences in expressivity strategies also between educational content and news programmes adhered to standard prosody. However, this does not concur with SELSI's (2024) testing, which suggested that users generally did not want a monotone voice, regardless of content type.

Temporal and workflow constraints further influenced prosodic choices. Both general time restrictions and fixed durations of content affected production, particularly depending on whether material was created in E2U Language from the outset or simplified afterward. In audio description, timing had to fit within gaps in dialogue; in news, events had to be explained within limited timeframes. Across formats, professionals reported relying on summarisation to address these constraints.

> H3. Paratextual elements in E2U audiovisual content are expected to vary depending on whether the content is created from scratch or adapted.

This hypothesis is partially supported. While whether content is created from scratch or adapted appears to have some influence paratextual decisions, professional preferences and content type also play a significant role.

For pre-recorded material, images and videos were used, but there was substantial variation in how they were implemented. Some content employed images and videos specifically adapted for EL, while other material used only the videos from the standard version, with changes limited to the narration. In some cases, a visible box with the narrator or interpreter was included. These differences appear to be largely related to whether the content was designed to be accessible from the outset or adapted later.

Several interviewees noted that images and videos can aid comprehension. However, studies involving individuals with intellectual disabilities, the main target group for most content analysed in this study, have found no measurable benefits when such visuals are paired with written EL texts (González-Sordé et al., 2025; Hurtado et al., 2014; Saletta et al., 2019; Sugiura & Fujisawa, 2021).

There was also considerable variation in the use of subtitles, including whether they were simplified. These differences did not seem to correlate with content type either, appearing instead to reflect individual professional preferences rather than a systematic approach.

Finally, interviewees working with news content described a workflow largely based on the adaptation of pre-existing standard news. This trend aligns with findings from

the ENACT project (Cuitavi-Martín & Matamala, 2026), in which the majority of organisations reported adapting existing news items instead of producing original accessible content.

6.2. Objective 2: speech rate

To evaluate speech rate within the framework of EL in Catalan.

This second objective was further divided into three aims: (1) evaluating whether comprehension improved with slower speech rates, (2) assessing the acceptability of the different speech rates tested, and (3) identifying users' preferences regarding speech rate. To address these aims, the study included 101 participants divided into three groups: a control group of neurotypical native Catalan speakers, a group of native Catalan speakers with intellectual disabilities, and a group of neurotypical learners of Catalan. The study assessed four speech rates: 130 words per minute (wpm), 150 wpm, 170 wpm and 190 wpm.

The element of speech rate was selected for examination in this study because it is among the prosodic features most consistently referenced across existing sources. Several guidelines and standards explicitly mention speech rate (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023; North Yorkshire County Council, 2014), and, as noted earlier, interviewees in the first part of the study generally recommended using a slower speech rate to allow more time for processing. Nevertheless, research on the relationship between speech rate and comprehension in standard language has produced mixed findings (see Sections 3.3).

H4. Slowing the speech rate in EL audios will significantly improve comprehension.

This hypothesis was not supported by the results. No statistical differences in comprehension were found between different speech rates for any of the three participant groups, people with intellectual disabilities, language learners, and the control group. In fact, the language learner group performed slightly better, though not significantly, at the higher rate of 170 wpm.

These findings are consistent with studies by Prafiyanto (2020), Prafiyanto et al., (2018) and Wei et al. (2016), which also report no effect of speech rate on comprehension. They also align with a broader trend in empirical research on EL involving participants with intellectual disabilities, where other recommendations such as the use of visual support (González-Sordé et al., 2025; Hurtado et al., 2014;

Saletta et al., 2019; Sugiura & Fujisawa, 2021) or lexical simplification (Fajardo et al., 2013, 2014, 2022) have likewise shown limited or inconsistent effects. However, studies with other target groups, such as individuals with dyslexia, have reported more positive outcomes (Rello et al., 2013; Rivero-Contreras et al., 2021).

One point worth noting is the possibility that the linguistic and lexical simplification applied in the materials may have been sufficient to support comprehension, thereby reducing any additional impact of speech rate. This suggests that further research should compare EL and Standard Language audio at different speech rates, in order to determine whether slowing speech can meaningfully improve comprehension or whether lexical and linguistic simplification alone is sufficient to support understanding.

> H6. User groups will view the prosodic modifications as acceptable, while the control group will not.

Given the general recommendations advocating a slower speech rate, it was expected that users would find the application of these recommendations acceptable. However, in the case of speech rate, the hypothesis was not supported. Both individuals with intellectual disabilities and second-language learners showed similar patterns: on average, they rated 150 wpm as the most acceptable, followed by 170 wpm. The second-language learners, however, tended to perceive the speeds as faster overall than the group with intellectual disabilities. Both groups generally considered 130 wpm to be slow. When examining the second-language learners by proficiency level, an interesting difference emerged: A1 participants rated 130 wpm as being as fast as A2 participants rated 150 wpm, although in both cases the speed was still judged to be slow.

The control group also rated 130 wpm as slow, but its acceptability ratings for 150 and 170 wpm were similar to those of the group with intellectual disabilities. Like the other user groups, the control group found 150 wpm the most acceptable, although the difference compared with 170 wpm was minimal.

It is particularly relevant to note, as discussed in Section 3.6, that participants in the group with intellectual disabilities tended to rate all speech rates as acceptable. Several possible explanations are proposed in that section, including a lower sensitivity to differences in speech rate (Gautam & Singh, 2016; Lense et al., 2021; Wynn et al., 2018) and the possibility of a positive response bias (Emerson et al., 2013; Hartley & MacLean, 2006). A more detailed analysis of these results is presented in Pujadas-Farreras (2025), which identifies two distinct subgroups of equal size within this

population: one group that rated all speeds as acceptable, and another that expressed clearer preferences across the different speech rates. Notably, a significant age difference was observed between these two subgroups.

> H7. Preferences across all participant groups will be strongly associated with their perceived acceptability of the prosodic practices.

In the case of speech rate, the hypothesis was supported. The second-language learners generally preferred 150 wpm, followed by 170 wpm, which aligns with their acceptability ratings. For the control group, there was a slight, though not statistically significant, preference for 170 wpm over 150 wpm. This also reflects their acceptability results, where both speeds were rated very similarly. In contrast, the group with intellectual disabilities showed no clear preference: apart from 190 wpm, all other speeds (and the option of choosing no preference) were selected in roughly equal proportions. This mirrors their acceptability ratings, in which all speeds were judged acceptable, suggesting that participants may have found it difficult to distinguish between them and therefore struggled to select a single preferred option.

6.3. Objective 3: pauses

To evaluate pauses within the framework of EL in Catalan.

This final objective was also divided into three aims, mirroring those of Objective 2: (1) evaluating whether comprehension improved with longer pauses, (2) assessing the acceptability of the different pauses tested, and (3) identifying users' preferences regarding pause lengths. This study included the same participants as the speech rate study, minus one participant in the group of native Catalan speakers with intellectual disabilities, resulting in a total of 100 participants across the three groups. The study focused on both inter-sentence and intra-sentence pauses, with four different durations tested for each type. The selected inter-sentence pauses were 590 ms, 740 ms, 890 ms and 1040 ms, while intra-sentence pauses were 250 ms, 400 ms, 550 ms and 700 ms.

As with speech rate, pauses were selected for examination in this study because they are also a frequent recommendation (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023), and were also highlighted by professionals during the interviews. This recommendation is echoed in the SELSI (2024) report, in which users accepted suggestions such as pausing between sections of a text, using pauses for emphasis, and inserting pauses between clauses. However, as with research on speech rate,

studies on pause duration and comprehension in standard language have mixed results (see Section 4.2.1).

> H5. Lengthening pause durations in EL audios will significantly improve comprehension.

The results of the study did not support this hypothesis. There were no statistically significant improvements in comprehension for any of the participant groups. While the language learners showed a slight trend towards improvement with longer pauses, particularly among participants at the A2 level of Catalan according to the Common European Framework of Reference, this effect was not significant. By contrast, the control group and the group of participants with intellectual disabilities demonstrated slightly better comprehension with the shorter inter-sentence and intra-sentence pauses. These findings are consistent with those of Prafiyanto (2020) and Prafiyanto et al. (2018), who also found that pause length had little effect on intelligibility.

As noted as well in the speech rate study, it is possible that the linguistic and lexical simplifications applied in the materials were sufficient to reduce the potential impact of lengthening pauses.

> H6. User groups will view the prosodic modifications as acceptable, while the control group will not.

A similar pattern to speech rate emerged for pauses, where the hypothesis was only partially supported. For inter-sentence pauses, individuals with intellectual disabilities rated all pauses as short, contrary to expectations, given that pause duration had been increased. In contrast, both the second-language learners and the control group found all inter-sentence pauses acceptable, despite the expectation that the control group would be less tolerant of longer pauses.

For intra-sentence pauses, the pattern was largely repeated: second-language learners generally found all pauses acceptable, while individuals with intellectual disabilities again judged them to be short. However, in this case, the control group was less tolerant of longer intra-sentence pauses, indicating less acceptability for longer disruptions within sentences.

H7. Preferences across all participant groups will be strongly associated with their perceived acceptability of the prosodic practices.

For pauses, the hypothesis was again only partially supported, and, as with speech rate, the results were not statistically significant. In the acceptability data, both the second-language learners and the control group rated all inter-sentence pauses as acceptable. This may explain why neither group demonstrated a strong preference for one pause length, and why many participants selected "no preference". Within this general pattern, the control group showed a slight tendency to favour the shortest pause, followed by selecting no preference, while the second-language learners showed the inverse pattern: most selected no preference, followed by a slight preference for the shortest pause.

The group with intellectual disabilities presented a more unusual pattern. Although they had judged all inter-sentence pauses as short in the acceptability task, when asked to choose a preference, the longest pause was the least favoured. Most participants selected no preference, followed by a preference for the 740 ms pause (the second shortest), although these differences were not significant.

For intra-sentence pauses, the control group, who had been less tolerant of longer pauses in this position, mostly preferred the shortest pause. Among second-language learners, preferences were again fairly evenly distributed, consistent with their acceptability ratings. Interestingly, in both the control group and the second-language learners, the most preferred pause was the shortest (250 ms), followed by the third-longest (500 ms). One possible explanation is that participants may have struggled to perceive the differences between pause lengths, particularly between the middle pause (400 ms) and the two adjacent options (250 ms and 500 ms). If the differences were difficult to detect, participants may have selected pauses somewhat inconsistently, leading to this pattern.

For the group with intellectual disabilities, the relationship between acceptability and preference for intra-sentence pauses was less straightforward. Although they had rated all pauses as short in the acceptability task, their preferred option was the 400 ms pause, followed by 250 ms.



Figure 6.1: Summary of hypotheses and results

6.4. Limitations and future research

This study presents several limitations, which have been discussed in the relevant sections of each chapter. However, they are summarised here for clarity and completeness.

As this thesis takes the form of a compendium of articles, the individual papers are included in their original published versions and have not been subsequently updated. Consequently, the thesis reflects the state of knowledge at the time of writing, which in some areas has since evolved.

Beginning with the first study, the interviews, although the aim was to map strategies in the creation of E2U Language in audio and audiovisual content, the distribution of language varieties represented was not balanced. Most interviewees reported working specifically with EL, which meant that the mapping was less informative

regarding other varieties, such as Plain Language. Secondly, because the scope of the study was broad, not limited to a single country or genre, and involved a relatively small number of participants, the conclusions are necessarily general and cannot be generalised to all contexts. As justified in the methodology, this broad scope was intentional, in order to allow for in-depth interviews and detailed qualitative analysis, as well as to include a wide range of experts to obtain an overall overview of practices. Additionally, at the time the study was conducted (2022), there was very limited information available on the topic. Therefore, adopting a wide scope was also necessary to explore the field comprehensively and capture diverse perspectives in an area that was still largely under-documented. Nevertheless, each content type has its own specific characteristics, and more focused research on individual genres would be valuable, for instance, the work currently being developed in the ENACT project.

Considering that within prosodic recommendations, opinions on emotivity appeared to vary according to content type in this study, whereas in the SELSI report (2024) this variation was not observed, further research could investigate this topic in greater depth, comparing a greater variety of target users and a larger number of participants to achieve more generalizable results. For example, this could focus on informative and educational content, which the interviews identified as the main type of content being produced.

The second and third studies, involving user testing, also have limitations, particularly regarding the design of the audio materials. All audio texts contained exactly 130 words, with overall duration varying according to the prosodic feature being tested. This decision was made deliberately in order to test several variables for each feature; however, longer audios would have made the testing session excessively long, especially for participants with intellectual disabilities. Furthermore, the participant pool was relatively small, comprising 35 participants with intellectual disabilities and 31 language learners as target users, although this sample size is within the usual range of accessibility studies.

Regarding the first limitation, future research could investigate speech rates and pauses using longer texts, which may yield different results and help to confirm or refute the hypothesis proposed in the discussion that lexical and linguistic simplification alone may be sufficient to support comprehension, potentially rendering prosodic modification unnecessary. Replicating the study with a larger participant pool would also be valuable, as it could produce more generalizable results.

A related avenue, also noted earlier, would be to compare Standard Language audio at average and slowed speech rates or with lengthened pauses with EL audio at the same rates and pause durations. Such a study could shed further light on whether lexical and linguistic simplification reduces or eliminates the need for prosodic adaptation.

Furthermore, it could be worthwhile to investigate whether the type of content affects the acceptability of slowing speech rate or lengthening pauses. A study comparing the acceptability of the same speech rates or pauses across different audio genres, such as news, literary, educational, or instructive, could explore whether preferences or perceptions differ. Additionally, it would be interesting to examine whether these acceptability results are consistent across different target user groups.

In addition, although empirical research on visual support has produced inconclusive findings (González-Sordé et al., 2025; Hurtado et al., 2014; Saletta et al., 2019; Sugiura & Fujisawa, 2021), it may be worthwhile to investigate visual support in audio-based formats. For example, comparing comprehension of easy news in audio-only format with easy news accompanied by video.

Finally, further research would also be valuable to determine whether current linguistic and lexical simplification recommendations are truly relevant and necessary in the oral modality, or whether different principles may apply in spoken EL.

Ultimately, this dissertation demonstrates that there is still much research to be conducted before the findings can be used as general recommendations, particularly regarding different target user groups. Nonetheless, it represents a step forward in understanding how EL in audio and audiovisual content can be approached from an empirically grounded perspective. The results provide initial insights that can inform both future studies and practical applications, highlighting areas where systematic investigation is needed to develop more generalizable guidelines.

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ANNEXES

Annex 1: Articles published within this thesis

Pujadas-Farreras, M., & Matamala, A. (2025). Creation and Translation of Audiovisual Content in oral easy-to-understand language: Insights from interviews with professionals. *Hermēneus. Revista de traducción e* interpretación, (27), 447-481. https://doi.org/10.24197/2jbfgs25.

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Creation and translation of audiovisual content in oral Easy-to-Understand Language: insights from interviews with professionals*

Creación y traducción de contenidos audiovisuales en lenguaje fácil de comprender oral: resultados de entrevistas con profesionales

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Abstract: This article discusses findings from eleven semi-structured interviews with experts who use oral Easy-to-Understand (E2U) Language in audiovisual content. Our research, grounded in audiovisual translation and accessibility studies, maps current practices concerning linguistic and prosodic aspects, paratextual elements, and validation processes. The contents follow written E2U Language linguistic recommendations. Prosodic features, like slower speech, pauses, and clear pronunciation are crucial, and content duration varies, but generally does not exceed the maximum recommended by Inclusion Europe. Use of subtitles and validation practices also vary depending on the content. This article highlights potential areas for future research, including speech speed, pause length, emphasis, emotivity, and sentence structure.
Keywords: Oral E2U Language; audiovisual translation; accessibility; recommendations; interviews.
Resumen: | Este artículo analiza los resultados de once entrevistas semiestructuradas con expertos que utilizan lenguaje fácil de comprender oral en contenidos audiovisuales. Se enmarca en los estudios de traducción audiovisual y accesibilidad. El estudio muestra las prácticas actuales en cuanto a aspectos lingüísticos y prosódicos, elementos paratextuales y validación del contenido. En general se siguen las recomendaciones lingüísticas escritas del lenguaje fácil de comprender y en la prosodia, un habla más lenta, pausas y una pronunciación clara son cruciales. La duración del contenido varía, pero generalmente no excede el máximo recomendado por Inclusion Europe. Tanto el uso de subtítulos como las prácticas de validación también varían. Este artículo destaca áreas potenciales para futura investigación, incluida la velocidad del habla, la duración de las pausas, el énfasis, la emotividad y la estructura de las oraciones.
Palabras clave: Lenguaje fácil de comprender oral; traducción audiovisual; accesibilidad; recomendaciones; entrevistas.
Summary: Introduction; 1. Easy-to-Understand Language, 1.1. Oral E2U Language recommendations, 1.2. E2U in AVT and accessibility; 2. Methodology, 2.1. Participants, 2.2. Analysis of the interviews: 3. Analysis and results, 3.1. Background and context, 3.2. Linguistic elements, 3.3. Prosodic elements, 3.4. Time restrictions, 3.5. Paratextual elements, 3.6. Validation and evaluation; 4. Conclusions; References.
Sumario: Introducción. 1. Lenguaje fácil de comprender. 1.1. Recomendaciones de lenguaje E2U oral 1.2. E2U en contenidos audiovisuales y accesibilidad. 2. Metodología. 2.1. Participantes. 2.2. Análisis de las entrevistas. 3. Análisis y resultados. 3.1. Antecedentes y contexto. 3.2. Elementos lingüísticos. 3.3. Elementos prosódicos. 3.4. Restricciones temporales. 3.5. Elementos paratextuales. 3.6. Validación y evaluación. 4. Conclusiones.

INTRODUCTION

Easy-to-Understand (E2U) Language refers to any language variety which enhances comprehensibility. Until now, research and practice in this area have focused mostly on written texts (Matamala, 2022, 2023). Guidelines and standards on E2U Language have few recommendations regarding audiovisual content in which oral E2U Language is used and, even then, suggestions are rather vague (Accessible Information Working Group, 2011; ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023). The impact of different prosodic aspects on comprehension has been studied, although not focusing on E2U contexts (Blau, 1990; Brookshire and

Nicholas, 1984; Henderson and He, 2022; Pashek and Brookshire, 1982; Reid, 2003; Schaeffer et al., 2022; Schafer, 1997; Yoon et al., 2016). There has also been research in how to apply E2U Language in audiovisual content (Bernabé-Caro, 2020a, 2020b; Bernabé-Caro and Orero, 2020; Maaß and Hernández Garrido, 2020; Matamala, 2023). However, this research is still limited. Our investigation aims to partially fill this gap and tries to give an answer to the following research question: What are the current practices and challenges when using oral E2U Language in audiovisual content? To answer the research question, the article reports on interviews with professionals experienced in creating audiovisual content in oral E2U Language. The interviews aim to shed light on the specificities of oral E2U Language and its relationship with written E2U Language. To narrow down our research, the focus will be exclusively on one-way communication settings.

To begin with, the article defines key concepts and provides an overview of existing recommendations and research on oral E2U Language. It then presents the methodology and discusses the results. The article concludes with a summary of our main findings and suggestions for future research. Our research is grounded in audiovisual translation studies (AVT) and accessibility studies.

1. EASY-TO-UNDERSTAND LANGUAGE

The ISO/IEC 23859:2023 standard defines E2U Language as "any language variety which enhances comprehensibility". Two well-established varieties are Easy Language (EL) and Plain Language (PL), but there can be intermediate varieties such as Easy Language Plus (EL+) (Maaß, 2020, p. 232).

EL (also known as Easy-to-Read) is a language variety that aims to facilitate reading and comprehension, following specific guidelines for wording, structure, design, and evaluation (ISO, 2023; Lindholm and Vanhatalo, 2021, p. 11). While traditionally targeted towards persons with cognitive disabilities, EL can also address persons with learning disabilities, functional illiteracy, and non-native speakers (Centre for Inclusive Design, 2020; Lindholm and Vanhatalo, 2021, p. 14). The ISO standard prioritises user needs instead of adopting a medical approach and considers EL to address persons with reading comprehension difficulties for any reason.

Conversely, PL uses clear wording, structure, and design to ensure users can easily understand and use the information the first time they read or hear it (Centre for Inclusive Design, 2020; ISO, 2023). The target users are the general public (Centre for Inclusive Design, 2020). EL+ is an intermediate variety of EL and PL. It has a "high level of perceptibility and comprehensibility", although not as high as EL, while the layout is closer to standard language (Maaß, 2020, p. 232).

In this article we will refer to "Easy Language", "Plain Language" and "Easy Language Plus" as "EL", "PL" and "EL+", but we will use "Easy Read", "ER", in direct quotations or when referring to terminology used by certain authors.

1. 1. Oral E2U Language recommendations

Some EL (UK Department of Health, 2009, 2010; García Muñoz, 2012; IFLA, 2010; NHS England, 2018; AENOR, 2018) and PL (Cutts, 2020; Health Service Executive, Health Promotion Unit and National Adult Literacy Agency, 2010) guidelines and recommendations suggest audio or video as alternatives or complements to written language but lack specific recommendations on oral aspects. A few provide recommendations regarding voice with slightly different approaches, as described next.

In EL, some guidelines recommend using low-pitched voices (Accessible Information Working Group, 2011), voices that are neither too high nor too low (Inclusion Europe, 2009) and allowing to choose the timbre if text-to-speech is used (ISO, 2023). Speakers should speak clearly (Inclusion Europe, 2009; ISO, 2023; North Yorkshire County Council, 2014) and make pauses (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023). Speech speed should be suitable (ISO, 2023) and speaking slower is recommended (Inclusion Europe, 2009; North Yorkshire County Council, 2014), but not too slowly (ILSMH-EA, 1998). The voice should not be strongly accented, and it should express emotions (Inclusion Europe, 2009), while ISO/IEC 23859:2023 states that users should be able to choose their preferences. Voices should match on-screen characters (i.e. a male voice for a male character) (Inclusion Europe, 2009) and, for longer audios, multiple voices are recommended (ILSMH-EA, 1998). Content duration should be 20-30 minutes maximum (Inclusion Europe, 2009).

The guidelines recommend using precise and relevant visual elements (Accessible Information Working Group, 2011; Inclusion Europe, 2009)

and allowing sufficient processing time (ILSMH-EA, 1998; Inclusion Europe, 2009; UK Disability Unit, 2021). Explanations should be given for charts, graphs, and drawings, and on-screen text may be used to provide supplementary information (Accessible Information Working Group, 2011).

Finally, the script should be clear and logical (Accessible Information Working Group, 2011; ILSMH-EA, 1998; UK Disability Unit, 2021), the audio should be high quality (Accessible Information Working Group, 2011; Inclusion Europe, 2009; ISO, 2023), and long words should be explained (North Yorkshire County Council, 2014). Background noise and music should be avoided as well (UK Disability Unit, 2021).

PL recommendations are to keep the content short and to clearly indicate the audio ending. Numbers should be pronounced consistently (i.e. "zero" and not "oh") (MENCAP, 2000) and acronyms should be spelled out (Centers for Disease Control and Prevention, 2009). Beyond E2U, but related to a better comprehension, there are recommendations on improving "listenability", which aims to reduce cognitive demands on listeners and enhance comprehension. The Listenability Scale Guide (Rubin, 2012) recommends using simple language, repetition, and clear messaging. It also suggests using coordinating conjunctions instead of subordination, moderate clause length, verb forms to express actions, common words and contractions, and signalling transitions between topics. Additionally, it advises to tell listeners what will be discussed, using internal summaries.

1. 2. E2U in AVT and accessibility

Bernabé-Caro (2020b), Bernabé-Caro and Orero (2019), Maaß and Hernández Garrido (2020), and Matamala (2023) have explored the relationship between E2U Language and AVT and accessibility. Bernabé-Caro and Orero (2019) and Bernabé-Caro (2020b) propose hybrid accessibility services that merge E2U Language with existing services, including E2U audio comment, audio description (AD), audio explanation, audio intertitles, audio introduction, audio subtitles, audio summary, audio surtitles, remake, sight translation, voice-over, and consecutive and simultaneous interpreting. These new easy access services should follow text simplification recommendations, recommendations governing the access service (e.g. audio description guidelines), and digital accessibility guidelines.

Matamala (2022, 2023) presents an overview of E2U Language in AVT and accessibility, focusing on oral easy access services. These include easy AD, audio introductions and audio guides, audio subtitling, interpreting, voice-over and off-screen dubbing, and audio explanations or easy audios.

