CHAPTER NINE

CONCEPTUAL AND PROCEDURAL INFORMATION FOR VERB TENSE DISAMBIGUATION:
THE ENGLISH SIMPLE PAST

CRISTINA GRISOT, BRUNO CARTONI AND
JACQUES MOESCHLER

1. Introduction

Improving the results of Statistical Machine Translation systems (SMT) is a great challenge and researchers have understood that this cannot be done without an interdisciplinary perspective. If machines have great results for realizing many linguistic tasks (such as syntactic parsing, semantic correlations for dictionaries or logic analyses according to a certain formal language), one domain that challenges them is language use in context. Pragmatics is thus a crucial domain to study when one aims at improving “linguistic capacities” of machines. Within the COMTIS and MODERN Projects2, our goal is to improve the quality of machine-translated texts by modelling intersentential relations, such as those that depend on verb tenses and connectives. Intersentential relations play an important role for the coherence and cohesion of a discourse. Since the late seventies, an important number of studies in various domains such as semantics, pragmatics, discourse analysis and Natural Language Processing (NLP) have analyzed the factors that contribute to discourse coherence (Halliday and Hasan 1976; Hobbs 1983; Mann and Thompson 1987) and propose taxonomies of discourse relations (Mann and Thompson 1987; Sanders 1993). Cohesion is a more specific notion related to

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2 The COMTIS Project (Improving the Coherence of Machine Translation Output by Modeling Intersentential Relations; project n° CRSI22_127510, March 2010-July 201) and the MODERN Project (Modeling discourse entities and relations for coherent machine translation; project n° CRSII2_147653, August 2013-August 2016) belong to the Sinergia interdisciplinary program funded by the Swiss National Science Foundation.
coherence, which refers specifically to the linguistic devices used to build coherence between sentences. Verb tenses represent a type of cohesive ties, among other lexical and grammatical devices such as pronouns, anaphora and discourse connectives.

This paper seeks to address the problem of verb tenses, and in particular how to formalize their distinct usages in order to improve their translation by SMT systems\(^3\). The multilingual objectives of the COMTIS and MODERN Projects reveal the crucial need of a common framework that can be used to describe and to analyze verb tenses in more than one language at a time.

This paper describes our research, which has multiple aims. The departure question was a complex one: why humans choose one rather than another tense when translating from a source language (SL) to a target language (TL) and how can this information be used to improve the results of machine translation systems? In order to answer to this question we needed to identify problematic tenses in translation corpora, propose possible features that explain the choices made by human translators, test them in annotation experiments and finally, use the annotated corpora for SMT systems.

Thus, our main research question is which features should be included in a model that explains and predicts the cross-linguistic variation of the translation of tenses. We argue that a reliable description of tenses can be done only within an inferential pragmatics framework, specifically Relevance Theory (RT) (Sperber and Wilson 1986/1995).

Since Grice (1989) it is generally accepted that human communication is an inferential process driven by the desire to express and recognize intentions. The founders of RT (Sperber and Wilson 1986/1995; Wilson and Sperber 1993, 2002, 2004) both refined and challenged Grice’s ideas. RT proposes a model for human communication based on the notion of relevance. They claim that the expectations of relevance raised by an utterance are precise and predictable enough to guide the hearer towards the speaker’s intended meaning (Wilson and Sperber 2004: 607). The speaker’s intended meaning is inferred on the basis of the evidence provided. The first step of the interpretation process is linguistic decoding of the meaning providing the logical form of the utterance. The output of the decoding phase is in turn used as input in the second step, a non-demonstrative inferential process providing the propositional form of the utterance (explicatures) and the pertaining implicatures. Wilson and Sperber (2004: 614) stress that although the decoded logical form is an important clue to the speaker’s intentions, the explicit content of an utterance goes well beyond what is linguistically encoded. The hearer builds

\(^3\) This paper was written in the middle-stage of the research carried out in COMTIS and MODERN projects. For the overall results and the final theoretical model, see Grisot (PhD Diss., University of Geneva, forthcoming).
appropriate hypotheses about the explicit content via decoding, disambiguation, reference resolution, narrowing, loosening, saturation, ad hoc concept construction and free enrichment (Carston 2004). As far as implicatures are concerned, they are of two types: implicated premises (hypotheses about the intended contextual assumptions) and implicated conclusions (hypotheses about the intended contextual implications). Wilson and Sperber (2004: 615) argue that given that comprehension is an online process, hypotheses about explicatures and implicatures are developed in parallel against a background of expectations, which may be revised or elaborated as the utterance unfolds.

We adopt the linguistic underdeterminacy principle for verb tenses as developed in RT (Sperber and Wilson 1986/1995; Smith 1990; Moeschler et al. 1998; Saussure 2003). We assume that the meaning of a verb tense form is underdetermined and must be contextually worked out through contextual enrichment conforming to expectations of optimal relevance. Verb tenses are thus a referential category: they are characterized as locating temporal reference for eventualities with respect to three coordinates, specifically speech point S, event point E and reference point R (Reichenbach 1947). Assigning temporal reference for eventualities is an inferential and context-depending process providing the propositional form of the utterance. Another important issue when investigating tense and temporal information at the discourse level is temporal sequencing and cause-consequence relations between eventualities. Sperber and Wilson (1986), Blakemore (1988) and Wilson and Sperber (1988) treat temporal sequencing and cause-consequence relations as inferentially determined aspects of what is said, thus part of explicatures. In this paper, we adopt their approach both for temporal reference assignment and for temporal/causal relations as being inferred information through non-demonstrative inferences.

Moreover, we explain temporal reference assignment and temporal/causal relations in terms of the conceptual/procedural distinction. The conceptual/procedural distinction was introduced in RT by Blakemore (1987) to explain differences between words with a conceptual content, such as table, cat, think or walk on the one hand, and discourse connectives, such as but, so or also. Content words encode concepts that contribute to the proposition expressed by an

We differentiate form of meaning and of usage. Specifically, verb tense form refers to different forms that verbal system of a language has, such as for example the English (EN) past continuous or past perfect, the French (FR) plus-que-parfait (past perfect) or futur (future). Tense meaning refers to location of a situation in time and it can be indicated by a morpheme, either on the main verb or on the auxiliary. Verb tenses usage refers to contextual usages due to contextual values taken by the conceptual and procedural information. In this paper, if not specified otherwise, verb tense is used to refer to verb tense form.
utterance while the meaning of a discourse connective is better described in terms of constraints on the inferential phase of interpretation than in conceptual terms. The hearer is expected to have access to the smallest and most accessible set of contextual assumptions in order to get the intended cognitive effects.

Regarding verb tenses more specifically, we argue that they encode both conceptual and procedural information (Moeschler 2002a; Moeschler et al. 2012; Grisot and Moeschler 2014). In our view the conceptual content is given by a specific configuration of Reichenbachian coordinates E, R and S. In Grisot and Moeschler (forthcoming) we argue that the specific configuration of the temporal coordinates S, R and E behaves like pro-concepts (Sperber and Wilson 1998: 15; Wilson 2011). Pro-concepts are semantically incomplete, they are conveyed in a given utterance and have to be contextually worked out. The conceptual content of the EN Simple Past (SP) E<S, where E and S are variables to be saturated contextually, was tested experimentally with linguistic judgment task (Grisot and Moeschler 2014). The experiment was designed based on the cognitive features of conceptual and procedural information proposed by Wilson and Sperber (1993).

Procedural information consists of instructions and constraints for contextual usages of a tense, i.e. [± narrative] and [± subjective]. These two instructions can have a contextual positive or negative value. Conceptual and procedural information represent bare-bone semantics that are contextually worked out through inferences. The hearer has to determine the contextual value for both types of encoded information in order to access the right contextual hypotheses to get the intended cognitive effects. In this study we propose a pragmatic description of the English SP and use its conceptual and procedural contents for usages disambiguation. Disambiguation is a central notion both in pragmatics as in NLP. Disambiguation and reference resolution (pronominal and temporal) represent enrichment processes necessary for constructing the propositional form of an utterance (Wilson and Sperber 2004). Following Grice (1989: 25), Carston (2004) argues that disambiguation or sense selection plays a crucial role in determining the explicit content of an utterance. We argue that a verb tense has several usages and these usages must be disambiguated in order to build appropriate hypotheses about the explicit content of what is said. In NLP, sense disambiguation is a crucial topic (Manning and Schutze 1999; Lee and Ng 2002; Kehler 2004; Agirre and Edmonds 2006). Linguistic items that have more than one sense must be disambiguated and each sense receives a label. Corpora tagged with these labels are used for machine learning processes.

This empirical study uses multiple complementary methods and methodologies. Firstly, verb tenses are identified and analyzed in translation corpora following

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5 Translation corpora are parallel corpora that contain texts written in an original language and their translation into one (bilingual) or more languages (multilingual).
contrastive analysis methodology (James 1980; Krzeszowski 1990). One of the advantages of translation corpora is to allow semantic and pragmatic equivalences for the phenomenon of interest. We argue that translation corpora permit cross-linguistic transfer of semantic and/or pragmatic information. This is due to the fact that studying instances and usages of verb tenses in a parallel corpus make it possible to control for context and register variables. Samardzic (2013) uses this novel methodology for investigating the translation equivalents of a range of English light verb constructions into several languages. Slavic languages encode lexically verb aspect unlike other European languages. She applies the aspectual representation obtained in the English-Serbian cross-linguistic setting to classify English verbs into event duration classes. In the two experiments we designed, we made use of the methodology of cross-linguistic transfer of properties. Specifically, the [± narrativity] features was tested and validated in Experiment 1, where working hypotheses have been formulated based on theoretical descriptions of FR tenses. Experiment 2 was designed based on the cross-linguistic transfer of semantic and pragmatic information from FR past tenses to the EN SP.

