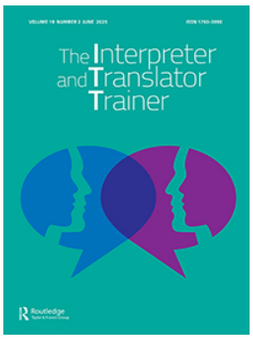

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Explicitation and cognitive load in sight interpreting/translation (SiT): a study into explicitating behaviour of English-Spanish trainee interpreters

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ABSTRACT

This study investigates the relationship between cognitive load and explicitation strategies employed by trainee interpreters during sight interpreting/translation (SiT). Using a mixed-methods approach, the study analysed interpreting outputs, retrospective verbal reports, interviews and self-assessments using the NASA Task Load Index (TLX). It explores how variations in task-induced cognitive load influence explicitating behaviour of trainee interpreters. The main research questions address (1) the correlation between cognitive load and explicitation frequency, and (2) the impact of varying load conditions on the nature of explicitating shifts. Eleven interpreting trainees performed SiT tasks with two texts of differing readability, designed to elicit high (T1) and low (T2) cognitive load. Quantitative analysis revealed moderate but statistically significant correlations between explicitations and both disfluency frequency and NASA TLX scores. Qualitative findings indicated that under high cognitive load (T1), explicitation served primarily as a coping mechanism to manage lexical or structural challenges. In contrast, under lower load (T2), explicitation was used more strategically to enhance textual cohesion and clarity. These findings highlight the dual function of explicitation: as a coping, process-oriented strategy under cognitive strain, and as a product- and audience-oriented tool when cognitive resources are less taxed, offering insights for interpreter training and cognitive processing research.

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Cognitive load; explicitation; sight interpreting/translation (SiT); retrospective verbal reports; NASA TLX

1. Introduction

Sight interpreting/translation (SiT) was long perceived as less demanding than simultaneous or consecutive interpreting, primarily due to the constant availability of the source text (e.g. Gile 2009; Lambert 2004). This perception is reflected in its widespread use as a traditional skills-enhancing introductory exercise in simultaneous interpreting training (Agrifoglio 2004; Čeňková 2015). However, as empirical research consistently demonstrates (Chmiel, Janikowski, and Cieślewicz 2020; Ho 2021, 2022; Shreve, Lacruz, and

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Angelone 2010), this apparent advantage can in fact become a significant constraint, contributing to the considerable cognitive load associated with SiT.

SiT has proven to be a complex mode of language transfer, placing unique cognitive demands on practitioners due to its hybrid nature, combining elements of written translation and interpreting. The primary source of cognitive load in SiT stems from the need to process written input while simultaneously producing an oral rendition, requiring the interpreter to coordinate multiple cognitive efforts in real time. This simultaneous engagement of visual and oral processing is reflected in Gile's (2009) Effort Model for SiT, which identifies four primary cognitive efforts: Reading Effort, Memory Effort, Speech Production Effort and Coordination Effort. The necessity to integrate these processes continuously places a considerable burden on cognitive resources, often leading to processing bottlenecks. Unlike written translation, where text comprehension and production are sequential, or simultaneous interpreting, where auditory processing is central, SiT requires the interpreter to read and verbalise almost concurrently. This dual-task demand can contribute to cognitive overload, particularly in less experienced interpreters who have not yet developed effective coping mechanisms (Agrifoglio 2004; Čeňková 2015).

A further constraint derives from the high expectations of fluency and naturalness imposed on SiT practitioners. End users often expect an output that mirrors a smooth oral delivery, akin to reading aloud (Angelelli 1999; Ho 2022). However, achieving this level of fluency is inherently challenging due to the necessity of real-time syntactic and lexical reformulation. Shreve, Lacruz, and Angelone (2011, 93) describe this difficulty as a consequence of the 'compression of the information processing window', in which interpreters must rapidly assimilate, restructure and articulate the text without the benefit of substantial pauses or revisions.

Another significant factor affecting cognitive load in SiT is the continuous visibility of the source text. While some researchers (e.g. Gile 2009; Lambert 2004) suggest that having the written source available might ease cognitive strain by reducing memory demands, empirical studies challenge this assumption. Viezzi (1989), Shreve, Lacruz, and Angelone (2010) and Chmiel, Janikowski, and Cieślewicz (2020) highlight that constant exposure to the source text can lead to visual interference, increasing the risk of shallow processing and linguistic interference. Ho (2021, 2022) also emphasises that SiT is not necessarily less demanding than other interpreting modes, as the interpreter's attention is divided between the written input and the oral output. This divided-attention effect can be particularly pronounced when dealing with syntactically complex passages, further exacerbating cognitive demands (Shreve, Lacruz, and Angelone 2011). To mitigate these cognitive constraints, interpreters often employ the strategy of reading ahead, which allows them to pre-process upcoming text segments before articulation. Empirical research using eye-tracking technology (e.g. Chmiel et al. 2022; Huang 2011) confirms the effectiveness of this technique, which facilitates more efficient management of cognitive resources by supporting the concurrent execution of reading and speech production. The ability to anticipate upcoming content reduces processing delays and contributes to a more fluid rendition. However, the effectiveness of this strategy depends on the interpreter's expertise, as trainees tend to exhibit shorter eye-voice spans (IVS) and less effective reading-ahead behaviours (Chmiel, Janikowski, and Cieślewicz 2020; Su 2020).