Maaß and Hernández Garrido (2020) explore the integration of E2U Language in different AVT modalities, finding EL and PL unsuitable for dubbing, as they would change the original language variety and make synchronisation more challenging. In voice-over, PL would be acceptable if the content is originally accessible, and it is also a more appropriate variety for film interpreting. Although E2U film interpreting has not been attempted yet (Matamala, 2023), EL simultaneous interpreting has been already performed (Nahón Guillén, 2020; Schulz et al., 2020; Yalon-Chamovitz and Avidan-Ziv, 2016). These studies suggest that, despite the name, the results are closer to PL, which Maaß and Hernández Garrido (2020) support by noting that PL is easier to produce spontaneously as it is less rule-governed than EL. However, it is unclear if EL cannot be produced spontaneously because interpreting samples in Nahón Guillén (2020) are closer to EL.

Concerning AD, Maaß and Hernández Garrido (2020) consider EL/PL AD useful only if the entire audio track is in those language varieties; otherwise, the final product would have different language difficulties. While Matamala (2023) proposes extended AD, in which visuals could be paused to provide longer explanations and potentially make the AD more acceptable to users, the issue of differing language difficulties is not addressed. Arias-Badia and Matamala (2020) also note that users may be reluctant to use simplified AD, finding it patronising and a hindrance to the imaginative process. They propose offering "audio adaptation" apart from standard AD and note that theatre plays, opera, dance, or museum AD could incorporate E2U Language more easily. Taylor and Perego (2020) support this by stating that ER could enhance museum accessibility by reducing the complexity and volume of information in AD. Bernabé-Caro and Orero (2020) observe that simplified AD should follow EL, AD, WCAG 2.1 (W3C, 2018), and sound mixing guidelines.

Finally, Bernabé-Caro and Orero (2019) mention "easy listening" or "easy to listen", which considers the choice of vocabulary, syntax, rhythm, and intonation, but it has yet to be researched. This concept is complementary to clean audio, which improves speech intelligibility by reducing the ambient noise, music, and sound effects. It can also be linked

to the concept of "listenability", which has not been studied with persons with cognitive disabilities, although there are studies regarding the effects of prosodic elements in comprehension (Blau, 1990; Brookshire and Nicholas, 1984; de-la-Mota and Rodero, 2011; Henderson and He, 2022; Kotani et al., 2014; Pashek and Brookshire, 1982; Prafiyanto, 2020; Prafiyanto et al., 2018; Reid, 2003; Schaeffer et al., 2022; Schafer, 1997; Yoon et al., 2016).

2. METHODOLOGY

This paper discusses the results of eleven individual semi-structured interviews, one of which was a group interview with two participants who create content together. The interviews were conducted online in September and October 2022, with a maximum duration of 1 hour each. After a brief presentation by the researcher, participants signed informed consent forms. The interviews followed the schedule outlined in Table 1 and concluded with the researcher thanking the interviewees for their participation.

Given the limited existing research on easy audiovisual content creation, the selected interview questions aimed to map current practices concerning linguistic and prosodic aspects, paratextual elements, and validation processes. This approach provided a holistic view of current practices across various content types. Additionally, employing semi-structured interviews allowed interviewees the flexibility to introduce other relevant topics beyond the initial questions.

1. What background or experience do you have creating easy audiovisual content?
2. What type of content do you simplify?
3. Who is this simplified content, this xxxx [term they use], addressed to?
4. Where is this simplified content, this xxxx [term they use], offered?
5. When did this simplified content, this xxxx [term they use], start to be offered (in your country, if necessary)?
6. I would like to learn more about how this simplified content, this xxxx [term they use], is done. I would also like to focus on four aspects: creation/translation, language, content, and other elements.
    a. Do you create easy content, or do you translate already existing easy content?
    b. How do you simplify the language (vocabulary, grammar)?
    c. Some people say that there are different levels of simplification: from Easy Language (what was traditionally called easy-to-read) to Plain

		Language, closer to standard language. Is your simplification closer to Easy or Plain Language?
	d.	In terms of prosody (speed, pronunciation, etc.), do you take any specific aspect into account?
	e.	How does the genre/content type influence the production of your easy content?
	f.	Are there any time restrictions and, if so, how do you deal with them?
	g.	How do you use other additional elements, if any: visuals, supplementary materials, etc.?
	h.	Do you follow any existing guidelines, recommendations, or standards, if available?
	i.	Do you take any other aspects that we have not mentioned into account when creating or translating easy content?
7.	Do you involve end users in the evaluation of the easy content? If so, how?	
8.	Is there anything else you would like to add?	

Table 1. Interview Schedule.

2. 1. Participants

Research and recommendations on oral E2U Language are scarce. To provide a broader view of how different easy content types are created, participants experienced in a wide range of content were targeted: E2U news, conference interpreting, educational material, and AD were some of the areas identified in the literature as current practices (Arias-Badia and Matamala, 2020; Maaß and Hernández Garrido, 2020; Matamala, 2023; Schulz et al., 2020). In line with the qualitative nature of this study, purposive sampling was employed to recruit participants with expertise covering the different areas identified in the literature review. The decision to interview a smaller number of participants (12 interviewees) was deliberate, aimed at facilitating in-depth and detailed interviews, as well as thorough subsequent analysis. The interviewees' profiles are presented in detail in the background subsection. The participants are anonymised using codes (P1, P2, P3, etc.).

2. 2. Analysis of the interviews

The interviews were transcribed using Teams' automatic transcription feature and later postedited. However, in two cases the transcript was done manually due to technical problems. The transcripts were coded with

Atlas.ti through a deductive process by using a premade code list, and an inductive process by modifying the list while examining the materials (Ballestín González and Fàbregues, 2018). The final list of codes is detailed in Figure 1:

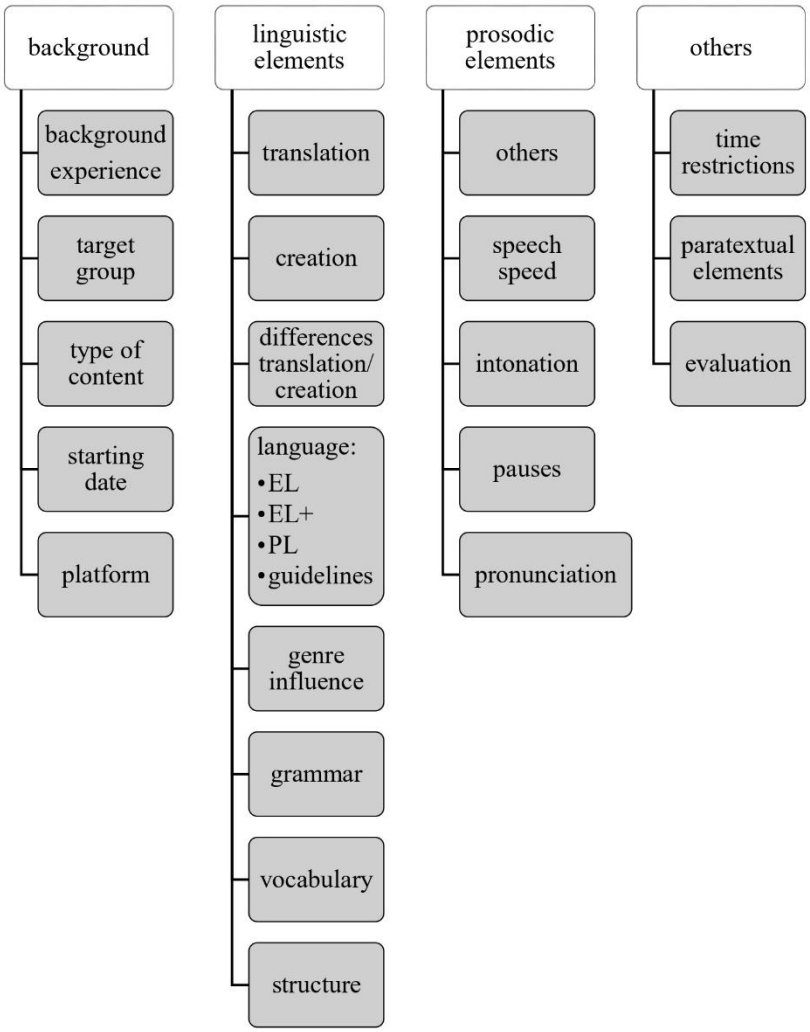


Figure 1. *Code list.*

Twenty-five codes were used, divided into four categories: "background", "linguistic elements", "prosodic elements", and "others". "Background" includes interviewee experience, basic parameters of content, and when content creation started. Interviewees were also asked when the type of content started being offered in their country. "Linguistic elements" covers vocabulary and grammar simplification, structure, genre influence on simplified content, language variety (EL, EL+, PL), and guidelines used.

It also has codes for creation and translation processes, although parameters such as time restriction may also be influenced by these processes. "Prosodic elements" encompasses relevant prosodic features, such as speech speed, intonation, pauses, and pronunciation. Finally, the "others" category includes other less common features such as time restrictions, paratextual elements, and evaluation processes.

After coding, the information was compared to identify patterns and similarities across different types of content.

3. ANALYSIS AND RESULTS

This section contains six subsections:

1) background and context (covering background, target groups, content type, starting date, precedents, country, and platform),
2) linguistic elements (including grammar, vocabulary, guidelines, and content simplification)
3) prosodic elements,
4) time restrictions,
5) paratextual elements
6) validation and evaluation.

3. 1. Background and context

Table 2 provides a summary of each participant's background, detailing the type of easy audiovisual content they create or have created, along with information on their target audience, start date, and language variety.

Participant code	Content	Target users	Starting date	Platform	Country/ language/ variety
P1	News interpreting	adults with a low or medium level of intellectual disability with schooling	2009	Television	Argentina / Spanish EL+
P2 and P3	Easy news	people with intellectual disabilities	2020	News web portal (enostavno.info)	Slovenia / Slovenian EL+
P4	News interpreting	adults with a low or medium level of intellectual disability with schooling	2009	Television	Argentina / Spanish EL+
P5	Educative course for validators	people with reading disabilities	2020	Google Classroom	Romania, Austria, Germany, Italy, Slovenia and Spain / English (and will be translated into national languages) EL
P6	Mediation	people with intellectual disabilities	2020	Online	Argentina / Spanish EL

Participant code	Content	Target users	Starting date	Platform	Country/ language/ variety
P7	Informative and institutional videos	non-native Finnish and Swedish speakers, people with loss of cognitive abilities and neurobiological linguistic difficulties	2007-12	Institutional webpages	Finland / Finnish and Swedish EL
P8	Films AD	people with intellectual disabilities	2005-7	Live sessions at the cinema	Brazil / Portuguese EL and PL
P9	Easy Swedish newscast	originally non-native Swedish speakers, later people with intellectual and cognitive disabilities as well	2016	Television and online	Sweden / Swedish EL
P10	Informative and institutional videos	people with intellectual and reading disabilities, and non-native Swedish speakers	2010	Websites	Sweden / Swedish EL
	Training for EL interaction	people with intellectual disabilities	2022	Workshop	
P11	Conference interpreting	people with cognitive disabilities	2016	Online and in-person	Germany and Austria / German EL

Participant code	Content	Target users	Starting date	Platform	Country/ language/ variety
P12	Informative video	people with intellectual disabilities or cognitive decline, prelingual hearing loss, low literacy level and non-native speakers	2016	Asociación Española de Fundaciones Tutelares web page	Spain / Spanish EL
	Audio explanation		2011		

Table 2. Summary of background information.

Looking at the type of content created by the interviewees, four main areas can be identified: news contents, informative and educative content, conferences and meetings interpreting and mediation, and AD and audio explanations.

Starting with news contents, P1 and P4, from Argentina, participate in live news intralingual interpreting addressed to adults with a low or medium intellectual disability who have been through the education system. This service started in response to a 2009 law requiring television content to be accessible to individuals with hearing, visual, and intellectual disabilities. P2 and P3 are Slovenian journalists who produced an easy news video pilot in 2020 that is available online. In their interview, they stated they would start translating audiovisual content into EL in 2023, being the first to produce such content for national TV and radio in Slovenia, despite the existence of other organisations working with EL in the country. Finally, P9's master's thesis focused on Sveriges Television's Easy Swedish newscast, which launched in 2016. The programme reuses news videos and adds a voice-over to make them more accessible to non-Swedish speakers, including refugees and immigrants, and people with intellectual and cognitive disabilities.

Regarding informative and educative content, P5 from Spain was developing an educational course for validators with reading disabilities under the Train to Validate project (2020-2023), parallel to a course for facilitators. At the time of the interview, it was said that the course would

be available on Google Classroom after the project's completion. Currently, it can be found on the webpage of Plena Inclusión Madrid[1]. A precedent in Spain for this type of content could be the programme Planeta Fácil TV. P7 from Finland has also created institutional and informative videos in EL for municipalities, organisations, and enterprises, available on their websites, targeting non-native Finnish or Swedish speakers and people with cognitive impairment and neurobiological linguistic difficulties.

This type of content started being created around 2007-2012. In addition, P10 in Sweden creates and translates institutional videos into EL since 2010, available on institutional websites. Furthermore, they conducted workshops for politicians in 2022 under the My Choice project, led by an NGO study organization since 2014, teaching politicians to speak in EL so that people with intellectual disabilities could vote confidently. An important difference P10 notes between translated and created content is that translated content often lacks a clear target group, as translation is often an afterthought. Finally, P12 from Spain translated a short video into EL in 2016 on establishing guardianship for adults, available on the webpage of the Asociación Española de Fundaciones Tutelares.

Turning to conferences and meetings interpreting and mediation, P6 offers online intralinguistic mediation into EL for persons with intellectual disabilities in both national and international meetings since 2020, being the sole provider of this service in Argentina. Additionally, P11 provides simultaneous conference interpreting in EL for people with cognitive disabilities in Germany and Austria since 2016, both online and in-person. They often have familiarity with their users' education level and the subject they will interpret. Similar services have been offered in Germany since 2010-2013.

Finally, P8 initiated Brazil's International Disability Film Festival in 2003. Around 2005-2007, they introduced special sessions for people with intellectual disabilities with live AD translated into EL and PL, depending on the film. This was unprecedented in Brazil. P12 also created EL audio explanations for theatre plays as part of an accessible theatre project that started in 2011. This content targets people with intellectual disabilities, cognitive decline, prelingual hearing loss, low literacy levels, and non-native speakers.

[1] See https://plenainclusionmadrid.org/train2validate/easy-to-read-academy/

3. 2. Linguistic elements

Table 3 summarises the content types, language variety, and guidelines followed by the interviewees, which will be explained in this section.

Participant code	Content	Language variety	Guidelines	Language
P1	News interpreting	EL+	Internal guidelines UNE standards	Spanish
P2 and P3	Easy news	EL+	Inclusion Europe Zavod Risa	Slovenian
P4	News interpreting	EL+	Internal guidelines UNE standards	Spanish
P5	Educative course for validators	EL	Internal guidelines Plena Inclusión	English (national languages in the future)
P6	Mediation	EL	Easy-to-read Fundación Visibilia IFLA guidelines UNE standards	Spanish
P7	Informative and institutional videos	EL	Easy Finnish Indicator 2.0 Instructions for interaction in oral PL	Finnish and Swedish
P8	Films AD	EL, PL	---	Portuguese
P9	Easy Swedish newscast	EL	IFLA guidelines Inclusion Europe	Swedish
P10	Informative and institutional videos	EL	Swedish Centre for Easy-to-Read	Swedish

Participant code	Content	Language variety	Guidelines	Language
	Training for EL interaction			
P11	Conference interpreting	EL	Capito Netzwerk Leichte Sprache University of Hildesheim	German
P12	Informative video Audio explanation	EL	Inclusion Europe	Spanish

Table 3. Summary of linguistic elements.

While all interviewees simplify language by following basic recommendations for written EL, such as using short sentences, common vocabulary, and avoiding subordination, they each mentioned specific strategies tailored to their content.

Starting with P1 and P4, they simplify live news for two channels using "simplified PL", which we classify as EL+. In one TV channel, they simplify all content by following a subject-verb-complement sentence structure, avoiding technicisms or abstract concepts but explaining them when necessary. They avoid foreign words, abbreviations and acronyms, as well as childish vocabulary, and use repetition to reinforce ideas. However, in the other channel, they only provide an oral explanation for difficult words or concepts and allow users to hear journalists speaking in standard language when they do not speak. Although the interpreters follow an internal guideline based on UNE standards (AENOR, 2018), the specific interpreting styles were chosen by the TV channels.

In contrast, in P2 and P3's easy news pilot the information is already given in EL+, following the Inclusion Europe (2009) and Zavod Risa's guidelines (Haramija and Knapp, 2019) for Slovenian, thereby eliminating the need of interpretation. Their aim is to convey "one or two [pieces of] information per sentence" and "maintain [their] standards" as journalists for accuracy, which means they cannot change certain difficult words or expressions. Instead, they use precise words, numbers, and quantities, while explaining them as simply as possible.

Similarly to P1 and P4, P5 also uses internal project guidelines to create educational videos for validators in EL, although they use Plena Inclusión (2018) for validation. According to P5, structuring and planning the content to be read aloud is key. For example, subordinate sentences should be avoided, as P5 considers them more difficult to understand orally than in written texts. As complex vocabulary cannot always be avoided or adapted in educational contents, it is important to contextualise and explain it without using vulgar or colloquial language.

P6 mediates in conferences and meetings following EL guidelines from Fundación Visibilia, IFLA (2010), and UNE (AENOR, 2018). Their mediation strategies are similar to P1 and P4's interpreting approaches, as P6 may choose to explain or contextualize difficult concepts in some meetings while completely simplifying the entire speech in others. They also adjust their vocabulary depending on the context of the meeting, using common Argentinian Spanish words in regional meetings, and finding a common word across dialects in Latin American meetings.

P7 follows the Easy Finnish Indicator (Finnish Centre for Easy Language, 2022) and recommendations for interaction in oral PL that have been recently revised. Most recommendations align with basic written EL ones, with specific guidelines for Finnish, such as avoiding non-finite clauses and structures. They mention that since EL videos can be "of different kinds", the EL guidelines they follow are more "loose". Furthermore, P7 also observes that "in the videos, you can be more compact with the language than in a text" because an image "can carry the understanding".

In contrast to other interviewees, P8 did not know about EL or PL and AD when they started translating film AD into E2U Language, so they do not follow any specific guidelines or recommendations. To make an easy AD, they use shorter sentences than in standard AD, although P8 also mentions that in standard AD they usually avoid "difficult, rare language" due to time restrictions and aim for precise language because "[the] audience has to understand in a few words", which aligns with basic EL recommendations.

According to P9, the Easy Swedish newscast mostly follows IFLA (2010) and Inclusion Europe (2009) guidelines. Although the programme tries to follow basic recommendations, as with P5, it is not always possible to use common vocabulary due to the topic of the news. Like P7, images in the news programme are used to help explain the content and avoid time constraints. However, P9 found no significant differences when comparing

easy and standard news, possibly because standard news are generally reported in PL.

Turning to P10, they follow the Swedish Centre for Easy-to-Read's guidelines when creating informative and institutional videos and training for politicians. Besides basic EL recommendations, they pay special attention to numbers and statistics, as those can be difficult to understand. As an example, P10 says that "80 million is a lot, but if it's 80 million out of 300 billion, it's very little". Furthermore, when training politicians, they also advise using synonymous words if they have different political nuances, such as "globalisation" and "internationalisation", while explaining them. Finally, P10 also refers to the structure of ER translations, which often must be changed substantially and end up being longer.

Regarding P11, they are familiar with the three main schools of easy German (Capito, Netzwerk Leichte Sprache, and the University of Hildesheim) to provide easy interpreting. Since P11 considers grammar the main comprehension barrier in oral German, they use short, clear sentences, minimise subordinate clauses, and use a more verbal language instead of substantivised words. In terms of vocabulary, they consider the target users' level of education and knowledge when selecting it. For instance, at the Special Olympics, P11 does not explain specific terminology like acronyms because the users understand them.

They also avoid foreign words or explain them if they are widely used. Finally, they avoid compound words by saying "the x of the..." since, although in written Easy German, compound words can be separated with a dash (-) or a middle dot (·), this approach cannot be transferred to oral Easy Language.

Lastly, P12 follows Inclusion Europe guidelines (2009) to create their EL content. As happens with easy AD for P8, audio explanations must be very short due to time constraints. They also avoid using literary techniques typical of theatre plays.

As mentioned as well by P5 and P9, in informative videos, technical terms that cannot be replaced by an easier synonym must be explained, described, or used in a context that makes the meaning obvious. P12 also notes that prosodic elements make it easier to "control the length of the sentences".

As seen, linguistic aspects in oral EL language do not vary much from written recommendations, with a preference for using short and clear sentences with common vocabulary when possible.

3. 3. Prosodic elements

Regardless of content type, most participants agree that a slower speech speed is crucial. However, among the twelve interviewees, only P1 mentions a specific speed, around 125 words per minute in Spanish. P2 and P3 are less specific, aiming to use a speed that is a quarter of the standard Slovenian speed, while P12 recommends a speed that allows the content to be listened to "comfortably" and without "an excessive effort". P5 also notices the importance of using cadence "in a way that attracts attention" and warns against slowing speech in an unnatural or robotic way. P6 mentions the need to anticipate speech while mediating if the speakers are too fast to not lose information.

Speed also impacts modulation and pronunciation, something that is important to keep in mind, as interviewees also agree that pronunciation must be clear. For instance, P1 highlights the impact a faster speed has, as "you can't modulate the words properly", reducing comprehension. Similarly, P12 comments that "you can't speak too fast" because "pronunciation must be very clear". Furthermore, the Easy Swedish newscast aims for an "easier" pronunciation according to P9, while P2, P3, and P12 believe that it should be "more eloquent" and clear than standard speech, though this is already the practice in audio and television content in their countries.

Several interviewees also use intonation to highlight key information to make the content easier, which aligns with the observation put forth by Yoon et al. (2016) that stress and intonation aid in interpreting information. P8 highlights meanings in easy AD by "exaggerating more" to help understand character emotions. In easy interpreting, P11 adopts the speaker's voice and highlights information with intonation, while using less emphasis in standard interpreting. In contrast, P2, P3, and P12 follow existing intonation standards for standard content.

Pauses are another prosodic element noted in reviewed standards and guidelines (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023) and by interviewees. Moreover, research by Blau (1990), Prafiyanto et al. (2018), and Yoon et al. (2016) also emphasises that pauses are crucial for higher comprehension. This is echoed by P10 and P11, who note that pauses help users process information. Concerning the use of pauses, P5 employs them to mark "when you change from one topic to the other" to show "progression". Similarly, P7 suggests making longer pauses "between the

so-called prosodic contents", but not between individual words. In easy interpreting, P11 also observes that pausing is encouraged, unlike in standard interpreting.

The use of expressivity and emotivity differs depending on the content. For news programmes, P4 mentions the simplified version should follow the standard version to help users identify with the speaker. However, both P5 and P6, working on educational video content and mediation respectively, consider important not to be "boring", and P6 explains that the speech should be more like "storytelling" instead of monotonous.

Finally, live interpreter P11 mentions that users prefer a "deeper voice" than a very high one, aligning with the Accessible Information Working Group's (2011) recommendation and the findings in an AD study done by (Machuca and Matamala, 2022, pp. 684, 685). P12, who works with theatre and video content, also adds that voices should match characters on screen. For example, a female character should have a female voice.

3. 4. Time restrictions

Strategies for managing time constraints vary based on content type and whether it is live or pre-recorded.

During live news interpretation, users rely on the images, which must align with the discourse. Because of this, P1 notes that if the news item changes, the interpreters must switch as well, even if the previous interpretation was unfinished. However, P1 observes that journalists often repeat themselves in standard language, allowing interpreters to convey all the necessary information.

For easy AD, P8 considers the length of the films (30 minutes or less) and the gaps for AD between dialogues. Furthermore, the narrators are actors who can improvise if necessary. In "quick and difficult scenes", narrators "simplify more" depending on temporal and contextual requirements.

In conference and meetings interpreting and mediation, P6 and P11 agree that summarising is key. For example, if a speaker talks too fast or provides too much information, P11 may only provide key points or just explain some of the examples given to avoid overwhelming users. Conversely, P6 sometimes waits for the speaker to complete an idea before summarising everything.

Finally, P12 explains that the audio explanations for a theatre play were created considering the time available. A sound technician was present during the play to ensure timing, and the actors tried to not take too many "licenses" to avoid overlaps.

Regarding pre-recorded content, P9 explains that in the Easy Swedish newscast, which lasts 5 minutes, there are two or three in-depth news items and some shorter ones lasting 15 seconds. However, this occasionally results in complex news items that are not easier than the standard due to insufficient time for detailed explanations. P9 also notes that "it's also difficult to just have five minutes when you are targeting groups that need more time". Similarly, P2 and P3's easy news pilot has a duration of around 1 minute to 1 minute and a half, following news and informative programme standards. However, they mention that their content might be "longer", but they will "test it".

