

Building a resource for studying translation shifts

Lea Cyrus

Arbeitsbereich Linguistik, University of Münster
Hüfferstraße 27, 48149 Münster, Germany
lea@uni-muenster.de

Abstract

This paper describes an interdisciplinary approach which brings together the fields of corpus linguistics and translation studies. It presents ongoing work on the creation of a corpus resource in which translation shifts are explicitly annotated. Translation shifts denote departures from formal correspondence between source and target text, i. e. deviations that have occurred during the translation process. A resource in which such shifts are annotated in a systematic way will make it possible to study those phenomena that need to be addressed if machine translation output is to resemble human translation. The resource described in this paper contains English source texts (parliamentary proceedings) and their German translations. The shift annotation is based on predicate-argument structures and proceeds in two steps: first, predicates and their arguments are annotated monolingually in a straightforward manner. Then, the corresponding English and German predicates and arguments are aligned with each other. Whenever a shift – mainly grammatical or semantic – has occurred, the alignment is tagged accordingly.

1. Introduction

Recent years have shown a growing interest in bi- or multi-lingual linguistic resources. In particular, parallel corpora (or translation corpora) have become increasingly popular as a resource for various machine translation applications. So far, the linguistic annotation of these resources has mostly been limited to sentence or word alignment, which can be done largely automatically. However, this type of alignment reveals only a small part of the relationship that actually exists between a source text and its translation. In fact, in most cases, straightforward correspondences are the exception rather than the rule, because translations deviate in many ways from their originals: they contain numerous *shifts*.

The notion of shift is an important concept in translation studies (see Section 2.). However, shifts have not yet been dealt with extensively and systematically in corpus linguistics. This paper presents an ongoing effort to build a resource (FuSe) in which shifts (in translations from English to German) are annotated explicitly on the basis of predicate-argument structures, thus making translation equivalence visible.

When finished, the resource will open up a possibility for linguists and translation theorists to investigate the correspondences and shifts empirically, but also for researchers in the field of machine translation, who can use this resource to detect the problems they still have to address if they want to make their output resemble human translation. The FuSe annotation project is described in more detail in Section 3., and Section 4. gives an overview of the way it relates to other work.

2. Translation Shifts

The investigation of shifts has a long-standing tradition in translation studies. Vinay and Darbelnet (1958), working in the field of comparative stylistics, developed a system of translation procedures. Some of them are more or less direct or literal, but some of them are *oblique* and result in various differences between the source and the target text. These procedures are called *transposition* (change

in word class), *modulation* (change in semantics), *equivalence* (completely different translation, e. g. proverbs), and *adaptation* (change of situation due to cultural differences). There is a slight prescriptive undertone in the work of Vinay and Darbelnet, because they state that oblique procedures should only be used if a more direct one would lead to a wrong or awkward translation. Nevertheless, their approach to translation shifts, even though *avant la lettre*, continues to be highly influential.

The actual term *shift* was introduced by Catford (1965), who distinguishes *formal correspondence*, which exists between source and target categories that occupy approximately the same place in their respective systems, and *translational equivalence*, which holds between two portions of texts that are actually translations of each other. A shift has occurred if there are “departures from formal correspondence” (p. 73) between source and target text, i. e. if translational equivalents are not formal correspondents. According to Catford, there are two major types of shifts: *level shifts* and *category shifts*. Level shifts are shifts between grammar and lexis, e. g. the translation of verbal aspect by means of an adverb or vice versa. Category shifts are further subdivided into structure shifts (e. g. a change in clause structure), class shifts (e. g. a change in word class), unit shifts (e. g. translating a phrase with a clause), and intra-system shifts (e. g. a change in number even though the languages have the same number system). One of the problems with Catford’s approach is that it relies heavily on the structuralist notion of system and thus presupposes that it is feasible – or indeed possible – to determine and compare the *valeurs* of any two given linguistic items. His account remains theoretic and, at least to my knowledge, has never been applied to any actual translations, not even by himself.

