An Eye-Tracking Study of Cognitive Effort in Processing of Lexical Features in Students and Experts

Estudio del esfuerzo cognitivo en el procesamiento de características léxicas en estudiantes y expertos utilizando una metodología de seguimiento de ojos

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Abstract: In this paper, it is our aim to observe the impact that translator training and experience have on different groups of participants (novice, trained and experienced) when evaluating a translation. We will be doing so by measuring the cognitive effort invested by the participants in the processing of lexical features applying an eye-tracking methodology. Participants will be presented with several translated versions from English into Spanish done by translators with different levels of training and experience. This paper offers a detailed description of the experiment carried out. In it, we were also able to observe that while there are common patterns in the three groups, training and experience does have an impact on their behaviour when reading and assessing the different translated versions. We have been able to observe a link between these two factors and the amount of cognitive effort, which is higher in the group of students than in the group of experts, with trained participants leading the numbers, which we believe confirms the skill acquisition model proposed by Dreyfus (2004). Also, that extrinsic information is an element of disruption that influences the decisions made by participants, the amount of cognitive effort employed and how those lexical features have been processed.

Keywords: Cognitive effort, Eye-tracking, Translator training, Assessment competence, Translation process

Resumen: El objetivo de este artículo es observar el impacto que la formación y la experiencia del traductor ejercen sobre diferentes grupos de participantes (principiantes, con formación y con experiencia) a la hora de evaluar una traducción. Para ello, mediremos el esfuerzo cognitivo empleado por estos en el procesamiento de características léxicas mediante la aplicación de una metodología de seguimiento de ojos. Se presentará a los participantes con una serie de versiones traducidas del inglés al español realizadas por traductores con distintos niveles de formación y experiencia. El artículo ofrece una descripción detallada del experimento llevado a cabo. En él, se puede observar que, además de detectar unos patrones comunes en los tres grupos, la formación y la experiencia han influido en su comportamiento a la hora de proceder con la lectura y la evaluación de las distintas versiones de traducción. Hemos podido observar un vínculo entre estos dos factores y la cantidad de esfuerzo cognitivo empleado, la cual es mayor en el grupo de estudiantes que en el grupo de expertos, siendo los participantes con formación los que registran un mayor esfuerzo, lo cual creemos que confirma el modelo de adquisición de destrezas propuesto por Dreyfus (2004). De la misma forma, la información extrínseca representa un elemento disruptivo que ha condicionado las decisiones de los participantes, la cantidad de esfuerzo cognitivo y cómo se han procesado las características léxicas.

Palabras clave: Esfuerzo cognitivo, Seguimiento de ojos, Formación del traductor, Competencia evaluadora, Proceso de traducción

INTRODUCTION

While much has been written about the competences a translator should acquire (for example, PACTE, 2000, 2003; Kelly, 2002), less is known about the impact translator training and experience have on the process and cognitive effort invested in evaluation of translation.

In this paper we present a study on the cognitive effort invested by three different groups of participants (novice, trained and experts) in processing lexical features through the use of eye-tracking methodology. By asking these three groups of participants to evaluate three translations and choosing which was their preferred version, we observed the impact training and experience had on the approach to the evaluation taken by different participant groups. Further, we provided either correct or incorrect information on the professional status of the translators to participants with the goal of observing how such information would influence their choices and evaluation process. For the sake of brevity, we refer to scenarios where no such extrinsic information was provided as NoInfo, where correct information was provided as GoodInfo, and incorrect information as BadInfo throughout. Finally, we observed a number

of patterns that were common across all participant groups regardless of training or experience.

In our reflections on the link between the competences acquired, the stage of the acquisition of those competences and the ability to assess the quality of a translation, we draw on the Dreyfus and Dreyfus five-stage model of adult skill acquisition (Dreyfus & Dreyfus, 1986; Dreyfus, 2004) and Chesterman's (2016) adaptation to Translation.

1. HYPOTHESIS/EXPECTATIONS AND OBJECTIVES

H01. When processing lexical features, we expect some common patterns in the behaviour of all groups of participants:

- H01.1 There is a preference for certain words as focus of attention.
- H01.2 Participants compare keywords, sometimes in a sequential manner.
- H01.3 Given NoInfo, participants expend more cognitive effort on lexical words than grammatical words.

H02. Having received formal training has an impact on the behaviour of participants when they are reading and assessing the three different translated versions. Cognitive effort is higher in the group of students than in the group of experts:

- H02.1 Students expend more cognitive effort than experts on the evaluation process.
- H02.2 Mistranslations and difficult to translate words require more cognitive effort on the part of the group of students, while experts are more efficient (that is, they spend less time on those units, which translates into less cognitive effort).

H03. Extrinsic information will be an element of disruption:

- H03.1 When meta words are included in the scenarios, participants pay attention to them, that is, they register long durations and are included in sequential comparisons.

The specific objectives in which we think the aforementioned might be materialised are the following:

1) Study the cognitive effort made by participants in the processing of lexical features and check whether there is a difference in novice, trained and expert groups.
2) Observe if, despite the possible differences, there are common patterns or common behaviours in the three groups.

3) Learn if the extrinsic information provided exerts some kind of influence in the decisions/the amount of cognitive effort/how those lexical features are processed.

2. LITERATURE REVIEW

In a previous study to this one, presented in De Wille and Bermúdez-Bausela (2018), we investigated 'perceived quality' and how strongly an individual is influenced by extrinsic cues, that is, factors such as price, brand name, level of advertising (Zeithaml, 1988, p. 6; Sirohi, McLaughlin & Wittink 1998, p. 226; Vantamay, 2007, p. 114) or, in the case that concerns us here, whether the translation has been performed by a novice student, a trained student or a professional translator. This is opposed to intrinsic attributes, which are usually information inherent to the nature of the translation process in itself. Examples include issues concerning the right meaning, grammar, terminology, or style.

While a number of factors such as status, remuneration, education, prestige or visibility (Paloposki, 2016, p. 18; Pym, Orrego-Carmona & Torres-Simón, 2016) play a role in delineating a 'professional' from a 'non-professional' translator, we are particularly interested in the relationship between being a 'professional translator' and training: Does a professional translator need to have received formal training to be considered so? Translation training can take many forms (Pym, 2011, p. 313): experience would be at the first level for all those translators that have learnt on the job, to short-term courses which tend to focus on the acquisition of specific skills required for a particular niche, and, finally, long-term training programmes offered by mainly Universities. As stated previously, in this paper we would like to test the hypothesis that having received formal training has an impact on how participants approach the translation evaluation process.

