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Cognitive Effort and Contextual Effect in Translation: A Relevance-theoretic Approach

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Abstract

This paper looks at the relationship between cognitive effort and contextual effect with respect to the interface between inferential processing, problem-solving and decision-making in translation, within a comprehensive framework of Relevance Theory, connectionist principles and competence-oriented researches of translation (CORT). It draws on the methodological notion of triangulation of previous researches to locate cognitive patterns related to the inferential behaviour of translators. Sample data from Spanish and Brazilian translators working from English into Spanish and Portuguese are examined, with concurrent use of different data elicitation procedures via *Translog* and retrospective protocols. The performance of novice and expert translators is assessed on the basis of cognitive rhythm, deliberate practice and the relationship between cognitive effort and contextual effect. The tentative outcome of the data analysis appears to support the amalgamation of procedural and conceptual encodings as constitutive instances of inferential processing. It also reveals aspects of a multi-level process mediated by the meta-representation that the translator has of both source and target texts. As a result, the relevance-theoretic approach to translation process seems able to account for how effort and effect may combine in a dynamic synergy to deal with the implicatures and explicatures of source texts and how this combination allows cognitive processing and textual rendering to take shape in different cognitive environments and ultimately in different target texts.

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1. Introduction

In Sperber and Wilson's (1986/1995) Relevance Theory (RT), human inferential processes are geared to the maximisation of relevance. The notion of relevance is defined in terms of effort and effects involved in ostensive-inferential communication, i.e., a type of behaviour in which the communicator ostensively manifests his/her communicative intention, whereas the audience makes an effort to infer what was ostensively communicated. In his first application of RT to translation, Gutt (1991) treats translation as interpretive language use and suggests that translations can be accounted for in terms of interpretive resemblance. Later on, Gutt (2000) argues in favour of a competence-oriented research of translation (CORT). According to Gutt (2000: 206), CORT provides a basis for research in translation which focuses on the competence of human beings to communicate with each other:

> The aim of CORT is to understand and explicate the mental faculties that enable human beings to translate in the sense of expressing in one language what has been expressed in another. The idea is that once these faculties are understood, it is possible to understand not only the relation between input and output, but also, and perhaps more importantly, the communicative effects they have on the audience. After all, the *raison d'être* of all translation appears to be to *communicate*.

We believe that RT and CORT can combine to offer a promising avenue to the investigation of cognitive processes in translation and that they can be used in empirical-experimental process-oriented studies (Alves and Gonçalves 2003, Alves 2005).

Empirical translation process analysis goes back to the mid-1980s when researchers began to investigate the process of translation (Krings 1986, Königs 1987, Séguinot 1989, Lörscher 1991 and Tirkkonnen-Condit 1991 among others). The use of think-aloud protocols (TAPs) allowed for the first attempts to map the translation process. However, overall results, although interesting, could not be correlated due to the fact that studies lacked a common methodological background (Fraser 1996). In more recent works, Tirkkonnen-Condit and Jääskeläinen (2000) and Hansen (1999, 2002), among others, have faced the methodological challenge raised by Fraser and tried to come forward with proposals which allowed for a more systematic mapping of the performance of novice and expert translators.

More recently, aiming at the investigation of problem-solving and

decision-making in the translation process, Alves and Gonçalves (2003) have drawn on Gutt's (2000) approach in an attempt to map the process of translation using a methodology called "triangulation", which combines *Translog* log files, pause protocols and retrospective protocols in order to adequately account for the inferential processes in translation (cf. Alves 2003).[1] CORT, according to Alves and Gonçalves, has opened up new avenues for the investigation of inferential processes in translation, especially for investigating the interface between cognitive effort and contextual effect with respect to problem-solving and decision-making in translation.[2] In addition, CORT also fosters a dialogue between RT and previous connectionist approaches to cognition (cf. Elman et al. 1996), in the sense that RT suggests a cognitive architecture compatible with connectionism in terms of parallel processing. In this connection, the concepts of cognitive rhythm (Schilperoord 1996) and deliberate practice (Ericsson 2002) can be also applied to analyse samples of the performance of novice and expert translators respectively, and in our case, data from English into Spanish and Portuguese.[3]

In the following, I will first outline the RT approach to the translation process and discuss relevant concepts in the study of effort and effect in translation (Section 2). Then I will make some methodological remarks aiming at fostering a dialogue between RT and connectionist approaches to cognition (Section 3). Finally, I will analyse some process-driven data with a view to corroborating some of the points raised in the previous sections (Section 4). The paper closes by advocating the importance of CORT for translation process analysis and reinforcing the role of the triangulation approach as a means to promote it (Section 5).