When discussing the constraints of SiT, it is also important to consider the more general contributors to cognitive load that SiT shares with other modes of interpreting. In her research on simultaneous interpreting, Chen (2017) distinguishes between task-related and interpreter-specific variables, highlighting cognitive abilities, motivation, experience, and activation level as key determinants. Plevoets and Defrancq (2018, 2020) draw attention to an often-overlooked factor: output load, i.e. the cognitive demands associated with producing the target text, alongside the traditional focus on input load stemming from source text comprehension. Their corpus-based research suggests that higher formulaicity in the output reduces cognitive strain, indicating that interpreters may adopt strategic linguistic patterns to mitigate cognitive demands. This raises an important question about the strategies interpreters consciously or unconsciously employ to manage their cognitive load. Previous research indicates that one of them may be explicitation (Defrancq, Plevoets, and Magnifico 2015; Gumul 2021; Tang 2018).

Building on these insights into cognitive constraints, the present study examines how cognitive load influences explicitating behaviour in trainee interpreters during SiT. By adopting both product- and process-oriented methodologies, the study investigates the extent to which increased cognitive effort correlates with explicitation patterns.

One of the reasons we have chosen this mode of interpreting to investigate explicitating behaviour of trainees is that SiT presents a particularly interesting context for exploring explicitation due to its distinctive features. One of the key factors is its lack of external time pacing: unlike simultaneous interpreting, SiT is not dictated by a speaker's ongoing delivery. This relative temporal flexibility allows interpreters to exert greater control over the pace and form of their output. As a result, they can shape the target text more freely, drawing on personal preferences and text production strategies, and potentially integrating more explicitating additions they deem relevant. Moreover, in contrast to simultaneous interpreting, SiT does not compel the interpreter to use explicitation as a compensatory strategy for dealing with speaker pauses, hesitations or repetitions. Therefore, the explicitations observed in SiT are more likely to reflect the interpreter's individual linguistic tendencies and stylistic choices, rather than responses to external pressure (cf. Gumul 2017).

2. Explicitation in interpreting

In addition to the aforementioned advantages of investigating explicitation in SiT, research in this area also reveals a notable gap. Among the various interpreting modes, SiT remains the least explored in terms of explicitation. To the best of our knowledge, only a handful of studies have addressed this phenomenon in SiT to date (e.g. Bakti 2017; Veresné Valentinyi 2022), with one more recently conducted study (Gumul and Pietryga, under review). Explicitation has been documented across all modes of translation and interpreting, irrespective of text genre, language combination, or direction of transfer, and, as the limited existing research confirms, SiT is no exception.

Explicitation generally involves the addition of information in the target text that is either implied or presupposed in the source text, or the specification of information that is overtly expressed in the original (Murtisari 2013). A defining characteristic of explicitation is its independence from language-specific differences, as it consistently

represents an optional shift. Such explicitating shifts may enhance comprehensibility and align the message with the cultural and linguistic expectations of the target audience. From a pragmatic perspective, explicitation serves as a strategy for optimising relevance (Li and Dong 2022; Pym 2005; Setton 1999) and reducing communicative risks (Pym 2005). However, research in interpreting, particularly in simultaneous and consecutive modes, indicates that explicitation is not exclusively audience-oriented; it may also function as a cognitive strategy that supports interpreters in coping with processing challenges (e.g. Defrancq, Plevoets, and Magnifico 2015; Tang 2018). This process-oriented function of explicitation is especially prominent in the performance of trainee interpreters (Gumul 2017, 2021; Tang 2018). For this reason, examining the relationship between explicitation and cognitive load in trainee SiT performance, as undertaken in the present study, offers a particularly interesting line of research.

Research has demonstrated a direct link between cognitive load and explicitating behaviour in interpreting (Dayter 2021; Defrancq, Plevoets, and Magnifico 2015; Gumul 2017, 2021; Tang 2018; Wehrmeyer 2021). Explicitation has been found to serve as a coping strategy to mitigate cognitive strain. For example, Defrancq, Plevoets, and Magnifico (2015) observed that interpreters frequently inserted connective devices to manage processing difficulties in simultaneous interpreting. Similarly, Wehrmeyer (2021) identified explicitating additions in signed language interpreting that functioned as cognitive load management mechanisms. Tang (2018) also reports numerous cases from her investigation of explicitation in consecutive interpreting, in which both professionals and trainees resorted to this shift for the sake of time management or to compensate for information loss.

Empirical research has shown that explicitation functions not only as a coping mechanism in response to increased cognitive load but may also impose additional cognitive demands on interpreters. For example, Wehrmeyer (2021) documented cases where explicitation heightened cognitive strain, resulting in coherence disruptions and processing errors. Similarly, Dayter (2021) noted that explicitation can be cognitively taxing, particularly when it entails extensive reformulation or elaboration.

The bidirectional relationship between explicitation and cognitive load was further explored in a study by Gumul (2021), which also aimed to identify correlations between these two factors, an objective shared by the present research. Gumul's study revealed that some instances of explicitation emerged as responses to processing challenges, serving as compensatory strategies to mask disfluencies. However, some explicitating shifts introduced additional cognitive difficulties, thereby intensifying cognitive load. Employing a triangulated methodology that combined product analysis with process data from retrospective reports, the study established a correlation between explicitating behaviour and cognitive strain. Markers of disfluency, such as hesitation markers, false starts and extended pauses, were used to signal cognitive overload, while participants' retrospective accounts offered valuable insights into the subjective experience of cognitive effort associated with explicitation.