We believe there is a close link between the skills and competences acquired during the degree and the ability to assess the quality of a translation as part of that training. We would like to highlight the five-stage model of adult skill acquisition suggested by Dreyfus and Dreyfus (1986) and Dreyfus (2004), since our intention is to establish a link between assessment abilities and translator training. The professional translator is an expert, i.e., with translational competence. But how is this expertise acquired? Dreyfus and Dreyfus (1986) differentiate five stages. In the first three (novice, advanced beginner and competence), trainees mainly acquire and follow rules, process information and make some choices; their actions and behaviour are conscious. In the last two (proficiency and expertise), intuition and experience take over and actions are more automatic and unconscious. This development from novice to expert stage is, according to Dreyfus (2004), marked by a range

of emotions in the intermediate stages, especially that of the competent learner (which is the third stage out of five). While the novice learner is provided with rules and examples, the «learning can be carried out in a detached, analytic frame of mind as the student follows instructions and is given examples» (Dreyfus, 2004, p. 177). However, with increased experience the learner can become overwhelmed and «performance becomes nerve-wracking and exhausting» (Dreyfus, 2004, p. 178) as they are able to recognize an increasing number of potentially relevant elements and procedures but are lacking a sense of what is important for the situation they are in. While the proficient performer sees what needs to be done and then decides how to do it, the expert not only sees what needs to be achieved but also immediately how to achieve it due to a «vast repertoire of situational discriminations» (Dreyfus, 2004, p. 180).

Chesterman (2016, p. 145-166) applies the Dreyfus and Dreyfus (1986) five-stage model to translation. The key term here would be 'conscious awareness', a concept that is applied in all five stages: in the early stages of novice, advanced beginner and competent performer, because the trainee is mainly following rules and processing information; in the higher stages of proficiency and expertise, because results need to be monitored and improved. The expert translator has internalised routines, operating in an automatic way, and brings about 'deliberative rationality' only when the situation requires so.

In the process of translation training, assessment abilities will have been acquired in the middle and the last stages, thanks to experience and having absorbed all the competences in translation. Chesterman (2016, p. 159-160) is of the opinion that contrastive analysis becomes relevant at this stage as it helps students take an analytical view on the source text and the target text. Having cultivated the required skills, their judgements will be more reliable. In this light, we argue that conscious engagement translates into cognitive effort: the more conscious engagement, the more the cognitive effort. This cognitive effort can then be visualised and measured using eye-tracking methodology.

Eye-tracking helps to investigate different aspects of cognitive processing, in our case, determining the cognitive effort spent by our participants on particular words. This is based on the assumption that there is a correlation between what the eye is looking at and the amount of cognitive effort devoted to its processing (Just & Carpenter, 1980, p. 330; Schäffner & Shuttleworth, 2013, p. 102). Muñoz Martín (2014, p. 60) uses the term 'mental load' to describe this concept. He reports on studies conducted in research efforts related to mental load and the comprehension and production of texts, and states that given complex mental activities, mental resources or mental

capacity (which are limited) can be overloaded, which we think might be the reason why the assessment process runs differently and takes different amounts of time for each group of participants.

Pavlović and Hvelplund (2009) have investigated directionality in translation processes, conducting an experiment that involves student and professional subjects. They reach the conclusion that cognitive effort invested in the processing of the translation is greater than that invested in the processing of the original in both directions of translation. Jakobsen and Hvelplund (2008) have conducted an experiment using eye-tracking methodology with novice and professional translators who are presented with some translation-oriented tasks. They then measured the cognitive effort employed by each group of participants in terms of gaze duration. One of their conclusions is that professionals spend more time on the translation itself and on its revision than on the source text, while students spend more time trying to comprehend the source text. Also applicable to our own study is Schaeffer, Paterson, McGowan, White, and Malmkjaer's (2017) work, which reports on the relationship between eye movement measures and words that have more than one translation alternative, as is our case on many occasions. They also compare the eye movement behaviour when reading for comprehension and when reading for translation. Dragsted and Carl (2013) carried out a study involving students and professional translators with the purpose of analysing, first of all, common features to all of them regardless of their expertise and, then, to investigate individual behavioural characteristics and their possible categorisation. In several moments of our own research we have reached similar conclusions, in particular, that some novices behave similarly to what is expected from experts and the other way around, at least under some conditions. The goal of these authors is to try to extract features that might describe the translator behaviour and to establish a relationship between the style of the translator and their level of expertise (whether professional or novice). They reached several interesting conclusions, among them, that translators are characterised by their individual profiles and that their behaviour remains quite constant regardless of the complexity of the texts. The authors point to the fact that this might also be the case regardless of other external factors (we add here that one of these external factors could be the extrinsic information that the participants were presented with in our study, and we will extract our own conclusions on this point). Schaeffer et al. (2019) carried out a study with students and professional translators to measure their revision competence in translation applying eye-tracking. They study the behaviour in each group of participants in relation to the correction of mistakes and reading, reaching the conclusion that professional translators are more efficient when it comes to error recognition and correction because they prioritise what they are searching and reading, being able to differentiate

between types of errors and adequating their strategies to it, while «students take longer to correct errors as compared to professional translators» (Schaeffer et al., 2019, p. 600), which is especially worth noting for our study. In our case, we will also be expecting more time devoted to mistranslations in the group of the students. The list of relevant studies is long and this section does not try to be a comprehensive collection of them. For a more extensive review of eye tracking methodology applied to process-oriented translation research, we recommend the overviews carried out by Walker (2021) and Hvelplund (2017).

As part of our expectations and objectives, we are interested in studying whether the participant has a tendency to focus on some particular words that might have caught their attention for several reasons and if they compare them, going from the same word in the ST and one or several of the three possible equivalents in the target language (we will call this 'keyword sequential movements' as we have not found an existing term in the literature that describes exactly what we want to study). Also, we want to check if this is a common pattern among participants. In this light, Rayner (1998, p. 377) points out that when a word is the unit of analysis, the two most frequently used measures in eye-tracking are the first fixation duration and the gaze duration on a word (that would be «the sum of all fixations made on a word prior to a saccade [rapid movements of the eyes] to another word»). According to this author, «readers' gaze durations are longer on low-frequency words than on high-frequency words» (Rayner, 1998, p. 378), which, we believe, might also be applied to lexical words and grammar words.

