Perfekt vs. Präteritum

The comparison of the use of the Perfekt and Präteritum by native German speakers in two translations of l'Étranger and the translation of verb tenses by Google Translate.

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Abstract

The novel *l'Étranger* by Albert Camus has two German translations; one with the Perfekt as main verb tense and one with the Präteritum as main verb tense. Both translations are correct, but different. This thesis compares the use of the Perfekt and Präteritum by native German speakers in two translations of the French novel *l'Étranger*. Additionally, the original French sentences are also translated by a machine translator to see which verb tense is translated. An experiment is proposed and conducted as a pilot study to see which verb tense is preferred by native German speakers in the translation of *l'Étranger*. A short case study of Google translate with 10 French sentences is done to see which verb tense is chosen by a machine translator. The results indicate that the Präteritum is the preferred verb tense for the native German speakers in the two translations and it is also the verb tense translated the majority of the time by Google Translate. The conduction of the proposed experiment is needed for a clearer view on the preferred verb tense in the translation of *l'Étranger*. Further experiments with Google translate can give more insight in the choices of the algorithm based on the input of the German users.

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1. Introduction

This thesis is part of the project Time in Translation¹. Time in Translation is a project on the semantics of the Perfect. When the verb tense Perfect is mentioned without belonging to a specific language, the Perfect is displayed in light uppercase letters. The aim of the Time in Translation project is to highlight the systematics behind the variations of the Perfect to get a better view of the semantics of the Perfect. The project has established several corpora for the Perfect in multiple languages. The project collects data to examine the use of the Perfect within a language, but between languages as well. The idea of Time in Translation is that computational linguistics combined with the more theoretical linguistics can form a more complete image of the Perfect. This thesis will examine the use of the German Perfect, the Perfekt. Two German translations of the French novel *l'Étranger* by Albert Camus are compared and used in an experiment to examine the choice between the Perfekt and Präteritum of native German speakers. The choice of a machine translator will be examined as well.

The Perfect is an interesting verb tense to examine. According to Ritz (2011), the Perfect allows speakers to talk about events that started in the past and are extended or relevant in the present. The Perfect indicates the phase when an event happened, and the consequences of this event are still relevant to the present.

(1) Jim has lived in New York all his life.

The fact that Jim lives in New York started in the past and is relevant in the present. The example of (1) indicates that the event of Jim living in New York started in the past when he was born and is relevant for the present, as Jim still lives in New York.

The Perfect 'has been characterized as a synchronically and diachronically unstable category' (de Swart, 2016, p. 57). The usage of the Present Perfect in English differs with the usage in languages such as Dutch (Voltooid Verleden Tijd), French (Passé Compose) and German (Perfekt) (De Swart, 2007). These differences become visual when translations are created. The meaning of a translated sentence can remain the same, while the structure is changed to satisfy the grammatical rules of the target language.

For example: the sentence 'I saw him at the coffee bar' is a sentence someone who speaks English might use when he has met someone at the coffee bar. The tense of the verb is the Simple Past. However, this sentence can be correctly translated in two ways in German.

(2) a. Ich **sah** ihm bei dem Kaffee hause. (Präteritum) b. Ich **habe** ihm bei dem Kaffeehause **gesehen.** (Perfekt)

Sentence (2)a uses the Präteritum tense for its main verb, which seems similar to the English sentence. (2)b uses the Perfekt tense for its main verb. Both translations are correct and can replace each other in certain situations. This cannot be said about the sentence 'I have seen him at the coffee bar'. The Present Perfect cannot replace the Simple Past, as the English Perfect has more restrictions than the Perfekt.

Although the two German sentences are grammatically correct, how does one know when to use which sentence? The Perfekt is used more often in non-formal conversations and texts, while the

¹ Time in Translation project https://time-in-translation.hum.uu.nl/

Präteritum is often perceived as more formal². However, the example above demonstrates that here is no hard line when one's allowed to use a specific verb tense (Rothstein, 2006).

The choice for the use of the Perfekt or the Präteritum comes forward in the two translations of the French novel *l'Étranger* by Albert Camus. There are two German translations of the novel. Both differ in the use of the verb tenses. The comparison of the two translations can give insight in the use of the Perfekt and the Präteritum by native German speakers.

Considering the difficulty of the use of these two verb tenses, what would a machine translator do? The English sentence above is translated as 'Ich habe ihn an der Kaffeebar gesehen' by Google Translate. Nowadays, a lot of machine translators are available for users on the internet. Machine translation is the translation of a language into the target language with the use of software³. Machine translators are expected to make an accurate translation, preserving the meaning of the input. The one that is commonly known by internet users is Google Translate. When there are two varying translations of one text, which one is chosen by a machine translator such as Google Translate? It is relevant that the machine translators produce the output which would also be produced by native speakers.

Machine translation belongs to the field of computational linguistics, which is a sub-field of Artificial Intelligence. To let machine translators work as accurately as possible, they have to be fed with accurate information about a language. This does not only contain a vocabulary but also the grammatical rules. The results of the choices between the use of the Perfekt and the Präteritum can contribute to a more accurate translation by a machine translator.

The relevance to AI is found in natural language processing as well. The machine translator has to extract the information necessary from the input natural language to produce the target language, which is also a natural language. The software has to process and analyse the natural language. As the grammatical rules of languages differ, it is not enough to build a machine translator that is able to translate words only. The machine translator has to use the grammar of the target language.

Through combining the previous question of when to use which German sentence and the modern use of machine translators, the research question is formed. What are the differences in the use of the Perfekt and the Präteritum by native German speakers in the two German translations of *l'Étranger* and to which verb tense is the Passé Composé translated by a machine translator?

The research question is split up to investigate the two parts independently. First, more literature will be studied on the use of the Perfekt and the Präteritum and the novel *l'Étranger* by Albert Camus. To examine the differences in usage by native German speakers, the two translations of the French novel *l'Étranger* are compared. The two translations differ in the presence of the Perfekt and the Präteritum. The verb tenses in the two translations will be compared with each other and with the verb tenses in Dutch and French. After that an experiment about the use of the Perfekt and the Präteritum by native German speakers is proposed. It will be performed as a pilot study due to limited time for this thesis. The results of the experiment will be discussed. The second part of the research will focus on the machine translation aspect. More literature will be studied to examine the

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² Center for Open Educational Resources and Language Learning. (n.d.). *Grimm Grammar: simple past regular verbs: Das Imperfekt - Regelmäßige Verben*. Retrieved October 5, 2019, from https://coerll.utexas.edu/gg/gr/vsp_01.html
³ Machine Translation. (n.d.). Retrieved October 5, 2019, from https://www.microsoft.com/en-us/translator/business/machine-translation.

algorithms behind machine translation. After the literature research, this thesis examines the translations of a machine translator of *l'Étranger* to German with focus on the Perfekt and the Präteritum. The results will be compared with the results of the pilot study.

This paper is structured as follows: the introduction is followed by the chapter about the two translations and the novel. The background information is necessary to understand the subjects discussed and the choices made. The background information will cover the use of the Perfekt and the Präteritum and the novel. This chapter is followed by the preparation of the two translations, which is necessary for the comparison. The results will be displayed in the following section. The next chapter is the proposed experiment and the pilot study. The results of the pilot study are discussed next. The second part of the thesis focusses on the machine translation. Google Translate is used as a case study. Background information about the algorithms of machine translation is given and followed by a short test of Google Translate with the sentences of *l'Étranger*. The results are shown in the following chapter. The discussion compares the answers of the pilot study with the results of the machine translation. After that a conclusion will be conducted.

2. The Perfekt and The Präteritum

2.1. Scientific Relevance

As mentioned in the introduction, this thesis examines the Perfekt and Präteritum in two German translations of the French novel *l'Étranger*. To understand the differences between the two translations, background information is needed about the verb tenses the Perfekt and the Präteritum and the differences between the Perfekt and the Passé Composé.

2.1.1. The Perfekt vs. The Präteritum

This thesis examines the differences between the Perfekt and the Präteritum in the two translations. To understand the differences between the verb tenses, the normal usage of the verb tenses is explained in this chapter.

Form

The Perfekt is formed by an auxiliary verb (Hilfsverb) and a past participle ($Partizip\ II$)⁴. The auxiliary verb is a conjugation of haben or sein. The conjugation of the past participle depends on the verb that is used.

(3) a.	Ich habe gearbeitet	(German)
b.	I have worked	(English)

The Präteritum can be formed in multiple ways, as there are weak and strong verbs⁵⁶. For weak verbs, the Präteritum is constructed by placing *-te, -test, -te, -ten, -tet, -ten* behind the verb stem. For strong verbs the verb stem changes. The endings are often the same, although there are exceptions.

Weak verb:

(4) a.	Ich arbeitete	(German)
b.	l worked	(English)

Strong verb:

(5) a.	ich sah	(German)
b.	l saw	(English)

Usage

There are situations where the speaker or writer has to use the Perfekt (Klein, 2000). In the first place: when a current state is the result of something that happened in the past, the Perfekt must be used.

Example:

⁴ Thuleen, N.(n.d.). *Deutsch 101 Handout: The Perfekt Tense*. Retrieved October 1, 2019, from http://www.nthuleen.com/teach/grammar/perfektexpl.html

⁵ Präteritum. (2018). Retrieved October 1, 2019, from https://mein-deutschbuch.de/praeteritum.html

⁶ Thuleen, N. (n.d.). *Verbtabelle: Starke und schwache Verben im Perfekt und Präteritum*. Retrieved October 1, 2019, from http://www.nthuleen.com/teach/grammar/verbchart.html

- (6) a. Gestern habe ich das Flugzeug nach Berlin genommen. (German)b. Yesterday I took the plane to Berlin. (English)
- → Result: I am now in Berlin.