P5 educational videos are also around 5-6 minutes long so as not to overwhelm users, compared to the 8-10 minutes for standard users. Additionally, P5 mentions that the content "needs to be shorter" than the standard version or else users may become distracted. As videos are mostly created from scratch, there are fewer time restrictions, but when standard videos must be translated, P5 relies on summarising information. P7 also creates informative videos and prefers to make them "short", although they do not have time restrictions nor duration limits.

Finally, P10 does not report any time constraints in their informative videos.

To summarise, two main discussion areas emerge: the maximum duration of simplified E2U content and the synchronisation of the simplified audio with the visuals, which is especially challenging in translated content. Time constraints are solved by summarising information and, where possible, preselecting the content to be translated.

3. 5. Paratextual elements

Table 4 summarises the paratextual elements used by the interviewees, which will be explained in this section.

Participant code	Content type	Images and video	Subtitles or transcripts	Others
P1	News interpreting	standard video		
P2 and P3	Easy news	-adapted -must be concrete -correlation between audio and image	closed captions	news article
P4	News interpreting			
P5	Educative course for validators	-the speaker is visible -images strengthen comprehension		transcription, bibliography, teacher guides and exercises
P6	Mediation	the mediator is invisible		
P7	Informative and institutional videos	images help explain and shorten narration		
P8	Films AD	film video	untranslated subtitles	untranslated voice-over, discussion session
P9	Easy Swedish newscast	-standard video -correlation between all content elements	-for foreign languages, strong dialects, and bad audio quality -audio subtitles on the website	
P10	Informative and institutional videos		-subtitles with text-to-speech -translated and untranslated	
	Training for EL interaction			

Participant code	Content type	Images and video	Subtitles or transcripts	Others
P11	Conference interpreting			brief summary, red card
P12	Informative video	correlation between audio and image	untranslated subtitles	
	Audio explanation			

Table 4. Summary of paratextual elements.

Most of the content the interviewees work with include videos and/or images. In news content, the interviewees report different practices regarding this visual support. P1 and P4 cannot change the images in their live news interpreting, while P2 and P3 can modify the standard content for their easy news. P2 and P3 try to use "concrete" photos or "the best approximation possible" to correspond with the audio elements. However, ensuring a "balance" between being concrete and not repetitive is difficult since using the same image repeatedly can make the content less dynamic. P9 also emphasises the importance of all content elements, "verbal, non-verbal, visual, and non-visual", cooperating to create the news, which is challenging to achieve. P9 notes that in easy news, this cooperation is sometimes lacking, and the video is not as integrated in the narration as in standard news.

To create informative and educative videos, P12 collaborated with an illustrator who was "knowledgeable about facilitating comprehension" to create an informative video where the images closely followed the audio steps. Regarding this, P7 and P9 also acknowledge that images can be used to explain information and reduce narration. However, P5 and P6 disagree on whether the speaker should appear on screen. P5 adds a small window for a "human connection", while P6 believes a mediator should be "hidden" unless requested. P5 also incorporates PowerPoint presentations, often with images to enhance comprehension and make the information more appealing.

Subtitles and transcripts are another support element present. P2 and P3 use closed captions for the whole video, but not transcripts, which they find "not so easy to read". On the other hand, P9 says the Easy Swedish

newscast only uses subtitles for foreign languages, strong dialects, or bad audio quality. Furthermore, although they mention that there are audio subtitles on the website, these do not work well as users hear the easy narration and the audio subtitle simultaneously. For institutional videos, P10 uses subtitles with a text-to-speech function that are either a "shortened version" of the audio or untranslated, while P12's subtitles for informative videos are untranslated. Finally, P5 prefers transcripts instead of subtitles, as they find them "easier" for users.

As a final point, several of the interviewees mentioned other elements they use as support for users. For example, P5 offers further bibliography on the topic of the videos, teacher guides, and exercises for the students to supplement the educative videos, while P2 and P3 have considered using easy news articles to supplement the easy news videos. The dialogues in P8's films are also voiced-over live, but not translated into E2U Language as is the case with the AD.

However, despite potential mixed language difficulties (Maaß & Hernández Garrido, 2020, p. 151), P8 does not report such problems. They add that a post-film debate session can clarify any confusion, and P8 can provide additional information about the film and plot upon request before the screening. In conference interpreting, P11 comments that sometimes a brief summary of the ideas discussed is offered every half an hour or hour to reinforce them. Furthermore, for in-person interpreting, P11 gives users a red card they can raise to signal they need further clarification or contextualisation.

3. 6. Validation and evaluation

Validation is a crucial element in the Spanish UNE standard (AENOR, 2018), where a group of validators collaborates with a facilitator to "evaluate the comprehensibility of a document" in EL. The ISO/IEC 23859:2023 standard (ISO, 2023) broadens this concept and refers to "evaluation", which includes expert and user evaluations "to determine whether content is easy to read and easy to understand". However, the ISO standard acknowledges that it may not always be possible to evaluate content with users before its release, so expert evaluation may be relied upon. User feedback can still be gathered after publication to improve existing practices and evaluate content.

Three different validation/evaluation processes were identified among the interviewees.

Firstly, there are the cases in which some content is not validated due to time constraints but can receive feedback for future improvement. For instance, P1 and P4 do not validate their live news interpreting due to the lack of a unified organisation representing people with intellectual disabilities in their country. P1 and P4 can receive "comments" through television channels and the organisation Defensoría del Público; however, not many are received due to the service being unknown to the target group.

Although P2 and P3's content is not live, they also mention that they cannot wait to make the easy news available to users, so they cannot validate the content before publishing it. Nonetheless, they plan to receive "feedback" with questionnaires through user organisations, as they do in easy news articles, to improve future content.

In simultaneous conference interpreting, P11 uses a red card system for "pseudo-verification" during the conference and afterwards, if possible, speaks to users "to receive feedback". They also use users' expressions to gauge comprehension when possible.

Finally, although P8 works with visually impaired "validators" for the standard AD, they do not do the same yet with the easy AD. However, they mention that they receive feedback for the easy AD after the screening sessions and they plan to work with "persons with intellectual disabilities" to validate the easy AD in the future.

Secondly, validation is part of the creation process in some instances. P9 notes the Easy Swedish newscast "evaluates" the content with Swedish language learners but not with additional target users, although P9 is not aware of what the evaluation entails. P5's educational course will also be "evaluated" in each of the local languages with a "facilitator" who will go through a "battery of common questions" with validators. P10's training workshop "works closely" with the Swedish Association for Children, Youth and Adults with Intellectual Disabilities, with whom they hold focus groups. Finally, P12 usually works with 3-8 validators who "review" the content with a facilitator but, in the past, they have also worked with a person with an intellectual disability during production.

Thirdly, some content is not validated nor receives feedback. P7 notes that while they recommend using "test users" or involving users in production, it is not required, and it is often not done. P10 is also unsure if institutional and informative videos are validated.

Participant code	Content type	No validation, but feedback	Validation or inclusion of target group	No validation nor feedback
P1	News interpreting	X		
P2 and P3	Easy news	X		
P4	News interpreting	X		
P5	Educative course for validators		X	
P6	Mediation			
P7	Informative and institutional videos			X
P8	Films AD	X		
P9	Easy Swedish newscast		X	
P10	Informative and institutional videos			X
	Training for EL interaction		X	
P11	Conference interpreting	X		
P12	Informative video Audio explanation		X	

Table 5. Summary of validation and evaluation procedures.

4. CONCLUSIONS

This article reports on data obtained from eleven semi-structured interviews with experts who use oral E2U Language in audiovisual content. This has allowed us to address our research question and map current practices and challenges regarding linguistic and prosodic aspects, paratextual elements, and validation processes.

The results show that most interviewees find written E2U Language recommendations (such as using short and active sentences, common vocabulary, and avoiding subordination, metaphors, and abstract concepts) appropriate for oral content, although they note that technical or complex concepts may be difficult to avoid. Prosodic features like slower speech speed, pauses, and good pronunciation are important regardless of content type. However, only two specific speed rates are mentioned: 125 words per minute for Spanish, and a quarter of the standard speed in Slovenian. Intonation is used to highlight information, and naturalness is also important, according to the interviewees. Time constraints in translated content is mostly managed through summarisation. Easy news, educational and informative videos, and live easy AD do not exceed the recommended maximum of 30 minutes (Inclusion Europe, 2009), while the duration of news and conference interpreting, mediation, and theatre audio explanation is unknown. Images and videos must be precise and correlate with the audio, in line with existing guidelines (Accessible Information Working Group, 2011; Inclusion Europe, 2009). However, research on enhancing comprehension in written content with images shows unclear results (Rivero-Contreras et al., 2021; Schatz et al., 2017; Sutherland and Isherwood, 2016). Interviewees' opinions differ on using transcriptions or translated or untranslated subtitles. More research is needed in this area, in line with the studies by Bernabé-Caro et al. (2020), Bernabé-Caro and Cavallo (2021), and Oncins et al. (2020). Finally, validation and evaluation practices vary, but interviewees stress time constraints that impede or difficult this process before publication.

According to the interviewees, genre affects linguistic aspects, such as vocabulary and word precision, content narration, and emotivity. The Slovenian easy news follows journalistic standards for accuracy in vocabulary and expressions. Similarly, educative and informative videos sometimes must use complex terminology. During training for politicians, using different synonyms for political terms is suggested, if they are well explained. Simplification strategies vary: news interpreting and mediation involve either complete simplification of speech or contextualisation of complex concepts depending on the TV channel or meeting. Conversely, in live easy film AD, the simplification level is adjusted based on time restrictions. Finally, in news interpreting, emotivity should match the standard, but in educational videos and mediations, it is important to avoid being boring.

This study has several limitations. Firstly, the focus is mainly on EL or EL+ since only one interviewee reports using PL. Secondly, rather than focusing on one genre or country, the research has looked at diverging types of content which nonetheless share one key aspect: the use of oral E2U Language in audiovisual one-way communication settings. Each content has its own specificity and would merit independent research, but this article provides a first contrastive approach and serves as a basis to understand how oral E2U Language is currently being used in audiovisual settings.

New research directions have also been identified in relation to oral E2U Language. In prosodic aspects, research is needed to determine the optimal speech speed, keeping in mind that it may vary between languages. Additionally, pauses should be studied to determine their effectiveness, as well as their optimal length and position. Researching the preferred type of emphasis could also be studied. Finally, emotivity also requires further research, as the interviewees have diverging views. Research like Blau (1990), de-la-Mota and Rodero (2011), Prafiyanto et al. (2018), or Yoon et al. (2016) could be used as a basis to expand into research with people with cognitive disabilities as a target group. Effectiveness of transcriptions versus translated or untranslated subtitles remains uncertain as well. Investigating the impact of orality on the efficacy of shorter sentences would be valuable. This is particularly relevant, as an interviewee mentioned using prosodic elements to control sentence length, and Kotani et al. (2014) discovered that sentence length had no significant influence on listenability, in contrast to written texts.

Additionally, it is worth exploring whether the favoured grammatical structures in written language are equally understandable in oral texts. All in all, research possibilities are manifold because, as indicated in the introduction, investigations in this field are still limited.

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The effect of speech rate on easy language audios comprehension

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ABSTRACT

Easy Language is a simplified language variety designed to make information more comprehensible for diverse target groups, including individuals with intellectual disabilities, second-language learners, and those with neurocognitive disorders. Although certain guidelines and standards of Easy Language give some recommendations regarding prosodic aspects, these have not yet been tested with the target user groups considered in this study. This study investigates the impact of speech rate on comprehension of Easy Language audios in Catalan, as well as the acceptability of different speech rates and users' preferences. Three participant groups were involved: individuals with intellectual disabilities, neurotypical second-language learners, and a neurotypical control group. Four distinct speech rates were assessed (130 wpm, 150 wpm, 170 wpm, and 190 wpm). The results indicated that speech rate had no significant effect on comprehension across any group. However, it is important to highlight that all three groups agreed that 150 wpm was the most acceptable speed, and it was also among the most preferred speeds.
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1. Introduction

According to ISO/IEC 23859, Easy Language is a language variety that applies specific recommendations on wording, structure, design, and evaluation to ensure information is accessible to people who have reading comprehension difficulties for any reason. Although this language variety is often referred to as "Easy-to-Read language" (ISO, 2023), the term "Easy Language" has become widely used (Fuchs, 2024) due to its applicability to not only written texts, but other formats as well (ISO, 2023). In practice, it has already been applied to oral and audiovisual formats, such as Easy Language interpreting, easy news programmes, and easy audio descriptions (Maaß, 2020; Miyazaki, 2007; Nahón Guillén, 2020; Pujadas-Farreras and Matamala, in press; Rubanovsky-Paz et al., 2024a; Schulz et al., 2020; Yalon-Chamovitz et al., 2019). In the academic field, projects like EASIT,[1] SELSI[2] and WEL[3] have also begun to explore the possible applications of Easy Language on oral and audiovisual formats, and various authors have also examined and theorised about its application across different audiovisual accessibility modalities, including easy audio descriptions, easy audio subtitles and easy audio guides (Alba-

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Rodríguez, 2024; Arias-Badia and Author 2, 2020; Arias-Badia and Matamala, 2023; Bernabé-Caro, 2020a, 2020b; Bernabé-Caro and Cavallo, 2021; Bernabé-Caro and García, 2019; Bernabé-Caro and Orero, 2020, 2019; Diab et al., 2024; Maaß and Hernández Garrido, 2020; Matamala, 2023; Perego, 2024; Randaccio, 2022; Rubanovsky-Paz et al., 2024b; Taylor and Perego, 2020). Specifically, one of the aims of the WEL project (From written to oral texts in Easy Language: easy audios in cultural visits and video games) is to study the practices of oral Easy Language in relation to the creation processes, users, and their main characteristics (WEL project, 2024).

However, the number of guidelines and standards that give recommendations to create audio, video, or multimodal content in Easy Language is quite limited (Accessible Information Working Group, 2011; ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023; North Yorkshire County Council, 2014; UK Disability Unit, 2021). Furthermore, these guidelines often lack clarity, particularly in their recommendations regarding prosodic features such as pauses, intonation, and speech rate (Pujadas-Farreras and Matamala, in press), leaving significant room for interpretation and potential ambiguity. An example of such vagueness is recommending the use of a suitable (ISO, 2023), slower speech rate (Inclusion Europe, 2009; North Yorkshire County Council, 2014) that is not too slow (ILSMH-EA, 1998). Furthermore, academic research that validates the effectiveness of the oral recommendations provided remains limited (González-Sordé and Matamala, 2023; Hansen-Schirra and Maaß, 2020a; Sutherland and Isherwood, 2016).

This article focuses on one key prosodic recommendation, using a slower speech rate (Pujadas-Farreras and Matamala, in press), by examining participants' comprehension, acceptability, and preferences regarding Catalan Easy Language audios at varying speeds. In this study, acceptability refers to participants' assessment of which speech rates they consider suitable, indicating the speeds they would find acceptable for listening. Preference, on the other hand, refers to the specific speech rate participants favour or prefer the most, reflecting their personal choice among the options presented. In Easy Language studies, it is important to assess these two factors as well, as it has been shown that acceptability can influence the cognitive processing costs associated with reading Easy Language texts (Gutermuth, 2020).

The study includes three participant groups: Catalan native speakers with intellectual disabilities, neurotypical second-language learners of Catalan at the A1/A2 level of the Common European Framework of Reference for Languages, and a control group of neurotypical native Catalan speakers.

The article is organised as follows: Sections 2 and 3 present a brief overview of Easy Language and speech rate studies. Section 4 introduces the materials and methods used in the experiments, while Section 5 presents the results of the experiments. Finally, Section 6 discusses the results and Section 7 presents the key conclusions drawn from the study.

2. Easy Language users and recommendations

Although Easy Language was initially designed for adults with intellectual disabilities (Maaß et al., 2021), its potential beneficiaries have since expanded (Fuchs, 2024). Bredel and Maaß (2016) categorise these groups into primary and secondary target audiences. Primary target groups depend on Easy Language due to their limited or non-existent access to standard language texts. Conversely, secondary target groups are able to comprehend standard language but choose to make use of Easy Language as well. Lindholm and Vanhatalo (2021) note that, in addition to individuals with "clear cognitive impairments", various other target groups are recognised in each country. These groups may include people with learning disabilities, neurocognitive disorders, functional illiteracy, second-language learners, children in specific circumstances (such as needing medical treatment instructions), and even the general public facing challenges like illness or fatigue.

Some key linguistic characteristics of Easy Language are using everyday vocabulary, avoiding technical, abstract, and complex terms when possible, using simple verb forms, and avoiding long and complex sentences (ISO, 2023). While specific linguistic recommendations for the oral format are not given, professionals working with Easy Language in audiovisual formats have reported that these written recommendations are useful for the oral format as well and generally do not require adaptation (Pujadas-Farreras and Matamala, in press). This could be due to the fact that the principles of Easy Language often naturally coincide with the characteristics of spoken language. Furthermore, these principles also reflect general recommendations aimed at improving listenability for the general public (Rubin, 2012). However, upcoming research from the WEL project may provide further insights into this relationship.

Prosodic recommendations for Easy Language outlined in guidelines and by professionals (Pujadas-Farreras and Matamala, in press) include using low-pitched voices (Accessible Information Working Group, 2011), avoiding strong accents (Inclusion Europe, 2009), and speaking at a suitably slower pace (Inclusion Europe, 2009; North Yorkshire County Council, 2014). Moreover, pauses should be used (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023) and speech should be clear (Inclusion Europe, 2009; ISO, 2023; North Yorkshire County Council, 2014).

However, when applying these recommendations, it is essential to account for the diverse cognitive characteristics not only across different target user groups but also within each individual group (Foster-Cohen and Bysterveldt, 2020; Fuchs, 2024). This makes it crucial to not only empirically validate the existing Easy Language recommendations but also to evaluate them with diverse groups. At the moment, empirical research on this topic is still lacking (González-Sordé and Matamala, 2023; Hansen-Schirra and Maaß, 2020a; Sutherland and Isherwood, 2016), but a literature review by González-Sordé and Matamala (2023) identified studies evaluating visual support (Rivero-Contreras et al., 2021; Schatz et al., 2017), linguistic simplification (Buell et al., 2020; Schmutz et al., 2019), word frequency (Fajardo et al., 2013, 2014; Rivero-Contreras et al., 2021), literacy mediation (Buell et al., 2020; Schmutz et al., 2019), connectives (Fajardo et al., 2013, 2014), co-references (Fajardo et al., 2014), and number of sentences, text length, and word length (Fajardo et al.,

2014; Schmutz et al., 2019). Since that review, additional studies have emerged addressing these areas (Borghardt, 2022; Canut et al., 2024; Deilen, 2022, 2023; Deilen et al., 2022; Frondén and Kaakinen, 2023; Rivero-Contreras et al., 2023), as well as new topics such as font size (Sieghart, 2023), the credibility of simplified texts (Sparks and Waddell, 2024), and the effectiveness of digital versus paper-based Easy Language content (Säuberli et al., 2023).

Studies on prosodic recommendations for Easy Language are even less prevalent, with only two studies identified so far (Prafiyanto et al., 2018; Wei et al., 2016) on Easy Japanese.

3. Speech rate and comprehension

According to Canals et al. (2006), the average speaking speed in Catalan is around 120 to 150 words per minute (wpm). Similarly, Albaladejo (2020) recommends a speed of 150 wpm for oral discourse. However, a report by the Institut d'Estudis Catalans (2023) analysing the linguistic quality of weather forecasts notes an average speech speed of 189 wpm, with individual speakers ranging from 134 to 222 wpm. Similarly, a study by Cabeza-Cáceres (2013) found an average of 198 wpm (or 17 characters per second) in audio description, where reducing the speed to 14 characters per second resulted in a nearly 9 % improvement in comprehension.

Studies in other Romance languages provide additional context regarding speech rates and comprehension. In Spanish, Hills (1987) suggests a speed of 160 words per minute in radio broadcasts, while Rodero (2016) determined that a speaking speed of 170–190 wpm was the most comprehensible. Interestingly, the often-recommended speed of 150 wpm proved to be notably more challenging for listeners to understand. Similarly, in Italian, guidelines for audio description recommend not exceeding 160 wpm (Blindsight Project, 2014). Bendazzoli's (2010) research highlights an average speech rate of 130 wpm for interventions in the European Parliament in Italian and 152 wpm for interventions in Spanish.

Research on speech rate and comprehension has yielded varying results. Lasky et al. (1976) and Pashek and Brookshire (1982) found that aphasic individuals demonstrated improved comprehension when exposed to slower speech rates of around 120 words per minute. In contrast, other authors (Blanchard and Prescott, 1980; Brookshire and Nicholas, 1984; Nicholas and Brookshire, 1986) report inconsistent results regarding comprehension improvement with reduced speech rates. Additionally, several studies (Blumstein et al., 1985; McCroskey and Thompson, 1973; Small et al., 1997a, 1997b; Tomoeda et al., 1990) have found no significant improvement in comprehension for individuals with Alzheimer's disease, aphasia, or specific language impairments when speech rates were slowed. Similarly, research involving second-language learners also presents mixed findings. Some studies report that slower speech rates enhance comprehension (Brindley and Slatyer, 2002; Chaudron, 1988; Chiu and Chen, 2023; Griffiths, 1990; McBride, 2011; Zhao, 1997), while others have found no significant benefit (Blau, 1990; Sugai et al., 2016). The two identified studies testing speech rate in Easy Language also involved L2 and non-native participants and found non-significant effects on comprehension (Prafiyanto et al., 2018; Wei et al., 2016).

This variation in results can occur because the classification of speech rate as "fast" or "slow" is subjective and dependent on the context of each experiment. Different studies may use different benchmarks or standards to define what constitutes a "fast" or "slow" speech rate (Zhao, 1997). Factors such as the population being studied, the purpose of the experiment, or even cultural differences in speech perception can influence these categorisations. As a result, the same speech rate might be perceived differently in varying experimental settings, leading to different results.

4. Materials and methods

This study aimed to assess the effect of different speech rates in the comprehension of Easy Language audios among two Easy Language target groups: persons with intellectual disabilities and neurotypical second-language learners, as well as with a neurotypical control group of Catalan native speakers. The study sought to answer two key questions:

1. Does speech rate affect comprehension of oral Easy Language texts?
2. What speech rate do participants find most acceptable and preferable?

This research was approved by the Ethics Committee of the Autonomous University of Barcelona.

4.1. Participants

This study involved a total of 101 participants, divided in three groups: (1) a control group of native Catalan speakers, (2) a group of Catalan second-language learners (L2 group), and (3) a group of individuals with intellectual disabilities (ID group), also native Catalan speakers.

Participants in the control group were recruited through snowball sampling using social media and posters in public spaces. For the L2 group, in addition to snowball sampling via the Consorci de Normalització Lingüística and UAB Idiomes school, three adult education schools (CFA Madrid, CFA Torre Romeu, and CFA Gavà) participated by involving their students in the experiment as part of a class activity. Finally, the ID group was recruited through two associations: SOM Fundació and

Fundació Asproseat Proa Esplugues. Participation in all cases was voluntary, and no economical compensation was offered. Those who took part in the experiment as a class activity had the option to decline without any impact on their class marks.

Each participant underwent an intelligence screening test, the Raven's Progressive Matrices (Raven, 1998). This test, explained in more detail later, was performed to ensure a homogeneous participant sample for each group. For participants with intellectual disabilities, a first screening was conducted by the associations they belonged to.

The control group included 35 neurotypical participants, all adult native Catalan speakers. The mean age of the control group was 46.31, with a mean Raven test score of 34.14 (out of 36). The L2 group comprised 31 neurotypical adult participants without intellectual disabilities, 18 of whom were learning at the A1 level of the CEFR and 13 at the A2 level. The mean age of the L2 group was 38.65, and their mean Raven test score was 33.39. Most L2 participants (26 out of 31) had Spanish or other Romance language as their native language. Finally, the ID group included 35 native Catalan-speaking adults. The mean age of this group was 45.66, while the mean Raven test score was 21.31 (see Table 1 for an overview). None of the participants reported hearing difficulties. There are no significant age differences among the three groups ($p = 0.137$). However, the ID group scored significantly lower on the Raven test compared to the neurotypical groups ($p < 0.001$).

Table 1
Participants demographics.