Following Muñoz Martín:

> When fixations are observed on ST words, it makes sense that the translator is engaged in ST reading and when fixations are observed on TT words, it makes sense that the translator is engaged in tasks related to the processing of the TT. (2014, p. 209)

Assuming that there is a link between visual focus and cognitive focus, our aim is to study the cognitive effort employed in the lexical features. Rayner (1998, p. 387) points to a study conducted by Frazier and Rayner (1982) who demonstrated that when readers encountered a word that indicated that their prior interpretation of the sentence might be wrong, they often made a «regression» (defined by Rayner (1998, p. 375) as «right-to-left movements along the line or movements back to previously read lines») to that word to find disambiguating information. In this sense, Rayner believes that many regressions are due to comprehension failures. He mentions that when these words are 'refixated', they receive additional fixations before the reader leaves the word (Rayner, 1998, p. 387). There is evidence to suggest that high-

frequency words are 'skipped' more frequently than low frequency words. Based on this, we have formulated our hypothesis that participants will focus on lexical words and skip grammatical words.

There are several textual variables that seem to influence where the readers' eyes move to next, one of them would be word length: the longer the word, the longer the duration, which increases the probability that the reader re-fixates on it. Two other factors that influence fixation time on a word are word frequency, already mentioned, and contextual constraints (Rayner, 1998, p. 387). Regarding contextual constraint (understood as the relative predictability of the context by Schwanenflugel and LaCount, 1988), when words are highly constrained by the preceding context, they are skipped more frequently than words that are not, or are fixated for less time (Rayner, 1998, pp. 387-388). The author mentions other variables that influence fixation time on a word or the pattern of eye movements: semantic relationships between words, repetition effects, morphemic units, anaphora and coreference, lexical ambiguity, phonological ambiguity, discourse factors and stylistic conventions, and syntactic disambiguation (Rayner, 1998, p. 390).

The terminology that we will be using in the paper, such as Fixation Point (FP), First Fixation Point (FFP), Duration of Fixation Point (DFP), Area of Interest (AOI) and regressions (or revisits), among others, will be further explained and developed in the data analysis. For the purposes of this study, we assume that they are all indicators of the cognitive effort used by each group of participants (and also of individual participants in the three groups) in their assessment of the translations.

3.   METHODOLOGY AND DATA COLLECTION

As the previous sections have shown, eye-tracking is a widely used method for investigating cognitive effort and processes during the evaluation task. It affords researchers a more direct way of measuring cognitive effort than alternatives such as Think Aloud Protocols. While these have their applications, they require an additional cognitive step from participants that involves verbally describing their research. Our concern with this approach was that this added step could influence the results by calling the process undertaken into the conscious awareness of the participants as opposed to merely observing the process as is the case for the eye-tracking approach (Saldanha & O'Brien, 2014, p. 124). Furthermore, due to the mixed language background of the research team, participants would have either had to describe their process in English (their L2) or the protocols would have required translation for analysis and publication, which would have added a further step distancing the cognitive efforts from the data analysis. While all known approaches don't directly measure cognitive effort (Saldanha &

O'Brien, 2014, p. 113), we believe eye-tracking is the most appropriate approximation in the context of our research. However, it does not lack its limitations which we have sought to mitigate as much as possible through the nature of the setup outlined below. O'Brien (2009) documents some challenges that researchers who are interested in applying eye-tracking methodology to translation research might be faced with, such as environment, participants, ethics, data explosion and validity, some of which we will discuss below as they relate to our study. Muñoz Martín (2014, p. 5) also comments on the potential difficulties (reliability, validity and appropriate use of these research tools and methods) imposed on translators.

3.1   Overview of the setup

Individual participants were assigned to three groups based on their level of training and experience. Each participant was then shown the same set of MS Powerpoint slides on a screen. Those slides included source text (ST), three translations or target texts (TT) and in some cases information (correct or incorrect) on who had conducted the translation. We refer to this information as «extrinsic» or «meta words». Participants were asked to verbally select which of the three translations on each slide they thought was best. Their preference was recorded by one of the researchers present in the room and their eye-movements during evaluation were recorded using eye-tracking technology.

Participants did not receive instructions on how to evaluate the translations or whether or not to consider the extrinsic information provided.

3.2   Participants

Members of the student body and teaching staff at the University Alfonso X el Sabio in Madrid were invited to participate in this study. Participants donated their time freely and were not compensated or rewarded. The setup was piloted with two participants and the data collected excluded from analysis. This was to allow the researchers to increase their familiarity with the setup and to resolve issues with the physical space and instructions given to participants.

The 24 participants included in data collection and analysis were grouped into three categories, based on their level of training received at that point and their working experience (Table 1).

Participant grouping	Number	Percentage
Novice evaluators (1st/2nd year students)	12 (5 1st, 7 2nd year)	50%

Trained evaluators (3rd/4th year students)	6 (4 3rd year, 2 4th year)	25%
Expert evaluators (lecturers)	6	25%

Table 1. Distribution of participants
Source. Elaborated by the authors

We considered students in years 1 and 2 of their studies to be novice evaluators, and students in years 3 and 4, trained evaluators. The rationale behind this division is based on the competences that the particular groups of participant students taking part in this case study acquire during their degree. Our idea of competence is the one outlined by Kelly (2002, p. 14) according to whom the translation competence is a 'macro-competence' that «comprises a set of capacities, skills, knowledge and even attitudes that professional translators combine and that intervene in translation as an expert activity». During their first year of the degree, students mainly developed linguistic and communication skills in their working languages (two foreign languages), something that continued to be reinforced in their second year, when students also acquired cultural competences and were introduced to their first translation and interpreting subjects, along with translation theory and linguistics courses. In their third and fourth years, they developed interpreting and translation skills, they acquired textual and translation competences in professional and specialised fields of translation (literature, business, legal, commercial, journalistic, audiovisual, scientific, technical, and so forth), along with technical skills covered in courses on Computer Assisted Translation Tools and localisation. In their third year they had a specific revision course in which students were provided with the necessary skills to conduct a linguistic and textual analysis applied to the revision of texts. Students were made aware of the difference between revision and correction, types of error in translation, the process of revision and industry quality standards. Based on these competences acquired by our students in their degree on Translation and Interpreting, we assume the progressive acquisition of new skills and competences. While first and second-year students had been mainly exposed to linguistic and cultural competences, the third and fourth-year students had covered all the competences in translation: linguistic, cultural, textual, translation, technical and documentary (for models on the acquisition of translation competences, see Hurtado Albir, 2015).