A second situation in which the Perfekt must be used is in a situation which refers to an action that will be completed in the future. The point in the future must be mentioned specifically, otherwise another verb tense must be used.

(7) a. Ich habe meinen Schreibtisch aufgeräumt in eine halbe Stunde
b. I will have my desk cleaned in half an hour
(English)

There are situations where the speaker or writer has to use the Präteritum. The Perfekt does not have a past-tense like meaning, like the Präteritum (Rothstein, 2006). Although there are many situations where the Präteritum can be substituted by the Perfekt, this is not always possible. The Perfekt cannot always be used as the Präteritum, which can be seen in example (8), (9) and (10). The two verb tenses are not synonyms (Rothstein, 2006).

The following example is made by Rothstein (2006, p.45):

- (8) a. Aber am Vormittag hatte sie dem Baum zu putzen. Morgen war Weinachten. (German)
 - b. But in the morning she had the tree to decorate. Tomorrow was Christmas. (English)

In the case of (8)a it is not possible to use the Perfekt in the second sentence:

c. *Aber am Vormittag hatte sie dem Baum zu putzen. Morgen ist Weinachten gewesen.

A second example given by Rothstein (2006, p.45) is the following:

(9) a. Fritz dachte, dass es 8 Uhr war .	(German)
b. Fritz thought that it was eight o'clock.	(English)
(10)a. Fritz dachte, dass es 8 Uhr gewesen ist.	(German)
b. Fritz thought that it had been eight o'clock.	(English)

The example in (9)a shows that Fritz thought that it was 8 o'clock right now or that it had already been 8 o'clock. The example in (10)a can only mean that Fritz thought that it had already been 8 o'clock. When a writer means that Fritz thought that it was 8 o'clock at that moment, he cannot use the Perfekt, only the Präteritum.

The use of the Präteritum in spoken German often sounds formal but can be the only correct form in written texts. Novels and academic writing often contain the Präteritum⁷. The writer uses the Präteritum to talk about the thoughts and intentions of the person (Rothstein, 2006).

Even though there are some rules about the use of the Perfekt and the Präteritum, Rothstein (2006, p. 43) mentions that 'native speakers of German are often not able to tell the difference between the PERFECT and the past tense'.

Example Perfekt vs. Präteritum:

(11)a. Ich habe ein Auto gekauft für meine Frau. (Perfekt)b. Ich kaufte ein Auto für meine Frau. (Präteritum)

⁷Center for Open Educational Resources and Language Learning. (n.d.). *Grimm Grammar : simple past regular verbs : Das Imperfekt - Regelmäßige Verben*. Retrieved October 5, 2019, from https://coerll.utexas.edu/gg/gr/vsp-01.html

c. I have bought a car for my wife.

(English)

Both (11)a and (11)b are grammatically correct.

Although the Perfekt and the Präteritum are used in standard German, there are dialects where the tenses are used otherwise. According to Rothstein (2006), native German speakers from the Southern of Germany show preferences for the Perfekt over the Präteritum. The Präteritum is barely used by these speakers. German dialects such as Swiss show loss of the Präteritum, making the Perfekt the only tense to refer to the past time. Some dialects have lost the use of the Präteritum completely. Some only contain a few verbs which do need the Präteritum to refer to the past time (Comrie, 1995). Even though the Präteritum is almost replaced by the Perfekt in the south, its usage is more widespread in the north of Germany⁸. This illustrates the difference in usage of verb tenses even in the same language.

2.1.2. The Passé Composé and the Perfekt

The Passé Composé is the French Perfect. Interestingly, the Perfekt and the Passé Composé pattern together (Schaden, 2009). In the first place, the German and French Perfect can occur with past time adverbials. This is a crucial difference with the English verb tense, as the Present Perfect cannot occur with past time adverbials (De Swart, 2007). The example below shows the differences between the German, French and English Perfect.

(12)a.	Nous sont arrivé à douze heures.	(French)
b.	Wir sind angekommen auf Zwei Uhr.	(German)
c.	*We have arrived at two o'clock.	(English)

Secondly, the Perfekt and the Passé Composé are allowed in narration. They can be used when a story is told (De Swart, 2007). The Present Perfect is not allowed in narration.

(13)a.	Quand Jean m' a vu , il m'a dit bonjour.	(French)
b.	Als Jean mich gesehen hat, hat er mir gegrüßt.	(German)
c.	* When Jean have seen me, he greeted me.	(English)

In (12)c and (13)c, the speakers have to use the Simple Past.

Where the French and German Perfect do not align is with stative verbs (van der Klis, Le Bruyn and de Swart, 2019). Stative verbs express the state of how someone feels. The German translator is obligated in these situations to choose the Präteritum as verb tense, as seen in (14)b.

(14)a.	J 'ai voulu voir maman tout de suite.	(French)
b.	Ich wollte sofort zu Mama.	(German)
c.	I wanted to see mother straight away.	(English)

⁸Center for Open Educational Resources and Language Learning. (n.d.). *Grimm Grammar: simple past regular verbs: Das Imperfekt - Regelmäßige Verben*. Retrieved October 5, 2019, from https://coerll.utexas.edu/gg/gr/vsp-01.html



Figure 1: Dahl, O., Velupillai, V. (2013). The Perfect. The areas on the map indicate areas where the Perfects have similar characteristics.

According to Figure 1, the Passé Compose and Perfekt in Southern Germany fall in the same categories. The interesting category is the green category where the 'area where a 'have' Perfect has developed into a past or a perfective' (Dahl & Velupillai, 2013). This indicates that the Perfect develops more into a tense to describe that an action was finished. Although the French language can use the Passé Composé for finished actions, it is not a Perfective Past tense yet (De Swart, 2007). A Perfective Past tense is used to indicate that an action is finished at some time in the past. A Perfect can indicate that an action has finished in the past, but also that an action started in the past and is continued in the present.

2.1.3. The Novel and the Two Translations

The novel *l'Étranger* is a French novel by Albert Camus, which is written in 1942. The book does not follow the traditional writing style of that time. Instead of using the Passé Simple as the main verb tense in narration, the Passé Composé is used continuously through the novel (van der Klis, Le Bruyn and de Swart, 2019). The first responses to the book in 1942 "are dramatic, funny and strange" (Kaplan, 2016, p.4).

Camus uses the Passé Composé to let the reader experience the events of the life of the main character Meursault, but in a distant way. Although the story is told in the first person, the reader

does not get into Meursault's head: he does not know what Meursault thinks or feels. This special distance is achieved by using the Passé Composé instead of the Passé Simple.

The Passé Composé can be used instead of the Passé Simple as the main verb in narration, because Camus uses "connectives, lexical semantics of verbs and adverbs and world knowledge about the 'natural' order of events" (de Swart, 2007, p. 17) to get the events arranged in time, or in a 'temporal order'. This is usually done with the Passé Simple.

Connectives are words that connect sentences to each other. Examples of connectives are: 'and', 'next', 'then'. The use of connectives can indicate when the events happened relative to each other (posteriority).

The use of verbs and adverbs helps with visualizing a timeline. Adverbs can tell when and how long the event took place (today, yesterday, all day, for a year etc.). However, Camus does not use past-time adverbials. He only uses time adverbials to indicate posteriority, such as aujourd'hui 'today' or un long moment 'quite some time'. By using aujourd'hui, he indicates that the previous day has finished and the next day has started. If Camus does not use adverbs to connect the events, he uses connectives, such as ensuite 'after' or a ce moment 'at that point'.

The time an event happens and the connection with the time of the utterance is clear in spoken language. For example, the word *before*.

(15) I have seen him before.

(English)

(15) can be a spoken utterance. The speaker means that he saw someone before the time the utterance was made. The connection of the event with the speech time is clear. However, when (15) is used as a written utterance, it is not clear what the connection of the word *before* is with the time line. Other information from the text is necessary for the understanding for the connection of the adverb with the time.

When the indication of time is not clear in written language, the reader has to form a storyline himself. This can only be clear when the events are read in the same order as they happened, like a diary (de Swart, 2007). This is illustrated in (16):

- (16)a. Et quand je me suis réveillé, j'étais contre un militaire qui m'a souri et qui m'a demandé si je venais de loin. (original French)
 - b. Und als ich aufgewacht bin, war ich an einem Soldaten gerutscht, der mich angelächelt hat und gefragt hat, ob ich von weit herkäme. (German translation2)
 - c. And when I woke up, I found myself cramped up against a soldier who smiled at me and asked me if I 'd come far. (English)

Considering the example, it is not possible to wake up after the soldier has asked the person if he came far. The story does not go back in time. As the order of the events in the sentence cannot be altered in this example, people automatically assume the connection of the event with the time of speech as being before the other events. In this example the common knowledge of events is used by Camus, as people do not tell stories in reverse order.

As a result, the translation of the novel to other languages can be challenging. With the writing style of *l'Étranger*, Camus explores the boundaries of Passé Composé. The Perfect in other languages is not always allowed to be used in the same situations as the Passé Composé is.

Therefore, translators have two options. First, they can ignore the writing style of Camus and translate the novel with usage of their own Past tense. The writing style which makes the book special has to be maintained with other aspects of the target language. Secondly, they can choose to maintain the style of the novel as much as possible and push their own Perfect to its own boundaries.