Bilingual parallel corpora reveal the convergences and divergences of the two compared systems. Bilingual corpora allow the identification and empirical testing of the theoretical framework. The most frequent divergences of translation of verb tenses have emerged through bilingual parallel corpus analysis (for one pair of languages: EN-FR). Corpus analysis (Grisot and Cartoni 2012) revealed that four verb tenses are both frequent and particularly ambiguous in the considered pair of languages and, thus problematic for MT systems: the EN SP and Present Perfect and the FR Passé Composé and Présent.

With respect to cross-linguistic variation in translation, we argue that conceptual and procedural contents of the SP explain its variation revealed by parallel corpora analysis. We suggest that the SP has several contextual usages. For each usage, there is a linguistic feature related to conceptual and procedural contents, which is the most salient information for launching different processes of pragmatic enrichment. This produces diverse effects according to the speaker’s intention, world and contextual knowledge following the principle of relevance. Variation is thus due to dissimilar interactions between conceptual and procedural contents, such as focus on one or another relation between Reichenbachian coordinates or the nature of the reference point R, for instance, a temporal string of R in narrative contexts or an inclusive relation (R ⊂ E) in non-narrative contexts.

The structure of this chapter is described as follows. Section 2 reviews traditional descriptions of the EN SP and three FR tenses Passé Simple (PS), Passé Composé (PC) and Imparfait (IMP). Section 3 provides the results of corpus analysis, where the SP is among the most problematic verb tenses regarding its translation into FR. Section 4 presents a theoretical perspective on the conceptual/procedural distinction, as well as our general predictive model. Section
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5 presents the annotation experiments that conducted on FR tenses and on the SP, as well as their results. Section 6 concludes our discussion on features of verb tenses used for improving machine translation output.

2. Classical descriptions

In this section, we provide briefly classical descriptions of the SP, PS, PC and IMP as tenses used to express past time. We aim at showing that the lack of a common framework makes it impossible to compare the EN and FR tense system. This comparison is necessary for identifying the features to be included in a model that explains and predicts the cross-linguistic variation of the translation of the considered tenses.

2.1. The SP

Classical descriptions of the SP (Comrie 1985; Quirk et al. 1985; Leech and Svartvik 2002; Radden and Dirven 2007) present it as the “the deictic time preceding speech time” (Radden and Dirven 2007: 218) which has a main meaning in reference to past time and special meanings in reference to present or future time identified under special contextual conditions (Quirk et al. 1985). The EN SP is thus described usually as representing an action or state as having occurred or having existed at a past moment or during a past period of time that is definitely separated from the actual present moment of speaking or writing. Radden and Dirven (2007: 218) note three properties of the SP: focus on the past time, detachment from present and definiteness. For Quirk et al. (1985) also, the simple past combines two features of meaning in reference to past time: the event/state must have taken place in the past, with a gap between its completion and the present moment, as in (1), and the speaker must have in mind a definite time at which the event/state took place, as in (2) and (3):

(1) I stayed in Africa for several months (→ I am no longer in Africa)
(2) Freda started school last year/in 1950.
(3) Prices slumped last winter/yesterday.

Quirk et al. (1985) underline that the SP may be accompanied by an overt indicator of time. The element of definite meaning (a past event/state) must be recoverable through inference from immediate or larger context or general world knowledge. Comrie (1985: 41) emphasizes that the Simple Past “only locates the eventuality in the past, without saying anything about whether the situation continues up to the present or into the future”. As we have noted above, one of the properties of the SP is detachment from present. This is due to a conversational
implicature based on Grice’s (1975) maxim of relation (relevance), explained as follows by Comrie (1985: 41-42): “statements about the present moment are more relevant than those about other times, so that use of a form explicitly locating a situation in the past suggests that that situation does not hold at the present, otherwise the present tense would be used”.

The SP may be used in relation to an immediate situation, which has a definite character, as in (4), in a domestic situation where it is known that the front door is locked at bedtime every night. Situational definiteness given by general knowledge explains the use of Simple Past in historical or biographical statements that have specific people, places or objects as their topics, as in (5). The use of the Present Perfect in the preceding sentence provides a context for mentioning the time so it allows a SP in the second sentence, as in (6).

(4) Did you lock the front door?
(5) Byron died in Greece.
(6) They have decided to close down the factory. It took us completely by surprise.

Radden and Dirven (2007: 219) also note the use of the SP to express bounded past situations, presented as a series of events, typically in narratives, as in (7). The individual events from example (7) are temporally ordered (signaled by their coordination and the conjunction and) and are thus interpreted as being successive. Labov and Waletzky (1967) argued that two sentences, which are interpreted as being temporally successive, form a narrative text. The first event is deictically situated in the past time related to the speech moment S while the other is related to the first one.

(7) I grabbed his arm and I twisted it up behind his back and when I let go his arm there was a knife on the table and he just picked it up and let me have it and I started bleeding like a pig. (Labov and Waletzky 1967, quoted in Radden and Dirven 2007: 219)

According to Quirk et al. (1985: 187) and Aarts (2010: 251), the SP also has special uses that occur in certain contexts, such as:

i. In indirect speech, where there is a transfer from the past tense of the reporting verb to the verb of the subordinate clause (known as back shifting or harmony of tenses), as in (8) or forward shifting, as in (9), where the sentence containing speech or thought in the future contains a reported speech referring to present time.

ii. The hypothetical or modal past, as in (10) and (11).

iii. The past tense used for politeness, as in (12).
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(8) A: Did you say you have/had no money? B: Yes, I am completely broke.
(9) My wife will be sorry that she missed seeing you this evening.
(10) It’s time we all took a rest.
(11) If I was to go to Dubai, I can get things like electrical goods.
(12) I wanted to ask you a little about The Exorcist.

One point that arises from these traditional descriptions is that they simply depict intra-linguistically the meanings of the SP, namely the main usage that specifically means “true before speech time” (Riddle 1986: 267) and the special usages, in reference to present and future time, as well as hypothetical and conditional sentences. Next to this description, we propose a cross-linguistic perspective based on corpus analysis and formalization for automatic implementation, specifically, a semantic-pragmatic description with a focus on the conceptual and procedural contents of the SP.

2.2. FR tenses PS, PC and IMP

FR verb tenses expressing past time have been extensively studied and described by scholars, among whom are Benveniste (1959, 1966), Kamp and Rohrer (1983), Comrie (1985), Vettet (1992, 1996), Moeschler et al. (1998), Reboul and Moeschler (1998), to name but a few. Each of the tenses described briefly in this subsection received a specific description in the literature.

The PC is described as a “tense with two faces” (Martin 1971) because of the possibility to express both past and present time. When describing the PC, some scholars focus either on the past time reference called the anteriority PC, as in (13) (e.g. Brunot 1922), on the present time reference called the accomplishment PC, as in (14) (e.g. Guillaume 1929) or on both of the usages (e.g. Reichenbach 1947; Vet 1980; Lusher and Sthioul 1996). Lusher and Sthioul (1996: 207) propose a base value for the PC and two usages. The base value of the PC is given by an event that took place before the speech moment. In the first usage the PC points to the event that took place in the past. In the second usage the PC points to the resultative state relevant in the present time.

(13) Une fois, j’ai conduit sans le permis de conduire.
   Once, I drove without driving licence.
(14) Policier: Votre permis de conduire, s’il vous plaît?
    Chauffeur : Je l’ai oublié à la maison.
    Policeman: You driving licence, please?
    Driver: I forgot/ have forgotten it at home.

Scholars have described the PS from several points of view (as presented by
Tahara 2000). Firstly, within the classical approach, the PS expresses a past event completely accomplished in the past with no connection to present time (Wagner and Pinchon 1962: 413; Grevisse 1980: 873). The focus on the accomplishment of the event in the past is the feature that distinguishes the PS from the PC, the second one expressing a link to present time. Secondly, in the aspectual approach, Martin (1971: 93-94) focuses on the perfective aspect of the PS, which is the feature that distinguishes the PS from the imperfective IMP. Thirdly, within the anaphoric approach, Kamp and Rohrer (1983) state that the PS is used in contexts where time progresses and events are temporally ordered, as in (15). They base their analysis on the three coordinates proposed by Reichenbach (S, R and E) pointing out that sentences with a PS introduce a new R moment in the discourse that is prior to the event moment E, while sentences with an IMP adopt the existing R (introduced by the precedent sentence with a PS), as in (16).

(15) Pierre entra. Marie téléphona.
   Peter entered. Mary made a phone call.

(16) Pierre entra. Marie téléphonait.
   Peter entered. Mary was calling.