Expert evaluators were lecturers at the University Alfonso X el Sabio in Madrid. In terms of formal training, 60% of them had a degree and/or a doctorate in Philology (English Studies mainly, and one in German Studies), while the other 40% had a degree and/or a doctorate in Translation and

Interpreting Studies. This is not a surprising distribution since the degree in Translation and Interpreting in Spain was not very common before the 1990s and translators who started their career during that period usually hold degrees in Philology and have afterwards acquired specific competences in Translation through advanced degrees and experience. Going back to our group of experts, 80% of them had more than 20 years of experience teaching Translation in Universities and over 20 years of being professional translations in the workplace.

3.3. Environment setup

Participants completed the task individually and only the two researchers were present in the room with them. Participants were asked to sit at a previously set up desk with a computer monitor elevated to allow them to comfortably read the text on the screen. The room was well lit, with a mix of daylight and artificial light. One researcher provided instructions and support for participants while the other operated the eye-tracking software and monitored the data collection. Although using an eye-tracking bar rather than head-mounted eye-tracking hardware may lower accuracy of the measurements (O'Brien, 2009), we used an eye-tracking bar placed below the screen that participants were viewing, with the goal of improving ecological validity as this technology is less intrusive to participants. Specifically, we used eye-tracking technology by Gazepoint, and associated software for recording the data and initial analysis. We used the built-in calibration procedure for the system and were able to confirm successful calibration with a test procedure on our recording screen. In some instances, calibration was not successful even after multiple attempts and participants had to be excluded from the study.

3.4. Setup of the stimulus

For this study, we used a selection of text created and translated for the study previously described in De Wille and Bermúdez-Bausela (2018). The text used for the study had been created by one of the authors of this paper and proofread by a native speaker who was trained and experienced in editing texts. Its features were:

- No previous translation was available.
- Short paragraphs (two to three sentences each) with individual headings (between two and 13 words each) to avoid as far as possible issues with missing references, context or consistency that may arise from segmenting longer sections.
- General subject matter without requiring high levels of specialisation.

The text was then independently translated by six Spanish translation students and lecturers (two from each group). The groups were:

- Novice translators: first-year translation students who had not yet received training in translation.
- Trained translators: fourth-year translation students who had received in-depth training in translation but had not gained real-life translation experience.
- Expert translators: lecturers at the University Alfonso X el Sabio in Madrid. Both had many (25 and 15 respectively) years of teaching experience in the translation degree and were trained and experienced in judging language quality.

All translators were told that their translations would be used for a study but not what the exact nature of the study was. The translations were screened (but not edited) by the researchers to ensure translations were mostly complete and did not include additional text such as translator comments.

For this eye-tracking study, individual sentences were laid out on MS PowerPoint slides. Text on the individual slides was limited to one single ST sentence per slide and three translations. Each translation had been conducted by a different translator as described above. Text was laid out in large font sizes (between 27 and 44 px) with the goal of increasing the accuracy of eye-tracking data.

The initial slides did not include extrinsic information on the translator (NoInfo). These were followed by slides that included the correct information on the professional status of the translator. We refer to this extrinsic information as GoodInfo going forward. GoodInfo was positioned above the target texts and included the phrases 'Novice Translator', 'Trained Translator' and 'Trained + Experienced Translator' without further explanation on those phrases (Figure 1). The third set of slides also included extrinsic information, but the extrinsic information provided did not match the professional status of the translator who had done the translation. So, a novice translator's TT might be labelled as 'Trained Translator' and that of the expert translator as 'Novice Translator', etc. In order to facilitate the comprehension of the analysis and discussion, we include all the texts shown to participants as follows.

Figure 1. Sample slide as shown to participants
Source. Elaborated by the authors

Scenario 1 NoInfo:

- ST: This is a demanding programme and you will receive a lot of material and opportunities to learn.
- TT1: Este es un programa muy demandado, por lo que vas a recibir mucho trabajo y vas a tener muchas oportunidades para aprender.
- TT2: Este es un programa exigente, por lo que recibirás muchos materiales y tendrás muchas oportunidades para aprender.
- TT3: Este es un programa exigente y recibirás mucho material y muchas oportunidades para aprender.

Scenario 2 NoInfo:

- ST: It can be tempting to try and do everything perfectly and thereby get behind on the material.
- TT1: Puede ser tentador intentar hacer todo a la perfección y como resultado, puedes quedarte atrás con el trabajo.
- TT2: Puede resultar tentador intentar hacer todo a la perfección, pero así podrías quedarte rezagado.
- TT3: Puede resultar tentador intentar y hacer todo perfectamente y, de este modo, apoyarse en el material.

Scenario 3 GoodInfo:

- ST: Think ahead to the dissertation but don't panic.
- TT1: Trained + Experienced Translator: Ten la tesina en mente pero que no cunda el pánico.
- TT2: Novice Translator: Mira de cara a tu tesis, pero no entres en pánico.
- TT3: Trained Translator: Pensar de cara a la tesis pero sin miedo.

Scenario 4 GoodInfo:

- ST: Make use of resources available to you like the library and magazine subscriptions
- TT1: Novice Translator: Haz uso de los recursos disponibles para ti, como la biblioteca o las revistas.
- TT2: Trained + Experienced Translator: Utiliza los recursos disponibles como la biblioteca o las suscripciones de revistas.
- TT3: Trained Translator: Use los recursos disponibles como la biblioteca y las suscripciones de revistas.

Scenario 5 BadInfo

- ST: Try to apply what you learn
- TT1: Trained Translator: (Done by Novice) Intentar poner en práctica lo que aprendas.
- TT2: Novice Translator: (Done by Experienced) Pon en práctica lo que aprendes.
- TT3: Trained + Experienced Translator: (Done by Trained) Intentar aplicar lo que aprendas.

Scenario 6 BadInfo

- ST: In some modules you will need to take a written exam at UL.
- TT1: Novice Translator: (Done by Experienced) Algunos módulos tienen exámenes presenciales que realizarás en la UL.
- TT2: Trained Translator: (Done by Novice) En algunas unidades tendrás que hacer un examen escrito en la Universidad de Limerick.
- TT3: Trained + Experienced Translator (Done by Trained): En algunos módulos deberá hacer un examen escrito en la universidad

4.   RESULTS

4.1   Data analysis

The following sections focus on four aspects as measurements of cognitive effort: First Fixation Points (FFP), Last Fixation Points (LFP), Keyword Sequential Movements (KSM) and duration of fixations.