The two German translations of *l'Étranger* are different. The translators both selected a different alternative when translating the novel. The oldest translation from 1948 has been made by Georg Royert and the Präteritum is used often as a translation of the Passé Composé. This translation is sometimes referred to as 'translation 1' during this thesis. The latest translation from 1994 has been made by Uli Aumüller. This translation is sometimes referred to as 'translation 2'. Contrary to the oldest translation, her translation uses the Perfekt frequently and the Präteritum occasionally as a translation of the Passé Composé.

The shared characteristics of the Perfects in German and in French discussed in the previous section make it possible for the translator to make a choice how to translate the novel.

3. Preparing the Two Translations

To be able to compare and use the two translations, both of them had to be digitally available. Translation 2 was already a part of the corpus, so only the oldest translation had to be digitalized.

3.1. Scans and OCR

The oldest of the two translations was not a part of the corpus of the Time in Translation project. To compare the two translations, the first three chapters of the oldest translation of Camus had to be added.

The pages of chapter 1 to 3 of the oldest translation of Camus were scanned with a mobile app called *Adobe Scan*. This app makes it possible to directly adjust scans of the pages. The page numbers were cut out. After photographing all the pages and adjusting them to the desired form, the app instantly made a PDF file.

These files were sent to Bert le Bruyn. OCR-software was used to convert the PDF scans into text. After a while, the scans were sent back as Word-documents.

3.2. Paragraph alignment

The Word-documents were checked for errors made by the OCR-software. The corrected versions were put in Notepad++ as .txt files so the paragraphs were able to be aligned with the paragraphs of the latest translation of Camus. This was necessary for the alignment process. The aligned versions of the chapters sent to Martijn van der Klis, who put the documents in the TimeAlign software.

3.3. TimeAlign

The TimeAlign software⁹ was used to annotate French verbs with their German counterparts. Figure 2 displays the interface of the software. On the left side of the screen a French tense from the original novel was presented, with a verb marked in green. On the right side the aligned German sentence was presented. The verb that corresponded to the marked French verb had to be marked in the German sentence. This was be done by clicking on the correct verbs. First all the marked French verbs were instances of the Passé Composé. Later on, also other French verbs were marked green.

There were two check boxes underneath the text, as seen in Figure 2. The first box asked whether the marked verb was an instance of a specific verb tense. The second box asked if the translation was made correctly. On the bottom of the page a comment could be made about the translation shown.

 $^{^9\,} Time Align\, Software: \underline{https://github.com/UUDigitalHumanitieslab/timealign}$

Figure 2: The Time Align annotation process. In this case the verb is not correctly translated. The German word 'winkten' can only be a result of the verbs in French if 'des signes' is added to 'ont fait'.

3.4. Tense assignment

After the Time Align process, the verb tenses had to be assigned to the verbs. All the verbs that were correctly translated were shown in an Excel-sheet. With this sheet is was possible to use filters to systematically assign tenses to the verbs. For instance:

- If w1 is habe, hat, haben, ist, bin, sind and w2 is **not** empty, then the tense is a Perfekt.

The Präteritum in German often has -te as addition on the end of the word, which also served as one of the filters. So:

- If w1 ends with -te, then the tense is a Präteritum.

Although many verbs followed the general rules, there were some exceptions. These were filled in by hand.

3.5. TimeMapping

The last part of the processing of the oldest translations was TimeMapping. Each sentence in the oldest German translation was aligned with the corresponding sentence(s) that were correct translations in the latest German translation, French and Dutch. The verb tenses had to be assigned manually. The Dutch translation was added, because the Dutch Voltooid Tegenwoordige Tijd behaves differently than he Perfekt and the Passé Composé. It has fewer restrictions than the Present Perfect, as it can be used with past time adverbials. However, it cannot be used in narration.

The tense assignment from the Excel sheet was used, which resulted in a four-tuple of aligned tense attributions. These tuples consist of the tenses of the aligned sentences. An example of a four-tuple: <ovt, Imparfait, Perfekt, Perfekt>. The first place in the tuple represents the Dutch tense, the second the French tense, the third the latest German translation tense and the last one the oldest German translation tense. This means that the French tense was an Imparfait, which was translated as a Perfekt in translation 1 and 2. It was translated as a Onvoltooid Verleden Tijd in Dutch.

The tuples were put in software to calculate the distance function to eventually show multidimensional scaling of variation (van der Klis, Le Bruyn and de Swart, 2017). When two fourtuples are similar, so the tense attributions are the same, the distance is 0. When a tense is different, 1 is added. The sum is divided by 4. The distance function is used to create a dissimilarity matrix (van der Klis, Le Bruyn and de Swart, 2017). The dissimilarity matrix was displayed by multidimensional scaling in a scatterplot, by using the distances between the four-tuples. This created a semantic map, as seen in Figure 3.

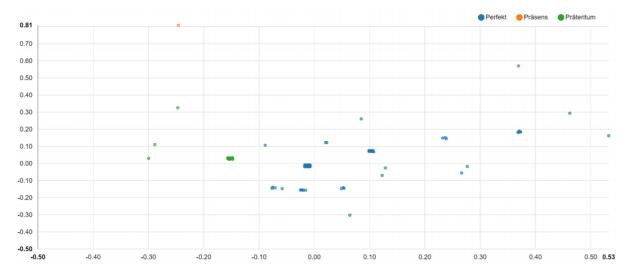


Figure 3: an example of a German semantic map, with six-tuples (German, Italian, Dutch, Spanish, English and Greek are used in this example).

The points were labelled with a colour assigned to each verb tense, seen in the upper right corner of Figure 3. Each point represents a tuple. To see the context of the point, clicking on the point will show the original sentence from the novel in French and the tuple that comes with the sentence. The points contain the aligned sentences of the four languages. The content and the place of the points stay the same in the semantic maps for each language, but the colour of the points differs per language. For this thesis the x-axis has dimension 1 and the y-axis has dimension 2. The x and y-axis do not have any linguistic meaning.

3.6. Comparing the two translations

The graphs in Figure 4 demonstrate an overview of the verb tenses used in the selected chapters of *l'Étranger* in the four languages. The green bar represents the Präteritum, the Imparfait and the Onvoltooid Verleden Tijd. The blue bar represents the Perfekt, the Passé Composé and the Voltooid Tegenwoordige Tijd. The orange bar represents the Präsens, the Présent and the Onvoltooid Tegenwoordige Tijd. The red bar represents the Plusquamperfekt, the Plus-que-parfait and the Voltooid Verleden Tijd. The purple bar represents the Future, the Future Simple and the Toekomende Tijd. The deep purple bar represents the Partizip, the Conditional Passé and the Voltooid Verleden Toekomende Tijd. Verb tenses that are not displayed in the graphs of the four languages are not discussed here.

The labels of the graphs differ from the labels used during this thesis. The label 'German(Camus Old)' represents translations 1 and the label 'German' represents translation 2.

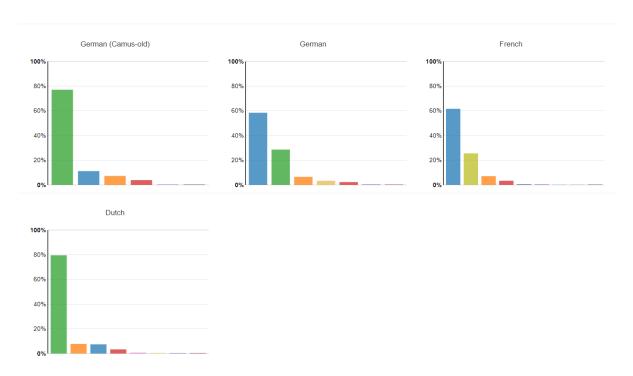


Figure 4: the four graphs display the percentual occurrence of verb tenses in the text. The first graph displays translation 1, the second translation 2, the third the French original text and the fourth the Dutch translation.

Totals per language					
German		German (Camus-old)		French	
Tense	Count	Tense	Count	Tense	Count
Perfekt	329	Präteritum	434	passé composé	347
Präteritum	161	Perfekt	63	imparfait	144
Präsens	37	Präsens	41	présent	40
Konjunktiv	19	Plusquamperfekt	22	plus-que-parfait	19
Plusquamperfekt	13	Futur I	2	conditionnel passé	3
Futur I	3	Partizip	1	futur simple	3
Futur II	1			conditionnel présent	3
				futur proche	3
				futur antérieur	1

Dutch			
Tense	Count		
ovt	448		
ott	44		
vtt	42		
vvt	19		
ovtt	4		
infinitief	3		
ottt	2		
vvtt	1		

Figure 5: four tables of translation 1 and 2, the French original and the Dutch translation, with the totals of the verb tenses in each text.

Figure 5 shows that translation 1 has 434 counts of the Präteritum, in comparison with 161 counts in translation 2. Translation 1 has 63 counts of the Perfekt, in comparison with 329 counts of the Perfekt in translation 2. Translation 2 has 37 counts of the Präsens and translation 1 has 41 counts of the Präsens.

As seen in Figure 4, 5 and 6, the Präteritum occurs more in translation 1 than in translation 2. The Perfekt occurs more in translation 2 than in translation 1.

The original French text contains 347 counts of the Passé Composé and 144 counts of the Imparfait. The text also has 40 counts of the Présent.

The Dutch graph in the table presents 448 counts of the Onvoltooid Verleden Tijd and almost similar counts of the Onvoltooid Tegenwoordige Tijd (44) and the Voltooid Tegenwoordige Tijd (42).