The extent to which explicitation correlates with cognitive load varies across individuals and interpreting conditions. Gumul's (2021) findings suggest that explicitation as a cognitive coping mechanism is highly idiosyncratic, reflecting individual interpreting styles. Furthermore, not all explicitations impose the same

cognitive demands. More elaborate additions, such as explanatory remarks, tend to increase processing difficulty. Another critical factor influencing this relationship is the interpreting direction: empirical evidence suggests a stronger correlation between explicitation and cognitive load in retour interpreting (Gumul 2021).

Given these complexities, further research is needed to explore the cognitive underpinnings of explicitation in under-researched modes such as SiT. By examining the interplay between cognitive constraints and explicitation in SiT, this study aims to contribute to a more comprehensive understanding of the cognitive mechanisms underlying interpreting performance.

3. Research design

3.1. Aims and research questions

This study examines the relationship between cognitive load experienced during SiT and the explicitating behaviour of trainee interpreters. Adopting both a product- and process-oriented approach, the study analyses interpreting outputs alongside participants' self-reports gathered through retrospective verbal reports, structured retrospective interviews and self-rated cognitive workload using the NASA Task Load Index (TLX).

Cognitive load, as conceptualised in this study, follows Chen's (2017) adaptation of cognitive load theory (Paas and Van Merriënboer 1994) and the mental workload model (Hancock and Meshkati 1988). It is defined as the proportion of interpreter's finite cognitive resources allocated to performing an interpreting task within a given context (Chen 2017, 643).

To operationalise cognitive load for product analysis, a performance-based approach is applied, identifying three types of disfluencies as indicators of increased cognitive demand: hesitation markers (filled pauses), false starts and anomalous unfilled pauses exceeding two seconds. These indicators of processing difficulty have been employed in previous interpreting studies (Chmiel et al. 2022; Defrancq, Plevoets, and Magnifico 2015; Gumul 2021; Plevoets and Defrancq 2018, 2020).

For process analysis, cognitive load is assessed through subjective measures, specifically through references to the cognitive load imposed by the SiT task and the experienced cognitive effort in participants' retrospective self-reports and their self-ratings captured via the NASA TLX questionnaire.

In this study, the independent variable is the cognitive load imposed by features of the source texts, while the dependent variable is the extent of explicitation in the target texts. The main aim is to investigate how this condition affects the dependent variable, namely the scope of explicitation performed by trainee interpreters.

The study addresses the following research questions:

(1) To what extent is the frequency of explicitating shifts correlated with cognitive load?
(2) How do varying levels of cognitive load influence the explicitating behaviour displayed by trainee interpreters?

The first research question is examined through quantitative methods, employing statistical correlation analysis and the weighted rating system of the NASA TLX. The second research question is approached qualitatively, drawing on an in-depth examination of process data.

Based on prior findings (Gumul 2021), which showed that approximately 31% of the variance in explicitation shifts among trainee simultaneous interpreters could be attributed to cognitive load (operationalised as the same types of disfluencies as in the present study), we hypothesise that explicitations in SiT will, at least in part, be a response to cognitive strain. Previous research (Gumul 2017) also suggests that trainee interpreters prioritise coping strategies that aid their own processing over communicative clarity for the target audience. We anticipate that this tendency will also manifest in SiT, with trainees displaying process-oriented explicitation strategies aimed at alleviating cognitive burden rather than optimising the communicative clarity of their outputs for end users.

3.2. Method

This study triangulates two process-oriented methods, namely retrospective verbal reports and retrospective interviews, alongside the NASA TLX questionnaire, with product analysis (interpreted outputs).

For retrospection, a specific approach is employed that involves autonomous self-reflection triggered by the source text, a method termed retrospective verbal reports (see Gumul 2020, 2021). In this form of introspective analysis, researcher intervention is minimised. The researcher's role is limited to outlining the task and providing initial instructions, without further guidance or prompting. Once the instructions are delivered, participants engage independently in verbalising their thought processes without external influence, ensuring that their reflections remain unprompted. The source text serves as a stimulus, aiding participants in recalling their cognitive processes during interpretation.

To complement retrospective verbal reports, the study incorporates a retrospective interview, another introspective method. This interview framework partially draws on the question set developed by Gumul and Herring (2022), designed to encourage verbalisations that reveal the interpreting process. In addition to these established questions, we introduced queries focusing on strategic behaviour (following Gumul and Pietryga under review), broadening the scope of insights into interpreters' decision-making. Given the retrospective nature of the interview, participants were explicitly instructed to base their responses solely on the SiT tasks performed for this study.

This study also employs the NASA TLX questionnaire, developed by Hart and Staveland (1988), which is a widely used tool for assessing cognitive workload across various domains, including translation and interpreting research. This multidimensional assessment measures six factors: mental demand, physical demand, temporal demand, effort, performance and frustration level. Its weighted rating system allows for a detailed evaluation of perceived workload, making it valuable for cognitive workload analysis. The NASA TLX is frequently applied in translation and interpreting studies, as seen in work by Gieshoff and Hunziker Heeb (2023), Pietryga (2024), Sun and Shreve (2014), and Zhou, Wang, and Liu (2022). Sun and Shreve (2014) confirmed the tool's validity for measuring translation difficulty, even when only four of the six workload factors were

considered. Gieshoff and Hunziker Heeb (2023) identified a strong link between cognitive load and effort, while Zhou, Wang, and Liu (2022) highlighted the impact of task complexity on perceived effort. The NASA TLX weighted rating system, often used as a global variable in research, provides a reliable method for quantifying cognitive workload in translation and interpreting tasks.