For the duration of first and last fixation point we established a threshold of 0.29 seconds and summarised which words the participants as a whole or per participant group fixated on primarily. We expected that participants would compare keywords in the different translations to a varying extent depending on their professional status. We expected that expert evaluators would expend less cognitive effort, and therefore compare keywords less than other participant groups. We counted the number of KSMs that indicated the number of movements between keywords in a group. We counted a KSM when participants went linearly from a particular word in ST, to the equivalent in one or more of the translations.

We were interested in two aspects:

- The range of KSMs registered. We have established three ranges: high, medium and low. When it is labelled 'high', it means that we have counted 1 for each participant who has registered KSM in both the scenarios presented according to the information provided (NoInfo, GoodInfo, BadInfo). Likewise, when the level is 'medium', we have counted 1 for each participant who has registered one KSM in one of the scenarios presented. Finally, 'low' level means that the participant has not registered any KSMs for either of the two scenarios.
- Nature of the keywords in the SMs. The other issue is whether the words in the KSMs have been lexical, grammatical or meta words and if this is an issue to bear in mind in our analysis.

In doing so, we would like to check if experts register less KSMs than students and if meta words are frequent in the KSMs, based on the assumption that the higher the KSMs the more the cognitive effort.

4.2   Main observations

We have summarised our findings in three tables: Table 2 shows first fixations and last fixations including the most frequent words, distribution between lexical, grammatical and meta words. Table 3 shows KSMs. We first discuss high-level observations and then provide details on how participants approached mistranslations, difficult words and meta information in more detail. Table 4 shows keywords and the average duration spent on them.

We have made the following high-level observations:

1) Overall, there were common patterns across all groups regarding words that participants spent the most cognitive effort on, whether that related to their first fixation points or last fixation points. We believe that a lot of these commonalities are due to specific aspects inherent in those words, such as being particularly difficult to translate or containing mistranslations.

2) There was a smaller variety in FFPs chosen than in LFPs across participant groups.

3) FFPs were more likely to be an English word in the ST, while LFPs were mostly from one of the three translated versions.

4) Participants spent more time on LFPs, in comparison to FFPs, before saying out loud their preferred translated version.

5) There was a strong correlation between LFPs and the translated version finally chosen by the participants. In most cases, participants fixated on a word in the scenario they chose last, with experts doing so most frequently (93.3%), followed by trained evaluators (83.3%) and then novice evaluators (75%).

6) Across all scenarios, experts spent the least amount of time on the evaluation, followed by novice evaluators and then trained evaluators with the most amount of time. Novice and trained evaluators also spent more cognitive effort in the form of movements between keywords (Table 3) than expert evaluators. Experts also spent less time, on average, on the LFPs, while the trained students tended to spend more time on them.

7) In the majority of the cases, both the FFP and the LFP were a lexical word. After that, the FFP constituted more grammatical words than meta words, while for LFP it was the opposite in the numbers, with the meta words being more frequent than the grammatical words. We calculated these averages without taking into account the NoInfo scenarios.

8) Participants, in general, focus on one word and compare them in the different versions. This was especially pronounced for keywords on which participants spent a higher amount of time. In GoodInfo and BadInfo scenarios, those words were frequently meta words, which tells us that this information prompted the interest of participants.

	FFP Words (duration in sec)	FFP Lexical	FFP Grammatical	FFP Meta	LFP Words (duration in sec)	LFP Lexical	LFP Grammatical	LFP Meta
Scenario 1 NoInfo	opportunities (1.2) / demanding (0.9)	90%	10%		exigente (4.09) / oportunidades (2.13) / este (1.01)	80%	20%	
Scenario 2 NoInfo	tempting (2.48) / thereby (1.35) / try/intentar (1.27) / on (1.08)	65%	35%		quedarse atrás / behind / rezagado (2.96) / puede resultar (2.45) / Perfección / perfectamente (2.01) / material (1.18) / tentador (1.03)	90%	10%	
Scenario 3 GoodInfo	[Extrinsic Info] (2.5) / dissertation (2.29) / ahead (1.93)	60%	10%	30%	mira/en mente/Think ahead (4.81) / [Extrinsic Info] (1.85)	50%	30%	20%
Scenario 4 GoodInfo	available 1.25)	55%	40%	5%	[Extrinsic info] (3.65) / suscripciones (2.34) / biblioteca (2.31) / disponibles (1.3)	55%	15%	30%
Scenario 5 BadInfo	apply/poner (3.7) / [Extrinsic Info] (2.59) / try to (1.01)	50%	20%	30%	Aprendas / aprendes (3.91) / [Extrinsic Info] (3.41) / pon (1.4)	60%	10%	30%
Scenario 6 BadInfo	modules/módulos (2.37) / written (2.01) / some (1.01)	70%	25%	5%	tendrás/deberá (2.53) / [Extrinsic Info] (2.17) / hacer/realizarás (2.21) / examen escrito/ exámenes (1.01)	55%	15%	30%
		(Av. 59.75%)	(Av. 29.75%)	(Av. 17.5%)		(Av. 55%)	(Av. 17.5%)	(Av. 27.5%)

Table 2. First and Last Fixation Points and distribution in categories
Source. Elaborated by the authors

	NoInfo scenarios		GoodInfo scenarios		BadInfo scenarios	
Novice behaviour	**Level of sequences registered**	**Type of words**	**Level of sequences registered**	**Type of words**	**Level of sequences registered**	**Type of words**
	High (S1 and S2): 6	Lexical: 10	High (S1 and S2): 2	Lexical: 3	High (S1 and S2): 7	Lexical: 9
	Medium: (S1 or S2) 2	Grammatical1	Medium (S1 or S2): 4	Grammatical:1	Medium (S1 or S2): 2	Grammatical:1
	Low (neither S1 nor S2): 2		Low (neither S1 nor S2): 4	Metawords: 6	Low (neither S1 nor S2): 1	Metawords: 7
Trained behaviour	**Level of sequences registered**	**Type of words**	**Level of sequences registered**	**Type of words**	**Level of sequences registered**	**Type of words**
	High (S1 and S2): 3	Lexical: 5	High (S1 and S2): 2	Lexical:3	High (S1 and S2): 4	Lexical: 4
	Medium (S1 or S2) 2	Grammatical1	Medium: (S1 or S2):1	Grammatical:0	Medium (S1 or S2):1	Grammatical:1
			Low (neither S1 nor S2): 2	Metawords: 3	Low (neither S1 nor S2): 0	Metawords:2
Expert behaviour	**Level of sequences registered**	**Type of words**	**Level of sequences registered**	**Type of words**	**Level of sequences registered**	**Type of words**
	High (S1 and S2): 1	Lexical: 5	High (S1 and S2): 1	Lexical: 2	High (S1 and S2): 3	Lexical: 4
	Medium (S1 or S2): 4	Grammatical0	Medium: (S1 or S2): 3	Grammatical:0	Medium (S1 or S2):1	Grammatical:0
			Low (neither S1 nor S2): 1	Metawords: 3	Low (neither S1 nor S2): 1	Metawords:3