In the four translations, the Präsens, Présent and Onvoltooid Tegenwoordige Tijd all have similar counts of the verb tense. The number is close to 40.

iotais	per	(tense)	category

	German	French	Dutch	German (Camus-old)
Past	161	0	448	434
Present Perfect	329	347	42	63
Present	37	40	44	41
Imperfect	0	144	0	0
Past Perfect	13	19	19	22
Subjunctive Present	19	0	0	0
Future	3	3	2	2

Figure 6: an overview of the verb tenses side by side.

Below are the Semantic Maps (Figure 7, 8, 9 and 10) of the text of translation 1, translation 2, French and Dutch. The points in the Semantic Map are four-tuples. Every tense in a source is matched with the tenses in the translation of the sentence. The outputs of the Time Align process and the tense assignment are used to obtain the tuples, as explained in the previous chapter.

For example:

In the Semantic Map of the oldest German translation the green points are the French verbs that were translated as Präteritum verbs. One point (32198) has the original sentence (17)a in the French text:

- (17) a. A l'asile, on les **plaisantait**, on disait à Pérez : "C'est votre fiancée". (French)
 - b. Im Heim **neckte** man sie. Man sagte zu Pérez : « Sie ist Ihre Braut . » (translation 1)
 - c. Im Heim hat man sie geneckt, man sagte zu Pérez: « Das ist Ihre Braut » (translation 2)
 - d. In het gesticht **plaagde** men hen , men zei tegen Pérez : ' Daar is je verloofde . ' (Dutch)

The oldest translation translates the verb as a Präteritum, the latest translation as a Perfekt and in Dutch the verb is an Onvoltooid Verleden Tijd(ovt). The verb tense in French is an Imparfait. This gives the following tuple: <ovt, Imparfait, Perfekt, Präteritum>

The distance between the points is based on the variation in tense use between the four-tuples¹⁰. This is calculated by an algorithm. The output is displayed in the Semantic Map, as seen below.



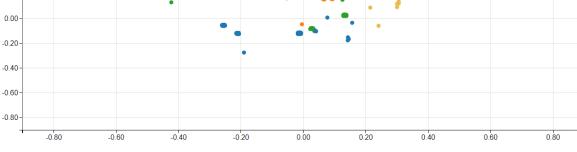




Figure 8: The Semantic Map of German, translation 2.

¹⁰Time in Translation Project. *Translation Mining for the Perfect*. Retrieved October 5, 2019, from https://time-intranslation.hum.uu.nl/translation-mining/



Figure 9: The Semantic Map of the French original.



Figure 10: The Semantic Map of the Dutch translation.

The points in the Semantic Map display the visualisation of the use of the Perfect in different languages. Points closer together show less variation in verb tense, opposed to points further away: these points show more variation in verb tense.

Table 1 shows five of the most occurring tuples. The tuples show the verb tenses in the following order: <German, French, Dutch, Camus Old>.

Tuple	Count
Perfekt, passé composé, ovt,	254
Präteritum	
Präteritum, imparfait, ovt, Präteritum	137
Perfekt, passé composé, vtt, Perfekt	32
Perfekt, passé composé, ovt, Perfekt	30
Präsens, présent, ott, Präsens	28

Table 1: an overview of the five most frequently occurring tuples.

The tuple that occurs 254 times is the tuple of the <Perfekt, passé compose, ovt, Präteritum>. This means that there are 254 times where translation 2 contains a Perfekt, translation 1 contains a Präteritum, the French original contains a Passé Composé and the Dutch translation contains a Onvoltooid Verleden Tijd.

An example of that tuple:

- (18) a. Er hat die anderen geweckt, und der Pförtner hat gesagt, sie müßten gehen. (Perfekt)
 - b. Il a réveillé les autres et le concierge a dit qu'ils devraient partir. (Passé Composé)
 - c. Hij maakte de anderen wakker en de concierge zei dat zij weg moesten gaan. (OVT)
 - d. Er weckte die anderen, und der Pförtner sagte, sie müßten jetzt gehen. (Präteritum)

4. Experiment Proposal

This chapter proposes an experiment where the two differing translations can be used to investigate the use of the Perfekt and the Präteritum by native German speakers. To examine the use of the Perfekt and the Präteritum by native German speakers, the two digitalized translations of *l'Étranger* are used. The two translations are known for their differences in the occurrence of the Perfekt and the Präteritum, which makes them suitable material to investigate the differences between the verb tenses.

4.1. Participants

The participants are native German speakers above the age of 18. They can live in a different country than Germany but have to be native German speakers. The lower limit of the age of the participants is chosen to only involve participants that understand the experiment. There is no upper limit of the age requirement because the research is interested in the use of the Perfekt and the Präteritum throughout the German speaking population and not necessarily a limited selection.

Participants are gathered through connections with other universities in Germany. Other ways to collect participants is through connections with acquaintances in Germany, who also have access to a larger group of native German speakers.

Another option to gather participants is through Amazon's Mechanical Turk. Mechanical Turk is a service from Amazone that helps to gather participants for questionnaire-based studies. Mechanical Turk is a reliable service for linguistic experiments¹¹.

The population of native German speakers is around 95 million¹². This makes the population size of the experiment 95 million. The minimum amount of native German participants for the experiment is 385¹³¹⁴. The sample size has a minimum of 385 participants. This is calculated with a confidence interval of 95% and a error margin of 5%. Although the required minimum is 385 participants, the desired amount of participants is higher than the minimum. By utilizing Mechanical Turk, it is expected that more participants can be approached to participate in the study.

4.2. Materials

The materials used are the two German translations of the first three chapters of *l'Étranger*. From the three chapters of the book a few paragraphs had to be selected with the most occurrences of the Präteritum in translation 1 and the Perfekt in translation 2.

¹¹ Sprouse, J. (2011). A validation of Amazon Mechanical Turk for the collection of acceptability judgments in linguistic theory. *Behavior research methods*, *43*(1), 155-167.

World Population Review (n.d.) *German Speaking Countries 2019.* Retrieved November 5, 2019, from http://worldpopulationreview.com/countries/german-speaking-countries/

¹³ Sample Size Calculator by Raosoft, Inc. (n.d.). Retrieved November 5 2019, from http://www.raosoft.com/samplesize.html

¹⁴ SurveyMonkey. (2018, November 14). *Bereken de steekproefgrootte*. Retrieved November 5, 2019, from https://nl.surveymonkey.com/mp/sample-size-calculator/

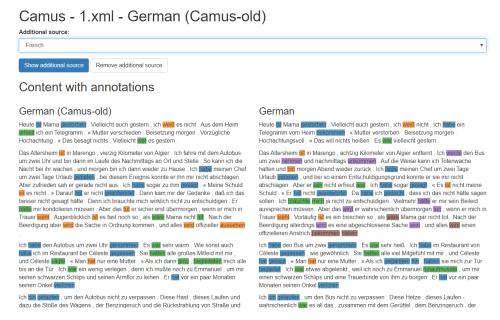


Figure 11: verbs in the two different German translations are highlighted with colours.

After the pre-processing of the two translations, they can be shown side by side as seen in Figure 11. The green coloured verbs in Figure 11 present the Präteritum and the blue coloured verbs present the Perfekt. All the paragraphs from the first three chapters were displayed like Figure 11. Eventually four paragraphs were chosen, with the most differences between the Perfekt and the Präteritum. These paragraphs occurred primarily in the first chapter of the translation.

The two translations do not only differ in the verb tense, but also in other aspects of the context, as seen in Table 2. Two versions of the selected paragraphs were made for the participants. The first version is more similar to translation 1 and the second version is more similar to translation 2. This is done to control the influence of the context on the choice of verb tense. The two versions of the selected paragraphs can be found in the appendix.

Translation 1	Translation 2
"Wie sonst auch habe ich im Restaurant bei	"Ich habe im Restaurant von Céleste gegessen,
Céleste gegessen."	wie gewöhnlich".

Table 2: an example of two correctly translated sentences that differ in the overall structure of the sentence and not only the verb tense.

It can also occur that the two translations are a correct translation of the French original sentence, but both contain a different verb. Several translations can be correct for the same word. Situations where the Präteritum in translation 1 and the Perfekt in translation 2 occurred as different words were not used for the results. The influence of word choice can interfere with the verb tense preference.

A few verb tenses that were not a choice between a Perfekt and a Präteritum were also added. This was done to disrupt a possible flow of one verb tense. The answers of these options were not considered with the results.

Eventually, there were 22 choices for a Perfekt or a Präteritum verb tense.

To be able to perform the experiment on a larger scale, the software Linger¹⁵ is used. Linger can be used for sentence processing experiments. Linger includes several experiment types. The type chosen for this experiment is *Centred Self-Paced Reading*. The phrases appear the screen and the participant can answer the question. The participant himself can choose when he continues to the next phrase.

Linger can display individual sentences and not the whole paragraphs. This tackles the influence of the context on the choice of verb tense. However, the influence of the two different translations still exists, as not all sentences are the same. Two Linger programs are made for the two different translations.

4.3. Procedure

The experiment uses a between-subject design. Half of the participants are assigned to the version that is more similar to translation 1 and the other half is assigned to the version more similar to translation 2. The participants are assigned randomly to one of the conditions. They are sent a link with the software of the Linger program. The participants are asked to follow the instructions of the program and perform the experiment. A phrase appears on the screen and they have to choose the verb tense they prefer in the sentence. The same word appears in the Perfekt and the Präteritum, with a few exceptions to disrupt a possible flow of verb tenses. There is no time restriction on the screen time of the sentence. The participants can fill in the preferred verb tense and move to the next sentence when they click on the screen.