As far as the IMP is concerned, scholars have often described it in opposition with the PS as being a tense of background information (Weinrich 1973) as in (16), aspectually unaccomplished and imperfective, which needs a hosting event previously presented (Guillemin-Flescher 1981) from a point of view localized in the past (Fuchs and Léonard 1979), with an anaphoric form (Ducrot 1979; Berthonneau and Kleiber 1993). The literature also mentions about a second type of IMP that has features completely opposed to the first one, called the breaking IMP or the narrative IMP (Comrie 1976; Tasmowski-De Ryck 1985; Vettters 1996), as in (17).

   Since she had gone to the opera, one winter evening, she came back all shivering. The day after, she was coughing. Eight days later, she died of phthisis.

In this subsection, we have shown that FR and EN frameworks for describing the meanings and usages of verb tenses expressing past are not identical. Bilingual comparison is possible only against a common framework in order to put in evidence common and different features. In section 4.3, we propose a common and language-independent framework and we use it for analyzing the translation of the
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3. Contrastive analysis of the SP

Contrastive analysis (CA) is defined by Johansson (2003: 31) as “the systematic comparison of two or more languages, with the aim of describing their similarities and differences”. Mainly, the methodology that was initially used in a contrastive study consists of a first phase of monolingual description of the data (the phenomenon to be analyzed), followed by the juxtaposition of the two or more monolingual descriptions and the analysis of the elements according to a tertium comparationis (James 1980; Krzeszowski 1990; Chesterman 1998). In most recent studies, contrastive analysis is based on corpus investigation that can be performed either on comparable corpora (collection of original texts in two or several languages matched by criteria such as register, genre, domain, time of publication, etc.) or translation corpora (collection of original texts and their translation into one or several languages) (Kennedy 1998).

We adopted the practice of languages comparison based on corpora for its numerous advantages, specifically because it gives new insights into the languages to be compared (which would have remained unnoticed in studies of monolingual corpora), the highlighting of language-specific features and the possibility of making semantic and pragmatic equivalences for the considered linguistic phenomenon. Contrastive analysis of bilingual parallel corpora is thus the methodology used in this study to investigate the EN SP and its translation into FR. It offered us the possibility to make semantic and pragmatic equivalences between the considered tenses in SL and the tenses used to translate the SP in into a TL through the possibility to control variables such as context and register.

In Grisot and Cartoni (2012) we studied the discrepancies between theoretical descriptions of verb tenses and their use in parallel corpora. We investigated corpora consisting of texts in EN and their translations into FR that belong to four different genres (literature 18%, journalistic 18%, legislation 33% and EuroParl 31%). A total of 1275 predicative verb tenses have been considered, which represents 77% of the verb tenses occurring in the corpus.

We have analyzed our corpus in two steps: (i) a first monolingual step in order to calculate the frequency of verb tenses in SL, and (ii) a second bilingual step in order to identify the tenses used as translation possibilities into TL for a certain tense in SL. Calculating the frequency of tenses in the corpus allowed us to verify if verb tenses that are considered to be ambiguous, are also frequent in corpora. Quantitative analyses of tokens of SP in our corpora enabled us formulate statistically significant observations.
Figure 9-1 illustrates the frequency of tenses\textsuperscript{6} in EN as SL in the corpora, where the most frequent tenses are the SPres (32%), the SP (25%) and the PresPerf (14%). This figure shows the inequality of occurrence of tenses in a fairly large corpus containing texts of different registers. The question to be is asked is why some tense forms are much more frequent than others. One possible answer is that some tense forms are ambiguous (expressing more than one sense) and thus they are frequent. The SP is one of the three most ambiguous tenses in EN and it can be disambiguated only through a pragmatic analysis.

\textbf{Figure 9-1: Distribution of tenses in the corpus SL=EN}

\footnotesize
\begin{itemize}
\item \textit{Spres} = Simple Present
\item \textit{SP} = Simple Past
\item \textit{PresPerf} = Present Perfect
\item \textit{PresCont} = Present Continuous
\item \textit{PastCont} = Past Continuous
\item \textit{PP} = Past Perfect
\item \textit{Non-analysed} = tenses not considered in the analysis from the indicative mode, conditional and subjunctive modes, modals.
\end{itemize}

\textsuperscript{6} SP = Simple Past, PresPerf = Present Perfect, PresCont = Present Continuous, Spres = Simple Present, PastCont = Past Continuous, PP = Past Perfect, Non-analysed = tenses not considered in the analysis from the indicative mode, conditional and subjunctive modes, modals.
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If we consider the distribution by register, Figure 9-2 shows that the SP occurs frequently in all four registers: literature (41%), journalistic and Euro Parl (24% and 23%) and legislation (12%). There is no specialisation of the SP for one or another register. It occurs in 12% of the cases in a least expected register, legislation, which is a prospective genre. In MT, high frequency of an ambiguous linguistic expression represents a problematic expression.

Figure 9-2: The distribution of the SP by register

With a contrastive analysis of the parallel corpora, we identified the translation divergence of the SP: the SP has several usages that correspond to several FR tenses used as its translation possibilities. The FR tenses used to render the semantic and pragmatic meaning of the SP are: the IMP, the PC used most frequent in the EuroParl and the journalistic stylistic registers, the PS used most frequent in the literature register and the Présent (Prés) used in 10% of the cases in the law register in order to create a certain effect in deontic contexts, as shown in Figure 9-3. This distribution shows that genre is not a good predictor as it could be expected, i.e. in the literature genre the SP is translated with an IMP in 44% of the cases and with a PS in 40%. The question is what pragmatic factors explain this cross-linguistic distribution. We will try to answer to this question in this paper.

Figure 9-3: Translation possibilities of the SP into FR
Examples (18)-(20) depict the translation divergence of the English SP: in (18) the SP is translated by the French IMP, in (19) by the PC and in (20) by the PS.

(18) EN/SP: The atmosphere *had* more to do with the negative aspects of a great European project and vision than a positive promotion of what is deep and good about the European dream, and that is a disappointing feature of Nice. (EuroParl Corpus)
FR/IMP: “L'ambiance *avait* plus à voir avec les aspects négatifs d'un grand projet et d'une grande vision pour l'Europe qu'avec une promotion positive de ce que le rêve européen a de profond et de positif, et c'est là un aspect décevant de Nice.”

(19) EN/SP: I welcome the consultation process and can assure colleagues that in my Member State the authorities *took care* to carry out a broad and meaningful consultation. (EuroParl Corpus)
FR/PC: “Je me félicite du processus de consultation et je peux assurer mes collègues que les autorités de mon pays *ont pris soin* de mener une consultation vaste et significative.”

(20) EN/SP: Cyril had very little affection for him, and was only too glad to spend most of his holidays with us in Scotland. They never really *got on* together at all. (Wilde O.“The of Mr. W.H”)
FR/PS: “Cyril avait fort peu d'affection pour lui, et n'était que trop heureux de passer l'essentiel de ses vacances avec nous en Ecosse. Ils ne *s'entendirent* jamais véritablement.”

Corpus analysis revealed that there is a mismatch between theoretical
descriptions of verb tenses and real usages in corpora. Certain verb tenses that are predicted by theoretical literature as being ambiguous for translation purposes, such as the English PastCont or the PastPerf, are infrequent in our corpus. Others, such as the English SPres and SP or the FR PC are ambiguous and frequent, representing therefore an important translation divergence.

4. Relevance-theoretic framework

In this section we propose a relevance-theoretic and cross-linguistic account of tense, and more specifically of the EN SP. Tense is a grammatical category that expresses time reference. But aspect and mood provide important temporal information as well. In subsection 4.1, we propose a general predictive model for encoded information about time and possible paths to follow in the interpretation process according to the cognitive and communicative principles of relevance.

In RT, tense is underdetermined: assigning temporal reference with the help of temporal coordinates S, R and E represents pragmatically determined aspects of what is said and is part of the explication of the utterance. In subsection 4.2, we argue that tense encodes conceptual and procedural information. Temporal reference with the help of S, R and E is conceptual information while temporal sequencing and causal relations holding between eventualities represent procedural information. In subsection 4.3 we propose a predictive model for the possible usages of the SP and their translation into FR.

4.1. A general predictive model

Comrie (1976: 6) argues that languages do not encode information about reference to time in the same way:

The semantic concept of time reference (absolute or relative), [...] may be grammaticalized in a language, i.e. a language may have a grammatical category that expresses time reference, in which case we say that the language has tenses. Some languages lack tense, i.e. do not have grammatical time reference, though probably all languages can lexicalize time reference, i.e. have temporal adverbials that locate situations in time.

There are thus tensed and tenseless languages. As regards tensed languages, many languages use three categories: past E≤S, present E=S and future S≤E. Other languages, such as English and Japanese, are two-tense languages and express past and non-past. Four- and six-tensed languages make finer distinctions based on the distance on the timeline between R and S. Tenseless languages express time reference through other resources, such as aspect and temporal adverbs, as in
Chinese and Vietnamese. In Vietnamese for example, time is marked by temporal adverbs such as already.