	Control	L2		ID
Age (Years)	46.31 (±16.51)	38.65 (±13.52)		45.66 (±14.58)
Raven test	34.14 (±1.85)	33.39 (±1.84)		21.31 (±6.91)
Catalan level	Native	A1	18	Native
		A2	13	

4.2. Stimuli

For these experiments, four texts in Catalan Easy Language were created by adapting excerpts from the book *Com tenir cura del planeta* (*How to Take Care of the Planet*) (Peralta, 2023). This book is written in Catalan Easy Language and explains various concepts regarding the environment and climate change. The excerpts were selected to ensure that each text was independent—that is, no text contained information necessary to understand the others—since their order was randomised across participants. Each excerpt was also modified to be similar in length and difficulty.

Each text consisted of 130 words, with a low text complexity, and did not include low-frequency words. Based on the Flesch-Szigriszt readability index, all four texts were rated as "very easy," with scores ranging from 80 to 87. This index was used because it has been adapted for Spanish (Barrio Cantalejo, 2007) and is also often used for Catalan (Pérez Colomé, 2011). The texts and comprehension questions were also externally validated through expert judgment, with each expert providing their individual opinions independently and without direct communication, following one of the methodologies proposed by Cabero Almenara and Llorente Cejudo (2013).

The texts were recorded by a professional female voice actor with a F0 of 218 Hz. A deeper voice was chosen based on the findings from interviews conducted by Pujadas-Farreras and Matamala (in press), as well as recommendations from Machuca and Matamala (2022) and the Accessible Information Working Group (2011).

Each audio recording was adjusted to produce four different speeds: 190, 170, 150, and 130 wpm, to be able to randomise the stimuli. For example, one participant might listen to Text A at 150 wpm, while another participant might listen to it at 130 wpm. The initial speed of 190 wpm was selected based on the average speech rate found in Catalan news programmes (Institut d'Estudis Catalans, 2023). To establish the remaining three speeds, Rodero's (2016) methodology was followed, decreasing each subsequent stimulus by 20 wpm. This approach allowed for the examination of speech speeds at 150 wpm, recommended in Catalan (Albaladejo Mur, 2020), and 130 wpm, which is near one of the speeds suggested by professionals in Pujadas-Farreras and Matamala (in press). The audio recordings ranged in length from 40 s to 1 min, depending on the speed of the audio.

The audios were also adjusted to ensure that pauses in speech adhered to the standard durations in Catalan (590 ms for intra-sentence and 250 ms for inter-sentence pauses) (Cantin and Ríos, 1991), ensuring that pause length did not influence the results.

4.3. Evaluation methods

As previously mentioned, participants were screened using Raven's Progressive Matrices (Raven, 1998), a non-verbal intelligence test commonly employed to evaluate general human intelligence and abstract reasoning abilities. This test serves as a non-verbal indicator of fluid intelligence (Bilker et al., 2012). In this study, the Raven Coloured Progressive Matrices version was utilised, specifically designed for young children aged 5 to 11, individuals with intellectual disabilities, and the elderly (Domino and Domino, 2006). The test had a total of 36 questions. Each question presented a geometric design with a missing piece, requiring participants to select the correct piece from a set of six options. An example can be seen in Fig. 1.

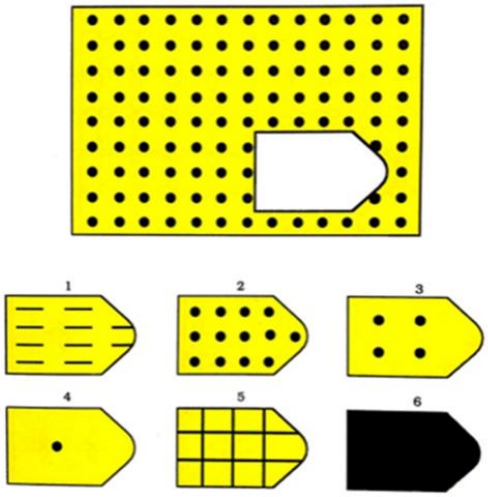


Fig. 1. Raven test example.

Comprehension was evaluated using multiple-choice questions, with each audio accompanied by three questions offering three answer choices. These questions measured comprehension at the literal level, that is, only referring to information that is specified in the audio (Herber, 1970). Therefore, for each speed, participants could achieve a maximum score of 3 by answering all questions correctly or a minimum score of 0 if none were answered correctly. The comprehension questions were validated using the same process applied to the audios.

Acceptability of each speed rate was measured using a five-point Likert scale through which participants shared their perception of each speed: too fast, fast, suitable, slow, or too slow.

Finally, a preference question was posed, asking participants to select their preferred speech rate, if they had one.

4.4. Procedure

The experiment took place over a single day in a quiet room, with each session lasting no more than an hour. Participants began by signing a written informed consent and were given the chance to ask any questions or share concerns about the experiment. They also answered demographic questions and indicated whether they had prior knowledge of the audio topics: sustainability and climate change.

After completing the Raven test, which was administered individually or in small groups, participants proceeded to the individual listening comprehension test. First, a volume test was conducted to ensure the audio was at an optimal level for each participant. During the comprehension test, each participant listened to four audios, each set at a different speech rate, without any accompanying transcript. After hearing each audio, participants answered three multiple-choice comprehension questions orally. Each audio was played twice, and the comprehension questions were asked after each listening. Responses from both rounds were recorded.

After each audio speed was played twice, participants were also asked for the acceptability of that specific speech rate. Once all speeds were completed, participants were asked to select their preferred speed, if they had one.

To control for potential extraneous factors, participants were exposed to the speech rates in varying orders, since previous studies have indicated that exposure to slower speech rates may cause subsequent temporal information to be perceived as relatively faster, while exposure to faster speech rates can result in the same temporal information being perceived as relatively slower (Ainsworth, 1974; Fujisaki et al., 1975; Summerfield, 1981).

4.5. Data analysis

Data analysis was conducted using SAS v9.4 software, with a confidence level of 95 %. Bivariate tests were selected based on variable types and distributions. For two qualitative variables, distribution homogeneity tests were applied (Chi-Square, Fisher's Exact, or Likelihood Ratio), depending on criteria compliance. When analysing one quantitative and one qualitative variable, the assumptions for normality (Shapiro-Wilk) and variance homogeneity (Levene's test) were first assessed. Based on these results, either parametric tests (*t*-Test or ANOVA) or non-parametric tests (Kruskal-Wallis) were used. For one

ordinal and one qualitative variable, a generalised linear model with a binomial distribution was employed. For two quantitative variables, Pearson's correlation coefficient assessed the linear association. For ordinal quantitative variables, non-parametric tests (Kruskal-Wallis) were applied. Significant findings in these tests prompted post-hoc pairwise comparisons, with p-values adjusted for Type I error using Tukey or Bonferroni corrections as required.

5. Results

This section will present the comprehension results for each speech rate, along with user acceptability ratings and final speed preferences for each group.

5.1. Comprehension results

A first analysis to ensure the different variables in each group were not affecting the comprehension results shows that the order in which each speed was presented did not significantly impact comprehension for any of the groups. Similarly, comprehension of the different speeds within the groups was not significantly associated with Raven test scores either. Age was generally not a significant factor either, with two exceptions. In the ID group, a positive trend emerged at the 130 wpm speed, where older participants performed better. Similarly, in the L2 group, a comparable trend appeared at the 170 wpm speed, again showing improved performance with increasing age. However, age was not a significant factor at other speeds for these groups. Finally, language level for the L2 group was significant only at the 150 wpm speed, where A2-level participants demonstrated significantly higher comprehension ($p = 0.02$).

Having addressed the background variables, we can now examine the main comprehension outcomes in detail. Starting with the fastest speed, 190 wpm, there is a significant difference in comprehension between the control group and both the ID and L2 groups ($p < 0.001$). The control group achieved a mean score of 2.91 (±0.28), while the ID group scored 2.03 (±0.86) and the L2 group scored 2.29 (±0.82) (Fig. 2). Although the L2 group's score is slightly higher than the ID group's, this difference is not significant ($p = 0.166$), suggesting that both groups experience similar difficulty comprehending at the highest speed.

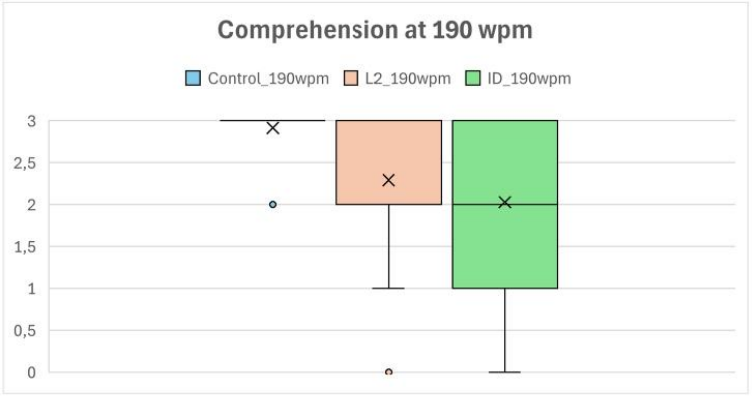


Fig. 2. Comprehension results at 190 wpm.

The results at 170 wpm are mixed (Fig. 3). The control group achieved a mean score of 2.80 (±0.41), while the ID group scored 1.80 (±0.99). In both cases, the mean score was lower than the scores obtained at 190 wpm, though the difference was not statistically significant. In contrast, the L2 group shows some improvement, with a mean score of 2.45 (±0.68).

A comparison of the three groups shows that, although the L2 group's comprehension improves at 170 wpm, their performance is still significantly behind the control group ($p = 0.021$). However, the difference between the L2 and ID groups also becomes significant ($p = 0.006$). This indicates that while the reduction in speed did not fully bridge the gap with the control group comprehension levels, it did benefit the L2 group enough to set them apart from the ID group in comprehension performance.

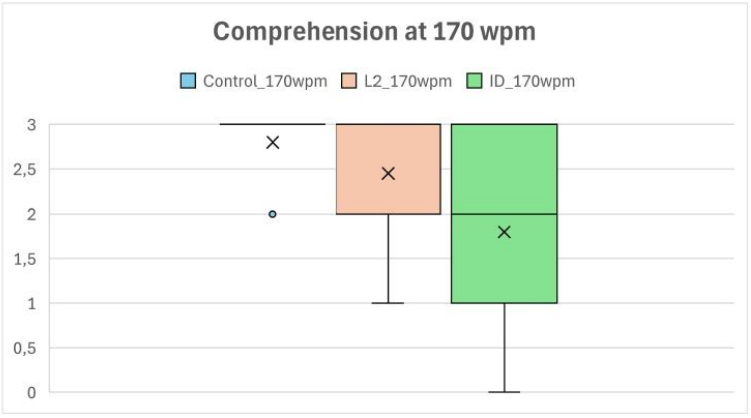


Fig. 3. Comprehension results at 170 wpm.

The comprehension results at 150 wpm reveal further unexpected patterns (Fig. 4). Unlike the improvement seen at 170 wpm, the L2 group did not maintain a higher level of comprehension at this speed, achieving a score of 2.29 (±0.82), the same as their performance at 190 wpm. Meanwhile, the ID group showed a slight improvement compared to the previous speed, with a score of 1.97 (±0.92), although this remains lower than their score at 190 wpm. The control group is the only one to show a slight improvement to their previous best speed, with a score of 2.97 (±0.17).

Comparing the groups shows that the gap in comprehension between the L2 and ID groups, which had become significant at the 170 wpm speed, is no longer significant ($p = .147$), while the difference between these two groups and the control group remains significant ($p < 0.001$).

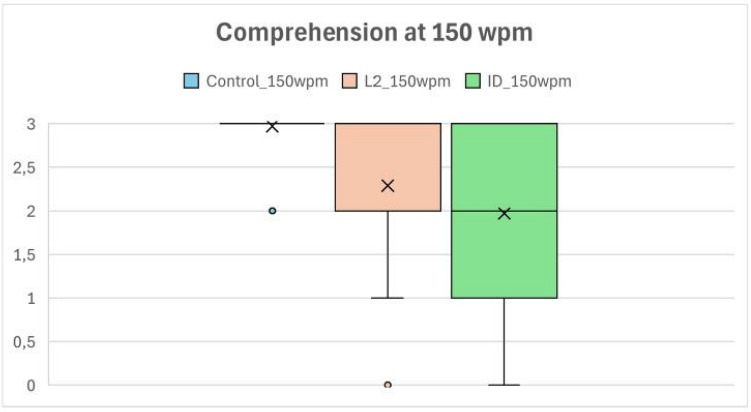


Fig. 4. Comprehension results at 150 wpm.

Finally, the slowest speed, 130 wpm, shows an increase in comprehension for both the L2 and ID groups (Fig. 5). The ID group achieved their highest score at this speed, with a mean score of 2.31 (±0.80), while the L2 group scored 2.39 (±0.80), although this does not exceed their score at 170 wpm. The control group's score of 2.91 matches their result at 190 wpm, but with a higher standard deviation (±0.37), indicating that the group's performance is less consistent than at the faster speed.

Despite the slight increase in comprehension for the L2 and ID groups, the difference between these groups and the control group remains significant ($p < 0.001$). This indicates that, even at the slowest speed tested in the study, the L2 and ID groups did not reach a comprehension level comparable to that of the control group.

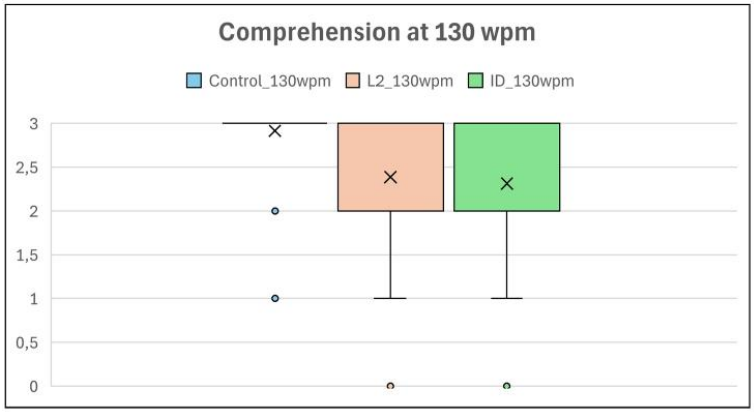


Fig. 5. Comprehension results at 130 wpm.

Notably, despite the variation in comprehension across different speeds, the differences are not statistically significant in any of the three groups, suggesting that speech rate might not be as relevant to comprehension as previously thought.

5.2. Speed acceptability

As noted in Section 4, acceptability was assessed using a five-point Likert scale, with the following ratings: 1 = too slow, 2 = slow, 3 = suitable, 4 = fast, and 5 = too fast.

Starting with the acceptability results from the control group, the order in which the faster speeds, 170 wpm and 190 wpm, were presented significantly influenced their ratings. When 170 wpm was presented as the second speed after 130 wpm, it was rated as "too fast." However, when it was heard as the last speed, it was considered "suitable." Similarly, 190 wpm was rated as "too fast" when presented at the end but was described as "fast" when heard in the second position. It indicates that perceptions of speech rate are relative and depend on the context provided by previously heard speeds, rather than being absolute judgments.

Fig. 6 shows the error bars indicating how consistent the participants' ratings are for each speech speed. Shorter error bars mean the ratings were more consistent among participants, while longer error bars indicate greater variability in their responses. Overall, the speed rated closest to 3 ("suitable") is 150 wpm, with an average score of 2.94, closely followed by 170 wpm, which received a slightly higher score of 3.11. In contrast, 130 wpm was rated at 1.86, indicating that it was generally perceived as slow, while 190 wpm was rated as "fast" with an average score of 4.09.

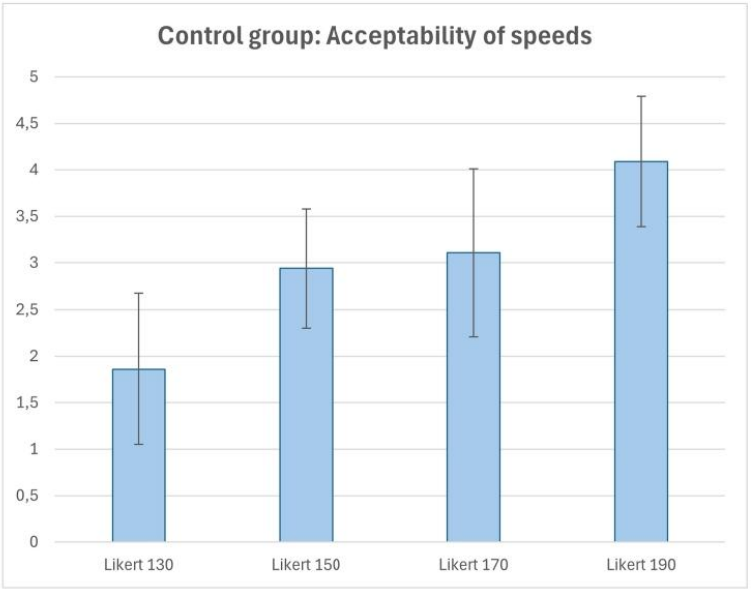


Fig. 6. Control group: Acceptability of speeds.

In the L2 group, the level of Catalan significantly influenced the ratings of the speeds, with the exception of 170 wpm. Considering first the results for the group as a whole (Fig. 7), the 150 wpm speed is rated closest to a score of 3, with an average of 3.03. This is followed by 170 wpm, which has a rating of 3.61, leaning closer to being considered "fast." The 130 wpm speed is generally perceived as "slow," with an average score of 2.29, while 190 wpm is rated as "fast," with a score of 4.19.

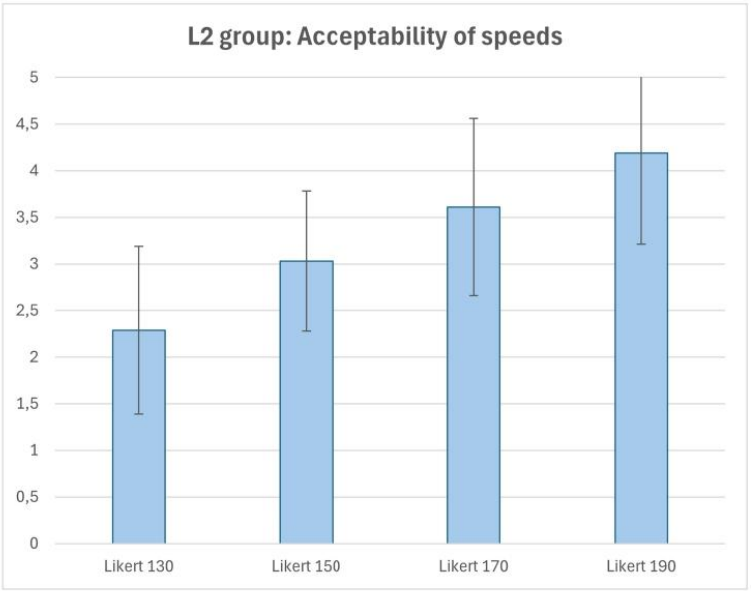


Fig. 7. L2 group: Acceptability of speeds.

When examining the results by language level (Fig. 8), both A2 and A1 learners rated 150 wpm as the speed closest to "suitable," with scores of 2.69 and 3.28, respectively. However, Catalan language level significantly influenced these ratings ($p = 0.006$), with more A1 learners perceiving it as fast, while A2 learners tended to find it slower. For A2 participants, the next speed closest to "suitable" was 170 wpm, with a score of 3.46, which A1 participants generally found fast. Conversely, for A1 participants, the second speed closest to a "suitable" score was 130 wpm, with an average score of 2.67, while A2 learners considered this speed too slow, with a score of 1.77.

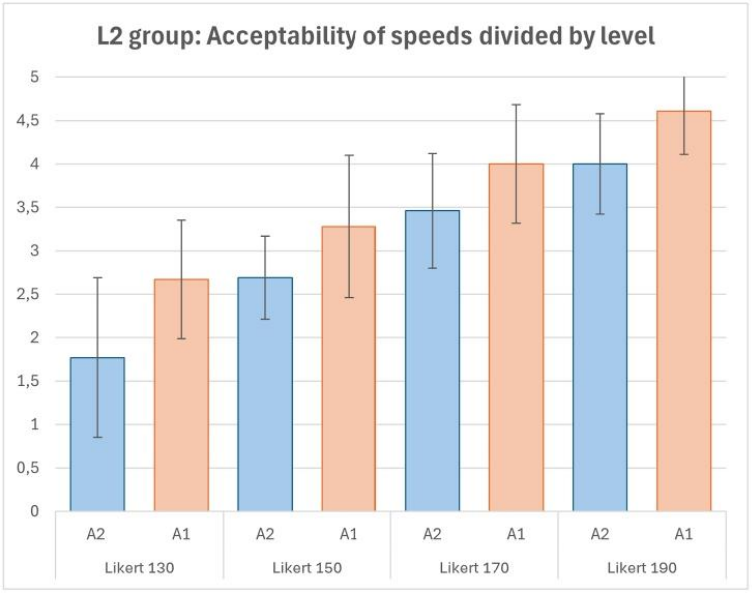


Fig. 8. L2 group: Acceptability of each speed by Catalan level.

Finally, looking at the acceptability results from the ID group (Fig. 9), it is important to note that while the order in which the speeds were presented and the Raven test scores did not influence the results, participant age had a significant impact at the 170 wpm speed. Younger participants rated the speed as "fast," while older participants considered it "suitable."

In the ID group, 150 wpm received a score of exactly 3. This is followed by 170 wpm, which scored 3.23. The 130 wpm speed, while close to 3, was still considered somewhat slow by the group, with an average score of 2.74. On the other hand, the 190 wpm speed received a higher score of 3.57, suggesting that more participants found it either "fast" or "too fast."

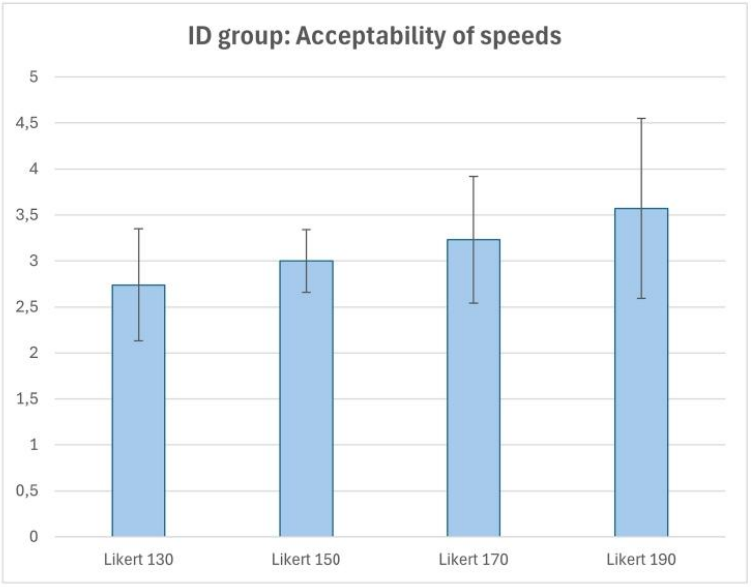


Fig. 9. ID group: Acceptability of speeds.

Interestingly, all three groups rate 150 wpm as the most acceptable speed, with no significant differences in scores between the groups ($p > 0.05$). Generally, the next most accepted speed across the groups is 170 wpm, provided the L2 group is not divided by language level. However, a significant difference exists in the ratings of 170 wpm between the L2 and ID groups ($p < 0.001$), with more L2 participants rating it as fast. Similarly, the perception of the 190 wpm speed also differs significantly between these groups ($p < 0.001$), with the L2 group finding it "fast" on average, while the ID group rates it as "suitable."

5.3. Speed preference

Final speech rate preferences were determined by asking participants to select a single speed they preferred. To help participants remember, each audio was paired with an image that was also displayed to them during the selection process. The results reveal varied patterns across the groups (Fig. 10). In the ID group, the largest proportion of participants (28.6 %) opted not to answer, expressing uncertainty or a lack of specific preference, although it is also possible that participants found it difficult to remember each speed. Among those who did choose, 170 wpm emerged as the most selected speed (22.9 %), followed closely by both 130 wpm and 150 wpm (20 % each). In contrast, all L2 participants provided a specific preference, with 150 wpm being the most popular choice (45.2 %), followed by 170 wpm (35.5 %). Similarly, the control group showed preferences closely aligned with those of the L2 group, but with a slight difference: 170 wpm emerged as the most favoured speed (45.7 %), while 150 wpm was a close second, preferred by 42.9 % of participants.