2. A Relevance-theoretic Approach to Translation Process

In its entirety, RT proposes the amalgamation of the code model of Shannon and Weaver (1949) with Grice's (1975) inferential model and suggests that inferential processes begin necessarily with a decoding phase. For RT, there is a synergy between what is said and what is implicated and the former always plays a major role in the unfolding of the latter. One of the tenets of RT is the replacement of the Gricean concepts of mutual cooperation and mutual knowledge by those of mutual manifestness and cognitive environment. These changes alter radically the notion of context. Context, for RT, is a mental instance and depends on the emergent characteristics of what is being communicated. This mental view of

context brings plasticity and flexibility into the explanation of cognitive and inferential processes.

As such, RT moves away from the Gricean framework and presupposes the existence of variable emerging (mental) contexts regulated by the principle of relevance in the place of Grice's account of variable degrees of relevance in a given context. As an alternative to the Gricean definition of context, RT introduces a notion of context which can only be established with respect to the audience's cognitive environment and the processing of new information. The RT framework takes into account individual differences among interlocutors and explains human communication processes as subject to different degrees of success depending on the maximisation of relevance. Effort and effect play a major role in such processes. In short, RT accounts for the unfolding of human inferential processes through the following sequence:

Figure 1. Relevance sequence

RELEVANCE = [Ostensive-inferential behaviour + (cognitive environment + mutual manifestness)]
→ contextual effect

(Source: Alves 2001: 18)

2.1 Interpretive resemblance and translation process-oriented analysis

Sperber and Wilson (1986/1995) argue that human cognition develops through the gradual and progressive modification of mental representations in an individual's cognitive environment. RT assumes that cognition is a highly dynamic phenomenon which generates the mental representations used by individuals in their processes of meaning construction. In its framework, RT presupposes two types of use for mental representations — descriptive and interpretive; each of them refers to a corresponding type of resemblance. Descriptive resemblance establishes a correlation between an object or state of affairs in the world and a mental representation, while interpretive resemblance does this between two mental representations. According to Gutt (1991/2000), translation is a case of interpretive resemblance.

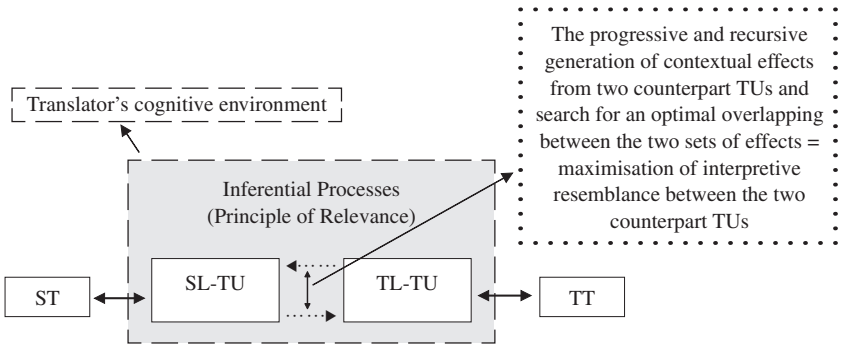
In process-oriented terms, Alves (2001) suggests that interpretive resemblance can be mapped through the comparison between counterpart translation units (TU) in a source and in a target language. Within the

translator's mental context the processing of each TU is supposed to generate a number of contextual effects in consistency with the principle of relevance. As far as translations are concerned, contextual effects are the result of inferential processing supported by an individual's cognitive environment. In consistency with the principle of relevance, RT postulates a function responsible for regulating the amount of processing effort needed to generate contextual effects.