A general picture of tense, aspect and mood (TAM) markers is usually given in typological studies, where the cross-linguistic perspective is departure point for their investigation. In natural languages, TAM markers express temporal cohesion at the discourse revel. For languages that grammaticalize all three categories, it is often difficult to untangle them because they are expressed in the same verbal form. Figure 9- provides a general predictive model for encoded information about time. Specifically, tense encodes conceptual information about location in time with the help of E, R and S. However, tense encodes as well procedural information, specifically procedures to relate temporally/causally eventualities and to look for a subjective point of view on the eventualities. Aspect category is of two types. Grammatical aspect expresses information about the way the eventuality is seen, as perfective or imperfective (terminology based on aspect in Slavic languages) or in terms of boundedness. Lexical aspect expresses inherent properties of eventuality type, dividing eventualities into states, activities, accomplishments and achievements (Vendler 1957). Lexical aspect is described in terms of telicity and duration. These two are not inherent properties of the eventuality but of a verb and its complements in a sentence. Moeschler (2002a) has shown that lexical aspect is conceptual information by showing that it has logical properties and adds to the propositional content of an utterance. Escandell Vidal and Leonetti (2011: 92) assume that grammatical aspect contains procedural information about how to construct the internal representation of the eventuality considered. They exemplify that the progressive marker in EN indicates that the event has to be viewed as an incomplete action in progress at a specific time.

The general model predicts that some of the encoded information is procedural, specifically mood expressing realis or irrealis world, narrativity and subjectivity for tense and grammatical aspect. Procedural information represents instructions that constrain the inferential process of discourse interpretation. For example, if the mood instruction has the value irrealis, the hearer must construct contextual premises and conclusions compatible with the irrealis system. On the other hand, temporal reference assignment with the help of E, R and S and lexical aspect represent conceptual information contributing to the full propositional form of an utterance. There are cases of mismatch between conceptual (e.g. lexical aspect) and procedural (e.g. grammatical aspect) such as the combination between the progressive and stative predicates, as in (21) from Escandell Vidal and Leonetti (2011: 93). They write that hearers do not view (21) as representing an incoherent state of affairs but they assign it a reading where John’s silliness (a state) is presented as an action in progress, that is, as a dynamic situation. The state of being silly is interpreted as a temporary action in progress taking place in a particular situation. This interpretation is due to the fact that the progressive
marker forces a reinterpretation of the predicate according to its requirements. Escandell Vidal and Leonetti (2011) argue that this is an example of the rigidity of the procedural meaning\(^7\).

(21) John is being silly.

Figure 9-4: General predictive model for encoded information about time

We assume that families of languages are organized around one or another node. For example, Slavic languages are organized around the aspect node, Romance languages around tense node while tenseless languages develop the other

\(^7\) The model of directional inferences (MDI) (Moeschler 2002b) dealing with temporal inferences at the discursive level makes the same prediction regarding the force procedural information has over conceptual information. Specifically, the MDI assumes that procedural information is stronger than conceptual information. The main argument is that information about representation representations of events or states cannot decide which operation can be applied to these representations. The MDI postulates the following hierarchy for information that contribute to directional inferences: contextual assumptions >> connectives (procedural content) >> tenses >> verbs class (lexical aspect). The general model defended in this paper predicts that procedural information encoded by connectives, mode, grammatical aspect and tense is stronger than conceptual information encoded by tense and lexical aspect.
The general predictive model as a whole is a theoretical model. We have tested empirically (corpus work and experimentally) the tense sub-model and its application for the SP, PS, PC and IMP. The interaction between tense and aspect sub-model is currently being tested. In the following section, we develop and give examples of the tense sub-model applied for EN and FR.

4.2. The conceptual and procedural contents

Since its proposal by RT (Blakemore 1987, 2002; Wilson and Sperber 1993) conceptual and procedural information is seen as representing types of information encoded by linguistic expressions. Discourse connectives have been and remain a major concern for research on the conceptual/procedural distinction (see, e.g., Blakemore 1988, on so, 2000, on nevertheless and but; Blass 1989, on several particles in Sissala; Ifantidou 2000, on the Greek particle taha; Moeschler 2002a, on French et “and” and parce que “because”; Zufferey 2012 on French puisque, parce que and car “because”).

Other phenomena have been investigated regarding the conceptual/procedural distinction and their role for discourse processing, such as mood and modality (Wilson and Sperber 1988; Ifantidou 2001 on evidentials; Ahern 2010 on speaker attitude), verb tenses (Moeschler 1993; Nicolle 1997, 1998; Moeschler et al. 1998, 2012; Wilson and Sperber 1998; Leonetti and Escandel Vidal 2003, on the Spanish imperfective; Saussure 2003, 2010; Ahern and Leonetti 2004, on the Spanish subjective; Amenós Pons 2010, on Spanish past tenses, 2011), pronouns and determiners (Gundel et al. 1993; Gundel 1996, 2010, on givenness hierarchy; Breheny 1999, on definite expressions), to name but a few. Many works are dedicated to the conceptual/procedural distinction from a theoretical point of view, which aimed at defining conceptual and procedural information and proposing qualitative features.

Wilson and Sperber (1993: 151) argue that conceptually encoded information contributes either to explicatures (to the proposition expressed and to high-level explicatures) or to implicatures, while procedurally encoded information represents constraints either on explicatures (to the proposition expressed and to high-level explicatures) or on implicatures. Wilson and Sperber (1993) argue that during interpretation the hearer builds conceptual representations and uses encoded procedures for manipulating them. A conceptual representation differs from other types of representations in that it has logical properties and truth-conditional properties. They give example (22) whose logical form is (23) and propositional form (24). They argue that the logic form recovered through decoding and the propositional form recovered by a combination of decoding and inference are conceptual representations.
(22) Peter told Mary that he was tired.
(23) x told y at ti that z was tired at ti.
(24) Peter Brown told Mary Green at 3.00 pm on June 23 1992 that Peter Brown was tired at 3.00 pm on June 23 1992.

As far as procedural information is concerned, Wilson and Sperber (1993) argue that it represents constraints on the inferential phase of comprehension, as in example (25), which can be interpreted as in (26) and in (27). Following Blakemore (1987, 1992), Wilson and Sperber (1993: 158) argue that connectives *so* and *after all* do not contribute to the truth conditions the utterances, but constrain the inferential phase of comprehension by indicating the type of inference the hearer is expected to go through.

(25)a. Peter’s not stupid.
    b. He can find his own way home.
(26)Peter’s not stupid; so he can find his own way home.
(27)Peter’s not stupid; after all he can find his own way home.

The first attempts to define and characterize conceptual and procedural information included qualitative features such as truth-conditional vs. non truth-conditional (see Wilson and Sperber 1993 for arguments against this association), representational vs. computational, accessible to consciousness vs. inaccessible to consciousness, easily graspable concepts vs. resistant to conceptualization, capable of being reflected on vs. not available through conscious thought (Wilson and Sperber 1993; Wilson 2011), non cancellable vs. cancellable and easily translatable vs. translatable with difficulty (Moeschler et al. 2012). Saussure (2011) proposes methodological criteria to distinguish between what is conceptual and what is procedural. In his words, an expression is procedural when it triggers inferences that cannot be predicted on the basis of a conceptual core to which general pragmatic inferences (loosening and narrowing) are applied.

As far as verb tenses are concerned, two main trends are opposed regarding the nature of their encoded content: on the one hand, a tense encodes procedural information and, on the other hand, we argue a tense encodes both procedural and conceptual information.

According to the first trend, verb tenses have only rigid procedural meanings that help the hearer reconstruct the intended representation of eventualities (Nicolle 1998; Saussure 2003, 2011; Amenós Pons 2011). Saussure (2003) proposes algorithms to follow, consisting of the instructions encoded by verb tenses, in order to grasp the intended meaning of a verb tense at the discourse level. Taking the distinction conceptual-procedural as a foundation, Blakemore (1987), Wilson and Sperber (1993), Moeschler (1994, 1998) and Nicolle (1997, 1998) claim that tenses
have a procedural meaning. Nicolle (1998: 4) argues that tense markers impose constraints on the determination of temporal reference and thus they “may be characterized as exponents of procedural encoding, constraining the inferential processing of conceptual representations of situations and events”. Concerning the status of the temporal coordinates, Saussure and Morency (2012) argue that tenses encode instructions on how the eventuality is to be represented by the hearer through the positions of temporal coordinates. They consider thus that temporal location with the help of S, R and E is of a procedural nature. We want to argue that location through temporal coordinates does not constrain the inferential processing but contribute to the propositional content of the utterance.

As far as conceptual information is concerned, the assumption is that the specific configuration of the temporal coordinates S, R and E behaves like pro-concepts (Sperber and Wilson 1998: 15; Wilson 2011). Pro-concepts are semantically incomplete, they are conveyed in a given utterance and have to be contextually worked out through an enrichment process similar to lexical-pragmatic processes. Once the enrichment process is completed the propositional form of the utterance is also available. This temporal information is not defeasible, i.e. it cannot be cancelled. Let us consider Wilson and Sperber’s (1993: 157) example given in (22) and the propositional form given in (24). We add to this propositional form the information that eventualities of *saying* and of *being tired* took place before the moment when the sentence was uttered. The extended propositional form would be something like the one given in (28). This temporal information cannot be cancelled or contradicted, as show the incompatibility with the adverb *now* or *tomorrow* in (29) and (30), as well as the compatibility with the adverb *yesterday* in (31).

(28) Peter Brown told Mary Green at 3.00 pm on June 23 1992 (a moment before the present moment/in the past) that Peter Brown was tired at 3.00 pm on June 23 1992 (a moment before the present moment/in the past).

(29) *Peter Brown told Mary Green at 3.00 pm on June 23 1992 which is now (a moment contemporary with the moment of speech)/ tomorrow (a moment which is after the moment of speech) that Peter Brown was tired at 3.00 pm on June 23 1992 which is now/tomorrow.