The answers given by the participants in the Linger program are directly sent to a computer. The software package Linger contains Lingalyzer. Lingalyzer directly analyses the datafiles generates by the Linger experiment.

4.4. Pilot Study

Due to limited time for the thesis, the proposed experiment described above is shortened to a pilot study. Instead of 385 participants, 6 native German participants were chosen for this pilot study. The participants were all older than 18 and born in Germany. An even number of 6 participants was chosen; three received the version more similar to translation 1 and three received the version more similar to translation 2. The participants were gathered through acquaintances in Germany.

Programming the whole experiment was not time efficient for this pilot study. The manner of presenting the paragraphs was different from the original experiment. After the paragraphs were prepared, they were sent to 6 native German speakers by e-mail. The participants were asked to choose the verb tense they preferred in a sentence. They were told that there were no correct or false answers. The participants had to cross the answer they did not prefer.

4.5. Hypothesis

Although the Präteritum is used more often in novels and formal writing, it can also be used in speech. The Perfekt sounds less formal than the Präteritum in speech and is used more frequently in non-formal speech. The Perfekt can also occur in writings. Native German speakers find it difficult to

¹⁵Software *Linger* https://tedlab.mit.edu/~dr/Linger/

tell the difference between the Präteritum and the Perfekt (Rothstein, 2006). Participants have to fill in the verb tense they think is most suitable. Both options are available at 23 points in the paragraph. Since the use of the Perfekt and the Präteritum seems to depend on the speaker, it is expected that not one verb tense will overrule the other verb tense. They will occur almost evenly

4.6. Results

Table 3 below presents the results of the pilot study. The six participants are lined horizontally and the instances of the Perfekt and Präteritum choice are lined vertically. The answers marked in grey are instances of the Perfekt.

Participant 1-3 received the version more similar to translation 1 and participant 4-6 received the version more similar to translation 2.

Table 3: the results of the pilot study. The participants are displayed on horizontally and the number of the verb option are displayed vertically. The Perfekt is marked grey.

	Participant	1	2	3	4	5	6
Verb		-	-	•	•	-	-
1		anlächelte	anlächelte	anlächelte	anlächelte	anlächelte	anlächelte
2		fragte	fragte	fragte	gefragt hat	fragte	fragte
3		sagte	sagte	hat gesagt	hat gesagt	sagte	sagte
4		empfing	empfing	hat empfangen	hat empfangen	empfing	empfing
5		fing an	fing an	fing an	habe angefangen	fing an	fing an
6		unterbrach	hat unterbrochen	unterbrach	hat unterbrochen	unterbrach	unterbrach
7		fügte hinzu	hat hinzugefügt	fügte hinzu	hat hinzugefügt	fügte hinzu	fügte hinzu
8		betrat	betrat	betrat	betrat	betrat	betrat
9		drehte	drehte	drehte	drehte	drehte	drehte
10		blendete	blendete	blendete	blendete	blendete	blendete
11		bot an	hat angeboten	bot an	hat angeboten	bot an	hat angeboten
12		nahm an	habe angenommen	habe angenommen	nahm an	habe angenommen	nahm an
13		kam zurück	kam zurück	ist zurück gekommen	kam zurück	kam zurück	kam zurück
14		zögerte	zögerte	zögerte	zögerte	zögerte	zögerte
15		bot an	bot an	habe angeboten	bot an	bot an	bot an
16		rauchten	haben geraucht	haben geraucht	rauchten	haben geraucht	haben geraucht
17		sah	sah	sah	hat gesehen	sah	sah
18		kamen	kamen	kamen er	kamen	kamen	kamen
19		richtete auf	richtete auf	richtete auf	hat aufgerichtet	richtete auf	richtete auf
20		nannte	nannte	nannte	hat genannt	nannte	nannte

21	sagte	sagte	sagte	hat gesagt	sagte	sagte	
22	folgte	folgte	folgte	bin gefolgt	folgte	folgte	

	1	2	3	4	5	6
total Perfekt	0	5	6	12	2	2
total Präteritum	22	17	16	10	20	20

Table 4: the counts of the Perfekt and the Präteritum of the six participants.

Table 4 shows the counts of the Perfekt and the Präteritum for the six participants. In total there were 22 choices of the Präteritum and the Perfekt. Overall, there were 6 times 22 choices: In total there were 132 choices for the Präteritum or the Perfekt. The Präteritum was chosen 105 out of 132 options. The Perfekt was chosen 27 times out of 132 options.

From the 22 options, there were 3 instances where the Perfekt was chosen 3 or more than 3 times by all the participants. Table 3 shows that these were the instances of 12, 13 and 17. From these 4 instances, the Perfekt was chosen in 1 instance 4 or more times by all the participants. Table 3 shows that this was the instance of 17.

For the other choices, the Präteritum was chosen 4 or more times by all the participants.

	1	2
total Perfekt	11	16
total Präteritum	55	50

Table 5: the total counts of the Perfekt and the Präteritum for the two versions.

Two versions of the paragraphs were made. The counts for choice of the Perfekt and the Präteritum are displayed in Table 5. Version 1 has 11 counts of the Perfekt and 55 counts of the Präteritum. Version 2 has 16 counts of the Perfekt and 50 counts of the Präteritum.

4.7. Discussion Experiment

During this thesis the research question was split up in two parts. The first part examined the use of the Perfekt and the Präteritum by native German speakers in two translations of *l'Étranger*. As time was limited for this thesis, a pilot study was conducted. The results of the pilot study give an indication of the results when the whole experiment is conducted on a larger scale. It is also possible that the results of the pilot study deviate from the results of the experiment. However, the results of the pilot study are reviewed and used for the conclusion.

The answers of the pilot study show that the participants generally chose the Präteritum more than the Perfekt. Out of the 132 options between the Präteritum and the Perfekt, the Präteritum was chosen 105 times and the Perfekt only 27 times. There were no large differences between the two versions of the paragraphs.

One verb was chosen as a Perfekt more than the other words, namely *rauchten-haben geraucht* 'to smoke'. A possible explanation for the option of *rauchten-haben geraucht* can be due to the preferences of the speakers, as native German speakers cannot always tell the differences between the Perfekt and the Präteritum (Rothstein, 2006). There are instances where the Perfekt or the Präteritum can be used, discussed in chapter 2.1.1., but in a few cases both verb tenses are correct. Nevertheless, even though the Perfekt was chosen 4 times, the Präteritum was chosen 2 times. The situation is unclear. The explanation can depend on multiple factors.

Overall, the results are not in line with the expectations. The hypotheses stated that the Perfekt and the Präteritum would be chosen equally frequent. Although the Perfekt does not have the past-tense like meaning like the Präteritum, there are German dialects where the Perfekt is preferred over the Präteritum. Even native German speakers have trouble with the differences between the Perfekt and the Präteritum (Rothstein, 2006, p.43-45). Every situation of the pilot study was a situation where both verb tenses can be used, as they appeared in similar sentences in the two translations. Therefore, it was expected that the choices of the Präteritum and the Perfekt would be equally divided.

The results support the idea that the Präteritum is used more often in literary writings. The participant's choice of verb tense might depend on written or spoken German. The participants of the pilot study received paragraphs that were clearly part of a novel. The texts were written texts.

According to the literature, the Präteritum is used frequently in German novels and other written texts¹⁶. The Passé Simple is usually the main verb in narration in French novels, which made the use of the Passé Composé in *l'Étranger* exceptional when it was published (van der Klis, Le Bruyn and de Swart, 2019). As discussed in section 2.1.3., the translators of the novel have the option to maintain the style of Camus by exploring the limits of the Perfekt, or use the Präteritum. The Präteritum is the standard form used in literary texts in German, which is reflected by the results.

Before mentioning further research suggestions for the pilot study, the conduction of the proposed experiment is important. If the results of the experiment deviate from the pilot study, then the recommendations for further research would also deviate from the recommendations based on the pilot study.

However, a recommendation based on the results of the pilot study is the following. As the pilot study was conducted with written texts, this can influence the verb choice of the participants. As mentioned before, the Präteritum is the standard form in literary writing. A suggestion for a further experiment is to explore the differences between spoken and written differences in the use of the Perfekt and Präteritum. The translations of *l'Étranger* can be spoken out loud.

Another recommendation can be to examine the influence of age on the use of the Perfekt and the Präteritum. The pilot study included participants between the age of 35 to 65, but it can be interesting to examine the preferences of younger or older participants.

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¹⁶ Center for Open Educational Resources and Language Learning. (n.d.). *Grimm Grammar: simple past regular verbs : Das Imperfekt - Regelmäßige Verben*. Retrieved October 5, 2019, from https://coerll.utexas.edu/gg/gr/vsp 01.html

5. Machine Translation

5.1. Machine Translators

Machine translation is the automated translation of a natural language by software into the target natural language. A natural language is a human language. Translation of natural languages is not just a substitution of words. When a machine translator translates a sentence word for word, the translation in the target language would not be correct. As syntax and semantics differ between languages, a machine translator must account for all these elements in a text when translating the text to the target language. If only the words were translated, the meaning of the original text would not be preserved in the translation.