For product analysis, a manual comparison of source and target texts was conducted to identify instances of explicitation. This method makes it possible to examine explicitation as a transformation from the source text to the target text, rather than merely assessing the explicitness of the final product, which is a common limitation of corpus-based research. This approach enables a distinction between interpreter-induced shifts and explicit renditions inherently linked to the speaker (e.g. connectors already present in the source text). The analysis exclusively considers optional explicitations that are not dictated by linguistic constraints. Consequently, obligatory shifts stemming from structural differences between English and Spanish are excluded. This approach aligns with prior research by the first author (Gumul 2017, 2021), ensuring methodological consistency and facilitating comparison of results.

3.3. Materials

The source materials for this study comprised two texts on general topics that did not require specialised knowledge or prior preparation. These texts, available online (see Table 1), were adapted to meet the demands of the sight interpreting task. First, excerpts were carefully selected to fit within a single A4 page using Times New Roman font (14 pt) with 1.5 line spacing, ensuring readability and accessibility for the task. Second, the degree of explicitation in the texts was systematically modified by either omitting certain words (e.g. connectors and discourse-organising items, modifiers and qualifiers, reiterated lexical items) or substituting them with less explicit alternatives (e.g. pronominal forms instead of nouns, general content words instead of more specific ones). Through these modifications, we created 20 empty slots or introduced implicit elements in each text, providing opportunities for potential explicitations. These became our Areas of Interest (AOIs) in the product analysis phase. In addition, AOIs that naturally exhibited explicitation potential, even without intervention, were identified and marked.

The primary aim was to establish textual conditions that would prompt varying forms of explicitation while minimising the confounding effect of a single type of explicitation shift. To achieve this, a range of surface-level modifications was incorporated. These included prompting common explicitating shifts, such as adding connectives and

Table 1. Features of the source texts.

	Topic	Number of words	Number of sentences	Flesh-Kincaid score	Number of AOIs	Expected forms of explicitation
T1	Addiction to social media[a]	396	25	47	20	adding connectives, lexicalisation of pro-forms, replacing nominalisations with verb phrases, disambiguation of lexical metaphors
T2	Cultural differences in the USA[b]	397	34	68.2	20	adding connectives, lexicalisation of pro-forms, substituting a generic name with a proper name, disambiguation of lexical metaphors

[a]https://www.addictioncenter.com/drugs/social-media-addiction/. Retrieved 16 Oct 2023
[b]https://www.edupass.org/living-in-the-usa/culture/. Retrieved 16 Oct 2023

lexicalising pro-forms, as well as less frequent transformations, such as converting nominalisations into verb phrases or disambiguating lexical metaphors.

Because the study aimed to investigate explicitation behaviour under varying cognitive load conditions, two texts with distinct readability levels were selected. These texts were further modified through slight alterations to structure and lexis in order to increase the disparity in their readability scores. According to the Flesch-Kincaid index, one text was classified as difficult to read (T1), while the other was written in plain English (T2). These textual characteristics were intended to elicit different levels of cognitive effort during sight interpreting, enabling an analysis of explicitation strategies across conditions of varying reading difficulty. Table 1 provides an overview of each source text, highlighting key characteristics and the anticipated forms of explicitation based on the identified AOIs.

3.4. Participants

The study included 11 participants, all of whom were interpreting trainees enrolled in the Faculty of Translation and Interpreting at the University of Las Palmas de Gran Canaria. The sample consisted of nine female and two male students. The mean age of participants was approximately 22 years, with a standard deviation of 1.47 years (birth years ranged from 1998 to 2002). Participants were in either their fourth or fifth year of studies and had comparable levels of prior training in interpreting. Self-reported English proficiency, rated on a scale from 1 to 7, ranged from 5 to 7, indicating an advanced command of the language.

Participation was voluntary, and each student provided informed consent prior to taking part. They also signed the Consent for the Processing of Personal Data and the Consent for Voice Recording. Participants were informed of ethical considerations, including the assurance of anonymity and their right to withdraw from the study at any time without consequences. Their identities were protected through anonymisation by assigning numbers (P01–P11). To avoid potential power dynamics, none of the participants was a student of the researcher conducting the study.

3.5. Procedure

The data collection process took place between October and December 2023 at the Faculty of Translation and Interpreting, University of Las Palmas de Gran Canaria. Each participant was tested individually in separate sessions. The study followed a structured five-stage procedure: (1) prior reading/skimming, (2) sight interpreting task, (3) self-retrospection prompted by the source text, (4) retrospective interview and (5) completion of the NASA TLX questionnaire.

At the beginning of each session, participants were given an overview of the study and the tasks they would perform. They also had the opportunity to ask questions and review the informed consent form before signing it. To prevent any influence on their interpretations and verbal retrospections, the true objective of the study, namely examining the relationship between explicitation and cognitive load, was not disclosed at this stage. The study was conducted in the participants' native language, Spanish.

Before commencing the experimental tasks, participants completed a short demographic questionnaire, providing information on their age, gender, hours of prior interpreting training, and self-reported English proficiency level. A preliminary pilot study was conducted with two participants to evaluate the study design. As no modifications were deemed necessary, their data were incorporated into the main study.