(30) *Now/tomorrow Peter told Mary that he was tired.

(31) Yesterday, Peter told Mary that he was tired.

The parameters themselves represent conceptual content, while their contextual values are pragmatic. For example, the FR PC allows reference both to past time and to future time. In (32), R is in the past and so the PC refers to past time. In (33), R is given by the temporal adverb so it expresses reference to future time.
Starting from the claim that eventuality types have a conceptual meaning (they have logical properties and add to the propositional content of the utterance) and tenses have procedural meaning, Moeschler (2002a) argued that the meaning of any lexical item includes two components: conceptual information, which describes the concept accessible via the lexical entry, and procedural information, which indicates how to reach the descriptive content of concepts. Moeschler (2002a) thus proposed that lexicon should be viewed from a perspective that combines both procedural and conceptual information. In our view, temporal coordinates S, R and E combine with the predicate’s lexical aspect, in order to allow the computations of the aspectual class (state, process, event). This conceptual information is the skeleton of the meaning for each verb tense, which is enriched based on contextual information and world knowledge in the inferential interpretation process. If we consider example (34) and imagine two different contexts, the distance on the time line between E and S, even if S=E for present tenses is contextually adjusted based on world knowledge. In a first context, a husband is upstairs and his wife is downstairs in their house, he calls her and she answers (34). In the second context, the wife has an hour ride from work to home, he calls her to see when she comes back home and she answers (34). The distance between E and S is between immediately and 2-3 minutes in the first context and a few minutes and one hour in the second context.

(34) J’arrive!
I am coming!

Regarding the procedural content of verb tenses, we have stated that they help the hearer access the right contextual hypotheses conforming to the principle of relevance to get the intended cognitive effects (Wilson and Sperber 1998). Carston (1998) points out that under normal conditions discourse material is presupposed to be relevant and, when information is not explicitly given, it is filled in. The linguistic content of utterances is thus enriched in the interpretive process: in our case, the basic temporal location of the eventuality represented by conceptual information of a verb tense is enriched through procedural information. In example (35), Binnick (2009) giving a similar example to that proposed by Grice (1989)\(^8\)

\(^8\) Binnick’s example is a typical example for conversational implicatures (in Grice’s terms, 1989) that follow the maxim “Be orderly”. Carston (1998, 2002) and Sperber and Wilson (1986/1995) treat this content as pragmatically determined aspects of what is said, thus an
argues that the material in brackets is implicit. We consider that (35) is an example of temporal ordering, and thus the procedural feature [± narrative] of the SP is active.

(35) He took off his boots and [then] got into bed.

We define procedural information of verb tenses in terms of the following features: [± narrative] and [± subjective\(^9\)]. We argue that these features are encoded by verb tenses and that they can be used for multilingual comparison of different usages of verb tenses. The general idea is that each of these features corresponds to a procedural instruction encoded by a verb tense: the [± narrative] feature corresponds to the demand to verify if the events are temporally ordered and the [± subjective] feature demands to verify the existence of a point of view (perspective) in the utterance. Regarding the [± subjective] feature, Binnick (2009) underlines that there is a perspective or point of view from which the events are narrated and the tense is sensitive to this focalization. He notes that narration may be non-focalized [- subjective] or it may adopt the perspective of either an internal or an external focalizer [+ subjective] (Fleischman 1990: chapter 7).

We will now consider each of these features and motivate their procedural nature. If [± narrative] feature is positive, then a procedure of temporal ordering calculus is set off. Identification of reference time is either linguistically triggered (through verb tense form or temporal adverb, for example) or pragmatically inferred by the hearer/reader. This procedure of temporal ordering calculus is not a default procedure, as Asher and Lascarides (2003) state, but it is triggered by the presence of [+ narrative] feature.

We provide four arguments in favor of the procedural nature of this feature. Firstly, the [± narrative] feature is information that constraints the inferential phase of constructing explicatures. It does not contribute but constraints the construction of the propositional content of utterance (Wilson and Sperber 1998; Binnick 2009; Escandell Vidal and Leonetti 2011). Secondly, temporal sequencing is a discourse property: it needs at least two eventualities for the [± narrative] feature to be active. Procedural content gives information about how to manipulate conceptual representations, corresponding to more than two discourse entities. If a tense has a narrative usage, it means that as soon as its reference time is set, it is used to construct the temporal reference of the next event, and thus time advances. Binnick explicature.

\(^9\) In the current state of the research, only the [± narrative] feature has been validated empirically through experiments with linguistic judgment task. The procedural status [± subjectivity] feature is a theoretical assumption that must be validated empirically.
Chapter Nine

(2009) points out the role of verb tenses for discourse coherence as temporal anaphors (discourse interpretation depends on the identification of their antecedents). In example (36), the SP of the verb *take* (specifically *took*) is bound by that of the verb *go* (specifically *went*). Time advances in a narrative sequence because the R point of one eventuality is located just after the preceding one.

(36) John went home early. He took the subway.

Thirdly, temporal sequencing can hardly be paraphrased (as with synonyms for conceptual representations), but it can be rendered explicit with the help of temporal connectives, such as *and, then, afterwards, because*. And fourthly, the [± narrative] feature is information inaccessible to consciousness resulting in low agreement for two annotators (Grisot and Moeschler 2014).

This predictive model is a discourse model. Kamp and Rohrer (1983) also argued for their discourse semantics model that the meaning of a tense could be established only at the discoursive level. We did not aimed at proposing a model for isolated tokens of SP. The model we present here is determined by the need to disambiguate usages of the SP and to improve its translation into FR. Consider example (37). Its translation into a TL is ambiguous. Taken as an isolated token it cannot be disambiguated. Consider now example (38), the second sentence introduces another eventuality and the two eventualities are causally related. According to our model, the SP has a narrative usage and it is translated into FR by a PS/PC. In (39) on the other hand, the second sentence introduces an eventuality that takes place simultaneously. More specifically, the R period of the first SP includes the R moment of the second eventuality. According to our model, the SP has a non-narrative usage and it is into FR by an IMP.

(37) John slept.
(38) John slept. He got rest.
    Jean *a dormi*. Il s’est reposé. (PC)
    Jean *dormit*. Il se reposa. (PS)
(39) John slept. He had a dream.
    Jean *dormait*. Il fit un rêve.

As far as the second feature [± subjective] is concerned, for utterances where it is active, a point of view is or is not lexically expressed. We consider that it is a procedural feature for several reasons. Firstly, it is does not contribute but it constraints the construction of explicatures during the interpretation process. Secondly, it gives information about the existence or absence of subjective point of view. This information has repercussions for manipulating conceptual representations of eventualities. Thirdly, it can hardly be paraphrased but it can be rendered explicit with the help of lexical expressions such as *from his/her*
perspective. This feature seems to be specific to certain tenses in some particular languages, such as the IMP and PS in FR (see subsection 4.3 for a more detailed presentation of these FR tenses and their narrative/non-narrative and subjective/non-subjective usages).

4.3. Predictive model for specific tenses

We argue that both conceptual (S, R & E) and procedural contents of the EN SP represent crucial information for usage disambiguation and utterance interpretation, as well as for discourse coherence. We claim that this information represents disambiguation criteria and can be used as semantic and pragmatic traits for tagging parallel corpora. These parallel corpora were be used for machine learning. In order to test empirically the [± narrative] feature, we performed annotation experiments that confirmed partially our hypotheses. The procedure and the results of our annotation experiments are provided in section 5. The feature [± subjective] is not directly included in the predictive model presented in this paper, but it represents important information to be added after empirical testing.

The model is based on the distinction between two procedural features: [± narrativity], [± subjective] and one conceptual [E/R/S]. These features can be lexically realized or not. This means that if the temporal and/or causal relation and the point of view are not explicit they need to be pragmatically inferred. Hence, each feature presents polarity, positive or negative, and the two features are ordered as it follows: narrative > subjective. In other words a certain verb tense has a narrative or a non-narrative usage that can be subjective or non-subjective.

One question that arises at this point of our discussion is how to apply this pragmatic model to specific verb tenses, such as the FR PS or IMP. The main hypothesis is that a verb tense can have some of the possible usages thus some branches could remain unfilled. Our assumption is that this kind of functioning of the features [± narrative] and [± subjective] explains the variation of usages of verb tenses. For example, the FR PS has narrative non-subjective and narrative subjective usages and non-narrative non-subjective usages as shown in Figure 9-5. The first type of usage is ordinary narrative usages as in (40) while the second occurs more rarely, as in (41). The third represent temporal simultaneity, as in (42).
Figure 9-5: The PS

(40) Max *entra* dans le bar. Il *alla* s’asseoir au fond de la salle.
Max *entered* the bar. He *sat* in the back.

(41) Aujourd’hui, personne ne lui *adressa* la parole (Stendhal, *Le Rouge et le Noir*,
in Vuillaume 1990:9)
Today, nobody *talked* with him.

(42) Bianca *chanta* et Igor *l’accompagna* au piano.
Bianca *sung* and Igor *played* the piano.