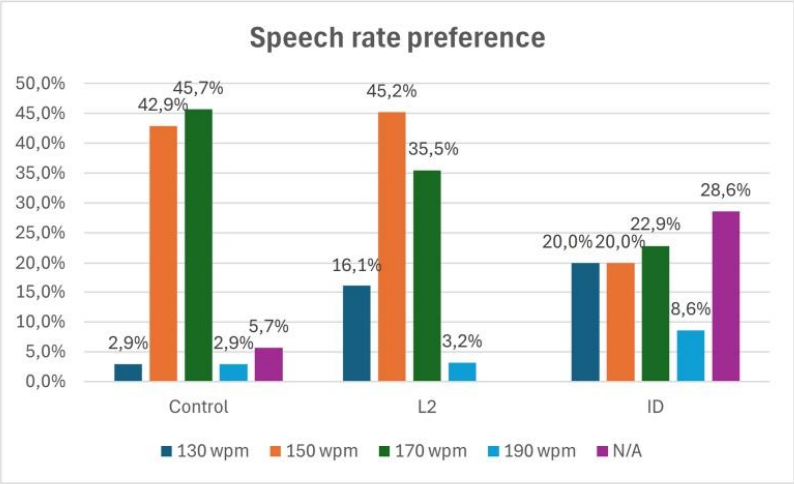


Fig. 10. Speech rate preference selection.

6. Discussion

This study explored the role of speech rate as a prosodic feature in oral Easy Language, examining its impact on comprehension. The research involved three participant groups: individuals with intellectual disabilities, neurotypical second-language learners, and a neurotypical control group. Four distinct speech rates were evaluated (130 wpm, 150 wpm, 170 wpm, and 190 wpm) to address the two central research questions.

1. Does speech rate affect comprehension of oral Easy Language texts?

Current professional practices and recommendations (Inclusion Europe, 2009; North Yorkshire County Council, 2014; Pujadas-Farreras and Matamala, in press) suggest that adopting slower speech rates improves comprehension for Easy Language users. However, when comparing the comprehension results across different speech rates, the differences in comprehension are found to be not statistically significant for any of the groups. This result aligns with findings from other studies on Easy Language, which have similarly found "non-conclusive and non-generalisable" results (González-Sordé and Matamala, 2023; Prafiyanto et al., 2018; Wei et al., 2016). Likewise, other listening comprehension studies have yielded mixed results, with several showing no significant effect of speech rate on comprehension for participants with cognitive disabilities (Blumstein et al., 1985; McCroskey and Thompson, 1973; Small et al., 1997a, 1997b; Tomoeda et al., 1990) and second-language learners (Blau, 1990; Sugai et al., 2016).

Additionally, the effect of speech rate on comprehension varies across groups. The neurotypical control group achieved the highest scores at a speed of 150 wpm, which aligns with Albaladejo's (2020) recommendation to maintain this speed for oral discourse. In contrast, the ID group performed best at the slower speed of 130 wpm, suggesting that this group might benefit slightly from a slower pace, as indicated by previous recommendations. The L2 group, on the other hand, performed best at 170 wpm. This could be explained by the fact that most of this group were native Spanish speakers, and Catalan and Spanish are quite similar languages in terms of rhythm. The results for this group also align with Rodero's (2016) findings in Spanish, where speech rates between 170 and 190 wpm were found to be most comprehensible for radio broadcasts. Interestingly, the control group of neurotypical Catalan native speakers performed the worst at 170 wpm. This suggests that the typical speech rate of a participant's native language may influence comprehension, as Spanish is generally spoken at a slightly faster pace than Catalan, despite the similarities between the two languages (Coupé et al., 2019).

Finally, it is important to note that a comparison of the comprehension results across the groups shows that none of the speech rates improve comprehension enough for either of the Easy Language user groups (ID and L2) to close the significant gap in comprehension between them and the control group.

2. What speech rate do participants find most acceptable or preferable?

While the three groups exhibit few commonalities in comprehension results, they show more alignment regarding the acceptability ratings of each speech rate. All three groups agree that 150 wpm is the most acceptable speed, followed by 170 wpm. However, the ID group demonstrates a distinct tendency to rate all speeds as "suitable," with their highest-scoring speed being 190 wpm at 3.57. This tendency might occur due to several interconnected factors. Individuals in the ID group may have a diminished sensitivity to differences in speech rates (Gautam and Singh, 2016; Lense et al., 2021; Wynn et al., 2018), which could lead them to perceive a wide range of speeds as equally acceptable or "suitable." This reduced sensitivity to varying speech rates could explain why the group focused less on speed and more on the overall comprehensibility of the speech. So, as long as the speech remained intelligible for them, they were likely to rate the speed positively, even at faster speeds.

Another contributing factor could be the positive response bias often exhibited by individuals with intellectual disabilities, which has been extensively researched (for example, Hartley and MacLean (2006), and Emerson et al. (2013)). This bias, characterised by a tendency to give favourable ratings regardless of true preferences, might serve as a social strategy to conform or please the evaluators. Furthermore, this reluctance within the ID group to rate faster speeds as "fast," in contrast to the other two groups, may stem from a desire not to be perceived as different. As it has been pointed out, there is a risk of stigmatisation in Easy Language texts and conventions (Hansen-Schirra and Maaß, 2020b; Maaß, 2020; Pedrini, 2023), which can lead primary target groups, such as individuals with intellectual disabilities, to avoid using these materials for fear of being stigmatised (Maaß, 2020; Pedrini, 2023). This tendency to rate all speeds as "suitable" might also reflect an underlying effort to avoid such stigmatisation by not rating the different speeds "negatively."

All these factors are also likely to be the reason behind the final preference results, in which a large proportion of the ID group preferred not to answer. In contrast, the L2 and control groups show preference for the 150 wpm and 170 wpm speeds, consistent with the results found in the acceptability and comprehension scores.

7. Conclusions

The results obtained in this study indicate that comprehension did not vary significantly across different speech rates within each group of participants. This suggests that comprehension in the context of Easy Language remains unaffected by variations in speech rate, at least within the range of speeds tested in this study. However, further research using longer audio samples may be needed to confirm whether this holds true for more extensive listening tasks.

Acceptability and preference are important factors to consider, as they can impact the cognitive ease with which listeners process information, even if speech rate variations do not affect comprehension. Research has shown that acceptability can influence the cognitive effort needed to process Easy Language texts, suggesting that similar dynamics may apply to listening. Participants generally found 150 wpm to be the most acceptable and preferable speech rate, as this rate was consistently rated as the most or second-most favoured across all groups. As such, given its high acceptability and preference, 150 wpm is recommended as the optimal speech rate for producing oral Easy Language content, at least in Catalan. Further research would be needed to determine whether this metric is universal or varies across different languages.

However, the study's design also presents limitations, particularly the brevity of the audio samples (130 words). This short length might not fully capture the impact of speech rate on comprehension over extended listening periods. Future research could replicate the experiment using longer audio segments to explore whether comprehension patterns remain consistent or change when listeners are exposed to more substantial content. This would provide deeper insights into the interplay between speech rate, acceptability, and comprehension in real-world applications of Easy Language.

In conclusion, this study empirically investigates the prosodic feature of speech rate in Easy Language, an area that has been underexplored in previous research. By exploring its impact on comprehension, acceptability, and preference, the study offers valuable insights into the design of Easy Language audio content, enhancing our understanding of how prosodic features affect Easy Language and advancing the broader goal of improving communication and accessibility for diverse audiences.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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CRediT authorship contribution statement

Marina Pujadas-Farreras: Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **María J. Machuca:** Supervision, Methodology, Conceptualization.

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Empirical Study on Pause Lengths in Catalan Easy Language Audios

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Abstract
This study investigates the effect of pause lengthening in Easy Language audios — a feature typically recommended to improve comprehension — on participants' understanding, acceptability, and preferences. The participants of this study included 35 neurotypical Catalan native speakers (control group), 34 Catalan native speakers with intellectual disabilities (ID), and 31 second-language learners of Catalan (L2). Participants completed a comprehension test with audio featuring four inter-sentence pauses (590 ms, 740 ms, 890 ms, 1040 ms) and four intra-sentence pauses (250 ms, 400 ms, 550 ms, 700 ms). They also rated pause acceptability and indicated preferences.
Results showed no significant improvement in comprehension with longer pauses in the ID or control groups, whereas L2 learners showed a non-significant trend toward improvement. Longer inter-sentence pauses were generally acceptable across groups, whereas longer intra-sentence pauses were less favored by the control group. Preferences for pause durations were unclear for the ID and L2 groups.
Key words: pauses, Easy Language, Listening comprehension, L2 learners, Intellectual disability

1. Introduction

Easy language is a simplified language variety designed to improve access to information by offering specific recommendations on wording, structure, and design for individuals with comprehension difficulties (ISO, 2023). These difficulties may arise from various causes: intellectual disabilities, neurocognitive disorders, learning disabilities, second language learners, or functional illiteracy, among others (Lindholm & Vanhatalo, 2021).
In recent years, Easy Language has started to extend into oral and audiovisual formats, such as easy audio descriptions, easy news programs, and Easy Language interpreting (Maaß, 2020; Nahón Guillén, 2020; Pujadas-Farreras & Matamala, 2025; Rubanovsky-Paz et al., 2024; Schulz et al., 2020; Yalon-Chamovitz et al., 2019). Among the various recommendations given for these formats, a recurring one in several Easy Language guidelines is the use of pauses (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023), which professionals also advocate for, emphasizing that longer pauses can aid in information processing (Pujadas-Farreras & Matamala, 2025; SELSI project, 2023).
However, these guidelines lack specificity, offering no clear instructions on the length or placement of pauses. Research on pauses in Easy Language remains limited, with only a few studies identified to date, specifically for Japanese (Prafiyanto, 2020; Prafiyanto et al., 2018). This lack of research leaves it unclear whether the recommendation to use pauses is effective in improving comprehension. Moreover, because existing guidelines are so vague, practitioners are left without concrete implementation parameters, leading to inconsistent, subjective applications in practice. This ambiguity creates challenges for professionals who must decide when, where, and how long to pause without evidence-based guidance. In addition, because each language has its own prosodic characteristics, research on pauses should be conducted within specific linguistic contexts. This is essential for developing locally relevant guidelines, especially since pause length within a sentence can significantly

impact a speaker's communicative effectiveness (Price, 2021). Furthermore, it is relevant to empirically test these recommendations across different user groups, as different user profiles may require different pause lengths. In the identified studies, only language learners were considered.

This study aims to investigate whether longer inter-sentence and intra-sentence pauses in Catalan Easy Language audios impact comprehension. It also examines the acceptability of these pauses and users' preferences, involving three participant groups: a control group of neurotypical Catalan native speakers, a group of Catalan native speakers with intellectual disabilities, and a group of second language learners of Catalan. In this study, both objective (comprehension) and subjective (acceptability and preferences) measures are assessed, as previous Easy Language research has shown that acceptability can influence the cognitive effort required to process read content (Gutermuth, 2020).

2. Silent pauses in speech

The term' hesitations' refers to various occurrences, including pauses, that interrupt the natural flow of spoken language and are typically regarded as not contributing to the semantic content of the message (Baqué & Machuca, 2023). Pauses are interruptions or stops during speech or reading (Mestres et al., 2019) that speakers can use to highlight the information structure by indicating groups of words or prosodic phrases and manipulating the distribution and length of these pauses (Gustafson-Capkova & Megyesi, 2001; Swerts & Geluykens, 1994).

Pauses can be categorized into filled pauses, which involve vocalizations such as [əː] or [əm], and unfilled pauses, also known as empty or silent pauses, which occur without any filler particles (Maclay & Osgood, 1959). However, some studies have observed that the concept of pauses should be expanded, because the term' silent pauses' fails to consider the acoustic characteristics of inhalation and exhalation during speech pauses (Belz & Trouvain, 2019; Trouvain et al., 2016). Silent pauses are often categorized into longer pauses, often accompanied by inhalation, to indicate higher syntactic-prosodic breaks and shorter pauses, predominantly non-breath pauses, for breaks within sentences (Fuchs et al., 2013; Gee & Grosjean, 1983; Grosjean et al., 1979; Grosjean & Collins, 1979; Trouvain et al., 2016; Werner et al., 2022).

As Fauth and Trouvain (2018) and Trouvain and Werner (2022) mention, there is no consensus regarding how long a pause must be to be considered a pause. For example, Trouvain (2004) establishes the minimum length at 100 ms, Cucchiarini et al. (2002) and Lennon (1990) establish it at 200 ms, and Tavakoli (2011) at 400 ms.

Pauses can also show a high variability in duration (Campione & Véronis, 2002). For example, Campione and Véronis (2002) suggest a categorization of brief (<200 ms), medium (200-1000 ms) and long (>1000 ms) pauses, the latter only occurring in spontaneous speech, based on their study with five languages (English, French, German, Italian, Spanish). In French, Grosman et al. (2018) found that 50% of pauses lasted 250-600 ms. Gustafson-Capkova and Megyesi (2001) find an average of 271 ms for professional readings of Swedish radio news and 561 ms for non-professionals. In spontaneous Spanish, Rebollo Couto (1998) finds that silent pauses have a duration from 42 to 1344 ms. Finally, Cantin and Ríos (1991) report average durations of 590 ms for inter-sentence pauses and 250 ms for intra-sentence pauses in Catalan.

Llisterri et al. (2024) have also conducted an in-depth analysis of the methodological issues regarding how to establish the duration of silent pauses.

All these previous studies were conducted on standard language varieties, as Easy Language or other simplified language varieties are yet to be studied.

2.1. Comprehension facilitated by pauses

Research on the role of pauses in comprehension has highlighted their potential to enhance understanding, particularly in individuals with brain damage, by improving the identification of prosodic boundaries and overall content processing.

Studies with subjects with brain damage have generally found that longer pauses increased accuracy in prosodic boundaries identification and comprehension (Aasland & Baum, 2003; de Beer et al., 2022; Lasky et al., 1976; Liles & Brookshire, 1975; Park et al., 2002; Sheppard et al., 2019), but these findings are not uniform. For example, Aasland and Baum (2003) and Park et al. (2002) observed improved comprehension with intra-sentence pauses up to 500 ms. With longer inter-sentence pauses, Lasky et al. (1976) and Liles and Brookshire (1974) also reported an improvement, using 1-second pauses and 5-second pauses, respectively. However, in a later study, Brookshire and Nicholas (1984) found inconsistent results while using 4-second pauses. Similarly, Blanchard and Prescott (1980) found no significant improvement when pause durations were expanded by factors of 1.25, 1.5, and 1.75. Furthermore, Blumstein et al.'s (1985) study tested pauses from 250 ms to 3000 ms, and while it found that adding pauses at syntactically salient points were particularly effective for Wernicke's aphasics, intra-sentence pauses actually significantly impaired comprehension performance.

Similar variability appears in studies with L2 learners, as positive effects have been reported using inter-sentence pauses of 3 seconds (Blau, 1990; Leeser, 2004) and 1–2 seconds (Kano & Saito, 1997), and intra-sentence pauses ranging from 200–800 ms (Sugai et al., 2007) and 200–450 ms (Sugai et al., 2016). However, Leeser (2004) reports on the findings of Sagarra (1998) and Chaudron and Richards (1986), noting that neither study found significant results, despite Sagarra also employing 1-2 second inter-sentence pauses.

Finally, studies involving native speakers (Fortunato-Tavares et al., 2023; Henderson & He, 2022; Tanaka et al., 2011) also show improvements in comprehension when longer pauses are used at prosodic boundaries. Fortunato-Tavares et al. (2023) reported improvements using 100–300 ms intra-sentence pauses, while Tanaka et al. (2011) observed benefits from 0–400 ms inter-sentence pauses.

Nonetheless, none of these studies were conducted using Easy Language. Prafiyanto (2020) and Prafiyanto et al. (2018), the only studies focusing on Easy Language identified, reported non-significant results in their research on Japanese Easy Language when using 200-800 ms inter-sentence pauses.

Research also indicates that varying pause lengths can influence listeners' perceptions and comprehension, with longer pauses often aiding in the identification of prosodic boundaries (Wright, 2021). Furthermore, studies have shown that pause duration is influenced by the length of the upcoming utterance, suggesting that speakers plan the upcoming speech during pauses (Krivokapić et al., 2022).

Easy Language standards and guidelines recognize pauses as an important feature of audio creation in Easy Language. However, as noted by Pujadas-Farreras and Matamala (2025), the available standards that address prosody remain limited, and their recommendations are often vague and nonspecific. The ISO standard (2023), for example, advises the use of 'adequate' pauses between words and sentences to convey sentence and text structure, but it does not define what constitutes adequacy. Similarly, the ILSMH-EA guidelines (1998) mention the need to pause briefly between sentences but offer no further detail on the duration. Finally, the Inclusion Europe guidelines (2009) stress the importance of pausing at logical points to allow listeners time to process information before introducing new content. As observed, these recommendations do not explain how long such pauses should be to aid comprehension or how they should be applied specifically, remaining quite general.

Professional creators of Easy Language audios and videos adopt practices that closely align with these recommendations. Interviews with professionals (Pujadas-Farreras and Matamala, 2025) showed that they believe pauses are useful for helping users process information. They also used the pauses to signal transitions between topics and to indicate progression. Additionally, a recommendation from these interviews was to make longer pauses between prosodic units rather than between individual words. Similarly, a report from the SELSI project (2023), which focuses on oral Easy Language, highlighted that both professionals and users consider long pauses between words, sentences, clauses, and different subjects to be effective strategies.

Nonetheless, some professionals have also mentioned that the use of pauses in Easy Language may not always align with practices in standard language. For example, in standard language interpreting, pauses are typically discouraged, whereas in Easy Language interpreting, pauses are more commonly used to support comprehension (Pujadas-Farreras & Matamala, 2025).

However, as previously noted, there is a lack of empirical evidence supporting these recommendations and practices. To date, only the studies conducted by Prafiyanto (2020) and Prafiyanto et al. (2018) have specifically examined this issue, and they reported non-significant results.

3. Methods

This study aimed to research whether longer inter-sentence and intra-sentence silent pauses in Catalan Easy Language audios significantly impact comprehension. The second objective was to assess the acceptability of different pause durations and participants' preferences. Based on the study objectives, the following research questions have been formulated:

a) Does the duration of inter-sentence and intra-sentence silent pauses in Catalan Easy Language audios significantly impact comprehension?
b) Which inter-sentence and intra-sentence pause durations do participants find most acceptable and preferable?

The Ethics Committee of the Autonomous University of Barcelona approved the protocol for this study.

3.1. Participants

Participation in this study was entirely voluntary, and the participants were not compensated economically. Prior to their involvement, all participants provided written consent using a consent form designed in Easy Language to ensure accessibility. Participants were free to withdraw at any point during the study if they chose not to continue for any reason.

The participant sample for this study overlapped with a previous study (Pujadas-Farreras & Machuca, 2025), which involved three groups: (1) a neurotypical control group of native Catalan speakers, (2) a group of neurotypical second-language learners of Catalan (L2 group), and (3) a group of native Catalan speakers with intellectual disabilities (ID group). The only difference was that one participant in the ID group declined to participate, resulting in a total of 100 participants.

Participants in the ID group had mild to moderate intellectual disabilities, as indicated by the associations through which they were recruited, and were familiar with Easy Language materials, as some had participated in validation sessions for these materials or used them themselves. No formal assessments of their language skills were conducted within the study; instead, the study identified individuals who, in their judgment, possessed sufficient language abilities to participate.

The L2 group consisted of participants with A1 or A2 proficiency levels in Catalan. Their first languages included Spanish (n = 19), English (n = 3), Portuguese (n = 3),

Italian (n = 2), Russian (n = 1), Urdu (n = 1), French (n = 1), and Romanian (n = 1). All had lived in Catalonia for five years or less, with most having arrived either in the same year as the study or the year before. Their primary exposure to Catalan came through language classes, although three participants reported additional exposure via work or intentional engagement with Catalan-language media. However, due to the widespread tendency of locals to switch to Spanish when addressing non-native speakers, overall exposure to Catalan in daily life was minimal unless actively sought out. None of the L2 participants had prior experience with Easy Language materials.
Finally, all participants in the control group had at least completed a bachelor's degree or an equivalent level of education.
All participants in the three groups also completed the Raven's Coloured Progressive Matrices test (see Section 3.3) to ensure homogeneity within the groups.

Table 1 displays the participants' demographic information, including their age and Raven test scores (out of 36), with slight adjustments to reflect the updated participant totals.

	Control	L2	ID
Count	35	31	34
Age (Years)	46.31 (±16.51)	38.65 (±13.52)	45.97 (±14.68)
Raven test	34.14 (±1.85)	33.39 (±1.84)	21.35 (±7.01)
Catalan level	Native	A1 (n=18)/A2 (n=13)	Native

Table 1. Participants demographics

The control group was recruited through snowball sampling, with outreach conducted through social media and public posters. The L2 group mainly consisted of students from three adult education centers (CFA Madrid, CFA Torre Romeu, and CFA Gavà), where participation was part of a class activity. Additionally, information about the study was shared with students through the UAB Idiomes school and the Consorci per la Normalització Lingüística ('Consortium for Language Normalisation'). Finally, the ID group was recruited through two associations: Som Fundació and Fundació Asproseat Proa Esplugues.

3.2. Materials

The audio materials for this study were recorded by a professional voice actor with an F0 of 218 Hz, consistent with recommendations and studies that found that listeners favor lower-pitched voices (Accessible Information Working Group, 2011; Machuca & Matamala, 2022; Pujadas-Farreras & Matamala, 2025). As previously noted, acceptability can influence the cognitive effort required to process a text (Gutermuth, 2020). Similarly, using a voice with high acceptability may enhance listenability (Machuca & Matamala, 2025), which is why this specific voice was chosen for the stimuli.
The articulation rate, which does not count pauses (Dowding et al., 2024), was set to 150 words per minute for each audio, aligning with the speed identified as most acceptable across the participant groups in a previous study (Pujadas-Farreras & Machuca, 2025).
The recordings were also modified to include varying pause durations. Inter-sentence pauses began at 590 ms and intra-sentence pauses at 250 ms, which correspond to the average durations for each pause type in Catalan, as reported by Cantin and Ríos (1991). Each pause was then incrementally extended in 150 ms intervals, following the methodology proposed by Prafiyanto et al. (2018). Table 2 shows the durations used in each audio.

Audio 1	Audio 2	Audio 3	Audio 4
Inter: 590 ms Intra: 250 ms	Inter: 740 ms Intra: 400 ms	Inter: 890 ms Intra: 550 ms	Inter: 1040 ms Intra: 700 ms

Table 2. Overview of stimuli

The scripts for each audio were 130 words long and adapted from the book *Com tenir cura del planeta* ('How to Take Care of the Planet') (Peralta, 2023). Both the scripts and the corresponding comprehension questions underwent validation by professionals affiliated with the Easy-to-Read Association to ensure the texts were properly written in Catalan Easy Language. This process followed one of the expert judgment methodologies outlined by Cabero Almenara and Llorente Cejudo (2013). Additionally, the scripts were analyzed using the Flesch-Szigriszt readability index, achieving scores between 80 and 91, which classify them as 'very easy' (Barrio Cantalejo, 2007). This analysis further helped ensure that all texts were of equivalent difficulty.

Table 3 provides an example of the comprehension questions used in Catalan, along with its English translation.

Original in Catalan	Translation
Quin altre regal recomana l'àudio? a) Els objectes de plàstic. b) Els objectes de vidre. c) Els objectes de fang.	What other gift does the audio recommend? a) Plastic items. b) Glass items. c) Clay items.

Table 3. Example of a comprehension question from Audio 3

3.3. Procedure

The experiment lasted about 40 minutes and was conducted individually in a quiet room. Participants had previously completed the Raven's Coloured Progressive Matrices test (Raven, 1998) as part of an earlier study, and the data from that assessment were reused for this experiment. The Raven's test is a widely used non-verbal intelligence assessment that evaluates general intelligence and abstract reasoning skills, serving as a measure of fluid intelligence (Bilker et al., 2012).

After completing a brief volume test, participants listened to all the audios presented in different orders. Each audio was played twice, with participants answering three orally presented multiple-choice comprehension questions after each playback. However, for this study, only responses from the first listening were analyzed. The second-listening data will be examined in a follow-up study that will explore the effects of repeated exposure, potential priming, and self-correcting strategies among participants.

Following the comprehension task, participants evaluated the acceptability of each pause using a six-point Likert scale: 0 (not noticeable), 1 (too short), 2 (short), 3 (suitable), 4 (long), and 5 (too long). To assist with this evaluation, participants listened to short excerpts featuring different pause durations, one at a time. After each excerpt, they rated the acceptability of the pause using a Likert scale. Participants provided their ratings based entirely on their own judgment, without any prior training or anchoring examples to calibrate their responses on the Likert scale. Once all four pause durations for one type of pause (either intra-sentence or inter-sentence) were rated, participants were asked to select their preferred duration, if any, to assess user preference. This process was then repeated for the other type of pause. The order in which participants heard the pause durations during the evaluation matched the order presented in the comprehension task; however, to control for order effects, each participant experienced a different sequence, as previously described.