During the first stage of the experiment, participants were given one minute to skim or read through the first source text. Following this, they proceeded with the sight interpretation of the text. Upon completing the interpretation, they received further instructions for the retrospective session:

> I'm going to show you the text you just interpreted. I'd like you to say anything you remember thinking or experiencing while you were reading the original and then interpreting it. Keep in mind that the purpose of this reflection is to reconstruct your thought process during interpretation, NOT to evaluate how well or poorly you did. You can speak in either English or Spanish. Don't worry about form or grammar: the more spontaneous, the better. Whenever you recall something you were thinking or feeling, please mention which part of the original text you're referring to.[1]

After the self-retrospection prompted by the source text, participants took part in a retrospective interview, during which they were asked the following questions:[2]

(1) How did you feel when you were sight-interpreting the text?
(2) What was difficult about the interpreting task?
(3) What was easy about the interpreting task?
(4) Can you describe any solutions, such as strategies or techniques, that you used deliberately and consciously? Why did you use them?
(5) Did you add anything? Why?
(6) Did you omit anything? Why?

The final task for the participants involved completing the NASA TLX questionnaire.

The five-stage procedure was conducted separately for each source text (T1 and T2) with a 10-min break between them. The order of the texts was randomised among participants to mitigate the effects of fatigue and familiarity with the task. At the end of the session, participants took part in a short debriefing, where they had the opportunity to ask additional questions. The entire process for each individual lasted approximately one hour. Audio recordings were made for the sight interpretation tasks and for both retrospection phases (self-retrospection and retrospective interview).

4. Results and analysis

4.1. Quantitative analysis

Our quantitative analysis consisted of examining the correlation between (1) the number of explicitation shifts and the number of disfluencies found in the interpreting outputs of participants (see Table 2), and (2) the number of explicitation shifts in the outputs and the weighted ratings from the NASA TLX (see Table 2 and Figure 2).[3]

The Pearson correlation analysis revealed two key relationships in the dataset. First, the correlation between the number of explicitations and the number of disfluencies was

Table 2. The number of explicitations and disfluencies found in the interpreting outputs.

		T1		T2	
		Number of explicitations	Number of disfluencies	Number of explicitations	Number of disfluencies
1.	P01	15	21	6	14
2.	P02	11	39	19	23
3.	P03	35	40	34	40
4.	P04	24	45	14	30
5.	P05	4	3	3	5
6.	P06	15	7	17	7
7.	P07	20	45	19	41
8.	P08	20	16	20	17
9.	P09	21	24	15	24
10.	P10	15	23	9	29
11	P11	13	28	19	27
	TOTAL:	193	291	175	257
	MEAN	17.54	26.45	15.9	23.36
	SD	7.6	13.87	7.92	11.32
	RANGE	4 – 35	3 – 45	3 – 34	5 - 41

$r = 0.591$, indicating a moderate positive correlation. This correlation was statistically significant ($p = 0.001842$). This suggests that as the number of explicitations increases, the number of disfluencies also tends to increase, implying a potential link between these two linguistic features. The coefficient of determination ($R^2 = 0.3493$) shows that approximately 34.93% of the variance in disfluencies can be explained by the number of explicitations.

Second, the correlation between the number of explicitations and the weighted rating of NASA-TLX was $r = 0.6257$, also reflecting a moderate positive correlation. This correlation was also statistically significant ($p = 0.003775$). This suggests that a higher cognitive workload, as measured by NASA-TLX, is associated with a greater number of explicitations. The coefficient of determination ($R^2 = 0.3915$) indicates that 39.15% of the variance in the number of explicitations can be attributed to differences in cognitive workload.

Both correlations highlight meaningful relationships, suggesting that explicitations may be influenced by cognitive load. However, these results do not provide evidence of causation, and further investigation is necessary to explore potential underlying mechanisms and confounding factors. A more detailed analysis of the NASA TLX results is presented below, providing additional insights into participants' subjective perception of cognitive load in the SiT tasks under investigation.

The NASA TLX mean values for the six NASA-TLX rating scales, presented in Figure 1, reflect participants' subjective assessment of workload across two experimental conditions: T1, characterised by higher cognitive demand, and T2, designed to be comparatively easy. A consistent pattern emerged across the six TLX dimensions: mental demand, physical demand, temporal demand, performance, effort and frustration. Participants reported notably elevated levels of mental demand and effort for T1 (means of 75 and 80, respectively, out of 100 points on the scale), underscoring its cognitively taxing nature. In contrast, T2 elicited lower ratings in these domains (46.36 and 49.09, respectively, out of 100 points), suggesting that the task was perceived as more manageable and less stressful.

Inter-individual differences among the eleven participants were also observed (see Figure 2). While the overall trend favoured higher workload scores for T1,