Considering the many machine translators that exist nowadays, this thesis will specifically examine one machine translator. The machine translator discussed in this thesis will be Google Translate. Google Translate is a generic machine translator¹⁷ based on neural networks. It produces fast translations for millions of people on daily basis. Although a novel translated by Google Translate is unlikely to be published, Google Translate is the machine translator that is used most by common people. It is interesting to examine if Google Translate produces accurate translated sentences that are similar to human-made translations.

5.1.2. Case Study: Google Translate

Since 2016, Google Translate has been based on GNMT, Google's Neural Machine Translation system. Previously, Google Translate was based on Statistical Phrase-Based Machine Translation, which broke the sentence into phrases for translation of the whole sentence (Koehn, 2009). The GNMT is a Neural Machine Translation. The entire input is used as one unit for the translation, instead of breaking the sentence into words and making it multiple units (Cho et al., 2014). This approach makes it possible to take other factors of language into account during the translation, such as semantics and syntax.

The architecture of the GNMT is explained shortly. A Neural Machine Translation system, and also GNMT, usually consists of two recurrent networks (Wu et al., 2016). Recurrent networks, or RNN, are networks that have two inputs: the present input and the input from the recent past¹⁸. An example is displayed in Figure 12. The recurrent network consists of a feedback loop that allows them to also look at their recent decisions with other input. This feedback loop can be seen as 'memory'. These inputs are combined to make a decision about the new input.

¹⁷ What is Machine Translation? (2017, September 18). Retrieved October 10, 2019, from https://www.gala-global.org/what-machine-translation.

¹⁸ Karpathy, A. (2015, May 21). *The Unreasonable Effectiveness of Recurrent Neural Networks*. Retrieved October 11, 2019, from http://karpathy.github.io/2015/05/21/rnn-effectiveness/

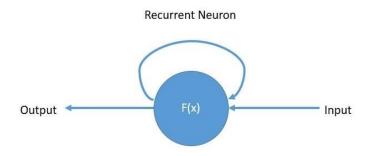


Figure 12: This is a simple example of how a recurrent network works.

GNMT uses two recurrent networks named Long Short-Term Memory (LTSM) and connects them. The first LTSM is the encoder and the second LTSM is the decoder (Wu et al., 2016). The encoder layer 'reads' the sentence and interprets all the words as vectors. The sentence is deformed as a list of vectors, seen in Figure 13 in step 1 and 2. These vectors represent the meaning of the words that are read to that point. The combinations of the vectors are unique for the pairs of the source and target language¹⁹. The GNMT does not translate in the word-for-word manner but translates the whole sentence at the same time (Wu et al., 2016). The vectors represent a word in a specific sentence. This representation is equivalent to the meaning of words in a sentence²⁰. Therefore, the GNMT can take other important aspects of the translation into account for the target translation.

After the entire sentence has been encoded, the decoder generates the desired sentence one word at a time. The vectors are paid special attention in an intermediary attention layer (see Figure 13, step 3 and 4), as they can indicate which vectors are most important to form a translated word²¹. Other words in the sentence can alter the meaning of a previous or preceding word. This process eventually forms the target sentence.

To process data, the GNMT needs to be trained. This training is done with human-translated sentences. With the training, the GNMT learns itself which combination of vector dimensions represents the combination of source and target languages. As a result of self-adaptiveness and the ability to learn to process non-structured data, the system learns to translate input more naturally over time. The machine translator gets better with the analysis of patterns because of the experiences it had with previous data.

¹⁹ Machine Translation. (n.d.). Retrieved October 5, 2019, from https://www.microsoft.com/en-us/translator/business/machine-translation

²⁰ A Neural Network for Machine Translation, at Production Scale. (2016, September 27). Retrieved October 4, 2019, from https://ai.googleblog.com/2016/09/a-neural-network-for-machine.html.

²¹ A Neural Network for Machine Translation, at Production Scale. (2016, September 27). Retrieved October 4, 2019, from https://ai.googleblog.com/2016/09/a-neural-network-for-machine.html.

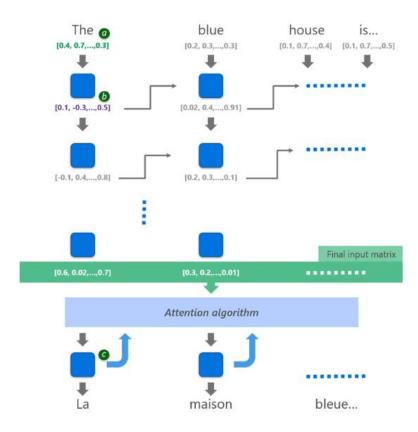


Figure 12: this image is from Microsoft and explains how the neural network translation works. ²²

- 1. Each word is represented by a vector.
- 2. This process is repeated for 7 layers, as there are 8 in total. This creates a matrix of vectors.
- 3. The output matrix of vectors is used by the attention layer to use the current output and the recent output of previous words how the next word should be translated.
- 4. The decode layer will translate the vectors that represent the words within a specific context to the best translation in the target language. The result is fed into the attention layer to influence the next word in the sentence.

5.2. Method Case study: Google Translate

To check which verb tense Google Translate uses to translate the Passé Composé, 10 sentences from the paragraphs from the pilot study were selected. These sentences all have the Passé Composé as verb tense in the French original, the Perfekt in German translation 2 and the Präteritum in German translation 1. The sentences can be seen in Table 6.

#	French	Translation 2	Translation 1
4.4	Et quand je me suis	Und als ich aufgewacht bin	Und als ich wach wurde ,
	réveillé, j'étais tassé	, war ich gegen einen	lehnte ich an einem Soldaten ,
	contre un militaire qui m'	Soldaten gerutscht , der	der mich anlächelte und
	a souri et qui m' <u>a</u>	mich angelächelt hat und	

²² Machine Translation. (n.d.). Retrieved October 5, 2019, from https://www.microsoft.com/en-us/translator/business/machine-translation.

	<u>demandé</u> si je venais de loin	g <u>efragt hat</u> , ob ich von weit herkäme	<u>fragte</u> , ob ich von weither käme
4.4	Et quand je me suis	Und als ich aufgewacht bin	Und als ich wach wurde,
	réveillé, j'étais tassé	, war ich gegen einen	lehnte ich an einem Soldaten ,
	contre un militaire qui m'	Soldaten gerutscht , der	der mich <u>anlächelte</u> und
	<u>a souri</u> et qui m' a	mich angelächelt hat und	fragte , ob ich von weither
	demandé si je venais de	gefragt hat , ob ich von	käme
	loin	weit herkäme	
5.4	Mais le concierge m' <u>a dit</u>	Aber der Pförtner <u>hat</u>	Aber der Pförtner <u>sagte</u> , ich
	qu'il fallait que je	gesagt, ich müsste erst den	müßte erst zum Heimleiter
	rencontre le directeur	Heimleiter sprechen	
5.6	Pendant tout ce temps,	Während dieser ganzen	Der Pförtner <u>redete</u> in einem
	le concierge <u>a parlé</u>	Zeit <u>hat</u> der Pförtner <u>gered</u>	fort
		<u>et</u>	
5.6	il m'a <u>reçu</u> dans son	er hat mich in seinem	er empfing mich in seinem
	bureau	Büro empfangen	Büro
5.20	II <u>a ajouté</u> : « Vous savez,	Er <u>hat hinzugefügt</u> : «	Er <u>fügte hinzu</u> : « Sie hatte
	elle avait des amis, des	Wissen Sie, sie hatte Freun	Freunde .
	gens de son âge	de , Leute in ihrem Alter	
13.7	II m'a <u>offert</u> alors d'	Er <u>hat</u> daraufhin <u>angeboten</u>	Dann <u>bot</u> er mir <u>an</u> , mir eine
	apporter une tasse de	, mir eine Tasse	Tasse Milchkaffee zu bringen
	café au lait	Milchkaffee zu bringen	
13.13	J'ai offert une cigarette	Ich <u>habe</u> dem Pförtner eine	Ich <u>bot</u> dem Pförtner eine
		_, , , , , , , , , , , , , , , , , , ,	→
	au concierge et nous	Zigarette <u>angeboten</u> , und	Zigarette <u>an</u> , und wir
	au concierge et nous avons fumé	Zigarette <u>angeboten</u> , und wir haben geraucht	zigarette <u>an</u> , und wir rauchten
22.10	_		 :
22.10	avons fumé	wir haben geraucht	rauchten Er <u>nannte</u> mich « mein Sohn »
22.10	avons fumé Il m'a <u>appelé</u> « mon fils »	wir haben geraucht Er <u>hat</u> mich « mein Sohn »	rauchten
22.10	avons fumé Il m'a <u>appelé</u> « mon fils »	wir haben geraucht Er <u>hat</u> mich « mein Sohn » genannt und mir ein paar	rauchten Er <u>nannte</u> mich « mein Sohn » und sagte ein paar Worte zu

Table 6: 10 sentences from the chosen paragraphs of l'Étranger.

As Wu et al. (2016) mentioned in their paper, Google Translate displays more difficulty with longer sentences. This may result in the loss or addition of words. To restrict the amount of errors made by Google Translate due to longer sentences, short French sentences were chosen as much as possible. In some cases, it was possible to cut the French sentence.

This thesis examines the differences between the Perfekt and the Präteritum, so the main focus of the translation by Google Translate lies on the translation of the verb tenses and not on the translation of other words. Only the sentences in German that were correct translations of the original fragment in French were chosen. This was done to minimalize the chance that Google Translate would translate the original French verb in another verb. The selected sentences were put through Google Translate one by one.