3.4. Data analysis

The choice of bivariate tests depended on the types and distributions of the variables. For comparisons involving two qualitative variables, tests for distribution homogeneity (chi-square or likelihood ratio) were applied. When examining one quantitative and one qualitative variable, normality (Shapiro-Wilk) and variance homogeneity (Levene's test) were first assessed. Depending on these results, either parametric methods (t-test or ANOVA) or non-parametric alternatives (Mann-Whitney U or Kruskal-Wallis) were employed. For comparisons between one ordinal and one qualitative variable, a generalized linear model with a binomial distribution was used. When significant results were found, post hoc pairwise comparisons were conducted, with p-values adjusted for Type I error using either the Tukey or Bonferroni correction. Data analysis was performed using SAS v9.4 software, with a confidence level of 95%. The analyses were carried out by the Statistics Division of the Autonomous University of Barcelona.

4. Results

This section will present the comprehension results for each pause duration, as well as the acceptability ratings and participants' preferences.

4.1. Comprehension results

To assess whether the order of stimulus presentation influenced participants' responses, a non-parametric two-way analysis of variance (ANOVA) was conducted using the Scheirer-Ray-Hare test, examining the interaction between participant group and presentation order. The results (the R1 variables refer to the pauses analyzed) indicated that the interaction effect was not statistically significant ($H = 3.41$, $p = 0.75$ for R1_590_250; $H = 4.82$, $p = 0.56$ for R1_740_400; $H = 3.92$, $p = 0.68$ for R1_890_550; $H = 3.76$, $p = 0.70$ for R1_1040_700), suggesting that the effect of order did not vary significantly across groups.

Furthermore, an analysis within groups suggests that, in general, comprehension results are not significantly influenced by the order of presentation, participants' age, Raven test scores, or, for the L2 group, their level of Catalan. However, there are two exceptions. In the ID group, participants with higher Raven scores show better comprehension for the audio with 890 ms and 500 ms pauses. In the L2 group, Catalan proficiency becomes significant for the results of the longest pauses, 1040 ms and 700 ms. These findings are detailed in Table 4.

Pause	Group	Order	Age	Raven	Catalan
R1_590_250	ID	p=0.936	p=0.259	p=0.097	
	Control	p=0.952	p=0.916	p=0.856	
	L2	p=0.228	p=0.219	p=0.810	p=0.418
R1_740_400	ID	p=0.614	p=0.832	p=0.166	
	Control	p=1.000	p=0.247	p=0.980	
	L2	p=0.228	p=0.345	p=0.092	p=0.844
R1_890_550	ID	p=0.060	p=0.705	p=0.032 *	
	Control	p=0.707	p=0.924	p=0.859	
	L2	p=0.818	p=0.785	p=0.387	p=0.696
R1_1040_700	ID	p=0.387	p=0.475	p=0.610	
	Control	p=1.000	p=0.628	p=0.230	
	L2	p=0.109	p=0.416	p=0.350	p=0.005 *

Table 4. Comprehension results according to different factors: order, age, Raven test, and Catalan proficiency (* $p < 0.05$)

Starting with the audio featuring the shortest pauses, with 590 ms for inter-sentence pauses and 250 ms for intra-sentence pauses (Figure 1), both the L2 and ID ($t=4.77$, $p < .001$) groups show a significant difference in comprehension compared to the control group. Additionally, there is no significant difference between the L2 group and the ID group ($t=2.24$, $p = .070$). The control group achieved a mean result of 2.91 (±0.05), while the L2 group scored 2.35 (±0.13) and the ID group, 1.91 (±0.14). Interestingly, the standard errors for both groups are quite similar, indicating comparable precision in their mean estimates.

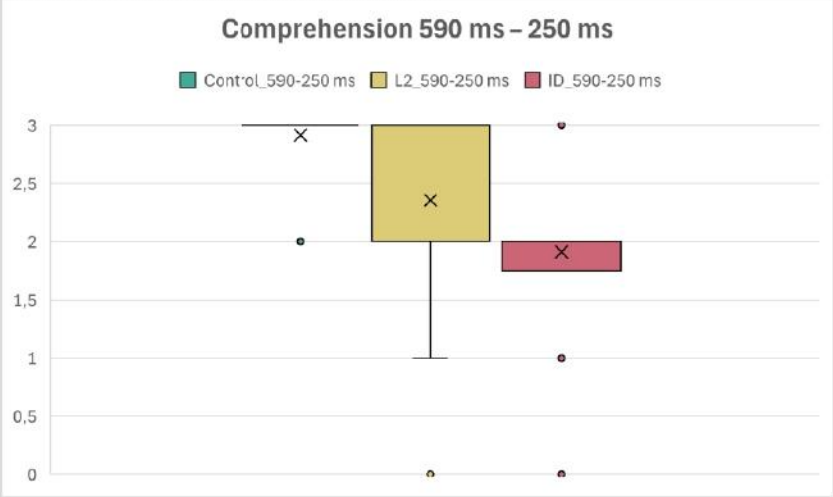


Figure 1. Comprehension results with 590 ms-250 ms pauses

Turning to the audio with 740 ms inter-sentence pauses and 400 ms intra-sentence pauses (Figure 2), the comprehension results show a mean score of 1.94 (±0.14) for the ID group, 2.35 (±0.13) for the L2 group, and 2.94 (±0.04) for the control group.

The improvement in comprehension compared to the shorter pauses is minimal, with mean scores remaining nearly unchanged across all groups. The control group shows a slightly smaller standard error in this condition, indicating a marginally more precise estimate of the mean score. However, both the L2 and ID groups have the same standard error as before, indicating that the precision of their average scores did not improve with longer pauses. This may imply that lengthening the pauses to these durations does not meaningfully aid processing for L2 and ID listeners.

The difference in comprehension between the target groups and the control group remains statistically significant (Control vs. L2 group: $t = 3.5$, $p = .002$; Control vs. ID group: $t = 4.49$, $p < .001$), while the difference between the two target groups ($t=2.11$, $p < 0.1$) is only marginally significant.

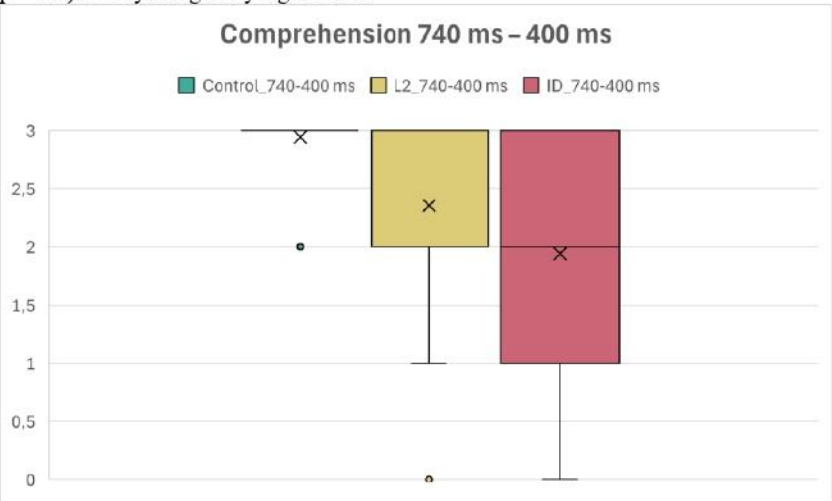


Figure 2. Comprehension results with 740 ms-400 ms pauses

In the audio with 890 ms inter-sentence and 550 ms intra-sentence pauses (Figure 3), the L2 group shows an increase in comprehension, scoring 2.48 with a slightly lower standard error (±0.12), indicating a marginally more precise estimate of their mean than in earlier conditions. These pauses correspond to the highest mean performance and the lowest standard error observed for the L2 group across all conditions. In contrast, both the control group and the ID group show their worst results with these pauses, with scores of 2.86 (±0.06) for the control group and 1.85 (±0.14) for the ID group.

Unlike the previous pause durations, significant differences emerge between all groups: between the L2 and control groups ($t=2.67$, $p = .024$), the L2 and ID groups ($t=3.19$, $p = .005$), and the ID and control groups ($t=5.02$, $p < .001$).

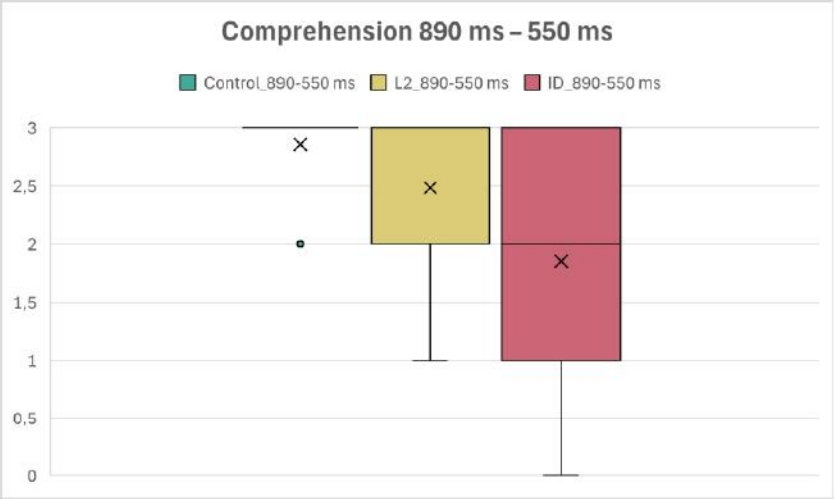


Figure 3. Comprehension results with 890 ms-550 ms pauses

Finally, the audio with the longest pauses, 1040 ms for inter-sentence and 700 ms for intra-sentence (Figure 4), shows the lowest mean score for the L2 group, 2.23 (±0.14), while the control group scores 2.89 (±0.06) and the ID group scores 1.88 (±0.14). Notably, despite the improvement seen with the earlier pause, this longer pause does not show the same results for the L2 group. However, when separated by proficiency, the A2-level participants maintain the improvement ($F=9.41$, $p=0.005$), with a mean score of 2.77 (±0.13), while A1-level participants show lower results, with a score of 1.83 (±0.20).

These pauses also show no significant difference in comprehension between the target groups ($t=1.71$, $p = .091$). Moreover, the comprehension differences between the target groups and the control group remain statistically significant ($t = 3.86$ and 4.93, $p < .001$).

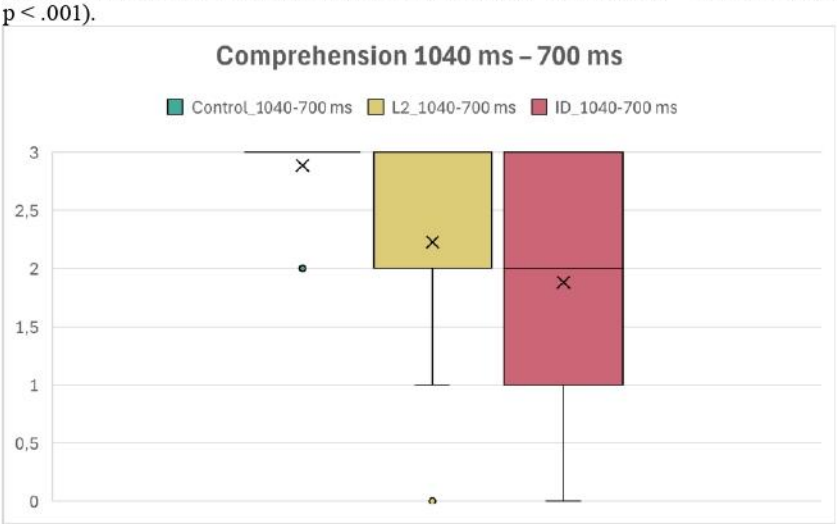


Figure 4. Comprehension results with 1040 ms-700 ms pauses

It is also worth noting that, within each group, differences in comprehension across the various pause conditions are not statistically significant. Specifically, no effect of

pause was found for the L2 group ($F(3, 388) = 0.67$, $p = .568$), the control group ($F(3, 388) = 0.47$, $p = .702$), or the ID group ($F(3, 388) = 0.07$, $p = .976$). This indicates that, despite some variation in performance, no specific pause length significantly improves or hinders comprehension within any group.

4.2. Acceptability results

As mentioned in Section 3, acceptability was evaluated through a six-point Likert scale, with the following ratings: 0 = not noticeable, 1 = too short, 2 = short, 3 = suitable, 4 = long, and 5 = too long.

4.2.1. Inter-sentence pauses

Starting with the control group, the Raven test results did not influence the acceptability ratings. However, the order in which the 740 ms pause was presented affected its rating, with it being rated 'long' when presented in the second or last audio. The participants' age only affected the rating of the 1040 ms pause, which older participants considered 'too long'. These findings are detailed in Table 5.

Inter-sentence pauses	Group	Order	Age	Raven	Catalan
590 ms	ID	p=0.258	p=0.836	p=0.336	
	Control	p=0.380	p=0.826	p=0.151	
	L2	p=0.267	p=0.438	p=0.328	p=0.119
740 ms	ID	p=0.078	p=0.124	p=0.426	
	Control	p=0.006 *	p=0.695	p=0.515	
	L2	p=0.476	p=0.702	p=0.448	p=0.264
890 ms	ID	p=0.046 *	p=0.260	p=0.549	
	Control	p=0.650	p=0.239	p=0.282	
	L2	p=0.037 *	p=0.619	p=0.379	p=0.054
1040 ms	ID	p=0.025 *	p=0.391	p=0.613	
	Control	p=0.325	p=0.041 *	p=0.256	
	L2	p=0.998	p=0.379	p=0.558	p=0.059

Table 5. Acceptability results in inter-sentence pauses according to different factors: order, age, Raven test, and Catalan proficiency (* $p < 0.05$)

Figure 5 illustrates the error bars, which represent the consistency of participants' ratings for each pause duration. Smaller error bars reflect a higher level of agreement among participants, while larger error bars indicate greater variability in their responses. In the control group, the pauses with the highest ratings, closest to 3 ('suitable'), are 740 ms, with a score of 3.14, and 890 ms, with a score of 3.20. These are followed by the 590 ms pause, which is regarded as somewhat short, receiving a rating of 2.77, and the 1040 ms pause. Nonetheless, this last pause is still considered 'suitable', with a score of 3.49, indicating that participants generally find it acceptable as well. In this group, the differences are significant ($\chi^2 = 14.3$, $p = 0.003$) between the 590 ms pauses (with the lowest mean) and the 1040 ms pauses (with the highest mean). However, these differences do not depend on order, age, or Raven scores ($p > 0.05$).

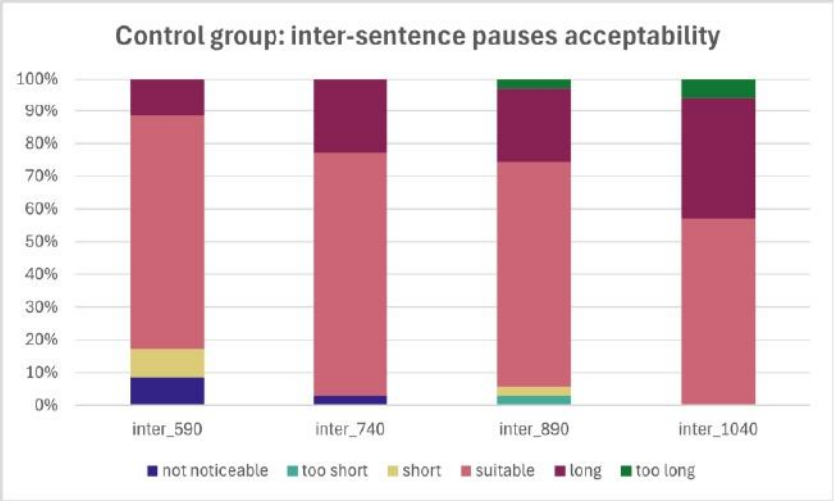


Figure 5. Acceptability of inter-sentence pauses, control group

In the L2 group (Figure 6), the results are quite different, with 590 ms being the better-rated pause at 2.94, followed surprisingly by the 890 ms pause at 3.13, and the 1040 ms pause at 3.19. Interestingly, the 740 ms pause is rated lower than the 590 ms pause, at 2.71, indicating that, on average, it is perceived as shorter. Language level does not significantly affect these ratings, nor does the age or the Raven scores of the participants, but when the 890 ms pause is heard in the third audio, fewer participants consider it 'suitable'.

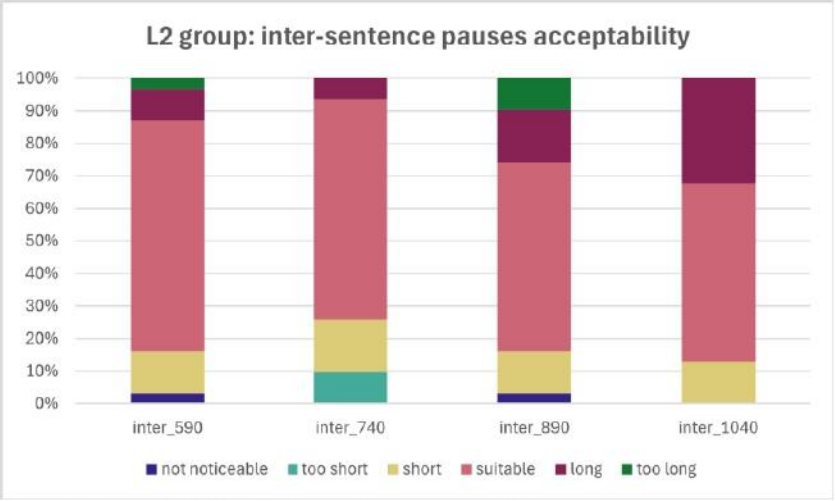


Figure 6. Acceptability of inter-sentence pauses, L2 group

Finally, the age and Raven test scores of the ID group did not influence the acceptability results. When the audio with the 890 ms pause was heard in the third audio, participants rated it as 'too short'. Similarly, the 1040 ms pause was rated 'too short' when heard in the first audio, but 'short' when heard in the third. However, no significant differences are observed ($p > 0.05$).

Notably, the ID group (Figure 7) does not find any of the pauses close to 'suitable' on average. Among the options, the 1040 ms pause is rated best, with a score of 2.38,

though it is still considered generally short by the group. This is followed by the 740 ms pause, rated at 2.24, and the 590 ms pause at 2.12. The 890 ms pause receives the lowest rating (2.09), suggesting the group perceives it as shorter than both the 590 ms and 740 ms pauses. However, no statistically significant differences were observed (χ^2 =1.05, p=0.790).

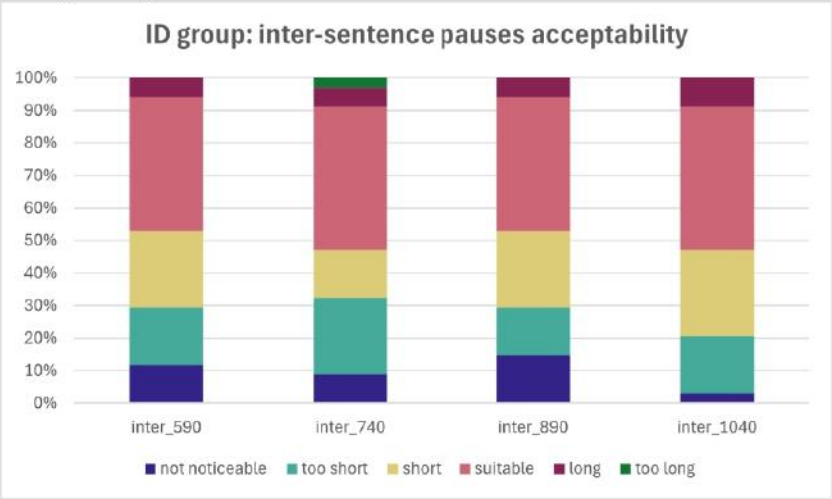


Figure 7. Acceptability of inter-sentence pauses, ID group

While the groups differ in their ratings of the pauses, the 1040 ms pause, rated best by the ID group, is also rated 'suitable' by both the L2 and control groups, with the control group leaning slightly towards 'long' (3.49). However, there is a significant difference in the perception of this pause between the ID group and the other two groups ($p < .001$). Similarly, significant differences are observed in ratings of the other pauses: the ID group generally finds them shorter than the L2 and control groups, who rate them as more acceptable overall.

4.2.2. Intra-sentence pauses

When examining the acceptability of intra-sentence pauses in the control group, the 550 ms pause was rated as 'long' or 'too long' when heard in the first audio. Neither age nor Raven test scores affected the ratings, as shown in Table 6.

Intra-sentence pauses	Group	Order	Age	Raven	Catalan
250 ms	ID	p=0.258	p=0.356	p=0.713	
	Control	p=0.162	p=0.775	p=0.885	
	L2	p=0.356	p=0.985	p=0.742	p=0.109
400 ms	ID	p=0.592	p=0.412	p=0.174	
	Control	p=0.819	p=0.817	p=0.630	
	L2	p=0.184	p=0.671	p=0.399	p=0.194
550 ms	ID	p=0.696	p=0.727	p=0.292	
	Control	P<0.001 *	p=0.598	p=0.898	
	L2	p=0.511	p=0.553	p=0.010 *	p=0.163
700 ms	ID	p=0.278	p=0.920	p=0.137	
	Control	p=0.281	p=0.323	p=0.874	
	L2	p=0.219	p=0.447	p=0.164	p=0.457

Table 6. Acceptability results in intra-sentence pauses according to different factors: order, age, Raven test, and Catalan proficiency (* $p < 0.05$)

The control group (Figure 8) rates the 250 ms pause most favorably, with a score of 2.94. This is followed by the 400 ms pause, which starts to lean towards 'long' with a score of 3.51, the 550 ms pause at 3.63, and finally the 700 ms pause, which is considered extremely close to being rated as 'long', with a score of 3.94 and a median of 4. Notably, despite these pauses being shorter than the inter-sentence pauses, none of the participants rated them as 'not noticeable. Furthermore, lengthening intra-sentence pauses appears to be less tolerated than lengthening inter-sentence pauses. Significant differences are observed according to the duration of the intra-sentence pause ($\chi^2 = 26.86$, $p < 0.001$). The score is lower for the 250 ms pause compared to the other pauses.

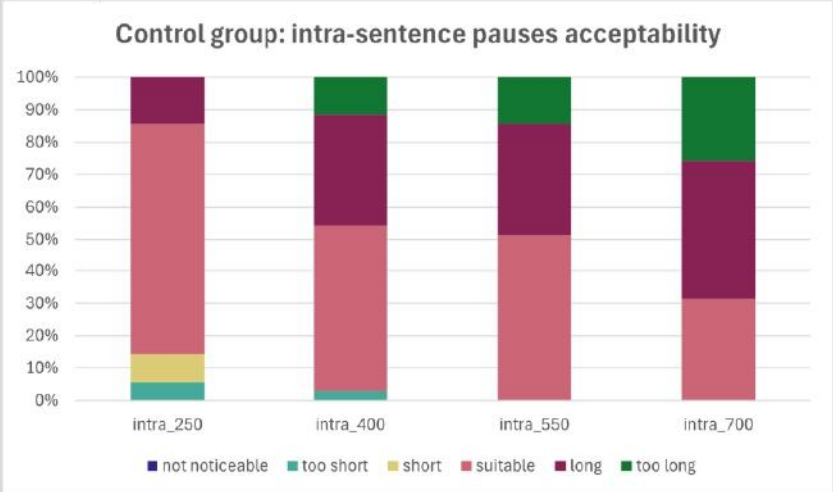


Figure 8. Acceptability of intra-sentence pauses, control group

The ratings in the L2 group were not significantly affected by the participants' age, Catalan level, or the order of the pauses. However, participants with lower Raven scores perceived the 550 ms pause as shorter than those in the same group, although these differences were not statistically significant.

This group (Figure 9) rates the 400 ms pause with an average score of 3, followed by the 550 ms pause, which has an average of 2.97, and the 250 ms pause with a mean rating of 2.77. In contrast to the control group, the L2 group is more accepting of longer pauses in the intra-sentence position, with only the longest pause (700 ms) receiving a relatively higher rating of 3.58.