The comparative model by Leuven-Zwart (1989) has been devised as a practical method for studying syntactic, semantic, stylistic, and pragmatic shifts within sentences, clauses, and phrases of literary texts and their translations.¹ It consists of four steps. Firstly, the units to be com-

¹There is also a descriptive model, in which the results from

pared must be established. Van Leuven-Zwart calls them *transemes*, and they consist of predicates and their arguments or of predicateless adverbials. Secondly, the common denominator of the source and the target text transeme – van Leuven-Zwart calls this the *architranseme* – must be determined. In a third step, the relationship between each transeme and the architranseme – either synonymic or hyponymic – is established. Finally, the two transemes are compared with each other. If both are synonymic with the architranseme, no shift has occurred. Otherwise, there are three major categories of shifts: *modulation* (if one transeme is a synonym and the other a hyponym), *modification* (if both transemes are hyponymic with respect to the architranseme), and *mutation* (if there is no relationship between the transemes). There are a number of subcategories for each type of shift: the whole list comprises 37 items, which is why the model has sometimes been criticized for being too complex to be applied consistently.

3. The FuSe Annotation Project

3.1. The Data

The data annotated in FuSe are taken from the Europarl corpus (Koehn, 2002)², which contains proceedings of the European parliament. In a resource designed for studying translation shifts, it is not enough that the data be parallel. It is of vital importance that they are actually translations of each other.³ Since many translation shifts are directional (e.g. *passivisation*), the direction of the translation must also be clear (in this case from English into German). We used the language attribute provided by the corpus to extract those sentences that were originally English. In the corpus, the language attribute is only used if the language of the corpus file does not correspond with the original language. Thus, we extracted those sentences from the English subcorpus that had no language attribute and were aligned to sentences with the language attribute “EN” in the German subcorpus. Furthermore, in order to ensure that the English source sentences were produced by native speakers, we matched the value of the name attribute against the list of British and Irish Members of Parliament, which is available on the Europarl website.⁴

3.2. Predicates and Arguments as Transemes

The first step in annotating translation shifts is determining the transemes, i. e. those translation units on which the comparison between source and target text will be based. It was mentioned in Section 2. that the transemes originally used by Leuven-Zwart (1989) consist of predicates *and* their arguments (and adverbials). The disadvantage with this division is that the transemes are quite complex (whole clauses), which means that there could occur several shifts

the comparative model are used to gain insight into shifts on the story level and into the norms governing the translation process (Leuven-Zwart, 1990). This model is not further discussed, because it is not related to the approach presented in this paper.

²We use the XCES version by Tiedemann and Nygaard (2004).

³The Europarl corpus is available in eleven languages, so large parts of the English and German subcorpora will be translated from a third language.

⁴<http://www.europarl.eu.int/>

within one transeme. While this seems to have been unproblematic for van Leuven-Zwart, who worked with pen and paper, the units must be smaller in a computational annotation project in order for the shifts to be assigned unambiguously.

The approach presented in this paper is also based on predicate-argument structures, because it is assumed that these capture the major share of the meaning of a sentence and are most likely to be represented in both source and target sentence. However, unlike in van Leuven-Zwart’s approach, each predicate (lexical verbs, certain nouns and certain adjectives) and each argument represents a transeme in itself, i. e. there are predicate transemes and argument transemes. Of course, even this more fine-grained annotation entails that correspondences and shifts on other levels will be missed, but in order to ensure workability and reproducibility of the annotation, this restriction seems justifiable.

The predicate-argument structures are annotated monolingually, and since the annotation is mostly a means to an end, it is kept deliberately simple: predicates are represented by the capitalised citation form of the lexical item (e.g. DRAMATISE). They are assigned a class based on their syntactic form (*v, n, a, c, l* for ‘verbal’, ‘nominal’, ‘adjectival’, ‘copula’, and ‘light verb construction’ respectively). Homonymous predicates are disambiguated for word senses, and related predicates (e.g. a verb and its nominalisation) are assigned to a common predicate group. In order to facilitate the annotation process, the arguments are given short intuitive role names (e.g. ENT_DRAMATISED, i. e. the entity being dramatised). These role names have to be used consistently only within a predicate group. If, for example, an argument of the predicate DRAMATISE has been assigned the role ENT_DRAMATISED and the annotator encounters a comparable role as an argument to the predicate DRAMATISATION, the same role name for this argument has to be used. Other than that, no attempt at generalisation along the lines of semantic cases is made.

If a predicate is realised in a way that might influence the realisation of its argument structure in a systematic way (e.g. infinitive, passive), it receives a tag to indicate this. If one of the arguments is a relative pronoun, its antecedent is also annotated. This is done in order to avoid the annotation of a *pronominalisation* shift (see Section 3.3.1.) in these cases, since the antecedent of relative pronouns is so close that it would be wrong to call this a pronominalisation. Apart from this, there is no anaphor resolution.