Table 3. Keyword Sequential Movements (KSMs)
Source. Elaborated by the authors

		KW1	KW2	KW3	KW4	KW5
Scenario 1 NoInfo	KW	*demanding*	*opportunities*	*receive*	*material*	*programme*
		demandado	oportunidades	recibir	materiales	programa
		exigente		recibirás		
	Av. Fixation Duration (sec.)	7.607	5.292	4.204	3.432	3.006
	%	32.3%	22.5%	17.9%	14.6%	12.8%
Scenario 2 NoInfo	KW	*get behind*	*thereby*	*tempting*	*try*	*material*
		quedarse atrás	(como) resultado	tentador	intentar	trabajo
		quedarte rezagado	(de este) modo			
		apoyarse				
	Av. FD (sec.)	8.959	5.098	4.524	4.104	3.592
	%	27.6%	15.7%	13.9%	12.6%	11.1%
Scenario 3 GoodInfo	KW	*Think ahead*	*don't panic*	(Extrinsic Information)	*dissertation*	
		Mira de cara	no entres en pánico	*Experienced Translation*	tesina	none
		Pensar de cara	que no cunda el pánico		tesis	
		Ten en mente	sin miedo			
	Av. FD (sec.)	7.908	60.414	5.719	5.166	
	%	32%	24%	23%	21%	
Scenario 4 GoodInfo	KW	*available*	*library*	*subscriptions*	*resources*	
		disponibles	biblioteca	subscripciones	recursos	none
				suscripciones		
	Av. FD (sec.)	6.32	5.77	4.21	3.977	
	%	31.20%	28.50%	20.80%	19.60%	
Scenario 5 BadInfo	KW	*Apply*	Aprendes			
		poner en práctica	aprendas	none	none	none
		pon en práctica				
	Av. FD (sec.)	4.698	3.846			
	%	55%	45%			
Scenario 6 BadInfo	KW	*written exam*	*to take*	*modules*	(Extrinsic Information)	*some*
		examen escrito	realizarás	módulos	*Experienced Translation*	algunos
			hacer	unidades		algunas
	Av. FD (sec.)	9.257	5.085	3.925	3.516	3.455
	%	37%	20%	15%	14%	14%

Table 4. Keywords and average durations
Source. Elaborated by the authors

4.2.1 Mistranslations

The texts shown to participants contained 4 mistranslations:

1) In scenario 1 (NoInfo), in the first translated version (TT1). The word 'demanding' would usually be translated as 'exigente', not as '*demandado', which could be considered a false friend.

2) In scenario 2 (NoInfo), in the third translated version (TT3). The expression 'get behind' could be translated as 'quedarse atrás' or 'quedarse rezagado', but not as '*apoyarse', which has a different meaning and, therefore, could be a mistake labelled false sense.

3) In scenario 3 (GoodInfo) in the second (TT2) and third (TT3) translated version. The word 'dissertation' has been wrongly translated as '*tesis' (PhD dissertation).

4) In scenario 5 (BadInfo) in the first (TT1) and third (TT3) version there is a grammatical mistake since it has been translated as an infinitive form ('*intentar'). However, this would be so strictly in grammatical terms since, lexically speaking, the translation of the imperative form 'Try' into Spanish would be 'Intenta', not 'Pon'. So, we are also interested in knowing what participants have prioritised, whether grammatical form or lexical choice.

We observed a strong focus from all three participant groups on the mistranslated words '*demandado' and '*apoyarse' compared to other words in the different scenarios with an average duration of 0.5 and 0.6 seconds relative to our cut-off threshold of 0.29 for a fixation point. This was not the case for '*tesis', which did not register very high fixation points. This could be due to the fact that it is not such an obvious mistake as the first two ones. For the fourth mistranslation in scenario 5, we observed a strong focus on the mistranslation '*Intentar', as opposed to the version in imperative form 'pon' (Table 5).

In all instances, trained evaluators spent the highest amount of cognitive effort on the mistranslated words relative to the other groups, followed by novice in second and experts in third position in all but one instance.

	Focus on mistrans. '*demandado' S1	Focus on mistrans. '*apoyarse' S2	Focus on mistrans. '*tesis' S3	Focus on mistrans. '*Intentar' TT1 and TT3 S5
Novice	Pos 3: 0.524	Pos 2: 0.298	Pos 2: 0.200	Pos 2: 0.679
Trained	**Pos 1: 0.604**	**Pos 1: 0.306**	**Pos 1: 0.272**	**Pos 1: 0.848**
Expert	Pos 2: 0.598	Pos 3: 0.190	Pos 3: 0.088	Pos 3: 0.594

Table 5. Focus on mistranslations and positions
Source. Elaborated by the authors

4.2.2   Difficult phrases

We had assumed that the focus of participants was going to be on lexical words, and this also applied to the FFP and the LFP in most cases. However, in scenario 2 NoInfo, participants placed a strong focus (high number of FFPs) on the word 'thereby', which is a discourse marker. A possible reason for this focus is that discourse markers are quite frequent in English but not so much in Spanish, which makes the word more challenging to translate than other grammatical words. Similarly, we have observed a focus on 'get behind' and possible equivalents, which does not have a unique or straight-forward translation in Spanish.

Other examples of participants encountering difficult translations were 'Think ahead' in scenario 3 GoodInfo and in scenario 6 BadInfo 'examen'/ 'exámenes', maybe because in one version it has been translated as 'exámenes presenciales' and in the other two as 'examen escrito' and 'exámenes escritos'.