The IMP and PS in FR have the same configuration of semantic coordinates
(E=R<S) but trigger different pragmatic inferences in contexts expressing past
time. This is due, on the one hand, to their narrative (temporal sequencing and
causal relations) or non-narrative usages, and on the other hand to their subjective
and non-subjective usages. Subjective usages demand the presence of a point of
view in contexts expressing past time, the point of view can be either explicit
(lexically expressed) or implicit (recovered through pragmatic inference). The IMP
has a primary non-narrative subjective usage. The subjective IMP can occur in
contexts where there exists a temporal ordering. This usage is known as the
*narrative IMP* or the *breaking IMP* (imparfait de rupture). In our model, we can
mainly identify four usages of the IMP: narrative subjective implicit, non-narrative
subjective explicit or implicit and non-narrative non-subjective, as shown in Figure
9-6 and exemplified in (43) to (46).
Conceptual and Procedural Information for Verb Tense Disambiguation

Figure 9-6: The IMP

(43) Marie sauta dans le train. Cinq minutes plus tard, le train déraillait.
Mary jumped in the train. Five minutes later, it was derailing.

(44) Marie entra dans le bureau. Que lui arrivait-il donc?
Mary entered the office. What was happening to her?

(45) Le juge alluma une cigarette. La fièvre donnait au tabac un goût de miel.
(Roger Vailland, La Loi)
The judge lighted a cigarette. The fever gave the tobacco a taste of honey.

(46) Les dinosaures vivaient il y a des centaines de millions d’années.
Dinosaurs lived thousands of millions of years ago.

Example (47) shows a subjective reading of the IMP (the omniscient point of view of the narrator), while (48) illustrates the non-subjective reading of the PS (from Fleischmann 1990: 217).

(47) Soudain, joyeux, il dit: Grouchy! – C’était Blücher.
Suddenly, joyfully, he [Napoleon] said, ‘Grouchy!’- It was Blücher. (He thought it was Grouchy but is was Blücher)

(48) It dit: Grouchy! – Ce fut Blücher.
He [Napoleon] said, ‘Grouchy!’- It was Blücher. (He became aware that it was Blücher)

In example (43), the subjective perspective triggered by the IMP is not explicitly presented in the sentence (lexically expressed). In (44) Mary’s thought is temporally localized by the event introduced by the PS, but the interpretation is not necessarily narrative. In (45) the narrative interpretation is blocked by the impossibility of having a temporal order marker such as et (‘and’) or ensuite (‘then’) as in (49) but with an implicit subjective interpretation (to be more specific, it is through the judge’s point of view that we are provided with the description ‘the fever gave the tobacco a taste of honey’). Finally, a descriptive sentence such as (46) implies neither temporal order nor perspective.
Contextual values of these features are pragmatic and intervene as disambiguation criteria for tense usages. They are based on the conceptual information about temporal localization of eventualities given by different configurations of Reichenbachian coordinates. It is only on this conceptual base that procedural features can come along and continue the temporal computation of discourse. FR native speakers identified these usages of the IMP and PS in Experiment 1 (section 5.2). Based on the results of this experiment, we included these procedural features in the disambiguation model.

The French PS and the IMP are described conceptually as E=R<S, while the PC as E<R=S. This conceptual information as well as the activation of procedural features such as [+narrative] and [+subjective] give sufficient information to disentangle usages of SP leading to different translations into FR. Consider Figure 9-7 that presents a predictive model for usages of the SP and its translation into FR. We adopt Wilson and Sperber’s (2004) idea that the subtasks related to conceptual and procedural information in the overall comprehension process are not sequentially ordered but take place in parallel. In other words, the hearer builds hypotheses about the explicit content, the intended contextual assumptions and contextual implications in the same time. We argue that the hearer defines the contextual values of conceptual and procedural information in the same time and he/she revises or elaborates them as the utterance unfolds.

Our predictive model combines procedural with conceptual information. In our view aspect plays a role for the choice of a verb form in SL. Specifically perfective aspect determines the choice of using an SP form while imperfective determines the choice of a Past Progressive form. Lexical aspect can block the choice of one or another form, for example states in English tend to reject progressive forms. If mismatches occur, procedural information prevails over conceptual information and the meaning is contextually adjusted (Moeschler 2002b; Escandell Vidal and Leonetti 2011).

As far as the SP form is concerned, it has several contextual usages characterized by contextual values of the conceptual and procedural features presented in Figure 9-7. There are four possible main paths provided by the different combinations of the two procedural features and their contextual values. When the procedural feature narrativity is active [+narrative], there is a series of R corresponding to the eventualities expressed. Narrative usages are either subjective when a subjective perspective on the eventualities is lexically expressed or inferred, or non-subjective. When the procedural feature is not active [-narrative],

(49) Le juge alluma une cigarette. *Ensuite/*Et la fièvre donnait au tabac un goût de miel.
The judge lighted a cigarette. *Then/*And the fever gave the tobacco a taste of honey.
the eventualities expressed are either not temporally/causally related or they take place simultaneously ($R \subset E$). Similarly to narrative usages, non-narrative usages can be subjective or non-subjective.

The possible usages of the SP are characterized by the combination between the two procedural features with the encoded conceptual information: $E<S$ while the position of $R$ can be either $R<S$ or $R=S$. Our proposal is to use this information to predict the choice of verb tense in FR as SL. When $R<S$, the SP will be translated into FR through tenses expressing past time as well, such as PS, PC or IMP. When $R=S$, the SP will be translated into FR through a tense expressing the present time perspective, namely the Présent Historique (PH). There are two cases that occur less frequent than the others. Firstly, the narrative subjective usage is translated into FR with the narrative IMP corresponding to a series of eventualities temporally related expressed from a subjective perspective. Secondly, the non-narrative non-subjective usage is translated into FR with the PS corresponding to a series of unrelated eventualities or to eventualities that occur simultaneously.

Figure 9-7: Predictive model for the SP and its translation into FR

Reichenbach (1947) proposed to describe a verb tense with the help of three coordinates at once. In Grisot and Moeschler (2014) we bring evidence from linguistic experiments with native speakers that using three pairs of two
coordinates is processed much easier than all three coordinates at once. The SP is described as E=R, R<S and E<S. In Grisot and Moeschler (2014), native speakers judged 30 excerpts from a translation corpus containing occurrences of the SP and occurrences of the PresPerf and agreed on the totality of the items that the conceptual content of the SP is E<S. In the following section, we provide the design of the linguistic experiments we conducted and their results.

This hierarchy is motivated by the communicative principle of relevance, specifically the hearer aims at constructing hypotheses about speaker’s intended meaning that satisfies the presumption of relevance conveyed by the utterance (Wilson and Sperber 2004). We assume that encoded instructions to verify certain intersentential information and conceptual content about temporal coordinates are rigid in the sense that the hearer is compelled to assign to each of them a value. This represents the input for the inferential machinery. The output consisting of the values of the instructions followed and the saturation of temporal coordinates is flexible and context-dependent. Escandell Vidal and Leonetti (2011) argue that rigidity is a feature of both the operational nature of procedural meaning (the algorithm) and of the representation obtained by following it (the result). They acknowledge though that instruction can give rise to different interpretative effects, such as for example different values of tenses. We would argue based on their analysis that following the encoded procedures is mandatory, thus they are rigid but the result of the algorithm is flexible and depends on the context and of world-knowledge.

As far as conceptual content is concerned, the interpreter is compelled to ascertain a value to the ad-hoc concept (E/R/S) encoded by a tense. The value assigned is flexible. Specifically the reference point R can be previous, simultaneous or preceding to the moment of speech. In the following section, we describe the two experiments designed for the identification of the narrativity procedural feature for FR tenses and for the EN SP, as well as its usage as a predictor for the translation of the SP into FR.

5. Annotation experiments

5.1. Experiments design

To account for the translation divergence of the SP our model predicts that the contextual values taken by the conceptual and procedural information encoded by a tense in SL trigger different translations in TL. One feature from the general predictive model, the [± narrative] feature, represents procedural information. We consider the encoded instruction to be cross-linguistically valid. We designed two experiments in order to test if EN and FR verb tenses encode this procedure.
FR verb tenses have been described in the literature as regarding their role for temporal sequencing. Kamp and Rohrer (1983) argued that temporal sequencing is a semantic information encoded by verb tenses: with the PS time advances while with the IMP does not advance, the IMP being a tense of background. In other words, the PS has a narrative usage and the IMP has a non-narrative usage. Experiment 1 was designed to test this theoretical assumption.

Experiment 2 was designed based on the novel methodology proposed in this study, namely cross-linguistic transfer of semantic and pragmatic information based on parallel corpora. According to this methodology, there is an equivalence between the SP and the FR tenses used for its translation as regards the [± narrative]. The hypotheses tested in Experiment 2 are:

(50) A: Narrative usages of SP are translated into FR more often through a PS/PC than through an IMP.
B: Non-narrative usages of the SP are translated into FR more often through an IMP than through a PS/PC.

One way of evaluating human annotation is to calculate the inter-annotator agreement with the help of Cohen kappa coefficient (Carletta 1996). One issue that influences corpus annotation by annotators is the subjectivity of judgments, which can be quite substantial for semantic and pragmatic annotations (Artstein and Poesio 2008). It can be tested whether different annotators produced consistently similar results, so that one can infer that the annotators have understood the guidelines and that there was no agreement just by chance. The kappa statistic factors out agreement by chance and measures the effective agreement by two or more raters. The kappa coefficient is 1 if there is a total agreement among the annotators, 0 if there is no agreement other than the one expected to occur by chance, and -1 for values greater than chance disagreement.