5.3. Hypothesis

The machine translator Google Translate learns from its previous combinations of input and output. As the input comes from humans, it is expected that Google Translate translates the verb tenses as the participants of the pilot study do. The results of the pilot study indicate that the participants

prefer the Präteritum in the two translations of *l'Étranger*. In view of the results, it is expected that Google Translate translates the verb tenses in the sentences more into a Präteritum than a Perfekt.

5.4. Results Case study: Google Translate

Table 7 below displays the results of the translations made by Google Translate. The first column displays the French sentences used for this case study. The second column shows the translation that is made by Google Translate. As Google Translate is still fallible, the results only focus on the correct translation of the French verb marked in the first column. Only the translation of the verb of interest has to be correctly translated. The third column displays if the verb is translated differently or the same as the verb that the two German translations use. The last column contains the verb tense of the translated word.

#	French	Translation made by GT	German translation?	Verb Tense
4.4	Et quand je me suis réveillé , j' étais tassé contre un militaire qui m' a souri et qui m' <u>a demandé</u> si je venais de loin	Und als ich aufwachte, wurde ich von einem Soldaten niedergeschlagen, der mich anlächelte und fragte, ob ich von weit her gekommen sei	Similar	Präteritum
4.4	Et quand je me suis réveillé , j' étais tassé contre un militaire qui m' a souri et qui m' <u>a demandé</u> si je venais de loin	Und als ich aufwachte, wurde ich von einem Soldaten niedergeschlagen, der mich anlächelte und fragte, ob ich von weit her gekommen sei	Similar	Präteritum
5.4	Mais le concierge m' <u>a</u> dit qu' il fallait que je rencontre le directeur	Aber der Concierge sagte mir, dass ich den Direktor treffen müsse	Similar	Präteritum
5.6	Pendant tout ce temps , le concierge <u>a parlé</u>	Die ganze Zeit <u>sprach</u> der Hausmeister	Different	Präteritum
5.6	il m' <u>a reçu</u> dans son bureau	Er <u>empfing</u> mich in seinem Büro	Similar	Präteritum
5.20	Il <u>a ajouté</u> : « Vous savez , elle avait des amis , des gens de son âge	Er <u>fügte hinzu</u> : "Weißt du, sie hatte Freunde, Leute in ihrem Alter	Similar	Präteritum
13.7	Il m' <u>a offert</u> alors d' apporter une tasse de café au lait	Er <u>bot</u> mir dann <u>an</u> , eine Tasse Kaffee zur Milch zu bringen	Similar	Präteritum
13.13	J' <u>ai offert</u> une cigarette au concierge et nous avons fumé	Ich <u>gab</u> dem Concierge und uns eine Zigarette habe geraucht	Different	Präteritum

22.10	Il m' <u>a appelé</u> « mon fils » et m' a dit quelques mots	Er <u>nannte</u> mich "mein Sohn" und sagte ein paar Worte zu mir	Similar	Präteritum	
22.11	Il est entré ; je l' <u>ai suivi</u>	Er trat ein; Ich <u>bin</u> ihm gefolgt	Similar	Perfekt	

Table 7: the results of the translation of Google translate.

Table 8 shows the counts of the Präteritum and the Perfekt and the counts of similarly and differently translated verbs.

	Präteritum	Perfekt
Similar	7	1
Different	2	0

Table 8: the counts of the Präteritum and the Perfekt in the ten sentences.

There are 7 counts of a similar translated Präteritum and 1 count of a similarly translated Perfekt. There were 2 counts of a differently translated word, which had the Präteritum as verb tense.

In total, from the 10 sentences given to Google Translate, 9 were translated as a Präteritum. The other one was translated as a Perfekt.

6. Discussion

An interesting finding from the second part of this thesis is that the machine translator Google Translate translates the sentences of *l'Étranger* primarily into German sentences with a Präteritum. Out of the 10 sentences translated by Google Translate, 9 were translated into a Präteritum. Only one was translated into a Perfekt.

These results are in line with the results of the pilot study. The Präteritum was chosen more frequently than the Perfekt by all the participants in the sentences of *l'Étranger*. Interestingly, the only word that was translated into a Perfekt by Google Translate was preferred as a Präteritum by five out of six participants in the pilot study.

The results are in line with the expectations. Google Translate translates the verb tenses of the sentences of l'Étranger more into a Präteritum than a Perfekt. By doing so, the system follows the behaviour of the participants of the pilot study.

The interpretation of the results is different from the one of the pilot study. As all the input of Google Translate is written text, the machine translator cannot distinguish which sentences are meant to be spoken out loud or are to be written down. The results do support the idea that Google Translate learns from its previous combinations of input and output (Wu et al., 2016). It is likely that Google Translate reflects the language use of its users. As mentioned before, the machine translator gets better with the analysis of patterns due to the experiences with previous data. The output of Google Translate is similar to the verb tense use of the native German speakers, as it recognizes patterns of its input and output.

The results are also in line with the Neural Machine Translation algorithm behind Google Translate (Wu et al., 2016). The translation is not just the substitution of words, otherwise the Perfekt would have appeared more in the output sentences. The importance of the verb is visible in the output sentence. The machine translator tries to maintain the meaning of the original text as much as possible in the German language²³.

Further research might explore the adaption of Google Translate to the input of its users. It can be interesting to see to what extent Google Translate follows the input of the users and the trainingset it has been trained on. At which point does it choose the input-output combinations it has learned from its users or the information gained from the trainingset.

6.1. Relevance Artificial Intelligence

The results of both parts are relevant for the field of artificial intelligence. The choices of the native German speakers give more insight in the way German speakers use the Perfekt and the Präteritum. This is helpful for natural language processing. The input is processed to produce the target language, which has to be an accurate translation of the input. Learning from the choices native German speakers make, machine translators can be trained to make choices that reflect the way native German speakers speak.

The results of Google Translate are relevant for machine translation. The results indicate that the machine translator reflects the use of language of its users. This means that Google Translate learns

²³ A Neural Network for Machine Translation, at Production Scale. (2016, September 27). Retrieved October 4, 2019, from https://ai.googleblog.com/2016/09/a-neural-network-for-machine.html.

from its input. The self-adaptiveness of Google Translate will help the algorithm to make more accurate translations over time, due to the learning process based on the input.

6.2. Limitations

There are a few limitations for this research. The first limitation is the influence of the experimental setting. Participants are given the option between two verb tenses. Because of the experimental purpose, they might select a different answer than they would normally use. Participants might consider their answer more than in everyday life and make a different choice.

The second limitation is the conduction of the pilot study. It is possible that the experiment on a larger scale provides other answers than the pilot study, as discussed in the beginning of this chapter. Although the pilot study is done as a provisional study, the proposed experiment is somewhat different from the pilot study. Instead of using the Linger software and showing participants sentences only, the participants were sent whole paragraphs. It is possible that the context of these paragraphs influences the choice participants make with the verb tenses. Not only the context of the paragraphs, but also the display of the paragraphs as part of a novel possibly influenced the participants to make a specific verb choice.

A third limitation is the text itself. L'Étranger is a widely known novel. It is possible that participants have already read the novel. This might influence their choice of verb tense. To account for this influence, the requirement of not knowing the novel can be added for the participants in the experiment.

7. Conclusion

To repeat the research question of this thesis: What are the differences in the use of the Perfekt and the Präteritum by native German speakers in the two German translations of *l'Étranger* and to which verb tense is the Passé Composé translated by a machine translator? During this thesis, the research question was divided in two parts. The first part examined the two translations of the novel and conducted a pilot study that examined the use of the Präteritum and the Perfekt by native German speakers in translations of *l'Etranger*. The second part focused on machine translation and more specifically on Google Translate. A short test was done, to see to which verb tense the Passé Composé in the sentences of the French novel would be translated.

The pilot study shows that the Präteritum is used more often by native German speakers. The results show that the Präteritum is used 107 times out of the 138 options between the Präteritum and the Perfekt. The Perfekt was only chosen 31 times. The results do not align with the hypothesis. The Präteritum and Perfekt were expected to both occur evenly in the choices of the participants, which was not the case.

The short test with Google Translate shows that the software translates the Passé Composé more frequently to a Präteritum than a Perfekt in the given sentences of *l'Étranger*. The Präteritum was translated in 9 out of the 10 sentences. The Perfekt was only translated 1 time. The results do not completely align with the hypothesis. Google Translate was expected to follow the behaviour of the participants: it would translate the Passé Composé equally into a Präteritum or a Perfekt. Google Translate does follow the behaviour of the participants, as it translates the Passé Composé much more in a Präteritum than in a Perfekt.

To conclude: This research shows that native German speakers prefer the Präteritum in the two translations of *l'Étranger* and that the machine translator Google Translate translates the sentences with the Passé Composé to a Präteritum more frequently.

However, the conduction of the experiment described in chapter 3 is necessary to gain more results.

8. References

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8.3. Software

TimeAlign Software

https://github.com/UUDigitalHumanitieslab/timealign

Linger Software

https://tedlab.mit.edu/~dr/Linger/

9. Appendix

9.1. Paragraph Translation 1

4

Ich bin gelaufen, um den Autobus nicht zu verpassen.