We believe that the focus on 'Think ahead' and its translated versions: 'Mira de cara', 'Pensar de cara' and 'Ten en mente' is because of the difficulty that the translation of 'Think ahead' entails, which does not have a straightforward translation into Spanish due to the inner complexity of the construction 'verb + preposition' from English into Spanish, in which the preposition in English can indicate 'action' and in Spanish it cannot. The suggested versions differ among one another and we believe that this is the reason why more Fixation Points have been devoted to this keyword.

Participants also picked up on difficult words that were translated correctly: In scenario 4 GoodInfo, both 'available' and its translation 'disponibles' were the most common keywords selected by all groups in general, followed by 'library', 'subscriptions' and 'resources', along with their translations. There is no particular linguistic issue regarding the choice of these words, only to point out that in Spanish, both 'subscripciones' and 'suscripciones' are correct spellings.

Regarding scenario 6 BadInfo, it is interesting to note several aspects. The first keyword is 'written exam' and its suggested translations. The second keyword, 'to take', also presents different variants. In this regard, we have been able to determine that when a specific word presents different translations, it represents a focus of difficulty or a challenge for the participant, something that we can appreciate looking at the DFPs over those variants. This is the same case with keyword 3 'modules' and its equivalents 'módulos' and 'unidades'. This time, keyword 4 has been the word 'Experienced', which is part of the extrinsic information provided to the participant, but only for this specific one, not for the other two of them, which leads us to think that the

participant was particularly interested in the translation given by the Experienced translator (even though it had been done by a Novice translator) (Table 4).

4.2.3.   Meta words

Overall, participants have spent less cognitive effort on meta words (extrinsic information about professional status of the translator) than on lexical or grammatical words, by all our measures. However, given that the information of meta words is less complex and does not require comparison between different versions or with a ST, we do not think that this is a very meaningful observation in itself. Instead, we focus our analysis on the comparison between participant groups and scenarios rather than absolute cognitive effort. When extrinsic information was first provided in scenario 3 GoodInfo, it became the centre of attention for all groups of participants, likely due to the novelty of additional information being introduced. However, this effect seems to have worn off by the next scenario, where we observed low FFPs on extrinsic information (Scenario 4, GoodInfo).

We also observed differences between participant groups:

While all groups were influenced by the introduction of extrinsic information, this was particularly the case for experts in BadInfo scenarios. For the LFPs, meta words were more frequently the focus in the case of Novices and Experts. However, extrinsic information was the FFP for the BadInfo scenarios in few instances.

Extrinsic information also had an impact on the number of KSMs for each group:

1) Novice students seem to have a preference for meta words in GoodInfo scenarios, while for BadInfo scenarios they show an equal preference for lexical and meta words.
2) Trained students, given GoodInfo scenarios, express an equal preference for lexical and meta words, while in BadInfo scenarios, they choose lexical words.
3) Experts show a preference for meta words in GoodInfo scenarios and there is almost a tie between lexical words and meta words for BadInfo scenarios.

5. DISCUSSION

5.1   Common patterns in the behaviour of all groups of participants

H01.1. There is a preference for certain words as the focus of attention. This has been so for all groups of participants. Several reasons may be behind this preference:

- Words that do not have a unique translation and, therefore, have had more than one equivalent. Example: 'dissertation'.
- Combination of words in English whose structure for a Spanish speaker is quite rare and, therefore, a direct or literal translation is not possible. This would be the case of 'Think ahead'.
- Words which have been mistranslated, such as 'demanding' for '*demandado'.

Other common patterns that have also been observed are the following:

- Participants chose the same words as FFPs. There were a lot of similarities too for LFPs, even though there is a greater variety of words in this latter case. Apart from this, it is worth noting that most of the FFPs have been in English (ST), while the LFPs have been mostly from the three translated versions (TTs).
- Participants spend more time on the LFP than on the FFP. We believe that after having processed all the information on the slide, participants know what they want to focus on. This was reinforced by the expectation of having to state their preference, so it might make sense to dwell a bit longer on the last word.

H01.2 Participants compare keywords, sometimes in a sequential manner. This expectation has been true. Participants, in general, focus on one word and like to compare them in the different versions. This has sometimes been done in a sequential way, and the study of keywords shows that, even if not always sequential, the interest in some particular words is common due to the long durations that they register.

Let us remember that Rayner (1998, p. 390) used the textual variable «semantic relationships between words» and, for the purposes of our own study, we have assumed an «equivalent relationship between words in the ST and in the TTs» that the participants have compared and looked at.

H01. 3 Participants choose the version they have looked at in the last place. This has been the case in 84% of the cases, so it is an expectation that has turned out to be true. There is a clear correlation between the LFP and

the version finally chosen by the participant, regardless of the type of scenario and participant group.

H01.4 Given NoInfo, participants expend more cognitive effort on lexical words than grammatical words. This has been so in the vast majority of the cases. We have only observed one exception with the discourse marker 'thereby'.

We conclude that, when processing lexical features, there were common patterns in the behaviour of all groups of participants. One of our objectives was to study whether participants have a tendency to focus on some particular words. We expected that lexical words would accumulate longer fixation durations than grammatical words, similar to Rayner's (1998) assumption that readers' gaze durations are longer on low-frequency words than on high-frequency words, and have shown this to be the case.

5.2   *The impact of training on the behaviour of participants: cognitive effort is higher in the group of students than in the group of experts*

H02.1 First Fixation Points and Last Fixation Points require more cognitive effort on the part of the group of students. The average of durations for FFPs and LFPs has revealed that, in general terms and regardless of the scenario (NoInfo, GoodInfo or BadInfo), it is the experts who spend less time on average on the FFP, while it is the trained participants who devote more time to it, and novice students are somewhere in between.