3.3. Shift Annotation

After the predicate-argument structures have been annotated monolingually, the source predicates and arguments are aligned to their target counterparts. Sometimes, this is possible in a straightforward manner, like in sentence pair (1).⁵

⁵Predicate transemes are in bold face, argument transemes are in square brackets. For the sake of clarity, the predicate and argument names are omitted.

- (1) a. [I] **refer** [to item 11 on the order of business].⁶
- b. [Ich] **beziehe mich** [auf Punkt 11 des I refer me on point 11 of the Arbeitsplans].
workplan.

However, more often than not the relationship will not be this simple. Whenever a shift occurs, the alignment between the two predicates or arguments is tagged. Mainly, the shifts are categorised according to whether they occur on the level of grammar or on the level of semantics. The following is an introduction to the main types of shifts. They are first described in Sections 3.3.1. to 3.3.3., and to make this more concrete, a few examples are given in Section 3.3.4.

3.3.1. Grammatical Shifts

Category Change This tag is assigned whenever the corresponding transemes belong to different syntactic categories, and it can be applied both to predicates and arguments. A typical example would be a verbal predicate transeme that is translated as a nominal predicate (nominalisation).

Passivisation This tag can only be assigned to the alignment between verbal predicates (and certain light verb constructions) and is used if an active predicate has been rendered as a passive predicate. Often, but not always, a passivisation shift goes hand in hand with a *deletion* shift (see below), namely if the source subject is no longer explicitly expressed in the passivised translation.

Depassivisation Conversely, if a passive verbal predicate has been rendered as an active verbal predicate, this is tagged *depassivisation*. If the source predicate-argument structure lacks the agentive argument, there will also be an *addition* shift (see below).

Pronominalisation This tag can only be assigned to the alignment between arguments. It is used if the source argument is realised by lexical material (or a proper name) but translated as a pronoun. This tag is not used if the pronoun in question is a relative pronoun, because the antecedent can always be found in close vicinity and is annotated as part of the transeme (see Section 3.2.).

Depronominalisation This tag can only be assigned to the alignment between arguments. It is used if a source argument transeme is realised as a pronoun but translated with lexical material or a proper name.

Number Change This tag is assigned if the corresponding transemes differ in number, i. e. one is singular, the other plural. This happens mainly between argument transemes, but can also occur between nominal predicates.

3.3.2. Semantic Shifts

Semantic Modification This tag is assigned if the two transemes are not straightforward equivalents of each other because of some type of semantic divergence, for example a difference in aktionsart between two verbal predicates.

It is rather difficult to find objective criteria for this shift. In the majority of cases two corresponding transemes exhibit some kind of divergence if taken out of their context, but are more or less inconspicuous translations in the concrete sentence pair. Since an inflationary use of this tag would decrease its expressiveness, semantic likeness is interpreted somewhat liberally and the tag is assigned only if the semantic difference is significant. Of course, this is far from being a proper operationalisation, and we hope to clarify the concept as we go along.

Explicitation This is a subcategory of *semantic modification*, which is assigned if the target transeme is lexically more specific than the source transeme. A clear case of explicitation is when extra information has been added to the transeme. One could also speak of explicitation when a transeme has been depronominised (see Section 3.3.1.). However, since the *depronominisation* shift is already used in these cases, this would be redundant and is therefore not annotated.

Generalisation This is the counterpart to the *explicitation* shift and is used when the target transeme is lexically less specific than its source, and in particular if some information has been left out in the translation. To avoid redundancy, it is not used for *pronominalisation* shifts.

Addition This tag is assigned to a target transeme, either predicate or argument, that has been added in the translation process. For instance, if there has been a *depassivisation* shift and if the agentive argument had not been realised in the source text, it must be added in the target text. Note that we do not speak of addition if only *part* of the transeme has been added. In this case, the *explicitation* tag is to be assigned (see above).

Deletion This tag is assigned to a source transeme that is untranslated in the target version of the text. Analogous to the *addition* shift, this tag is only used if the entire transeme has been deleted. If it is only part of a transeme that is untranslated, the shift is classified as *generalisation*.

Mutation This tag is used if it is possible to tell that two transemes are translation equivalents (in the sense intended by Catford, see Section 2.), but if they differ radically in their lexical meaning. This shift often involves a number of other shifts as well.