Figure 2 below, taken from Alves and Gonçalves (2007), expands the proposal made in Alves (2001: 18) and shown in Figure 1. In other words, relevance can be achieved as a function of an ostensive-inferential behaviour involving cognitive environments which share some degree of mutual manifestness. On the basis of this architecture, processing effort generates contextual effects.

Figure 2. A relevance-theoretic account of inferential processing in translation

(Source: Alves and Gonçalves, 2007)



(ST = source text; SL = source language; TL = target language; TT = target text)

Within the relevance theory framework, we argued in Alves and Gonçalves (2003) that translation can be regarded as a progressive and recursive search for interpretive resemblance between two counterpart TUs. From a cognitive perspective, it implies the progressive and recursive generation of contextual effects from two counterpart TUs and the search for an optimal overlapping between the two sets of effects. Therefore, translating aims at the maximisation of interpretive resemblance between the two counterpart TUs. This interpretive resemblance is achieved as the result of a positive function which regulates the relation between cognitive effort and contextual effects.

For instances of translation, I believe that the notion of interpretive resemblance proposed by Gutt (2000) offers an insightful alternative — both theoretical and empirical — to account for problem-solving and decision-making processes in translation for it presupposes that "any instance of human (ostensive) communication necessarily involves an element of inferential interpretation" (Gutt 2000: 166). Alves and Gonçalves (2003) draws on the RT distinction between conceptual and procedural encoding and suggests that this distinction should provide a theoretical framework upon which empirical investigations on the nature of the translation process can be carried out. It is further argued that the ability to manipulate consciously, in both L1 and L2, conceptually and procedurally encoded information, coordinated by interpretive resemblance, leads to the reorganisation of the explicatures and implicatures conveyed by the source text into a target text counterpart. Here we would like to argue further that this conscious manipulation of conceptually and procedurally encoded information, coordinated by interpretive resemblance, is dependent on a relation between effort and effect. If, according to RT, translating aims at the maximisation of interpretive resemblance, then it becomes relevant to discuss to what extent it is based on a positive function responsible for regulating the relation between cognitive effort and contextual effects.

2.2 Cognitive effort and contextual effects in translation

According to RT, relevance is a cognitive property determined by two fundamental factors, namely the necessary effort for a given stimulus to be optimally processed and the effects stemming from this optimal processing. Through this optimal relation, the relevance of a cognitive stimulus for an individual is seen as a positive function of the contextual effects achieved by this processing. The amount of effort undertaken is seen as a negative function with respect to the effects achieved. In RT terms, the amount of processing effort is dependent on the effects it is capable to generate.

However, it is not without criticism that the role played by effort in RT is received. Gutt (1998) suggests a radical change in the RT theoretical framework through the elimination of the notion of effort from the definition of relevance. If, on the one hand, Sperber and Wilson (1986/ 1995) use the notion of cognitive effort to account for the existence of different degrees of relevance, Gutt argues that the problem can be solved

without reference to effort. He states that "assumptions are more or less relevant in a context to the degree that they have more or less contextual effect in that context" (Gutt 1998: 96). In this respect, the role of effort would be present in the efficiency principle that seems to guide the cognitive functioning of human beings.

As a result of the elimination of the notion of effort from a definition of relevance, Gutt suggests that the presupposition of optimal relevance postulated by RT should be revisited and he proposes, as an alternative, the presumption of adequate relevance:

> "Presumption of adequate relevance: A set of assumptions {I} which the communicator intends to make manifest to the addressee is adequately relevant." (ibid.)

Consequently, on the basis of this presupposition, the principle of relevance would be defined as follows:

> "Revised principle of relevance: every act of ostensive communication communicates the presumption of its own adequate relevance." (ibid.)