Diese Hast, dieses Laufen und dazu die Stöße des Wagens, der Benzingeruch und die Rückstrahlung v on Straße und Himmel waren sicher der Grund dafür, <u>dass ich einschlief/weswegen ich eingenickt bin</u>. Ich habe fast während der ganzen Fahrt geschlafen. Und als ich <u>aufgewacht bin/wach wurde</u>, lehnte ich an einem Soldaten, der mich <u>angelächelt hat/anlächelte</u> und <u>gefragt hat/fragte</u>, ob ich von weiter käme. Das bejahte ich; um weiter nicht sprechen zu müssen.

5

Das Heim ligt zwei Kilometer vom Dorf. Ich habe den Weg dorthin zu Fuß gemacht. Ich wollte Mama sofort sehen. Aber der Pförtner hat gesagt/sagte, ich müsste erst zum Heimleiter. Da der beschäftigt war, habe ich ein wenig gewartet. Der Pförtner redete in einem fort; dann bin ich zum Leiter gegangen: er empfing mich in seinem Büro/hat mich in seinem Büro empfangen. Er ist/war ein kleiner, alter Mann und trägt das Bändchen der Ehrenlegion. Er hat mich mit seinen hellen Augen angesehen. Dann hat er mir die Hand gedrückt und sie so lange in der seinen gehalten, dass ich nicht wüsste, wie ich sie befreien sollte. Er hat in einem Aktenstück geblättert und dann zu mir gesagt: "Vor drei Jahren ist Frau Meursault ins Heim gekommen. Sie waren ihr einziger Beistand". Ich meinte/habe geglaubt, er wollte mir irgendwie Vorwürfe machen, und fing an/habe angefangen, ihm Erklärungen zu geben. Aber er unterbrach mich/hat mich unterbrochen: "Sie brauchen sich nicht zu rechten, mein liebes Kind. Ich habe die Akten ihrer Mutter gelesen. Sie konnten nicht für sie sorgen. Sie brauchte eine Pflegerin. Ihr Gehalt ist/sind bescheiden. Und alles in allem war sie schon besser aufgehoben". Ich antworte/habe gesagt: "Ja, Herr Direktor". Er hat hinzugefügt/fügte hinzu: "Sie hatte Freunde. Gleichalterige Menschen. Mit ihnen konnte sie Interessen teilen, die aus einer anderen Zeit stammen. Sie sind jung, und sie hat sicher bei Ihnen gelangweilt. "

13

In diesem Augenblick <u>betrat die Schwester die Totenhalle/ist die Schwester die Totenhalle eingetreten</u>. Der Abend war plötzlich hereingebrochen. Über dem Glasdach hatte sich die Nacht sehr schnelle verdichtet. Der Pförtner <u>drehte den Schalter/hat den Schalte gedreht</u>, und das plötzlich aufspritzende Licht <u>blendete mich/hat mich geblendet</u>. Er fordere mich auf/hat mich eingeladen, mich zum Essen in den Speisesaal zu begeben. Aber ich hatte keinen Hunger. Er hat daraufhin <u>angeboten/bot mir an</u>, mir eine Tasse Milchkaffee zu bringen. Da ich Milchkaffee sehr gern trinke, <u>nahm ich an/habe ich angenommen</u>, und einen Augenblick später <u>kam er mit einem Tablet zurück/ist er mit einem Tablet zurück gekommen</u>. Und dann hatte ich Lust zu rauchen. Aber ich <u>zögerte/habe gezogen</u>, weil ich nicht wusste, ob ich das in Mamas Gegenwart tun durfte. Ich <u>habe nachgedacht/überlegte and sagte mir</u>, dass <u>machte gar nichts/es nichts zu bedeuten hatte.</u> Ich <u>bot</u>

dem Pförtner eine Zigarette an/habe dem Pförtner eine Zigarette angeboten, und wir habe geraucht/rauchten.

22

Wir haben uns ziemlich lange schweigend gegenübergesessen. Dan erhob sich der Leiter und sah durch das Bürofenster. Dan <u>sagte er/hat er festgestellt</u>: 'Da ist schon der Pfarrer Marengo. Er ist zu früh. Er sagte mir, der Weg zur Kirche, die im Dorfe selbst läge, betrüge dreiviertel Stunden. Wir sind nach unten gegangen. Vor dem Gebäude stand der Pfarrer mit zwei Chorknaben. Der eine der Knaben hielt ein Weihrauchkessel, und der Pfarrer beugte sich zu ihm, um die Länge der silbernen Ketten zu regeln. Als wir <u>kamen/gekommen sind</u>, <u>richtete der Pfarrer sich auf/hat der Pfarrer sich wiederaufgerichtet</u>. Er <u>nannte mich "Mein Sohn"/hat mich "Mein Sohn" genannt</u> und <u>mir ein paar Worte gesagt/sagte ein paar Worte zu mir.</u> Dann ging er ins <u>Haus/ist hineingegangen</u>; und ich <u>bin ihm gefolgt/folgte ihm</u>

9.2. Paragraph Translation 2

4

Ich bin gelaufen, um den Bus nicht zu verpassen. Diese Hetze, dieses Laufen - wahrscheinlich war es all das, zusammen mit dem Gerüttel, Benzingeruch, der Spiegelung der Straße und des Himmels, dass ich einschlief/weswegen ich eingenickt bin. Ich habe fast während der ganzen Fahrt geschlafen. Und als ich aufgewacht bin/wach wurde, war ich an einem Soldaten gerutscht, der mich angelächelt hat/anlächelte und gefragt hat/fragte, ob ich von weit herkäme. Ich habe "Ja; gesagt; um weiter nicht weiterreden zu müssen.

5

Das Heim ist zwei Kilometer vom Dorf entfernt. Ich bin zu Fuß gegangen. Ich wollte sofort zu Mama. Aber der Pförtner hat gesagt/sagte, ich müsste erst den Heimleiter sprechen. Da der beschäftigt war, habe ich ein wenig gewartet. Während dieser ganzen Zeit hat der Pförtner geredet, und dann habe ich den Heimleiter zu Gesicht bekommen: er empfing mich in seinem Büro/hat mich in seinem Büro empfangen. Er ist/war ein kleiner, alter Mann mit einem Orden der Ehrenlegion. Er hat mich mit seinen hellen Augen angesehen. Dann hat er mir die Hand gedrückt und sie so lange festgehalten, dass ich nicht recht wüsste, wie ich sie zurückziehen sollte. Er hat in einem Aktenstück nachgelesen und hat gesagt: "Madam Meursault ist vor drei Jahren hierhergekommen. Sie waren ihr einziger Beistand". Ich meinte/habe geglaubt, er wollte mir etwas vorwerfen, und fing an/habe angefangen, es ihm zu erklären. Aber er unterbrach mich/hat mich unterbrochen: "Sie brauchen sich nicht zu rechtfertigen, mein liebes Kind. Ich habe die Akten ihrer Mutter gelesen. Sie konnten sie nicht versorgen. Sie brauchte Pflege. Ihre Einkünfte ist/sind bescheiden. Und alles in allem war sie hier glücklicher". Ich antworte/habe gesagt: "Ja, Monsieur le Directeur". Er hat hinzugefügt/fügte hinzu: "Wissen Sie, sie hatte Freunde, Leute in ihrem Alter. Sie hatten gemeinsame Interessen, die aus einer anderen Zeit stammen. Sie sind jung, und mit Ihnen musste sie sich ja langweilen. "

.....

13

In dem Moment betrat die Pflegerin die Totenhalle/ist die Pflegerin die Totenhalle eingetreten. Der Abend war jäh hereingebrochen. Sehr schnell war die Dunkelheit über dem Glasdach undurchdringlich geworden. Der Pförtner drehte den Schalter/hat den Schalte gedreht, und das plötzlich aufspritzende Licht blendete mich/hat mich geblendet. Er forderte mich auf/hat mich eingeladen, zum Abendessen in den Speisesaal zu gehen. Aber ich hatte keinen Hunger. Er hat daraufhin angeboten/bot mir an, mir eine Tasse Milchkaffee zu bringen. Da ich Milchkaffee sehr mag, nahm ich an/habe ich angenommen, und einen Augenblick später kam er mit einem Tablet zurück/ist er mit einem Tablet zurückgekommen. Dann habe ich Lust zu rauchen. Aber ich zögerte/habe gezogen, weil ich nicht wusste, ob ich es vor Mama tun könnte. Ich habe nachgedacht/überlegte and sagte mir, dass machte gar nichts/es nichts zu bedeuten hatte. Ich bot dem Pförtner eine Zigarette an/habe dem Pförtner eine Zigarette angeboten, und wir haben geraucht/rauchten.

22

Wir haben ziemlich lange geschwiegen. Der Heimleiter ist aufgestanden und sah durch das Bürofenster/hat aus dem Bürofenster gesehen. Dan sagte er/hat er festgestellt: "Da ist schon der Pfarrer Marengo. Er ist früh da. Er hat mich darauf hingewiesen, dass man zu Fuß mindestens eine Dreiviertelstunde bis zur Kirche brauchte, die im Dorf selbst wäre. Wir hinuntergegangen. Vor dem Gebäude war der Pfarrer mit zwei Chorknaben. Der eine hielt ein Weihrauchfass, und der Pfarrer bückte sich zu ihm hinunter, um die Länge der silbernen Kette zu regulieren. Als wir kamen/gekommen sind, richtete der Pfarrer sich auf/hat der Pfarrer sich wiederaufgerichtet. Er nannte mich "Mein Sohn"/hat mich "Mein Sohn" genannt und mir ein paar Worte gesagt/sagte ein paar Worte zu mir. Dann ging er ins Haus/ ist er hineingegangen; und ich bin ihm gefolgt/folgte ihm