3.3.3. Problematic Issues

Long Transemes Normally, a maximum of two shifts can be assigned to any one pair of transemes: a grammatical and a semantic shift. This can be a problem if the transemes are long, like for instance clausal arguments. Because of their length, they can contain multiple shifts, and it is difficult to determine which of them is to be the basis for the shift annotation, in particular if they are contradictory (e. g. there might occur both *generalisation* and *explicitation* in different parts of the transeme). The general rule here is to check whether the shift actually affects the overall transeme. In most cases, long transemes contain further transemes, e. g. clausal arguments contain at least one extra predicate plus arguments, which will be represented by their own predicate-argument structure, and it is on this level that these shifts are recorded.

⁶Opus/Europarl (en): file ep-00-01-18.xml, sentence id 4.2

Lexical Modals Modal auxiliaries are currently not annotated as separate predicates. This is no problem as long as the modality is expressed by means of a modal auxiliary in both languages. However, sometimes modality is expressed by a full verb with modal meaning (e. g. *to wish*), which is consequently annotated as a predicate. If the other language uses a modal auxiliary, no alignment is possible, because there is no predicate transeme. Normally, when a predicate transeme has no correspondent in the other language, one would assign the *addition* or *deletion* shift, but since nothing really has been added or deleted, this is not a particularly satisfying solution. One way out would be to rethink our attitude towards modals and simply annotate them as predicates. While the decision is still pending, such predicates are tagged *dangling modal*.

Structure Shifts It also happens that a transeme cannot be aligned because it is not realised as part of a predicate-argument structure in the other language. An example of this would be a full verb with modal meaning that is rendered as an adverb in the other language (e. g. *to wish – gern*, ‘with pleasure’). Again, it would not be adequate to speak of addition or deletion. However, since these cases constitute real structural shifts, the additional tag *non-pas* (i. e. ‘non-predicate-argument-structure’) has been introduced to deal with them.

3.3.4. Examples

In this section, the shift annotation described in the previous sections is illustrated by a few examples from the corpus.

- (2) a. [It] should not be **dramatised** [into something more than that].⁷
 b. [Wir] sollten [die ganze Sache] nicht weiter We should the whole thing not further **aufbauschen**. exaggerate.

Both sentences contain one predicate transeme (DRAMATISE and AUFBAUSCHEN) and two argument transemes. The two predicates differ with respect to voice: while the source predicate in (2-a) is passive, its German counterpart (2-b) is active, so the alignment between these two predicates would receive the *depassivisation* tag. As a consequence of the change of voice, the agentive argument, which is left unexpressed in the passive source sentence, is explicitly expressed in the German translation (*Wir*, ‘we’), and is consequently tagged *addition*. Conversely, the argument *into more than that* is left unexpressed in the German version – this is an instance of *deletion*. Furthermore, the subject of the English sentence (*it*), the entity that is being dramatised, is expressed lexically in the translation. The alignment between these two arguments is thus tagged as *depronominalisation*.

- (3) a. [...] [we] agreed yesterday to **have** [the Bourlanges report] [on today’s agenda].⁸
 b. [Wir] kamen gestern überein, [den Bericht We came yesterday agreed, the report

Bourlanges] [auf die Tagesordnung von Bourlanges on the agenda of heute] zu **setzen**. today to put.

In this sentence pair, the alignment between the two predicate transemes HAVE and SETZEN is tagged *semantic modification* because they differ in aktionsart: the English predicate is static, while the German predicate is telic.

- (4) a. [I] do not want to **drag up** [the issue of this building] endlessly [...] ⁹
 b. [Ich] will nicht endlos [auf diesem I want not endlessly on this Thema] **herumreiten** [...] topic keep.on.about [...]

Example (4) illustrates the use of the *generalisation* shift. The second argument transeme in the original (4-a) contains explicit information on what the issue is about. This information is left out in the translation (4-b), with the result that the transeme is more general. Since it is only a part of the transeme that has been dropped in the translation, this is not annotated as deletion.

3.4. Tools

The (monolingual) predicate-argument structures are annotated with FuSer (Pyka and Schwall, 2006). The annotator is presented with a sentence and, if available,¹⁰ a graphical view of its syntactic structure, and selects those tokens (or nodes from the tree) which are to be annotated as a predicate. The annotator can choose from a list of predicates, or, if the predicate type is encountered for the first time, add a new predicate type or group to the database. Once the predicate is annotated, the procedure is repeated for the arguments of this predicate. Again, either the argument types are chosen from the list or added to the database. Additionally, the necessary tags (see Section 3.2.) are added to the predicates and arguments. The annotation process is then repeated for all the predicate-argument structures in a sentence. They are annotated independently, i.e. there is no nesting of predicates.