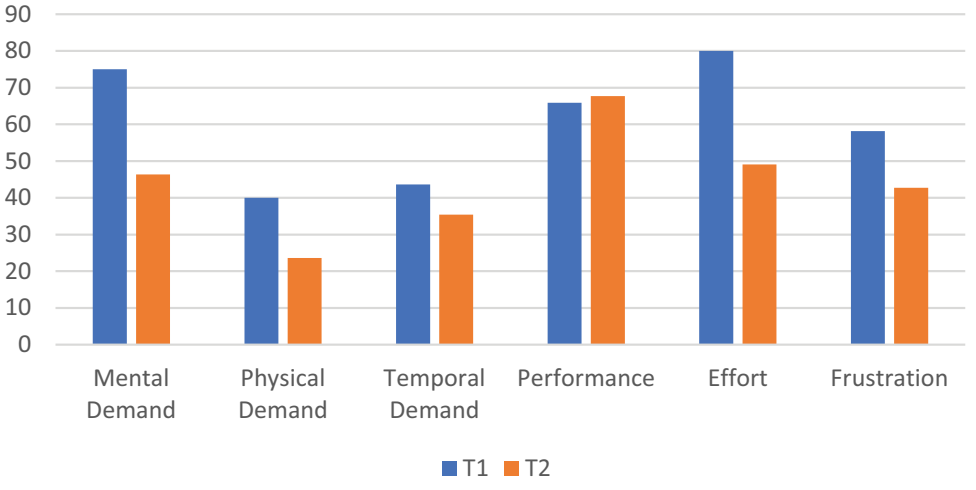

Figure 1. Mean values for the six NASA-TLX rating scales.

some participants, particularly P04, P07 and P09, exhibited more pronounced differences between T1 and T2, suggesting heightened sensitivity to cognitive load. For example, P09 scored 81.33 out of 100 points on the scale for T1, compared to only 34.66 for T2. Others, such as P01 and P05, reported relatively stable workload levels across both texts, potentially indicating higher cognitive resilience or differing task strategies. These individual variations highlight the importance of considering participant-level factors when interpreting subjective workload assessments.

Overall, the results confirm that T1 imposed a significantly greater cognitive burden than T2, consistent with the experimental manipulation and supporting

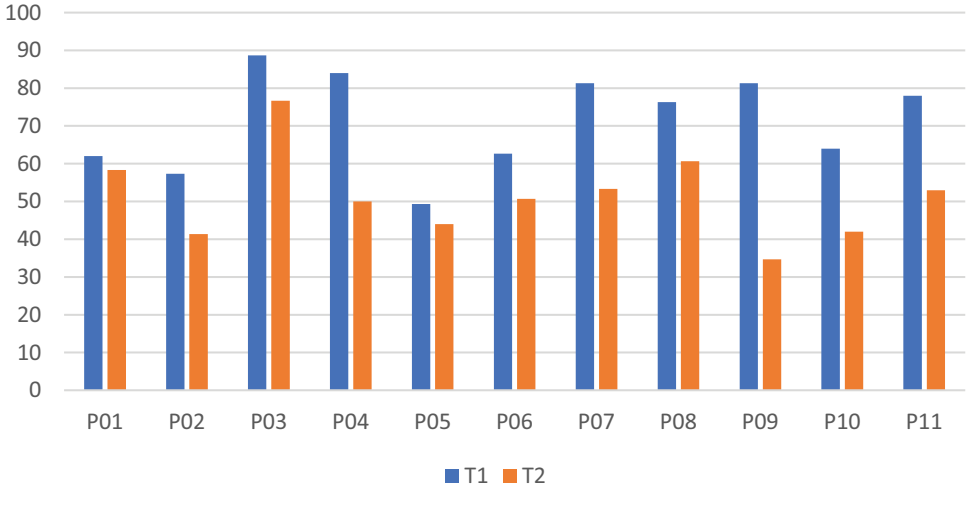

Figure 2. Individual differences in NASA TLX weighted rating results across participants and SiT tasks.

the sensitivity of the NASA TLX in capturing nuanced differences in perceived workload.

4.2. Qualitative analysis

The qualitative data collected from retrospective verbal reports, retrospective interviews and interpreting outputs highlight the role of explicitation in managing cognitive demands during SiT. While explicitation strategies were employed across both experimental conditions (T1 and T2), their function and underlying motivation differed depending on the cognitive load induced by each source text.

Table 3 provides a comparison of product-oriented and process-oriented explicitations across both T1 and T2 as reported in self-retrospection (SR) and retrospective interviews (RI). A total of 60 explicitations were reported by participants during retrospection, out of 368 explicitations detected in the product (i.e. participants' sight translations of T1 and T2). The results reveal distinct patterns depending on the reason behind explicitation and the text under consideration. Participants engaged more actively in process-oriented explicitation when working with T1 (20 reports vs 11 in T2) to mitigate cognitive load. In contrast, product-oriented explicitation was more frequent in T2 (22 reports vs 7 for T1), a condition which imposed lower cognitive strain.

Participants' reports revealed clear differences in the type and intensity of cognitive load experienced in the two conditions. In T1, the lexical burden was particularly high, stemming from unfamiliar vocabulary and complex expressions. Many participants reported struggling with interpreting specific terms, which often led to hesitation, disrupted output, and increased emotional strain, especially for individuals such as P03, P06, and P11. This is illustrated by the following example from the retrospective report of P06, in which a more explicit equivalent was used non-deliberately, simply as a response to the cognitive load imposed by lexical search problems. Later in her self-retrospection, she admitted to adding information to mask perceived errors in her performance:

(1)

Recuerdo que, al principio, «checking and scrolling» me costó traducirlo, incluso con la lectura previa, así que simplemente lo sinteticé en «el uso de las redes sociales». [. . .] Y no sé

Table 3. Product-oriented and process-oriented explicitation as reported during retrospection.