Based on this revised definition of relevance, Gutt (1998) argues that the processing effort may have implications in the decision of an individual to become involved or not in a communicative exchange. However, he does not believe it is necessary to assume that the amount of effort is related to the expected contextual effects. Gutt's remarks seem to be extremely relevant for translation process-oriented studies. If, according to RT, translation is a mental activity guided by the search of interpretive resemblance between the units of translation of source and target texts, it necessarily follows that this relation has to be postulated as derivative of the meta-representations the translator has of both source and target texts. Therefore, according to Alves (2005), the attribution of adequate relevance, as proposed by Gutt (1998), would not be tied only to the production of contextual effects related to the effort made by the translator. It would also be related to the way certain factors, such as mutual manifestness and the translator's cognitive environment, influence the production of contextual effects and the corresponding allocation of cognitive effort. In other words, more effort on the part of the translator can increase or decrease the contextual effects generated by his works depending on the meta-representations translators may have and the corresponding interpretations they render in their target texts. Gutt insists that it is not necessary to assume that a comparison between contextual

effects and processing effort would result in a certain value of relevance. The amount of effort can increase due to the pleasure one has in engaging in certain communicative exchanges. As such, Gutt claims that effort does play a role in the attribution of relevance since individuals will only dedicate more effort to a certain processing if it generates some pleasure, a personally motivated reason for such extra processing to occur.

Differing from the RT standard view, Medeiros (2003) argues that, in certain contexts, greater processing effort may be necessary even if it generates contextual effects which are considered not to be worth the effort. Medeiros discusses issues of translation in post-colonial contexts and argues in favour of the deliberate manipulation of translations — in her case, abusive subtitling — as a reaction against the demands of hegemonic cultural powers. We agree that the case of abusive subtitles may require more processing effort on the part of the translator. This extra effort, however, would still be assessed with respect to the production of stronger contextual effects worth or not the processing effort. In other words, it would still respond to a relation of optimal relevance.

Alves (2005) argues that, within translation contexts, the relation between cognitive effort and contextual effects can be better understood as a relation established between the translator's cognitive environment and the meta-representations generated as the result of the attribution of relevance to certain translation units. We have seen that Gutt (1998) insists that the notion of effort could be removed from a definition of relevance without radically affecting its application to translations. Nevertheless, we assume that there will always be an amount of cognitive processing which is considered worth the effort by the translator and, in many cases, translators could stop short before arriving at stronger contextual effects simply because they deem the effort to be incompatible with the effects they hope to achieve. In other words, Alves (2005) proposes that in relevance-theoretic terms this relation is always established as a positive function of the least necessary processing effort to achieve the strongest possible contextual effects.

Returning to Gutt (2000) and CORT, I believe that RT offers Translation Studies a cognitive core which appears to be central to all human communication efforts, and that it is this common cognitive core that makes human communication across language and cultural boundaries possible.

I assume that the perspective offered by RT has implications for the study of human inferential processes and, as a consequence, for process oriented studies in translation.

Therefore, I reinstate here the views on translation formulated in Alves and Gonçalves (2003: 7);

- Translation as an act of communication;
- Translation as an information-processing activity;
- Translation as an instance of cognitive categorisation;
- Translation as an instance of pragmatic contextualisation;
- Translation as a problem-solving and decision-making activity.

Based on these assumptions, Alves and Gonçalves (2003) have argued that besides a mastery of many other cognitive skills, translators have to learn to manipulate more consciously conceptually and procedurally encoded information so that they can identify the inferential constraints inherent to a given statement. They make an effort to maximise the mutual manifestness between their cognitive environments and those they assume to be the cognitive environment of their audiences in order to enhance the probability of successful communication in translation. Through this specific effort it becomes possible for them to work inferentially and generate the contextual effects they deem compatible with the task they have to perform. In short, the meta-representations translators have of the source culture/text as well as that of the target audience are the driving forces for the work they produce.

As mentioned earlier, the discussion of the relations between cognitive effort and contextual effect is the central focus of this article. In Alves (2001) I made a first attempt to establish a connection between interpretive resemblance, effort and effect in the analysis of the translation process of novice and expert translators. The results of our analysis pointed out that usually novice translators tend to make an effort to generate rather weak contextual effects. In Alves (2005) I expanded the analysis to encompass the work of expert translators and have refined the methodology to do so.