Currently, the predicate-argument structures are annotated manually, which is a time-consuming task. However, there are a couple of “wizards” under development which will assist the annotator. For instance, there will be a wizard to scan the sentence for predicate candidates or to suggest suitable argument types when the predicate is already included in the database.

Technically, FuSer is a platform-independent Java application which operates on an extended ANNOTATE MySQL database. This data model makes it possible to be flexible with respect to the input data, which can be either raw (as

⁹Opus/Europarl (en): file ep-00-01-18.xml, sentence id 13.3 (abbreviated for convenience)

¹⁰The original outline of FuSe also included phrase structure (Cyrus et al., 2004; Cyrus and Feddes, 2004), but this was shelved for practical reasons. However, syntactic annotation is something from which FuSe would definitely profit, and the tools can be used both on raw data and on trees.

⁷Opus/Europarl (en): file ep-00-01-18.xml, sentence id 8.4

⁸Opus/Europarl (en): file ep-00-01-18.xml, sentence id 11.1 (abbreviated for convenience).

is currently the case) or syntactically annotated. Furthermore, since the ANNOTATE database is only extended and not modified, data processed with FuSer can always be processed by ANNOTATE afterwards (e. g. for further annotation).

It is planned to extend FuSer for the bilingual alignment and the shift annotation. While this extension is under development, we use a simple Web-based alignment tool (XML, Perl, CGI) for this task (see Figure 1). The browser window is divided into three parts: in the upper third, the annotator can select a sentence pair. In the middle part, all the predicate-argument structures that have been annotated for these sentences are listed, with the predicates and arguments being highlighted in different colours. The annotator chooses (by means of radio buttons) two corresponding predicate-argument structures, which are then displayed in more detail in the lower window. Here, the annotator can align corresponding predicates and arguments with each other and, if necessary, choose up to two shift-tags for each pair of transems from a drop-down menu. The lower window can also be used for viewing existing annotation.

4. Related Work

Being interdisciplinary, this work is related both to approaches from translation studies and to various annotation projects. Since the translational approaches have already been presented in Section 2., this section will confine itself to related annotation projects and the way they compare with FuSe.

First of all, there are those projects that also deal with predicate-argument structures in some way, in particular FrameNet (Ruppenhofer et al., 2005) (which is mainly a lexicographical project but can, of course, be adopted for extensive corpus annotation, as is currently done in the SALSA project (Erk et al., 2003)), PropBank (Palmer et al., 2005), and NomBank (Meyers et al., 2004). In these projects, the predicate-argument annotation is the main objective, so they all try some kind of generalisation by organising their predicates in semantic frames (FrameNet) or by following the Levin classes (PropBank, and for nominalisations also NomBank). In FuSe, however, this type of annotation is not an end in itself – predicates and their arguments simply constitute the transems. Consequently, their annotation is kept deliberately simple and is entirely predicate-group specific without any attempt at generalisation.

What distinguishes FuSe from all of the above mentioned projects is that it deals not with one language, but with two (and potentially more) languages, and in particular with parallel data. It thus makes sense to also compare it with approaches that model the relationship between original texts and their translations.

In the IAMTC project (Farwell et al., 2004), texts from six languages (Arabic, French, Hindi, Japanese, Korean, and Spanish) and their translations into English are annotated for interlingual content. For each original text, at least two English translations are being annotated (so as to be able to study paraphrases), and the annotation proceeds incrementally over three increasingly abstract levels of representation.

The difference here, apart from the languages involved, lies

first and foremost in the type of the semantic representation. The semantic representation aimed at in IAMTC will be a full-fledged interlingua and thus far more complex than the predicate-argument structure in FuSe. The ultimate aim is to create a full semantic representation of each sentence that is not only independent of the actual syntactic realisation, but also of the language. Thus, provided there aren't any shifts, the IAMTC representations of the source and target language material could be identical.

In FuSe, however, considerable parts of the sentence meaning are not captured by the predicate-argument annotation. Furthermore, the annotation is entirely language-specific. There is nothing in the database that indicates that a predicate BUY and a predicate KAUFEN can be used to express the same meaning in their respective languages, except for the fact that they are being aligned with each other. The predicate-argument structure is the basis of the alignment, but it is not an interlingua.