		Product-oriented explicitation				Process-oriented explicitation			
		T1 SR	T1 RI	T2 SR	T2 RI	T1 SR	T1 RI	T2 SR	T2 RI
1	P01	–	–	1	1	–	2	–	–
2	P02	–	–	–	1	1	3	1	–
3	P03	–	2	1	–	–	1	–	–
4	P04	–	–	1	1	–	2	1	2
5	P05	1	–	–	1	–	1	–	1
6	P06	–	–	1	2	–	–	–	2
7	P07	1	–	–	–	–	1	–	1
8	P08	–	–	1	–	–		–	1
9	P09	–	–	3	3	2	2	1	1
10	P10	–	–	–	2	–	2	–	–
11	P11	1	2	2	1	1	2	–	–
	TOTAL	**3**	**4**	**10**	**12**	**4**	**16**	**3**	**8**

si en la parte del final, como me puse nerviosa, pues, puede que también añadiera información para intentar [risa] cubrir el error. [P06, SR, T1]

GLOSS: *I remember that, at the beginning, 'checking and scrolling' was hard for me to translate, even with the prior reading, so I just condensed it into 'the use of social media'. [. . .] And I don't know if, toward the end, since I got nervous, well, maybe I also added some information to try [laughs] to cover up the mistake.*

By contrast, T2, while less taxing lexically, introduced a different kind of cognitive challenge: the need to manage structural and discourse-level coherence. Participants frequently mentioned difficulties in segmenting the text, dealing with a lack of explicit cohesive markers and reorganising fragmented content. This led to mental fatigue and saturation, particularly for participants like P05 and P10. Some also reported increased performance pressure, especially if they had already encountered the more difficult T1 condition earlier in the session, leading to heightened stress and a desire to produce a well-structured target text.

These differences in cognitive load shaped participants' explicitation behaviour as a response tailored to the specific cognitive demands of each task. In the T1 condition, which was cognitively demanding due to dense lexical content and complex phrasing, explicitation often served as a coping strategy. Participants used lexical glosses, paraphrasing and added connectors to compensate for comprehension difficulties and to clarify meaning. Retrospective reports and interview responses from participants such as P05, P07, P09 and P11 indicated that explicitating strategies were frequently employed when facing unknown or difficult terms (e.g. 'barrage', 'curated', 'stunted'), or when dealing with segments that were hard to anticipate or integrate, as illustrated by example (2):

(2)

Como dije antes «curated content», no sé cómo traducir «curated». Sé la idea que quería representar así que intenté aproximar con otras construcciones. Creo que simplemente añadí lo que había después. Lo expliqué o sea, hice una explicación más bien. [P11, RI, T1]

GLOSS: *As I said before, 'curated content', I don't know how to translate 'curated'. I know the idea I wanted to convey, so I tried to approximate it with other constructions. I think I just added what came after. I explained it, I mean, I gave more of an explanation instead.*

In contrast, in the T2 condition, which presented a relatively lower lexical load, explicitation was typically used in a more deliberate and structured way with the aim of enhancing the relevance of the message and facilitating comprehension for the target audience. Participants focused on improving discourse cohesion and fluency, often reformulating content to produce a more coherent and readable output. Typical forms of explicitation include adding connectors, explanatory remarks and using reiteration. Retrospective comments from P02, P04, P08 and P09 point to the use of cohesive devices, such as logical connectors and reformulated sentence structures, aimed at clarifying the flow of ideas rather than solving immediate lexical problems.

Across both conditions, participants employed a range of strategies to manage cognitive load. However, in T2, where the lexical pressure was lower, many participants showed greater metacognitive awareness of their approach to explicitation. Participants such as P01, P02, P03, P05 and P06 described consciously making decisions to

restructure their output to enhance cohesion. These reflective accounts suggest that participants were more attuned to discourse-level concerns and actively sought to improve the readability of their interpretations in T2 by adding connectors, as illustrated by examples (3), (4) and (5):

(3)

El meter los conectores cuando creía que quedaba bien unir dos ideas y me ayudaba a que sonara más natural, creo yo. [P02, RI, T2]

GLOSS: *Adding connectors when I thought it fit well to link two ideas and helped make it sound more natural, at least that's what I think.*

(4)

Esta vez, y de forma más usual, utilicé la unión de oraciones, pero porque, si no, en español hubiese [. . .] o sea, a la hora de interpretarlo hubiese quedado como muy entrecortado el texto y necesitaba como más ritmo. Entonces, por eso, por ejemplo, unía una oración con otra que eran básicamente la misma idea o eran el resultado y lo unía con un «porque» o algo así. [Carmen, RI, T2]

GLOSS: *This time, as I normally would, I linked sentences together, but because otherwise, in Spanish it would have [. . .] I mean, when interpreting it, the text would have sounded really disjointed and I needed more rhythm. So that's why, for example, I would join one sentence with another that was basically the same idea or the result, and I would link them with a 'because' or something like that.*

Another participant's report (example 5) demonstrates how the two functions of explicitation, namely strategic use to facilitate the interpreting process and audience-oriented use, can be combined. The addition of connectives served both as a chaining mechanism to maintain the flow of interpreting and as a means of enhancing audience comprehension:

(5)

En algunos casos, me di cuenta de la relación implícita que había entre las ideas que no se explicitaba mediante un conector y yo sí se lo añadía porque eso, por un lado, me ayudaba a mí a hilar mejor el discurso y, por otro lado, creo que facilitaba la comprensión. [P01, RI, T2]

GLOSS: *In some cases, I noticed the implicit relationship between the ideas that wasn't made explicit with a connector, and I did add one because, on the one hand, it helped me to tie the discourse together better and, on the other hand, I think it made it easier to understand.*

5. Discussion & conclusions

This study investigated how explicitation functions in sight interpreting under different cognitive load conditions, addressing two main research questions: (RQ1) To what extent is the frequency of explicitating shifts correlated with cognitive load?; and (RQ2) How do varying levels of cognitive load influence the explicitating behaviour displayed by trainee interpreters?