3. Methodological Remarks

In Alves (2001) I suggested that connectionist approaches to cognition could engage in a fruitful dialogue with RT arguing that the RT notions of context and cognitive environment as well as RT account of inferential processing would fit adequately within a framework which allowed for constant reconfigurations of cognitive processing. Further, building on Elman et al. (1996), Alves and Gonçalves (2007) suggested that the cognitive processing of expert translators could be envisaged as a fully-

recurrent connectionist network operating through recursive movements aimed at a dynamic construction of meaning in a multi-level process. We argued that an analysis of this type of cognitive processing could provide evidence of gradual and progressive cognitive development. Methodologically, in order to enhance the connection between RT and connectionism, we used two other concepts, namely deliberate practice (Ericsson 2002) and cognitive rhythm (Schilperoord 1996), which we assumed to be closely associated with connectionism.

In Alves and Gonçalves (2007), we also presented a cognitive model of the translator's competence which is supported both by connectionism and RT. This model presupposes the deliberate and reflective engagement of an individual for the development of a particular skill. This presupposition can be coupled with Ericsson's (2002) concept of deliberate practice, namely the engagement in solitary practice after receiving specifically designed instructions for the development of a particular skill. In agreement with Ericsson, we assume that translators increase their performance for a limited time until they reach an acceptable level. Beyond this point, however, further improvements appear to be unpredictable. We understand that connectionist networks operate in a similar way, increasing their performance for a certain amount of time until they reach an acceptable level of performance. Once this level is achieved, intrinsic changes in the network's configurations are necessary to allow for further learning. In Alves and Gonçalves (2007) we argue that continuous improvement in the achievements of both individuals and networks appears to be closely linked to the introduction of meaningful input capable of destabilising acquired learning in order to allow learning processes to move a step further.

Ericsson (2002) points out that experts do not extract patterns automatically from a sample of input but rather that the superior quality of their mental representations allows them to adapt rapidly to changing circumstances and anticipate future events. Consequently, experts show an ability to monitor and evaluate their own performance. I agree with Ericsson and propose to use Schilperoord's (1996) concept of cognitive rhythm, namely rhythmical patterns found in the alternation between pauses and text production, in the mappings of the translation processes of novice and expert translators. I intend to assess the translators' ability to monitor and evaluate their own performance. According to Schilperoord, there are moments along the process of text production when there is a hierarchical change in the process and this change can be observed through

pauses. Jakobsen (2002) applies Schilperoord's concept of cognitive rhythm to try to make pauses "speak" and investigates three phases of the translation process: orientation, drafting and revision. Alves and Magalhães (2004) built on Jakobsen and investigated characteristics of the cognitive processing of novice translators. Their cognitive rhythms were found to be erratic. Alves and Magalhães (2004) also observed that there was no correlation between the subjects' cognitive rhythms and the type of target text rendered by them. Strict linear processing and the lack of adequate cognitive management were characteristic of their cognitive processing.

Previously mentioned and present studies foster the use of *Translog* recordings in conjunction with retrospective verbal protocols collected with the aid of the *Translog* replay function immediately after the translation works ended. As stated in Alves (2003), *Translog* offers a viable alternative to mapping the cognitive rhythms of novice and expert translators and hope, through longitudinal studies, to better understand the impact that deliberate practice may have on the performance of translators.

The data presented in the next section stem from a study described in Alves (2005), which aimed at investigating the effort/effect relation in the translation processes of Spanish and Brazilian translators working from English into their mother tongues. Briefly, we wanted to show how problem-solving and decision-making are regulated through the maximisation of relevance or rather, how the attribution of interpretive resemblance by the translator seems to be anchored on the least necessary effort to achieve the strongest possible contextual effects guided by the meta-representations the translator has in consistency with the principle of relevance.

4. Discussion

I will focus my discussion on the relation between effort and effect by examining one particular example, marked in italics, from the source text below:

> Bugbear — Email virus strikes in new form
>
> Computer users were warned last night to be on the lookout for an email virus that can steal confidential information and allow hackers to take control of infected machines. The virus, a new variant of the BugBear email worm that infected tens of thousands of computers around the world last October, began to spread rapidly from Australia to Europe and the USA at around 8am yesterday.