The results of experiment 2 were also evaluated against a baseline established on the parallel corpus. Specifically, for each instance of SP labeled by annotators we identified in the FR part of the parallel corpus the tense used in translation. The results of this investigation represent arguments for the functioning of the predictive model defended in this study.

5.2. Experiment 1

In experiment 1 we had 76 participants, FR native speakers, who were first year students at Faculty of Letters. Their participation at the experiment was benevolent
and anonymous. The material consisted of 300 items\textsuperscript{10} randomly chosen from FR part of the parallel corpus organized in 19 sets. Each participant received a set of 15 items. The data contained 127 occurrences of IMP described by the literature as non-narrative, 173 occurrences of PS/PC (101 PS and 72 PC) described as narrative.

The first task from the annotation guidelines was to read and understand the instructions containing definitions of narrative and non-narrative usages, as given in (51). They also included two explained examples for each usage, as given in (52) where V1 (PS) and V2 (PS) have a narrative usage while V3 (IMP) has a non-narrative usage. Narrativity was defined and explained to annotators as it follows:

\begin{itemize}
  \item [(51)] In \textit{narrative} contexts a story that is being told (you might not have the whole story available in the sentence) and eventualities are temporally ordered, while \textit{non-narrative} contexts are associated with descriptive passages, where no story is being told.
  \item [(52)] On raconte qu’un Anglais \textit{vint} [V1] un jour à Genève avec l’intention de visiter le lac; on le \textit{fit} [V2] monter dans l’une de ces vieilles voitures où l’on \textit{s’asseyait} [V3] de côté comme dans les omnibus.
\end{itemize}

The second task was to read each item and decide if the verb highlighted has a narrative or a non-narrative usage. Participants were training on 6 items followed by a collective discussion. The evaluation was done by calculating majority of answers for each item and by using Cohen kappa coefficient. Labels given by participants were compared to a theoretical baseline established on the basis of theoretical descriptions of the considered tenses (provided in section 2.2).

Table 9-1 provides the results of this annotation experiment, where a total of 221 tokens of IMP, PC and PS were annotated. Among the 300 items annotated by four annotators, 68 received equal answers (no majority). These items were not considered in the analysis. The set of 232 remaining items contained 99 IMP (narrative) and 133 PS/PC (non-narrative). In the clean data of 221, annotators agreed in 182 items (82\% of the data) with a kappa value measuring inter-annotator agreement of 0.63. This value signals reliable results.

The table shows that the narrative feature was identified for 83\% of the annotated tokens according to our prediction (110 items labeled as narrative out of 133 existent in the corpus) and the non-narrative feature for 73\% of the cases (72 items labeled as non-narrative out of 99 existent in the corpus).

\textsuperscript{10} An item consists of a sentence where the tense form of interest occurs (PS, PC or IMP for Experiment 1 and SP for Experiment 2) and another sentence, either the preceding or following one. This choice is explained by the need to have sufficient co(n)text for a pragmatic decision.
Table 9-1: Confusion matrix for items (majority of annotators)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Majority of annotators</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Narrative</td>
<td>Non-narrative</td>
<td>Total</td>
</tr>
<tr>
<td>Narrative</td>
<td>110</td>
<td>18</td>
<td>128</td>
</tr>
<tr>
<td>Non-narrative</td>
<td>21</td>
<td>72</td>
<td>93</td>
</tr>
<tr>
<td>Total</td>
<td>131</td>
<td>90</td>
<td>221</td>
</tr>
</tbody>
</table>

More precisely, annotators clearly recognized a primary narrative usage for the PS (92%) but did not make the same clear judgment for the PC (77%) or the expected non-narrative primary usage of the IMP (77.5%). This leads to about 27% of non-expected usages, namely non-narrative usages for the PC and narrative usages for the IMP. This result opened a path for further finer-grained research, namely an annotation experiment on IMP with the [± narrative] feature. Further research will consider the nature of the procedural content of the PC.

The IMP, known as the breaking IMP (“imparfait de rupture”), is characterized by the presence of a subjectivity marker or a temporal adverbial or connective that encodes an immediate transition towards a resulting state. This information is inferential and directs discourse computation towards temporal sequencing.

We have organized a second annotation experiment with the [± narrative] feature for the French IMP in order to identify narrative IMPs. The annotated data consists of items of IMP in SL and in TL (translations of SP). The experiment focused on the annotation of 100 items.

The results are presented in Table 9-2. Both annotators annotated the IMP in this corpus of 100 tokens as being non-narrative in 71% of the cases, which represents its main usage. Annotators identified the secondary usage of the IMP for 9% of the cases, which is the narrative usage. Out of 100 annotated tokens, annotators agreed on the annotation of 80 tokens (9 narrative tokens and 71 non-narratives).

Table 9-2: Confusion matrix of IMP items (annotator 1 vs. annotator 2)

<table>
<thead>
<tr>
<th>Annotator 1</th>
<th>Annotator 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Narrative</td>
<td>Non-narrative</td>
<td>Total</td>
</tr>
<tr>
<td>Narrative</td>
<td>9</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Non-narrative</td>
<td>11</td>
<td>71</td>
<td>82</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

The annotation experiment on FR tenses validated our hypothesis concerning main usages of the considered tenses, namely narrative PS, narrative PC and non-narrative IMP. The high value of the inter-annotator agreement shows that the [± narrative] feature is cognitively motivated for processing FR tenses.
5.3. Experiment 2

In Experiment 2\textsuperscript{11} we had two participants, EN native speakers, who were studying Linguistics at the Bachelor level and were originate from the United Kingdom. Their participation at the experiment was paid. The material consisted of 458 items randomly chosen from the EN part of the parallel corpus.

As in the first experiment, annotators received annotation guidelines and went through a training phase. The first task from the annotation guidelines was to read and understand the instructions containing definitions of narrative and non-narrative usages (as given in Experiment 1). They also included two examples for each usage, as given in the examples (53) and (54). The second task was to read each item and decide if the verb highlighted has a narrative or a non-narrative usage. Participants were training on 10 items followed by a discussion where each annotator had to “think loud” his/her answers.

In the first example below, there are two events, i.e. ‘the marriage that happened’ and ‘the wealth which was added’. The second event is presented in relation to the first (first he got married and then he added to his wealth), which is why the SP verbs happened and added are in narrative usage. In the second example, there are three states (was a single man, lived and had a companion) that describe the owner of the estate. States are not temporally ordered, which is why this example illustrates the non-narrative usage of the SP.

\begin{itemize}
  \item (53) By his own marriage, likewise, which happened soon afterwards, he \textit{added} to his wealth. (Literature Corpus: J. Austen, “Sense and Sensibility”)
  \item (54) The late owner of this estate was a single man, who \textit{lived} to a very advanced age, and who for many years of his life, had a constant companion and housekeeper in his sister. (Literature Corpus: J. Austen, “Sense and Sensibility”)
\end{itemize}

As in Experiment 1, we used Cohen kappa for evaluating inter-annotator agreement. As regards cross-linguistic evaluation, the labeled items were compared to a reference baseline containing the tenses used for the translation of the SP into FR from the FR part of the parallel corpus.

Results are provided in Table 9-3. The two annotators agreed on 325 items (71\%) and disagreed on 133 items (29\%). The value of kappa coefficient was 0.42. This value is above chance, but not high enough to point to entirely reliable

\textsuperscript{11} Experiment 2 is also described in Grisot and Moeschler (2014) where we test the procedural nature of the [± narrativity] instruction based on the features identified for procedural information by Wilson and Sperber (1993).
linguistic decisions. Among the 113 items of disagreement, 19 items were signaled as having insufficient context for a pragmatic decision. They were deleted from the corpus.

Table 9-3: Confusion matrix of SP items (annotator 1 vs. annotator 2)

<table>
<thead>
<tr>
<th></th>
<th>Annotator 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Narrative</td>
<td>Non-narrative</td>
</tr>
<tr>
<td>Annotator 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narrative</td>
<td>180</td>
<td>83</td>
</tr>
<tr>
<td>Non-narrative</td>
<td>50</td>
<td>145</td>
</tr>
<tr>
<td>Total</td>
<td>230</td>
<td>228</td>
</tr>
</tbody>
</table>

Error analysis showed that the main source of errors was the length of the temporal interval between two eventualities, which was perceived differently by the two annotators. This lead to ambiguity between temporal sequence or simultaneity, each of them corresponding to narrative, respectively, non-narrative usage, as in example (55) where the eventualities “qualify” and “enable” were perceived as being simultaneous by one annotator and successive by the other.

(55)Elinor, this eldest daughter, whose advice was so effectual, possessed a strength of understanding, and coolness of judgment, which qualified her, though only nineteen, to be the counselor of her mother, and enabled her frequently to counteract, to the advantage of them all, that eagerness of mind in Mrs. Dashwood which must generally have led to imprudence. (Literature Corpus: J. Austen, Sense and Sensibility)

A possible explanation is the fact that personal world knowledge is used to infer temporal information, such as the length of the temporal interval between two eventualities, i.e. information that allows the annotator to decide whether the eventualities are temporally ordered or not. Cases where the length of the temporal interval between two eventualities was very reduced were ambiguous for the annotators, so each of them decided differently whether it was long enough for temporal sequencing or too short, so that the simultaneity meaning was preferred.