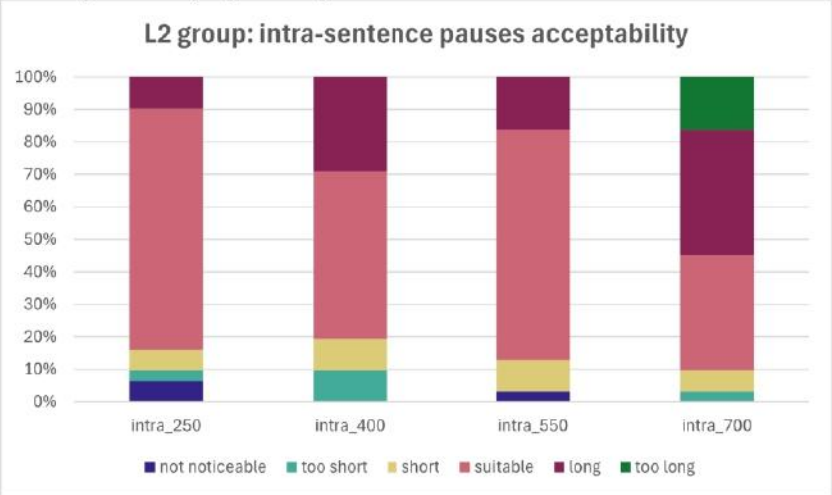


Figure 9. Acceptability of intra-sentence pauses, L2 group

Finally, the acceptability results for the intra-sentence pauses in the ID group were not affected by the participants' age, Raven test scores, or the order in which the pauses were presented. Although the ID group (Figure 10) rates the intra-sentence pauses more favorably than the inter-sentence pauses, their ratings still fall below 'suitable', as none of the pauses reach an average score close to 3. The best-rated pause is the longest, 700 ms, with a score of 2.71, followed by the 550 ms pause with an average of 2.59. The 400 ms pause is rated at 2.53, and the 250 ms pause receives a mean score of 2.24. Interestingly, while some participants considered the 400 ms and 550 ms pauses as 'too long', this was not the case with the 700 ms pause. However, no significant differences are observed according to the duration of the intra-sentence pause ($\chi^2 = 3.74$, $p = 0.291$).

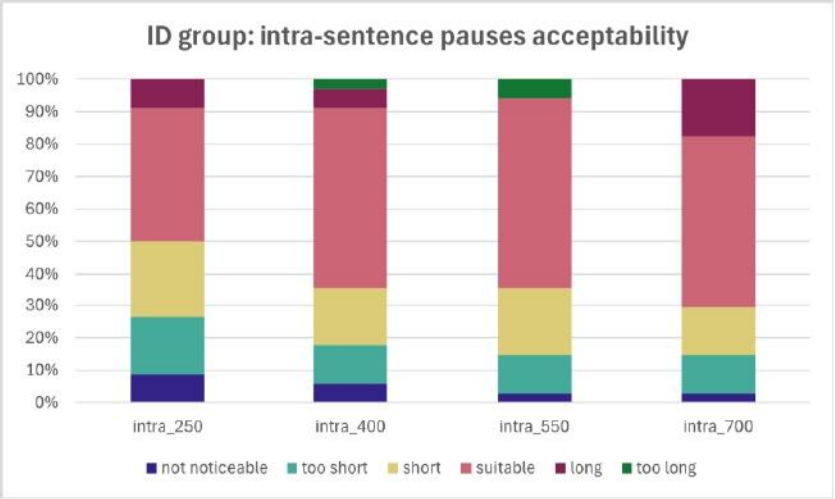


Figure 10. Acceptability of intra-sentence pauses, ID group

In general, there is a significant difference in the acceptability of the pauses across the three groups. The ID group tends to find the pauses short on average, while the control group generally perceives them as longer, and the L2 group considers most of them as acceptable. Focusing on the ratings from the L2 and ID groups, although their best-rated pause does not coincide, the 550 ms pause stands out as the second most favorably rated by both groups.

4.3. Preference results

As previously mentioned, after rating each pause, participants were asked to indicate their preferred pause duration, if any, for both inter-sentence and intra-sentence pauses.

Preference ratings in the ID group were not influenced by age, Raven scores, or the order of the pauses. Similarly, the control group showed no effect of age, Raven scores, or order on their preferences. In the L2 group, age did not affect participants' responses, but they favored the 740 ms inter-sentence pause when it was presented in the last audio. Those in this group with lower Raven scores also tended to prefer the 700 ms intra-sentence pause.

The results for inter-sentence pauses (Figure 11) show that neither the L2 group nor the ID group had a clear preference, as the differences in votes between options were typically 1 or 2. Additionally, in both groups, the most common response was to abstain, either due to a lack of preference or uncertainty about how to answer. In the L2 group, the second most popular choice was 590 ms (22.6%), followed by 740 ms and 890 ms, each of which received 19.4% of the votes. In the ID group, 740 ms (23.5%) and 890 ms (20.6%) were the next most selected options.

While the control group showed a somewhat clearer tendency, with 34.3% selecting 590 ms as their preferred pause duration and 25.7% opting not to answer, the overall distribution of preferences does not differ significantly between groups ($\chi^2 = 3.11$, $p = 0.927$).

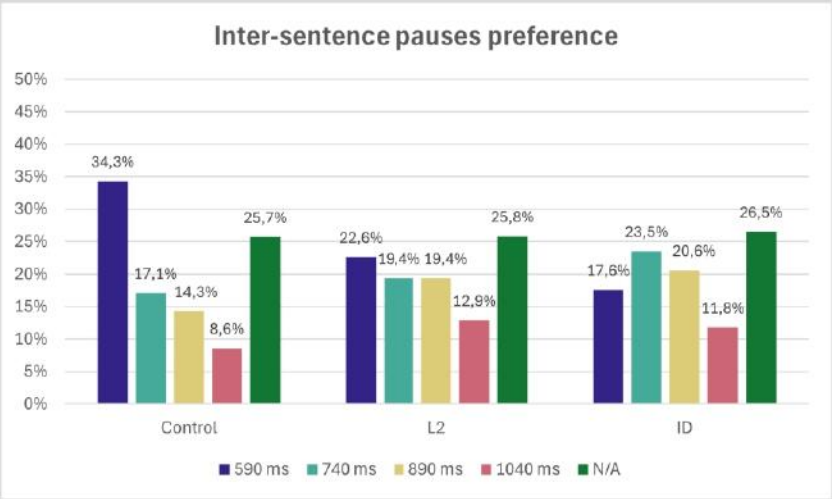


Figure 11. Inter-sentence pauses preference

For intra-sentence pauses (Figure 12), the ID group showed a preference for 400 ms pauses, which received 32.4% of the votes, followed by 250 ms pauses with 20.6%. In the L2 group, the most preferred duration was 250 ms (25.8%), followed closely by 550 ms pauses and abstentions, both at 22.6%. The control group showed the clearest preference, with 48.6% selecting 250 ms pauses, followed by 20% favouring 550 ms pauses. However, although there appears to be a notable visual difference, the result is not statistically significant ($\chi^2 = 12.4$, $p = 0.134$).

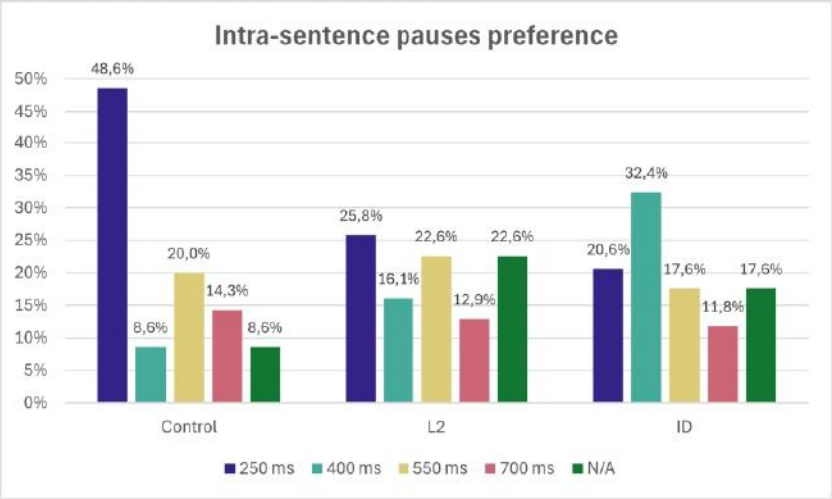


Figure 12. Intra-sentence pauses preference

5. Discussion

This study examined the impact of four inter-sentence (590 ms, 740 ms, 890 ms, 1040 ms) and four intra-sentence (250 ms, 400 ms, 550 ms, 700 ms) pause durations on the comprehension of Catalan Easy Language audios. Additionally, the acceptability of each pause and the participants' preferences were evaluated. The aim was to answer two central research questions:

a) Does the duration of inter-sentence and intra-sentence silent pauses in Catalan Easy Language audios significantly impact comprehension?
b) Which inter-sentence and intra-sentence pause durations do participants find most acceptable and preferable?

In response to the first question, although existing guidelines and practices in Easy Language recommend the use of longer pauses (ILSMH-EA, 1998; Inclusion Europe, 2009; ISO, 2023; Pujadas-Farreras & Matamala, 2025; SELSI project, 2023), the comprehension results in this study do not align with these recommendations, as none of the participant groups demonstrated significantly better comprehension with any of the tested pause durations. Both the control group and the ID group show slightly better performance with shorter pauses. Conversely, the L2 group demonstrates improvement as pauses become longer, although this effect is more consistent among participants at the A2 level. However, the improvement is not statistically significant.

These findings are consistent with prior research (Prafiyanto, 2020; Prafiyanto et al., 2018), which also tested similar pause durations in Easy Language audios and found no significant effects. One possible explanation for the lack of significant improvement observed in these studies is the already simplified language used in the audios, which may render additional pauses unnecessary. Chaudron and Richards (1986) suggest that non-significant results in their L2 study might be attributed to the slower speech rate in their audios, which could make further pauses less impactful. Similarly, the combination of a 150 wpm speech rate and simplified language in the study presented in this article might account for the absence of significant improvement.

This could also explain why studies using standard language generally found positive results despite employing similar pause lengths, as in Blumstein et al. (1985) and Sugai et al. (2007, 2008). Nonetheless, it is worth noting that although the improvement observed in the L2 group was not statistically significant, it is consistent with the findings of Sugai et al. (2007, 2016), who reported enhanced comprehension among lower-intermediate L2 learners when longer pauses were incorporated.

However, studies by Blanchard and Prescott (1980), Sagarra (1998), and Chaudron and Richards (1986), which explored the effect of pauses on comprehension in standard language, also reported non-significant results.

It is also interesting to note that the length of the tested pauses does not appear to consistently correlate with the significance of the results found in other studies. For instance, Sagarra (1998) tested pauses ranging from 1 to 2 seconds and found no significant improvements, whereas Leeser (2004), who also tested 3-second pauses, reported a significant enhancement in comprehension. Similarly, Prafiyanto (2018), who examined pauses between 200 and 800 ms, observed no significant effects, but Aasland and Baum (2003), testing pauses up to 500 ms, did find significant improvements.

Another potential explanation could be that unusually long pauses are more difficult to process than those of typical duration. Lundholm Fors (2015) notes that extended pauses can create challenges in processing, which might help explain why the control and ID groups performed better with shorter pauses. These shorter pauses are closer to the average Catalan pause duration, as measured by Cantin and Ríos (1991). Additionally, pause length can influence listeners' perceptions of speech, with longer pauses often leading to the impression of a slower speech rate, even if the actual rate is unchanged (Liu et al., 2022). This perceived slowness might affect comprehension, as participants may find it harder to maintain concentration when they perceive the speech as too slow.

Furthermore, speakers who take longer pauses are often perceived as less knowledgeable or confident (Matzinger et al., 2023), which can increase listeners'

cognitive load as they try to interpret these cues. This added mental effort may divert attention from processing the content itself, potentially explaining the lack of improvement in comprehension observed in some of the groups.

Finally, overly long pauses are often perceived as less natural and less pleasant (Liu et al., 2022; Price, 2021), and unnatural pausing patterns can negatively affect speech intelligibility (Takayanagi et al., 1999). As a result, listeners may lose focus when they encounter pauses of unusual length, as they are not accustomed to such patterns. This could explain why the two groups with native speakers, the control group and the ID group, performed better with shorter pauses. In contrast, L2 learners, who are less accustomed to the nuances of pausing in their non-native language, might not be as affected by this. This could explain the slight improvement seen in the L2 group, as they may rely less on native-like pause patterns when processing speech.

It is important to note that the current study did not collect direct behavioral or qualitative measures (e.g., attentional drift, processing fatigue, or participants' judgments of naturalness), which limits the ability to empirically validate some of the explanatory hypotheses proposed here. Therefore, some interpretations remain speculative. Future studies incorporating such measures would be valuable to substantiate these mechanisms.

In response to the second question, the findings of this study on the acceptability of different pause durations in Catalan Easy Language audios reveal notable differences across participant groups. Both the L2 and control groups generally consider all inter-sentence pause lengths acceptable, whereas the ID group tends to perceive them as too short. Interestingly, a connection emerges between each group's comprehension results and their pause acceptability ratings. For the control group, the 740 ms inter-sentence pause yields the best comprehension results and is also the most highly rated in terms of acceptability. Similarly, the L2 group shows a preference for the 590 ms and 890 ms pauses, which align with their strongest comprehension outcomes. Conversely, the ID group rates the 1040 ms pause most favorably, though they still perceive it as short overall, which does not coincide with the pause they performed the best with.

A comparable trend emerges with intra-sentence pauses: the L2 group generally finds them acceptable, with only the longest ones perceived as slightly long. In contrast, the ID group consistently views most intra-sentence pauses as short, although the longer pauses are closer to being considered suitable. The control group displays a different pattern, where all pauses except the shortest one (250 ms) are perceived as leaning toward being 'long'. This indicates that while extended pauses are more tolerable in inter-sentence positions, they are less acceptable within sentences for this group, which aligns with findings in other studies (Liu et al., 2022). Furthermore, a similar correlation between acceptability and comprehension results is evident for intra-sentence pauses. The control group rated the 250 ms pause most favorably, which aligns with their second-best comprehension performance. Likewise, the L2 group preferred the 400 ms and 550 ms pauses, which correspond to their best comprehension outcomes. In contrast, the ID group again rated the longest pause (700 ms) most favorably, maintaining their pattern of preferring extended pauses.

The ID group's tendency to rate pauses as 'short' may be linked to the way they process prosodic features such as pauses. Research has shown that pauses are a key distinguishing feature of the speech patterns of individuals with intellectual disabilities compared to neurotypical individuals (Corrales-Astorgano et al., 2016), suggesting that pauses play a particularly significant role in how they interpret and organize speech. This could lead the ID group to perceive all pause durations as shorter than those of other groups, as they may rely on these pauses more heavily to structure and make sense of spoken information. This might explain why they

consistently rated the pauses as shorter, even when the pauses were deemed acceptable by the neurotypical groups.

Regarding the preference results, neither the L2 nor the ID group shows a strong preference for any specific inter-sentence pause, which may be explained by their acceptability ratings: the L2 group generally finds all pauses suitable, while the ID group perceives them all as short. In contrast, the control group demonstrates a clear preference for the shortest pause, 590 ms, over the others. A similar pattern emerges in the preference results for intra-sentence pauses, where the control group consistently favors the shortest pause. However, both the ID and L2 groups show more varied preferences, with the 400 ms and 250 ms pauses receiving the most votes, though the difference between these and the others is minimal.

6. Conclusions

This study explored the impact of different pause durations on comprehension, acceptability, and preference in Catalan Easy Language audios, involving three participant groups: individuals with intellectual disabilities, L2 learners of Catalan, and neurotypical control participants. The findings reveal that the duration of inter-sentence and intra-sentence pauses did not significantly affect comprehension across the groups, despite existing guidelines suggesting the use of longer pauses in Easy Language materials. Interestingly, the L2 group showed slight improvements with longer pauses, particularly among A2-level learners, although the effects were not statistically significant. In contrast, both the control and ID groups performed better with shorter pauses, likely due to a preference for more natural and familiar speech patterns. This suggests that pause length alone may not be a decisive factor in improving comprehension among the Easy Language target groups, and that the combination of different prosodic parameters may be responsible for the improvement.

Regarding acceptability, both the L2 learners and the control group found all inter-sentence pauses acceptable, including the longest ones, while the ID group generally found them all short. For intra-sentence pauses, this is repeated: the ID group finds all durations short, while the L2 group finds them generally acceptable. In contrast, the control group is less accepting of longer pause durations in intra-sentence positions. In addition, neither the L2 nor the ID group showed a clear preference for any specific pause duration, whether for inter-sentence or intra-sentence pauses, when asked to choose their preferred length for each type. The L2 group had a slight inclination towards shorter intra-sentence pauses, however.

Considering these acceptability and preference results, longer inter-sentence pauses, such as 1040 ms, could be recommended, as they were generally well-received by all participant groups. For intra-sentence pauses, however, shorter durations, such as 550 ms, might be more suitable. This duration could accommodate both the L2 group's preference for shorter pauses and the ID group's tendency towards longer pauses, positioning 550 ms as a middle ground acceptable to both groups. However, as these recommendations are based on acceptability and preference only, they are solely intended as practical guidelines aimed at optimizing listener experience, rather than directly enhancing comprehension.

This study has several limitations. First, the short length of the audio samples, each consisting of just 130 words. The brevity of the audios may not have fully captured the effects of pause length on comprehension over longer listening periods. Future research could replicate this experiment using longer audio segments to explore whether comprehension and acceptability patterns remain consistent or evolve as participants engage with more substantial content. In particular, the L2 group, which showed a positive trend, may yield significant results with longer audio samples. It is also possible that longer inter-sentence pauses may become less acceptable with longer audio samples for the L2 and control groups. This could be explored in future

studies to gain further insights into how pause length interacts with extended listening durations. Additionally, the study did not account for individual differences in auditory processing abilities, attention span, or prior familiarity with Easy Language conventions. While participants in the ID group were familiar with these conventions, those in the control and L2 groups were not.

Furthermore, future research could explore empirically the benefits of multimodal reinforcement cues, such as images or videos. In written Easy Language, Rivero-Contreras et al. (2021) reported improvements in word-level processing with supportive images, although overall comprehension gains were inconclusive, and Schatz et al. (2017) found no significant benefit from images in Easy Language texts. In audio formats, it would be valuable to investigate whether on-screen images or video clips enhance listener comprehension and engagement.

Moreover, evaluating whether the simplification strategies used to create Easy Language texts, such as reduced syntactic complexity, high-frequency vocabulary, and active voice, are equally effective in audio delivery would be highly informative. This question is a central focus of the ongoing WEL project, which aims to determine how written Easy Language conventions can be adapted for spoken formats; its forthcoming findings may shed light on best practices for script design and audio production in Easy Language.

In conclusion, this study provides an empirical examination of pause duration as a prosodic feature in Easy Language, an area that has received limited attention in prior research. By analyzing its effects on comprehension, acceptability, and preferences, the study provides valuable insights into the design of Catalan Easy Language audio content. It also deepens current understanding of how prosodic features shape communication in Easy Language and contributes to the broader effort to enhance accessibility and foster effective communication for a wide range of audiences.

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AI Tools Declaration

AI assistance (ChatGPT) was used solely for improving language and readability (specifically for grammar checking, dialectal consistency, and stylistic refinement). After using this tool, the entire text was carefully reviewed and revised by the authors. No part of the article was generated without substantive authorial input, and all ideas, analysis, and interpretation remain entirely the authors' own.

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Annex 2: Data management plan

DATA MANAGEMENT PLAN FOR THE PHD THESIS "FROM PROFESSIONAL PRACTICES IN ORAL EASY-TO-UNDERSTAND CONTENT TO PROSODY IN EASY LANGUAGE: SPEECH RATE AND PAUSES IN CATALAN"

(Version 4.0, 28 March 2026)

Document control page	
Title	Data management plan for the PhD thesis "From Professional Practices in Oral Easy-to-Understand Content to Prosody in Easy Language: Speech Rate and Pauses in Catalan"
Creator	Marina Pujadas Farreras
Editor	Marina Pujadas Farreras
Description	This Data Management Plan outlines the data management policies adopted throughout the course of this PhD thesis. It provides a detailed overview of the datasets, specifying the types of data, processing methodologies, and post-project data management strategies. The plan highlights the commitment to ensuring data follows principles of being Findable, Accessible, Interoperable, and Reusable (FAIR). The document is a living resource and will be subjected to updates as needed in response to significant changes affecting data types or handling procedures.
Research domain	Audiovisual translation and media accessibility
Version number	4.0
Version date	28-03-2026
Language	English

Revision history			
Version	**Date**	**Modified by**	**Comments**
1.0	14-12-2023	Marina Pujadas Farreras	Created the first draft of the plan.
2.0	01-03-2023	Marina Pujadas Farreras	Added planned research outputs and modified details on the first draft.

3.0	17-07-2024	Marina Pujadas Farreras	Modified list of planned research outputs.
4.0	28-03-2026	Marina Pujadas Farreras	Modified section about name and structure of the files and folders.

ABOUT THE RESEARCH

Name and email address	Marina Pujadas Farreras marina.pujadas@uab.cat
Thesis director	Dr. Anna Matamala Ripoll
Working title for the thesis	From Professional Practices in Oral Easy-to-Understand Content to Prosody in Easy Language: Speech Rate and Pauses in Catalan
Description of the research	Easy to understand (E2U) is a general term that includes Plain Language and Easy Language. Plain Language is aimed primarily at the general public without expert knowledge of the subject. Easy Language, on the other hand, has strict rules that limit grammatical structures and lexicon that can be used to ensure the highest possible level of comprehension by the user. To date, research on E2U Language has focused almost exclusively on the written form, and it is from this research gap that this thesis emerges. This doctoral thesis focuses on Easy Language in accessible audiovisual content. More specifically, it will focus on speech speed and pause length in Catalan oral EL in order to investigate what are the optimal conditions for users with intellectual disabilities. This research involves interviews with professionals experienced in creating E2U language audiovisual content. From the results of these interviews, two experiments will be carried out. The first experiment evaluates different speech rates, testing four speeds to determine the most optimal for audiovisual content in Easy Language. The second experiment explores the impact of pauses on comprehension for users with intellectual disabilities. Audios recorded at the optimum speed established in the first test will have pauses lengthened in order to assess if they help enhance comprehension and, if so, how long they should be.
Duration of the research	Start date: 01-05-2022 End date: 30-04-2026

Linked project	WEL project (PID2022-137058NB-I00)
Funding	Joan Oró grant to hire research staff in training (2022FI_B 00097)

DATA COLLECTION

Data origin

The data for this project are primarily generated by the researcher through three studies, consisting of interviews and experimental studies involving human participants. The interview data are collected from professionals who produce audio and audiovisual content in Easy-to-Understand Language, while experimental data are obtained from participants recruited for the studies on speech rate and pauses in Easy Language.

In addition, limited use is made of existing data from previous studies conducted by the same research group, specifically prior Raven test results used for participant screening purposes.

Data description

Protocols and Standards:

This research adheres to ethical guidelines and protocols approved by the Ethical Commission of the Autonomous University of Barcelona. The ethical protocol outlines the principles and procedures guiding the entire research process, ensuring the protection and well-being of all participants involved in the study.

The consent forms designed for obtaining participants' agreement to engage in interviews, experiments, and other research activities have also been approved by the Ethical Commission and were designed in Easy Language.

Tools, Instruments, Equipment, Hardware, and Software:

For data collection and participant assessment, this research employs the Raven's Colored Progressive Matrices, an intelligence test that gauges general human intelligence and abstract reasoning abilities. This version of the test is designed for young children aged 5 to 11, individuals with intellectual disabilities and the elderly.

The audio recordings used for the experiments were professionally captured by a voice actor in a controlled studio environment. Post-production modifications to create the different variables were performed using the Audacity software program.

To facilitate participant engagement in the experiments, wireless headphones, specifically the Skullcandy Riff Wireless model, will be provided.

For transcription of interviews, the research utilized the transcription feature provided by Microsoft Teams.

Data types and format

Where possible, widely used and stable formats (such as CSV, PDF, and PNG) are employed to ensure long-term accessibility and compatibility.

- Study 1: Interviews
  The data consist of interview transcripts stored in text-based PDF format. Audio and video recordings are not included in the dataset in order to ensure participant privacy and anonymity, as well as to comply with data repository policies.
- Study 2: Speech rate experiment
  The data include quantitative results stored in spreadsheet format (CSV), as well as text-based materials in PDF format, including transcripts of the audio stimuli. Visual materials used in the stimuli are stored as PNG image files. Audio stimuli are not included in the dataset to ensure privacy and to comply with data repository policies.
- Study 3: Pause experiment
  The data include quantitative results stored in spreadsheet format (CSV), as well as text-based materials in PDF format, including transcripts of the audio stimuli. Visual materials used in the stimuli are stored as PNG image files. Audio stimuli are not included in the dataset to ensure privacy and to comply with data repository policies.