> *According to MessageLabs, a Cheltenham-based virus filtering firm* which reported about 30,000 infected messages in 115 countries, the propagation rate of BugBear.B almost doubled every hour throughout the morning. There was also a huge surge as US users came online. Like its predecessor, the variant spreads by sending itself as an attachment to every address in an infected machine's email address book. To disguise where it came from, it uses different subject headings. As well as searching for anti-virus software and disabling it, BugBear.B installs a keylogger to record what the user types, which may allow hackers to record confidential information such as credit card details and passwords. It also installs a "Trojan horse" program which could allow a hacker to take remote control of infected machines. Experts analysing the virus code have found that it contains the domain name of about 20 banks and financial institutions. One of the possibilities being investigated is that BugBear.B is able to check whether an infected machine is inside one of these domains and, if it is, launch a dial-up connection that could allow a hacker into the bank's computer system.
>
> Stuart Millar, Friday June 6, 2003, *The Guardian*

In RT terms we set to investigate the translation of a relatively uncomplicated phrase occurring in the fifth/sixth line of the source text, namely "*According to MessageLabs, a Cheltenham-based virus filtering firm*". I assumed that the recognition and processing of procedural and conceptual encodings would not pose a problem for novice and expert translators alike. I was more interested in identifying the type of meta-representations novice and expert translators, working form English into Spanish and Portuguese, would create. I was even more specific as to investigate how translators would deal with the reference to *Cheltenham*, the place where the firm *MessageLabs* has its headquarters.

Translators could obviously ignore any reference to the place and remove *Cheltenham* from the meta-representations they create to generate their target texts. They could assume that reference to *Cheltenham* would be irrelevant for the target text audience since it does not have constraints which would interfere in the understanding of the passage. Interestingly, however, none of our subjects, novice and experts alike, ignored the reference to Cheltenham. Through their *Translog* representations and retrospective verbalisations, I tried to identify how much effort was made to arrive at solutions with different contextual effects. Due to space constraints I will restrict my analysis to the performance of four translators: a Brazilian (T1) and a Spanish (T2) novice translator, and a Brazilian (T3) and a Spanish (T4) expert translator.

T1, the Brazilian novice translator, spent 8 minutes and 31 seconds to reach the point where the reference to *Cheltenham* appeared. The pause protocol shows a pause of 14 seconds before the reference to *MessageLabs* followed by a longer pause of 84 seconds right after the name of the company was typed. Additional pauses totalling 20 seconds appear alternately up to the end of the segment.

Figure 3. T1's pause protocol viewed with *Translog*



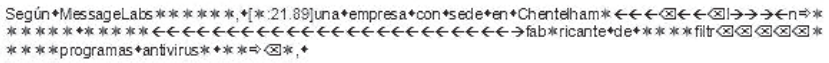
The *Translog* representation shows that T1 apparently needed to allocate some effort to the processing of conceptual and procedural encodings present in the noun phrase *MessageLabs, a virus filtering firm*. Pauses of approximately 4 seconds while *Cheltenham* was being typed indicate that T1 had little or no concern with respect to the reference to *Cheltenham.* The corresponding retrospective verbalisation provides evidence of that type of processing:

> *This part was not difficult to translate once there were almost no unknown words. My only problem was "Cheltean" which I assumed to be the name of a city*. (T1)

We believe that the *Translog* representation and the retrospective verbalisation made by T1 corroborate some of the issues raised earlier. Although T1 did not know if *Cheltenham* was really a city, a meta-representation was created within four seconds of processing effort allocated to the TU. *Cheltenham*, as rendered by T1 in Portuguese offers the audience no cue as to the relevance of the reference to the city. Very little processing effort seems to result in relatively weak contextual effects.