Disagreements (114 items) were resolved in a second round of the annotation experiment, where the narrativity feature was identified with a new linguistic test that was explained to two new annotators. Annotators were asked to insert a connective such as and and and then when possible, in order to make explicit the ‘meaning’ of the excerpt, namely the temporal relation existent between the two eventualities considered. The connective because (for a causal relation) has also

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12 The new annotators were one of the authors and a research peer, who was not aware of the purpose of the research.
been proposed by annotators under the [+ narrative] label showing that causal relations should also be considered. We will not look more into causality in this paper. The inter-annotator agreement in this second experiment was $kappa=0.91$, signaling very strong and reliable agreement. In Grisot and Moeschler (forthcoming) we argue that the low kappa value of the first round shows the difficulty hearers/readers have in the interpretation process to conceptualize the language rules they have and make decisions about their functioning. The high kappa value from the second round emphasizes the procedural nature of the feature taking into account that one of the characteristics is the possibility to render explicit the instructions encoded with the help of discourse markers.

The cross-linguistic application of these findings consists of the observation of a pattern in the parallel corpus. We investigated the data containing agreements from both annotation rounds (435 items) and analyzed them against the reference baseline, defined based on the parallel corpus. As noted in section 5.1, our hypotheses were non-narrative SP is translated more often with an IMP and narrative SP is translated more often with a PC/PS. The results are provided in Table 9-9-1. We observed that the narrative usages of the SP correspond to narrative usages in the FR part of the corpus (translation by a PC or PS) and the non-narrative usages of the SP correspond to the non-narrative usages in the FR text (translation with an IMP) in 338 items (78%). This leaves 22% where annotators agreed on the narrativity label but where it is not consistent with the tense used in FR. Future work will focus on investigating the other factors that explain the 22% of the variation in the translation of the SP into FR. In further research, we will consider three other languages for this parallel corpus, namely Italian, Romanian and Serbian. We would like to test the role of aspect (lexicalized in Serbian) but not in Romanian and Italian (Romance languages). Our idea is that lexicalized aspect in Serbian could be transferred to EN SP based on parallel corpora and both features (narrativity and aspect) could be analyzed with a statistical regression analysis.

Table 9-1: Confusion matrix for SP items annotators vs. reference baseline

<table>
<thead>
<tr>
<th></th>
<th>Reference baseline</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Narrative</td>
<td>Non-narrative</td>
</tr>
<tr>
<td>Annotators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narrative</td>
<td>208</td>
<td>49</td>
</tr>
<tr>
<td>Non-narrative</td>
<td>48</td>
<td>130</td>
</tr>
<tr>
<td>Total</td>
<td>256</td>
<td>179</td>
</tr>
</tbody>
</table>

The general conclusion of these annotation experiments with the $\pm$ narrativity feature is that they confirmed our initial hypotheses, concerning the language-independence nature of this feature (it has been correctly identified for both considered languages) and the fact that tenses have, in our corpus, a primary usage
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(narrative for the FR PS and non-narrative for the FR IMP) and a secondary usage, identified under certain conditions in context. The PC, on the contrary, cannot be described in terms of narrative or non-narrative usages. We assume that the PC should be described, as has been noted by many scholars, in terms of *anteriority* \((R<S, R=E, E<S)\) and *accomplishment* \((R=S, E<R, E<S)\). The use of this kind of description as a disambiguation criterion should be tested empirically in future annotation experiments.

The present section provided the results of the annotation experiments with \([±\text{ narrativity}]\) disambiguation criterion. It was hypothesized that \([±\text{ narrativity}]\) represents procedural information necessary for temporal calculus at the discursive level. We assumed that this procedural content of verb tenses could be used as a disambiguation criterion for translating the SP into FR. The narrative usage of the SP is translated with PC or PS (themselves having a narrative usage), while an IMP is used to translate the non-narrative usage of the SP. The results of our experiments showed that the narrativity feature was identifiable both for FR and EN. Hence, it is conceivable to hypothesize a cross-linguistic character of this procedural feature of verb tenses, but further research is required to establish this.

The predictive model presented in this paper was applied in order to improve the results regarding verb tenses of a statistical machine translation system. Current machine translation systems have difficulties in choosing the correct verb tense translations, in some language pairs, because these depend on a larger context than systems consider. A machine translation system generally misses information from previously translated sentences, which is detrimental to lexical cohesion and coherence of the translated text.

A first run of an SMT system, which uses the classifier trained on the annotated data with the \([±\text{ narrativity}]\) feature, had slightly better results than without this pragmatic feature. When trained and tested on automatically annotated data, the \([±\text{ narrativity}]\) feature improves translation by about 0.2 BLEU points\(^{13}\). More importantly, manual evaluation shows that verb tense translation and verb choice are improved by respectively 9.7% and 3.4% (absolute), leading to an overall improvement of verb translation of 17% (relative) (for more detailed results see Meyer et al. 2013).

**6. Discussion and Conclusion**

This chapter has given an account of the necessity of using pragmatic principles for

\(^{13}\) BLEU (Bilingual Evaluation Understudy) is an evaluation measure for machine-translated texts. It calculates the degree of resemblance to a human-translated text and it is a number between 0 and 1, where values closer to 1 represent more similar texts.
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improving machine translation systems output. Our main research question was which features should be included in a model that explains and predicts the cross-linguistic variation of the translation of tenses into a SL. To be more specific, we aimed at describing and analyzing usages of verb tenses within the general framework of Relevance Theory, arguing that they encode both procedural and conceptual contents.

Prior studies (Nicolle 1998; Saussure 2003, 2011; Amenós Pons 2011) have noted that tense encodes procedural content about temporal location of eventualities with the help of temporal coordinates. We have argued that temporal coordinates represent conceptual information (pro-concepts semantically incomplete and contextually saturated) because they contribute to the propositional content of an utterance. This conceptual information corresponds to the description in cognitive terms given by Wilson and Sperber (1993) to conceptual representations. In Grisot and Moeschler (2014) we provide evidence for the conceptual nature of temporal coordinates from experimental work and propose a quantitative measure that is the Kappa coefficient measuring inter-annotator agreement.

We have also argued that the procedural information encoded by a verb tense (shown by verb systems in Romance languages) consists of two features [± narrative] and [± subjective]. We have argued that these procedures receive a contextual value that can be positive and negative. They represent constraints on the construction of explicatures modifying the way in which the conceptual representations have to be related one another.

In this investigation, we used a multifaceted methods and methodologies. Firstly, our investigation is a corpus-based work with parallel or translation corpora. Verb tenses have been analyzed according to a contrastive analysis methodology (James 1980; Krzeszowski 1990). This analysis showed that the necessity a common and cross-linguistic valid framework for investigating verb tenses. We defined this framework in terms of their conceptual and procedural contents. We proposed a novel methodology: cross-linguistic transfer of semantic and pragmatic features based on parallel corpora. Parallel corpora have the advantage to control for variables such as genre and context and we can assume that human translators aim at proving in TL the same meaning from SL.

We have shown that contextual values assigned to conceptual and procedural contents of the SP can be used as disambiguation criteria and we have tested them through annotation experiments. Evaluation of the annotated data against a reference baseline showed two interesting findings: (a) the conceptual content of the SP, i.e. E<S where the contextual value of R can balance the reference either to past, present or future time, is shared by the verb tenses used most frequently for its translation into FR (specifically PS, PC and IMP) and (b) the procedural feature [± narrativity] explains 78% of the variation in FR. This result can have two
explanations: (a) the IMP used for translating a narrative SP is used in its secondary usage, the breaking IMP and (b) there is at least another factor that can explain this variation. Our idea is that aspect could play an important role, as general model predicts an interaction between aspect and tense for building temporal cohesion at the discursive level. In further research, we will consider three supplementary languages (Italian, Romanian and Serbian). Serbian encodes lexically aspect in opposition to Romance languages or English. We plan to transfer cross-linguistically aspect from Serbian to English SP based on translation corpora and analyze the interaction between [± narrative] feature and aspect in a statistical mixed model.\(^\text{14}\)

In conclusion, our investigation of the EN SP and its translation into FR showed that tense encodes both conceptual and procedural contents and that this information explains partially its cross-linguistic variation. Further corpus and experimental work is needed to provide an explanation for the totality of the variation.

References


Ahern, A. “Speaker attitude in relevance theory: An overview”. In *In the Mind and across Minds: A Relevance-theoretic Perspective on Communication and Translation*, edited by E. Wałaszewska, M. Kisielewska-Krysiuk and A.

\(^\text{14}\) See Grisot (forthcoming) for a detailed presentation of all annotation experiments, as well as the results of the statistical mixed model.


Carston, R. “Relevance theory and the saying/implicating distinction”. In


Grevisse, M. *Le bon usage: Grammaire française avec des remarques sur la
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Infantidou, E. “Procedural encoding of explicatures by the modern Greek particle
Luscher, J. M. and B. Sthioul. “Emplois et interprétations du Passé Composé:
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43
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Corpora references


*Presseurop*, bilingual articles collected and aligned by C. Grisot, 2011 from
Conceptual and Procedural Information for Verb Tense Disambiguation

http://www.presseurop.eu/fr (30-04-2011)