H02.2 Mistranslations and difficult to translate words require more cognitive effort on the part of the group of students, while experts are more efficient (that is, they spend less time on those units, which translates into less cognitive effort). We have been able to identify that the group of trained participants have spent longer, on average, on the mistranslated words than experts, who are the ones spending the least on them (and novices were generally in the middle between the other two groups), which we believe confirms the skill acquisition model proposed by Dreyfus (2004), which describes the emotional involvement of learners in intermediate stages, which leads them to spend more cognitive effort than novice learners, while experts are the most efficient. Their nonreflective involvement and intuition are dominant. They are self-aware of their own profession (Chesterman, 2016, p. 161). That would easily explain why they require less cognitive effort in the assessment task: they are more confident in themselves. A key concept here would be 'conscious engagement' (Chesterman, 2016, pp. 148-149) in relation to cognitive effort. It has turned out to be true that the participants engaged in 'deliberative rationality' when the situation required it (words that posed a difficulty in translation and mistranslations). We believe that where there is deliberative rationality there is higher cognitive effort, and this could

be the reason why trained students require more cognitive effort than the other two groups: they have required critical conscious engagement. For them, it is no longer 'information processing', but also and mainly goal-oriented decision making and problem solving; however, they do not have yet the confidence and experience of experts. Our objective of studying the cognitive effort in the processing of lexical features through the use of eye-tracking methodology has been accomplished. Rayner (1998) pointed to the textual variable 'lexical ambiguity' to explain that readers increase their fixation time on ambiguous words, which, in our case, are words that are particularly difficult to translate and mistranslations. Schaeffer et al. (2019) reached a similar inference in their study, concluding that professional translators are more efficient in terms of error recognition and the evaluation process in general, as they have the needed skills that help them prioritise, evaluate and apply the adequate strategies. Other studies that support the fundamental points of our findings are those conducted by Schaeffer et al. (2017), Jakobsen and Hvelplund (2008) or Dragsted and Carl (2013).

Also, we have observed a higher number of KSMs regarding novices and trained students, which translates into a higher cognitive effort than in the case of experts. Students have devoted more time comparing words than experts, registering the highest number of movements.

We can conclude that having received formal training has had an impact on the behaviour of participants when they are reading and assessing the three different translated versions. We have observed a link between formal training and the amount of cognitive effort, as observed in the behaviour of participants, and a close relationship between the Dreyfus and Dreyfus model, the concept of 'conscious awareness' and cognitive effort.

5.3   *Extrinsic information as an element of disruption*

H03.1 When meta words are included in the scenarios, participants pay attention to them, that is, they register long durations and are included in sequential comparisons. This has been true in all scenarios and in all situations, registering a long duration of Fixation Points and Keyword Sequential Movements where participants frequently compared them in sequential order. Even though lexical words have registered the highest number of durations, we also observed cognitive effort expended on meta words. We saw this in the study of keywords, where for scenarios 4 GoodInfo and 6 BadInfo, meta words were also keywords (particularly the meta word 'Experienced' and its cluster 'Experienced Translation'), which is indicative of the fact that the participant was particularly interested in this piece of information.

We have observed that novice students have a clear preference for meta words in this comparison; trained students focus slightly more on lexical words and experts have an equal preference for lexical words and meta words for KSMs. Across all groups, participants especially paid attention to meta information in the first scenario it was introduced. Overall, they favoured lexical words, followed by grammatical words as FFPs and meta words in LFPs.

If we focus on the participants' choice, we can see that all groups have been influenced by the introduction of meta words in the GoodInfo and BadInfo scenarios. We would like to point out that the influence of extrinsic information over the choice of participants for one particular translation has been dealt with previously. In De Wille and Bermúdez-Bausela (2018), the researchers found out that those participants with higher levels of expertise were less influenced by extrinsic information (the translator's professional background) than those with lower levels of expertise. Expert participants overall selected the expert translation, at the same time that they took into account both extrinsic information and intrinsic attributes. However, when they observed a discrepancy between both, they relied more heavily on the intrinsic attributes, discarding the extrinsic cues. On the other hand, there was a greater element of disagreement among trained participants, who were situated in the mid-range between experts and novices in terms of reliance on extrinsic cues. Finally, novice participants were heavily influenced by extrinsic information, being the only group that chose the false expert translations (BadInfo) more often that the actual expert translations. All this indicates that certainty in the evaluation process is linked to the levels of expertise and the training received.

CONCLUSION

One of our initial research questions was whether having received formal training and the level of expertise influences the way in which one approaches the translation evaluation process in terms not only of agility but also in terms of decisiveness, efficiency and how influenceable one might be. Also, we wanted to go a step beyond and see whether this was linked to the model of adult skill acquisition. We worked with a sample of participants (novice, trained and experts) and we measured the amount of cognitive effort that each group employed in the processing of lexical features through an eye-tracking methodology. The study has allowed us to detect certain trends, such as the fact that experts spent the least amount of time on the evaluation, followed by novice, while trained participants expended the most amount of time; or the long fixation points over difficult phrases and mistranslations, which required more cognitive effort on the part of the students than on the experts (efficiency). However, and notwithstanding the previous findings, we

observed, as researches before us did, that not everything was different in the behaviour of groups, as there were common features shared by all of them, such as the fact that certain words caught their attention, or that they all liked to compare them in the different versions (even sequentially), not to speak of the effect and influence that extrinsic information (meta words) exercised on the groups, particularly the first time that the cues appeared on the slides.

While the number of participants in our study (24) was too small to be able to generalize the findings, we note that our participant sample was similar in size to that of other studies as described for example in Dragsted and Carl (2013), O'Brien (2009), Pavlović and Hvelplund (2009), and Schaeffer et al. (2019). Based on our experience with eye-tracking as a data collection method and subsequent analysis of the large volume of data generated, we believe that this method is highly relevant for the development of hypotheses and observation of tendencies, but would be difficult to realize with participant numbers that allow for general observations.

We would like to make a final observation, which also relates to the question of generalizability of our findings: Although it is quite evident that there are different tendencies between the groups of novices, trained and experts, it would be too simplistic to limit or explain it all in terms of groups of participants. Within each group we have been able to ascertain some common behaviours among certain individuals that were common throughout the three groups. Bearing in mind that we worked with a closed group of participants, well-known to us, we believe that it is not only a matter of professional background, expertise or amount of training that defines the behaviour of a participant, but also the individual character and personality of each of them, which has an impact on the participant behaviour. Along the same lines as Dragsted and Carl (2013), in several moments of our own research, we have seen novices behaving similarly to what would be expected from experts and the other way around. Let us remember as well that these authors pointed to the fact that translators are characterised by their individual profiles and that their behaviour remains quite constant regardless of the complexity of the texts and they leave open the possibility that this might also be so regarding other external factors. Nonetheless, the overall conclusion is that training has been a determining factor in our study; groups of participants have been recognized in their behaviour while processing lexical features, but there have been important common patterns too. In this process, extrinsic information has exerted an influence in the decisions, in the amount of cognitive effort and, in general, how those lexical features have been processed. As a closing reflection to this section, we believe that we can talk about coherent behaviour in the assessment process and that eye-tracking has proved to be very useful in attaining our objectives.

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