In response to RQ1, the quantitative analysis revealed two statistically significant moderate correlations: (1) between the frequency of explicitations and the frequency of disfluencies, assumed to be indicators of cognitive load in the interpreting product, and (2) between the frequency of explicitations and the level of cognitive workload as reported by participants in the NASA-TLX questionnaire. While these results cannot be taken as evidence of causality, the qualitative analysis of process data supports the interpretation that a denser pattern of explicitations in more demanding SiT tasks may reflect trainees' attempts to manage increased cognitive load. In such cases, explicitation seems to function as a self-preservation strategy that may potentially facilitate task performance. These findings align with previous research, which has shown that both professional and trainee interpreters use explicitation as a coping mechanism under cognitive strain (e.g. Defrancq, Plevoets, and Magnifico 2015; Gumul 2017, 2021; Li and Gumul 2024; Tang 2018).

Both the quantitative and qualitative findings provide insights into the impact of cognitive load on the explicitating behaviour of trainee interpreters. Regarding RQ2, the data highlight distinct differences in how explicitation is used in response to high and low cognitive load conditions (T1 and T2 respectively).

In T1, which imposed a high cognitive load, explicitation emerged primarily as a coping strategy. Participants frequently used explicitation to overcome lexical challenges, such as unfamiliar terms and complex expressions, which disrupted their fluency. This finding aligns with the positive correlation found between cognitive load and the number of explicitations in the quantitative analysis. By contrast, in T2, where cognitive load was lower, the use of explicitation was more product- and audience-oriented, consistent with pragmatically oriented approaches to explicitation (Li and Dong 2022; Pym 2005; Setton 1999). It often served to enhance textual cohesion and flow. Participants reported consciously restructuring sentences and adding connectors to improve coherence. This product-oriented use of explicitation, aimed at improving the interpreting output rather than resolving immediate lexical or structural issues, points to greater metacognitive awareness in less demanding conditions. In this sense, participants were able to focus on improving the structure and readability of their interpretations.

Drawing on the results discussed, it can be argued that varying levels of cognitive load shape how trainee interpreters employ explicitation strategies. In high-load conditions, explicitation is more reactive, addressing immediate lexical and comprehension issues, whereas in low-load conditions it becomes a tool for enhancing discourse coherence. These findings underscore the importance of considering both cognitive and metacognitive factors in interpreting training, as well as the need for further exploration into how different types of cognitive load impact the use of explicitation in interpreting practice.

Although the findings provide some meaningful insights into the relationship between explicitation and cognitive load, several limitations must be considered. First, the correlational nature of our analysis precludes causal conclusions. While significant associations were identified between explicitations and cognitive load, other unmeasured factors, such as individual differences in interpreting experience or expertise, may have influenced both the frequency of explicitations and cognitive load ratings. In addition, although the NASA TLX is a valuable tool for assessing subjective cognitive load, it may not fully capture the complexity of cognitive processes involved in interpreting, such as the dynamic allocation of cognitive resources and the interplay between attention,

memory and language processing. Future research could benefit from employing more objective measures of cognitive load, such as eye-tracking or physiological indices, to triangulate these findings.

A further limitation lies in the sample size and in the variability in participants' cognitive resilience and task strategies. As noted in the analysis, some participants exhibited consistent workload ratings across both experimental conditions, suggesting that individual factors, such as familiarity with interpreting tasks or personal strategies for managing cognitive load, may have influenced the observed patterns of explicitations. A larger and more diverse sample could provide a more comprehensive understanding of how individual differences affect the use of explicitation and the experience of cognitive load.

Another set of limitations relates to the scope and design of the study. The data reflect only one language combination and one direction of interpreting, and therefore do not account for possible directionality effects, which may influence the relationship between explicitation and cognitive load. In addition, other methodological variables could have affected the results, such as the criteria used for text selection or the involvement of external assessors in evaluating output. If systematically varied, these factors might provide further insight into how different task conditions or assessment approaches mediate the link between cognitive effort and explicitation. Expanding future studies to include multiple language pairs, retour and bidirectional interpreting, and a wider range of assessment methods would strengthen the generalisability and robustness of the findings.

In conclusion, the study confirms that the frequency of explicitating shifts is positively correlated with cognitive load in SiT tasks. Explicitations appear to be an effective strategy for managing the cognitive demands imposed by interpreting tasks, and the relationship between explicitations and cognitive load is influenced by both task-specific factors and individual differences. Further research is needed to explore the underlying mechanisms that drive this relationship and to investigate how different strategies are employed by interpreters to manage varying levels of cognitive load.

Notes

1. The instructions were provided in Spanish and only translated into English for the purposes of this article.
2. The interview was conducted in Spanish, the participants' native language.
3. Our initial aim was to determine whether there was a statistically significant difference between the two conditions (T1 and T2). However, this approach proved unfeasible for two main reasons. First, the sample size of 11 participants was too small to support robust statistical comparisons. Second, substantial inter-subject variability in explicitation patterns (see figures in Table 1, particularly SD and range values) introduced noise that obscured potential trends. Consequently, we opted for correlation analyses, which allowed us to examine relationships between selected indicators, namely the frequencies of explicitations and disfluencies, as well as the weighted NASA TLX ratings, across all 22 interpreting outputs.

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