T2, the Spanish novice translator, spent 13 minutes and 8 seconds to reach the point where the reference to *Cheltenham* appeared. The pause protocol shows a pause of 6 seconds after the reference to *MessageLabs* was typed, followed by a blue diamond which may be indicative of a hierarchical change in the process, and a much longer pause of 22 seconds followed by the decision to situate the company in *Cheltenham*. Sequentially, pauses with a total value of 26 seconds alternate up to the end of the segment with cursor movements. This may be indicative of some additional effort made by the translator to deal with *virus filtering*, a segment which only appears at the very end of the process.

Figure 4. T2's pause protocol viewed with *Translog*



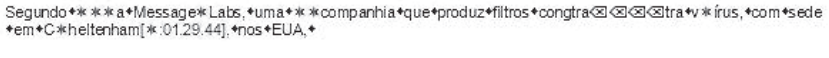
The corresponding retrospective verbalisation provides evidence of that type of processing:

> *Should I translate virus filtering as "programas antivírus"? Could it be "filtros antivírus"?* (T2)

Again, the *Translog* representation and the retrospective verbalisation made by T2 corroborate some of the issues raised earlier. There was a little more effort on the part of the Spanish novice translator to process a particular segment, namely *virus filtering*, which constitutes a TU in itself. This additional processing effort may be seen as indicative of the search for a meta-representation and, consequently, of a rendering that is contextually embedded in the target language. In line with the theoretical issues raised earlier, the mapping of T2's cognitive rhythm allows us to see a different correlation between the amount of processing effort undertaken and the relatively weak corresponding contextual effect which was generated through this effort. The fact that T2 dealt with *Cheltenham* in a similar way as T1 did is another evidence in the same direction.

T3, the Brazilian expert translator, spent 4 minutes and 58 seconds to reach the point where reference to the *MessageLabs* was made. T3 was the fastest translator in the group and needed half the time of T1 and a third of the time spent by T2 to translate the same passage. Consequently, one can argue that T3 made less effort during his processing of the text. The *Translog* representation reveals a cognitive rhythm which flows almost without interruption apart from a 3-second pause before the reference to *MessageLabs*. The *Translog* representation also reveals that T3 did not have problems related to the processing of conceptual and procedural encodings. One could argue that T3 shows a kind of behaviour compatible with the profile of an expert translator.

Figure 5. T3's pause protocol viewed with *Translog*



However, it is interesting to observe that T3 has a very long pause of 89 seconds after *Cheltenham* was typed. The pause is followed by the introduction of "nos EUA" [in the USA], an insertion which could be an attempt on the part of T3 to contextualise the envisaged audience. T3's retrospective verbalisation sheds light on this point and allows us to have a glimpse of the meta-representation the translator had of the passage:

> *I stopped here to check where the city was. Checked the Encyclopedia Britannica. Saw that there were two Cheltenham, one in the US, in Maryland, and another one in England. Then I decided to have a look at Google. Typed the name of the company. It was dot com. I realized it didn't have the extension dot uk and I concluded that the company was in Maryland. Then I wrote USA.* (T3)

An analysis of the cognitive rhythm of T3 indicates that the translator seems concerned about providing the envisaged audience with communicative cues to help in the contextualisation of the target text. However, what appears to be a logical reasoning in T3's verbalisation turns out to produce an inadequate rendering. *Cheltenham* is, in fact, situated in England where *MessageLabs* has its headquarters. By stating that the company was situated in the USA, T3 provided the envisaged audience with an explicitation which is not only redundant but also contextually inadequate. As such, the extra effort allocated by T3 to the processing of the segment does not yield stronger contextual effects. On the contrary, by explicitating the location of *Cheltenham* in the USA, T3 constrains the inferential processing of the audience. Although T3's experience as a translator is readily acknowledged by his peers, the case in point is problematic as an instance of translation. As we can attest from T3's verbalisation, the meta-representation the translator had of the TU determined the way the segment was processed. Effort and effect in this case have a negative function.