Furthermore, in IAMTC, there seems to be no direct alignment between the different versions of the texts. Differences in semantics result in differences in the interlingual representation, but particularly shifts on the level of grammar, e. g. passivisation, are normalised even on the most basic level (cf. p. 58).

As part of the Nordic Treebank Network,¹¹ Volk et al. (2006) have begun to build an English-Swedish-German treebank in which the relationship between the languages is annotated by alignment on a sub-sentential level, i. e. between words, phrases, and clauses. In this respect, there is a close resemblance with FuSe. One of the differences is that their emphasis lies on the syntactic annotation of the sentences, which is not the case in FuSe.

Second, the phrase alignment is done directly, i. e. without the predicate-argument “detour”: nodes that “convey the same meaning and could serve as translation units” are aligned, and there are two types of alignment, namely *exact* and *approximate*.

5. Outlook

So far, the annotated data consist of English source texts that have been translated into German. It would be interesting to include the opposite direction as well, i. e. German source texts that have been translated into English. This would make it possible – by comparing the types of shifts and their quantity – to find out which shifts have occurred due to the direction of the translation process, and which shifts might be due to the translation process as such (e. g. *explicitation* is taken to be such a potential “translation universal” in current translation research, see Mauranen and Kujamäki (2004)).

Furthermore, the genre of the Europarl corpus – parliamentary proceedings – is highly restricted and it would be a useful extension to include other types of data (e. g. technical language, literary prose) in order to compare the occurrence of shifts across genres.

¹¹<http://w3.msi.vxu.se/~nivre/research/nt.html>

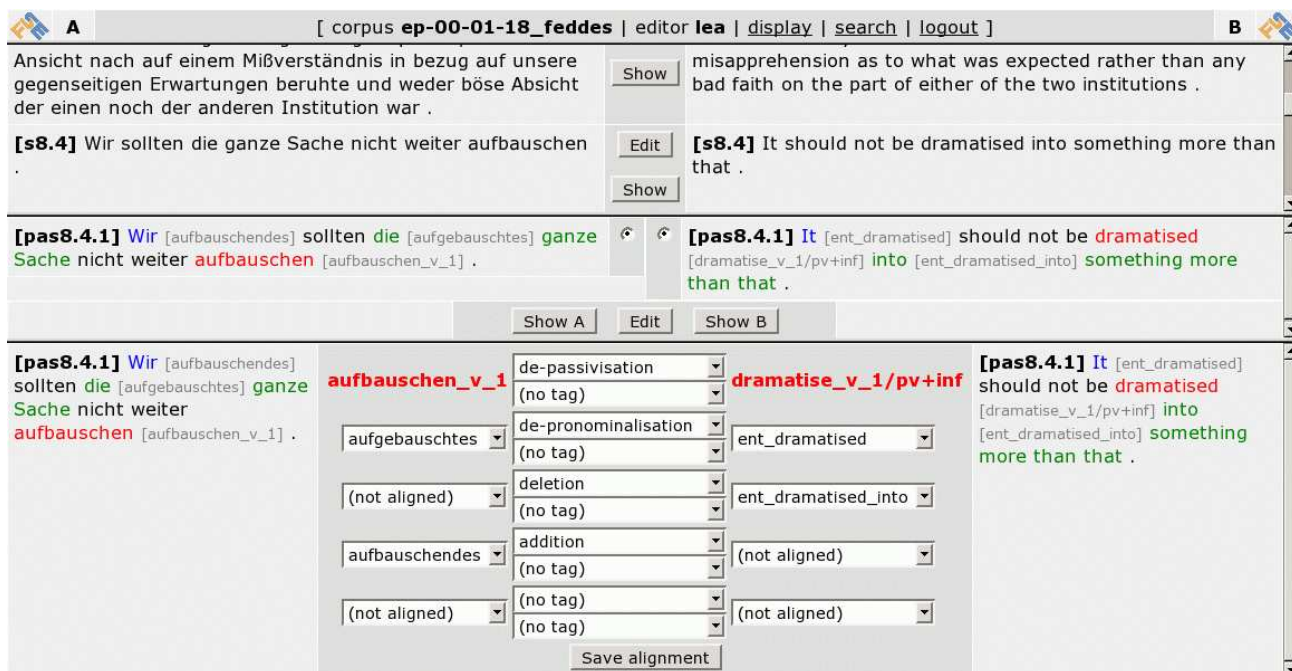


Figure 1: Screenshot of the Web-based alignment tool, showing the annotation of Example (2)

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