Data volume

While the final data volume is not known yet, our estimate suggests that it will not exceed 10 GB. The most substantial contributors to the data size are the audio recordings, averaging around 10 MB per file.

DATA STORAGE AND SECURITY

Restrictions that may affect the data

The Regulation (EU) 2016/679, enacted on April 27, 2016, by the European Parliament and the Council, commonly known as the General Data Protection Regulation (GDPR), serves as a comprehensive framework for the protection of individuals in the processing of personal data and the free movement of such data. This regulation repeals Directive 95/46/EC and strengthens and extends the rights granted to data owners by the existing Organic Law 15/1999, dated December 13, on the Protection of Personal Data (LOPD), and its implementing regulation (RD 1720/2007). The overarching objective is to fortify the guarantees of rights and liberties for data subjects.

Major data security risks

This study has identified the following main data security risks that could occur during the research.

Accidental deletion of data or loss of data poses a significant risk in which critical research information may be unintentionally removed or erased. This risk, often stemming from human error or software glitches, has the potential to result in the loss of valuable data essential for the study. The loss of data has the potential to compromise research results or delay the progress of the research process if the process of data collection or creation must be repeated.

Data corruption involves the unintended alteration or damage to research information, potentially compromising the accuracy and reliability of the dataset. This risk may manifest during storage, transmission, or processing.

Technical failures encompass disruptions in hardware, software, or equipment functionality. During the experiment, these failures could impact data collection, processing, or storage, potentially compromising the reliability of the obtained results and necessitating the identification and inclusion of additional participants to redo the experiments.

Cyberattacks involve deliberate attempts to breach the security of digital systems, potentially leading to unauthorized access, erasure, or corruption of research data. The university's experiences with cyberattacks in the past have led to data loss and prolonged unavailability of data. This poses a potential risk for compromised research results or delays in the progress of the research process.

Measure to reduce the risk of data loss

In light of the identified risks, a duplicate copy of the data will be stored on an external hard drive. This redundancy serves as a safeguard, allowing for data recovery in the event of accidental deletion, corruption, or loss of the original files. Furthermore, this measure provides an additional layer of protection against potential data loss resulting from cyberattacks.

To address the risk of technical failures, physical copies of questionnaires will be readily available during experiments. This precaution ensures continuity in data collection even if access to online questionnaires is impeded. Additionally, an alternative set of headphones and audio reproduction devices will be on hand to counteract potential equipment difficulties, minimizing the likelihood of disruptions during experiments.

Finally, to ensure the privacy of personal data there will be a process of pseudonymization of the participant data, through which each participant will be assigned a code.

Data storage

The data will be securely stored in a shared folder with the thesis director within a private Teams space. Additionally, for data recovery purposes, a duplicate copy will be maintained in physical storage on an external hard drive. This dual storage approach ensures both collaboration with the thesis director and an extra layer of protection through physical backup.

DATA DOCUMENTATION

Name and structure of the files and folders

This research will be organized in three datasets, each corresponding to one study for coherence. Within each dataset, each file will be given a descriptive name that incorporates a version number if needed. The file naming convention for each folder will be as follows.

Study 1: Interviews

- Transcripts: Int_transcript_num (Int_transcript_01.pdf)

Study 2: Speech rate experiment

- Quantitative results: YYYYMMDD_results_SS_group (20251215_results_SS_Control.csv)
- Stimuli transcripts: Stimuli_X_SS (Stimuli_comprehension_SS.pdf)
- Images: Image_SS_AudioX (Image_SS_Audio1.png)

Study 3: Pauses experiment

- Quantitative results: YYYYMMDD_results_P_group (20251216 _results_P_ID.csv)
- Stimuli transcripts: Stimuli_X_P (Stimuli_comprehension_P.pdf)
- Images: Image_P_AudioX (Image_P_Audio1.png)

Version control

To manage document versions effectively, the Track Changes feature in Microsoft Word will be employed. This feature allows for transparent tracking of modifications, additions, and deletions within the document. Each version of the document will be saved as a different file and will include the version number in the file name, providing a clear chronological record of changes made over time.

In the event of data deletion, the use of the Track Changes feature will help in facilitating data recovery. Should the Track Changes method prove insufficient, Microsoft Word's document recovery features will be employed to maximize data recovery efforts.

If, despite these efforts, the data remains unrecoverable, an assessment will be conducted to determine the feasibility of recollecting the lost information. This may involve redoing experiments, reprocessing raw data, or employing other appropriate measures. In instances where data recollection is not possible, the unavailability of specific data will be transparently acknowledged in the results section of the research.

Metadata standards

The CORA and DDD repositories use open metadata standards based on the Data Documentation Initiative (DDI) and Dublin Core (DC). Additionally, users can export metadata in the following formats: Dublin Core, DDI, DataCite, DDI HTML Codebook, JSON, OAI-ORE, OpenAIRE, and Schema.org JSON-LD.

The metadata will include references to the research project (through the grant identification number 2022FI_B 00097, the projected linked to the research, etc).

ACCESS, SHARE AND REUSE OF DATA

Restrictions on data sharing

As discussed in Section 2.1, the General Data Protection Regulation (GDPR) provides a robust framework for data protection. This study is committed to following current data protection laws, ensuring that personal data undergoes anonymization before any sharing occurs. In instances where anonymization isn't feasible, the data will not be made publicly available.

Potential users of the data

The research findings are likely to be of interest to a diverse audience, including researchers in media accessibility and easy language, or content creators. To maximize accessibility, the dataset will be deposited in the CORA data repository, ensuring broad availability within the research community. Furthermore, the research outcomes will be shared through conference presentations and open-access publications, accessible in the DDD repository of the Autonomous University of Barcelona. A dedicated folder within the dataset will also be made available for convenient access.

Licenses

The datasets will be licensed under the Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND 4.0) license to facilitate maximum reuse of the data. Under this license, potential users of the data are required to give appropriate credit, provide a link to the license, and indicate if changes were made. Users may do so in any reasonable manner, but not in any way that suggests the licensor endorses them or their use. It is important to note that the material may not be used for commercial purposes under this license. Furthermore, users are restricted from creating derivative works, remixing, transforming, or distributing modified versions of the original material under this license.

DEPOSIT AND CONSERVATION OF DATA

Criteria for data long-term preservation

The selection of data for long-term preservation is based on several criteria. Priority is given to processed and anonymized data that are necessary for the verification and

reproducibility of the research findings, such as experimental results and interview transcripts.

Data that are directly linked to publications will be preserved to ensure transparency and support future research. Additionally, preference is given to data stored in open and widely reusable formats to facilitate accessibility and reuse by other researchers.

Due to ethical and privacy considerations, raw audio and video recordings are not preserved. Only anonymized and processed versions of the data are retained for long-term storage.

Duration of the preservation of the data

The chosen repository will preserve the dataset for at least 10 years, which is a recommendation found in several international standards.

Repository

The datasets will be stored in the repository CORA Repositori de Dades de Recerca (RDR). This repository is multidisciplinary and allows up to 10 GB of data storage by default. It also assigns a DOI identifier, which allows for an increase in visibility of the dataset. Additionally, it allows to assign personalized licences to the dataset.

Individual conference presentations and open-access articles will also be stored in the DDD, the institutional repository of the Autonomous University of Barcelona. This repository assigns a permanent link to the data published in it, as well as allowing to assign CC licences to the data.

PLANNED RESEARCH OUTPUTS

Planned research outputs overview

Dataset - "Study 1. Transcriptions of interviews on Easy-to-Understand audiovisual content"

This dataset comprises the transcripts of 11 interviews involving twelve participants, all of whom are creators of Easy-to-Understand Language audiovisual content. The interviews were conducted in either English or Spanish, depending on the interviewee's language preference. The transcripts are provided in the original language of each interview, and no translations have been included. The data have been anonymized. The documents in this dataset are available in PDF format.

Dataset - "Study 2. Experimental data to assess speech rate comprehension, acceptability, and preference in Catalan Easy Language"

This dataset includes the results and stimuli used in Study 2 on speech rate. The materials are presented in Catalan. The data have been anonymized. The documents in this dataset are available in PDF, CSV, and PNG formats.

Dataset - "Study 3. Experimental data to assess pause comprehension, acceptability, and preference in Catalan Easy Language"

This dataset includes the results and stimuli used in Study 3 on pauses. The materials are presented in Catalan. The data have been anonymized. The documents in this dataset are available in PDF, CSV, and PNG formats.

Text - "Article. Creation and translation of audiovisual content in oral Easy-to-Understand Language: insights from interviews with professionals"

This output is a journal article based on the data included in the dataset for Study 1. It is published in open access and is available in English. The document is provided in PDF format.

Text - "Article. The effect of speech rate on easy language audios comprehension"

This output is a journal article based on the data included in the dataset for Study 2. It is published in open access and is available in English. The document is provided in PDF format.

Text - "Article. Speech Rate Perception in audios in Easy Language amongst Individuals with intellectual disabilities"

This output is a journal article based on the data included in the dataset for Study 2. It is published in open access and is available in English. The document is provided in PDF format.

Text - "Article. Empirical study on pause lengths in Catalan Easy Language audios"

This output is a journal article based on the data included in the dataset for Study 3. The article has been accepted for publication and is currently in press. It will be published in open access and will be available in English in PDF format.

Planned research output details

Title	Type	Anticipated release date	Initial access level	Intended repository(ies)	Anticipated file size	License	Metadata standard(s)	Sensitive data	Personal information
Study 1. Transcriptions of interviews…	Dataset	2026-08-31	Open	CORA. Repositori de Dades de Recerca	1MB	CC BY-NC-SA 4.0	Dublin Core DDI (Data Documentation Initiative)	No	No
Study 2. Experimental data to assess speech rate…	Dataset	2026-08-31	Open	CORA. Repositori de Dades de Recerca	1MB	CC BY-NC-SA 4.0	Dublin Core DDI (Data Documentation Initiative)	No	No
Study 3. Experimental data to assess pause…	Dataset	2026-08-31	Open	CORA. Repositori de Dades de Recerca	1MB	CC BY-NC-SA 4.0	Dublin Core DDI (Data Documentation Initiative)	No	No
Article. Creation and translation…	Text	Available	Open	DDD. Dipòsit Digital de Documents de la UAB	<1MB	CC BY-NC-SA 4.0	Dublin Core DDI (Data Documentation Initiative)	No	No
Article. The effect of speech…	Text	Available	Open	DDD. Dipòsit Digital de Documents de la UAB	<1MB	CC BY-NC-SA 4.0	Dublin Core DDI (Data Documentation Initiative)	No	No
Article. Speech Rate Perception…	Text	Available	Open	DDD. Dipòsit Digital de Documents de la UAB	<1MB	CC BY-NC-SA 4.0	Dublin Core DDI (Data Documentation Initiative)	No	No
Article. Empirical study on pause…	Text	2027-04-01	Open	DDD. Dipòsit Digital de Documents de la UAB	<1MB	CC BY-NC-SA 4.0	Dublin Core DDI (Data Documentation Initiative)	No	No

Table 6.1: DMP outputs overview

Annex 3: Datasets of the studies

Study 1:

Pujadas-Farreras, M., & Matamala, A. (2026). *Transcriptions of interviews on Easy-to-Understand audiovisual content.* CORA. Repositori de Dades de Recerca, V1. https://doi.org/10.34810/data3158

Study 2:

Pujadas-Farreras, M., & Machuca, M. J. (2026). *Experimental data to assess speech rate comprehension, acceptability, and preference in Catalan Easy Language*. CORA. Repositori de Dades de Recerca., V1. https://doi.org/10.34810/data2944

Study 3:

Pujadas-Farreras, M., & Machuca, M. J. (2026). *Experimental data to assess pause comprehension, acceptability, and preference in Catalan Easy Language*. CORA. Repositori de Dades de Recerca, V1. https://doi.org/10.34810/data2034

Annex 4: Consent forms

Consent form in Catalan

Si us plau, llegeix amb atenció aquest document
abans de decidir si vols participar en aquesta entrevista / prova / enquesta.

Aquesta entrevista / prova / enquesta forma part d'una investigació del llenguatge fàcil.
La Marina Pujadas és la responsable de la investigació.
És de la Universitat Autònoma de Barcelona.

Quin és l'objectiu de l'estudi?
L'objectiu d'aquesta entrevista / prova / enquesta és estudiar
com podem crear audioguies fàcils/ continguts audiovisuals fàcils.

Què faràs si hi participes?
(Si escau) escoltaràs uns fragments d'uns vídeos/guies/continguts audiovisuals.
Després et farem unes preguntes
i et demanarem informació sobre tu.

Durada
L'entrevista / prova / enquesta dura *(duració en minuts).*

L'estudi té cap risc o benefici?
Participar en aquesta entrevista / prova / enquesta no té cap risc.

Estàs obligat a participar-hi?
No estàs obligat a participar en aquesta entrevista / prova / enquesta.
Pots deixar de participar-hi quan vulguis
i no cal que donis explicacions.

No paguem perquè hi participis.

Què farem amb les teves dades personals?
Les dades personals són, per exemple, el teu nom .

La Marina Pujadas serà la responsable de guardar-les.
D'aquí 5 anys, destruirem les teves dades personals.

Seguirem les lleis de la Unió Europea
que protegeixen les teves dades.
No compartirem les teves dades amb ningú.

Pots posar-te en contacte amb la Marina Pujadas
si vols que canviem o esborrem les teves dades.

També posar-te en contacte amb el responsable de protecció de dades de la UAB.
El seu correu electrònic és proteccio.dades@uab.cat

Com puc tenir més informació?
La persona responsable d'aquesta entrevista / prova / enquesta és la Marina Pujadas.
Si vols més informació, li pots escriure a marina.pujadas@uab.cat
També li pots preguntar ara tot el que faci falta.

La responsable del projecte és l'Anna Matamala.
És de la Universitat Autònoma de Barcelona.

Gravacions
(Si escau) gravarem l'entrevista / prova / enquesta.

Marca l'opció que prefereixis:

- ☐ Estic d'acord que graveu l'entrevista / prova / enquesta.
- ☐ No estic d'acord que graveu l'entrevista / prova / enquesta.

Si fem servir les teves respostes,
no direm mai el teu nom.

Consentiment
Signa o clica el botó SÍ si estàs d'acord amb les afirmacions següents:

- Has llegit la informació o bé algú te l'ha explicada d'una manera entenedora.
- Has pogut fer preguntes, les hem respost i estàs content amb les respostes.
- Vols participar en (l'entrevista/la prova/l'enquesta).

Nom i cognoms del participant: _____

Signatura: _____ Data: _____

Investigador/a: _____

Signatura: _____ Data: _____

En el cas de persones tutelades, signatura del tutor legal.

Signatura: _____ Data: _____

Consent form in Spanish

Por favor, lee con atención este documento
antes de decidir si quieres participar en esta entrevista / prueba / encuesta.

Esta entrevista / prueba / encuesta forma parte de una investigación sobre el lenguaje fácil.
Marina Pujadas es la responsable de la investigación.
Es de la Universidad Autónoma de Barcelona.

¿Cuál es el objetivo del estudio?
El objetivo de esta entrevista / prueba / encuesta es estudiar
cómo podemos crear audioguías fáciles/ contenidos audiovisuales fáciles.

¿Qué harás si participas?
(Si procede) escucharás unos fragmentos de unos vídeos/guías/contenidos audiovisuales.
Después te haremos unas preguntas
y te pediremos información sobre ti.

Duración
La entrevista / prueba / encuesta dura 60 minutos.

¿El estudio tiene algún riesgo o beneficio?
Participar en esta entrevista / prueba / encuesta no tiene ningún riesgo.

¿Estás obligado a participar?
No estás obligado a participar en esta entrevista / prueba / encuesta.
Puedes dejar de participar cuando quieras
y no es necesario que des explicaciones.

No pagamos para que participes.

¿Qué haremos con tus datos personales?
Los datos personales son, por ejemplo, tu nombre .

Marina Pujadas será la responsable de guardarlos.
En 5 años, destruiremos tus datos personales.

Seguiremos las leyes de la Unión Europea
que protegen tus datos.
No compartiremos tus datos con nadie.

Puedes ponerte en contacto con Marina Pujadas
si quieres que cambiemos o borremos tus datos.

También puedes ponerte en contacto con el responsable de protección de datos de la UAB.
Su correo electrónico es proteccio.dades@uab.cat

¿Cómo puedo tener más información?
La persona responsable de esta entrevista / prueba / encuesta es Marina Pujadas.
Si quieres más información, le puedes escribir a marina.pujadas@uab.cat
También le puedes preguntar ahora todo lo que haga falta.

La responsable del proyecto es Anna Matamala.
Es de la Universidad Autónoma de Barcelona.

Grabaciones
(Si procede) grabaremos la entrevista / prueba / encuesta.

Marca la opción que prefieras:

- ☐ Estoy de acuerdo en que se grabe la entrevista / prueba / encuesta.
- ☐ No estoy de acuerdo en que se grabe la entrevista / prueba / encuesta.

Si usamos tus respuestas,
no diremos nunca tu nombre.

Consentimiento
Firma o clica el botón SÍ si estás de acuerdo con las siguientes afirmaciones:

- Has leído la información o bien alguien te la ha explicado de una manera comprensible.
- Has podido hacer preguntas, las hemos respondido y estás contento con las respuestas.
- Quieres participar en (la entrevista/la prueba/la encuesta).

Nombre y apellidos del participante: _____

Firma: _____ Data: _____

Investigador/a:
_____

Firma: _____ Data: _____

En el caso de personas tuteladas, firma del tutor legal.

Firma: _____ Data: _____

Consent form in English

Read this document carefully
before deciding whether you want to participate in this interview / test / survey.

This interview / test / survey is part of a research on easy language.
Marina Pujadas is responsible for the investigation.
She works in the Universitat Autonoma de Barcelona.

What is the purpose of the study?
The purpose of this interview / test / survey is to study
how we can create easy audio guides / easy audiovisual content.

What will you do?
(If applicable) you will listen to excerpts from videos/guides/audio-visual content.
Then we will ask you some questions
we will ask you to give us some information about you.

Duration
The interview / test / survey will last 60 minutes.

Does the study have risks or benefits?
There is no risk in participating.

Are you required to participate?
You are not forced to participate in this interview / test / survey.
You can stop participating whenever you want
and you do not need to give any reason

We do not pay money to participate.

What will we do with your personal data?
Personal data is, for example, your name.

Marina Pujadas will be responsible for keeping them.
In 5 years, we will destroy your personal data.

We will follow the laws of the European Union
that protect your data.

We will not share your data with anyone.

You can contact Marina Pujadas
if you want us to change or delete your data.

You can also contact the data protection officer of the UAB.
Their email is proteccio.dades@uab.cat

How can you know more?
The person responsible for this interview / test / survey is Marina Pujadas.
If you want more information, you can write to her at marina.pujadas@uab.cat
You can also ask her anything you need now.

The person responsible for the project is Anna Matamala.
She works in the Universitat Autonoma de Barcelona.

Recordings
(If applicable) we will record the interview / test / survey.

Choose the option you prefer:

- ☐ I agree, you can record this interview / test / survey.
- ☐ I do not agree, you cannot record this interview / test / survey.

If we use your answers
We will not say your name.

Consent
Sign or click the YES button if you agree with the following statements:

- You have read the information or someone has explained it to you in an understandable way.
- You were able to ask questions, we answered them, and you're happy with the answers.
- You want to participate in (the interview/test/survey).

Full name of the participant: _____

Signature: _____ Date: _____

Researcher: _____

Signature: _____ Date: _____

In the case of wards, signature of the legal guardian.

Signature: _____ Date: _____

Annex 5: Evaluation forms

INSTRUCCIONS

Els 8 textos que llegireu es faran servir en un experiment amb usuaris amb discapacitat cognitiva. L'objectiu d'aquest experiment és investigar la Lectura Fàcil en modalitat oral. Aquests textos s'enregistraran amb velocitats diferents i amb duracions de pauses diferents per poder avaluar quins paràmetres són els ideals pels usuaris de la Lectura Fàcil.

Amb la vostra revisió com a experts volem assegurar-nos que els textos que farem servir per als experiments segueixen les recomanacions de la Lectura Fàcil i són adequats pels usuaris.

Per fer la revisió d'experts, us donarem un sèrie d'afirmacions i heu d'indicar si hi esteu d'acord o en desacord en una escala de l'1 al 4. Aquestes preguntes valoraran si cada text segueix les recomanacions de la Lectura Fàcil sobre gramàtica i vocabulari. També haureu de valorar la facilitat de comprensió de les preguntes de cada text i si considereu que són adequades per mesurar la comprensió dels usuaris.

Si considereu que es pot canviar o millorar algun aspecte dels textos o de les preguntes, indiqueu-ho a la casella d'observacions i comentaris.

QÜESTIONARI

1. Quants anys d'experiència teniu en la Lectura Fàcil?_____
2. Indiqueu si esteu d'acord amb les afirmacions següents. Marqueu amb una creu (X) la vostra resposta. Si considereu que s'han de fer canvis o millores, indiqueu-ho a la casella d'observacions i comentaris.

1. Totalment en desacord 2. En desacord 3. D'acord 4. Totalment d'acord				
	VALORACIÓ			
TEXT 1	1	2	3	4
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa a la gramàtica.				
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa al vocabulari.				
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa a l'estructura del text.				
La pregunta 1 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				

La pregunta 1 és adequada per mesurar la comprensió del text.				
La pregunta 2 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 2 és adequada per mesurar la comprensió del text.				
La pregunta 3 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 3 és adequada per mesurar la comprensió del text.				
OBSERVACIONS I COMENTARIS:				

	VALORACIÓ			
TEXT 2	1	2	3	4
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa a la gramàtica.				
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa al vocabulari.				
La pregunta 1 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 1 és adequada per mesurar la comprensió del text.				
La pregunta 2 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 2 és adequada per mesurar la comprensió del text.				
La pregunta 3 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 3 és adequada per mesurar la comprensió del text.				
OBSERVACIONS I COMENTARIS:				

	VALORACIÓ			
TEXT 3	1	2	3	4
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa a la gramàtica.				
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa al vocabulari.				
La pregunta 1 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 1 és adequada per mesurar la comprensió del text.				

La pregunta 2 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 2 és adequada per mesurar la comprensió del text.				
La pregunta 3 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 3 és adequada per mesurar la comprensió del text.				
OBSERVACIONS I COMENTARIS:				

	VALORACIÓ			
TEXT 4	1	2	3	4
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa a la gramàtica.				
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa al vocabulari.				
La pregunta 1 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 1 és adequada per mesurar la comprensió del text.				
La pregunta 2 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 2 és adequada per mesurar la comprensió del text.				
La pregunta 3 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 3 és adequada per mesurar la comprensió del text.				
OBSERVACIONS I COMENTARIS:				

	VALORACIÓ			
TEXT 5	1	2	3	4
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa a la gramàtica.				
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa al vocabulari.				
La pregunta 1 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 1 és adequada per mesurar la comprensió del text.				
La pregunta 2 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				

La pregunta 2 és adequada per mesurar la comprensió del text.				
La pregunta 3 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 3 és adequada per mesurar la comprensió del text.				
OBSERVACIONS I COMENTARIS:				

	VALORACIÓ			
TEXT 6	1	2	3	4
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa a la gramàtica.				
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa al vocabulari.				
La pregunta 1 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 1 és adequada per mesurar la comprensió del text.				
La pregunta 2 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 2 és adequada per mesurar la comprensió del text.				
La pregunta 3 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 3 és adequada per mesurar la comprensió del text.				
OBSERVACIONS I COMENTARIS:				

	VALORACIÓ			
TEXT 7	1	2	3	4
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa a la gramàtica.				
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa al vocabulari.				
La pregunta 1 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 1 és adequada per mesurar la comprensió del text.				
La pregunta 2 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 2 és adequada per mesurar la comprensió del text.				

La pregunta 3 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 3 és adequada per mesurar la comprensió del text.				
OBSERVACIONS I COMENTARIS:				

	VALORACIÓ			
TEXT 8	1	2	3	4
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa a la gramàtica.				
Aquest text segueix les recomanacions de la Lectura Fàcil pel que fa al vocabulari.				
La pregunta 1 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 1 és adequada per mesurar la comprensió del text.				
La pregunta 2 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 2 és adequada per mesurar la comprensió del text.				
La pregunta 3 segueix les recomanacions de la Lectura Fàcil i és fàcil d'entendre.				
La pregunta 3 és adequada per mesurar la comprensió del text.				
OBSERVACIONS I COMENTARIS:				

Annex 6: Participant recruitment materials

WEL pamphlet



Recruitment posters