The last subject in the present discussion is T4, the Spanish expert translator. T4 shows a cognitive rhythm which is different from the three other translators and the effort/effect relation in his processing of the segment reveals a rather different picture. T4 was the second fastest translator in the group and spent nearly 6 minutes to reach the point where reference to *MessageLabs* was made. Consequently, one can argue that T4, like T3, made less effort during his processing of the text. Furthermore, according to the *Translog* representation, the translator showed a pattern of pauses scattered throughout the segment, perhaps an indication of intense

meta-cognitive monitoring of the translation process and of issues related to problem-solving and decision-making.

Figure 6. T4's pause protocol viewed with *Translog*



T4's retrospective protocol provides us with some robust evidence with respect to the meta-cognitive monitoring of the process of translation:

> *I don't know where Cheltenham is. Checked the Britannica. Found that it is situated both in the USA and in England. Didn't trust my first impression and checked the MessageLabs webpage in Google. Found out that it's in Gloucester. Checked www.multimap.com. Returned to the Britannica and confirmed that the borough of Cheltenham is in the Gloucester area. Decided not to mention the city and to make a reference to the west of England.* (T4)

An analysis of the cognitive rhythm and the verbalisations of T4 indicate that, like T3, the translator seems concerned to provide the envisaged audience with communicative cues to help in the contextualisation of the target text. However, the characteristics of the cognitive processing are different in the performances of T3 and T4. The Spanish translator questions the information received, expands the search for further contextual information and decides for a strategy of explicitation which eliminates the reference to the city and places the headquarters of *MessageLabs* in a broader geographical setting. By doing that, T4 provided the envisaged audience with an explicitation which is relevant for the unfolding of inferential processing. The extra effort allocated by T4 to the processing of the segment yields stronger contextual effects and helps the audience in the contextualisation of the passage. As is in the case of the three previous translators, T4's meta-representation of the segment determined the way it was processed and the meta-cognitive monitoring of the translation process contributed to the maximisation of relevance. Effort and effect in this case have a positive function.

5. Conclusion

As a way of conclusion, I have tried to show that a relevance-theoretic approach to translation process analysis may be able to account for how effort and effect combine in a dynamic synergy to deal with the

implicatures and explicatures of source texts and for their processing in different cognitive environments. I also hope to have made it clear that problem-solving and decision-making are related to the processing of conceptually and procedurally encoded information and dependent on a relation between effort and effect. Translators with different levels of expertise tend to regulate the relation between processing effort and contextual effect on the basis of a multi-level process mediated by the meta-representation that the translator has of both source and target texts. In my data, pause and retrospective protocols reveal that the relation between effort and effect is also influenced by the translator's degree of meta-cognitive monitoring, one of the characteristics observed in the performance of experts (Ericsson 2002). The cases of T3 and T4 seem to be illustrative of that relationship. While T4's pause and retrospective protocols provide us with evidence of more intense meta-cognitive monitoring, T3's patterns show signs of somewhat limited meta-cognitive activity. Although the data set is small, it highlights some striking differences in respect to the performance of novice and expert translators. More intense meta-cognitive activity leading to the construction of meta-representations seems to be a distinguishing feature in the differentiation of performance levels and has implications in the allocation of cognitive effort and in the production of related contextual effects. On the basis of these examples, I conclude that ultimately, by regulating the effort/effect relation, expert translators show an ability to monitor and evaluate their own performance and generate meta-representations which strengthen existing contextual information.

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Notes

1. A software developed at the Copenhagen Business School by Arnt Lykke Jakobsen and Lasse Schou. *Translog* records keyboard strokes online and allows for its later reproduction as pause protocols (*Translog* representation files) as well as for the visualisation of logged data (*Translog* replay function). For further information the reader is referred to Jakobsen (1999, 2002).
2. I am aware of the fact that, in more recent works, RT uses the term cognitive

effect to account for the same process that Gutt (2000) calls contextual effect (see Vianna 2005: 171). However, I have decided to keep the term contextual effect here since it is deeply associated with Gutt's approach which I follow in this paper. Likewise, I decided to use interchangeably the terms processing effort and cognitive effort as synonymous.

3. Translations were rendered from British English into Iberian Spanish and Brazilian Portuguese, native languages of the subjects whose translation performance is discussed herewith.

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