A dynamic approach to L2 development in written language

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Last, but certainly not least, we would like to thank Stephan and Wouter. Whenever we felt down, lost, stressed, or tired, we could count on their endless love and support.
ABSTRACT

It is assumed that language is constantly changing and developing within a Dynamic Systems Theory and Complexity Theory approach. This study investigates how the developmental process works for two advanced students of English their written language productions over the course of approximately 4 years. Subsequently, the written data samples were divided into two overarching categories of writing genres, e.g. formal and informal texts. Grammatical complexity, lexical complexity, and use of formulaic sequences are analyzed by at looking at the degree of variability and patterns of change. The results were processed with scattered graphs, moving min-max graphs, and moving correlations. The results show both inter- and intra-individual variability and difference in writing genres have influenced how the learners’ language has progressed over time.
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CHAPTER 1 – INTRODUCTION

Students of English who learn English as a second language are assessed on several areas of language proficiency; one of those being written proficiency. During their years of studying a rather large amount of written work arises. It is assumed that not only the quantity, but also the quality of written work will increase over these years since learners acquire more skills and knowledge. This study sets out to investigate the development of linguistic competence of two native Dutch speakers who study English Language and Culture at the University of Groningen. The data comes from a longitudinal learner corpus, which consists of a large number of samples from their written works that are collected in short intervals over three and a half years of study. By looking at the quality of writing of these two advanced learners of English, this study explores the development of their second language systems. Previous studies have often assumed that language development progresses in a linear fashion as the use of that language develops. However, recent studies have pointed out that language development fluctuates and the developmental progress is affected by other influences that are interconnected (Spoelman & Verspoor, 2010; Lowie, forthcoming). This assumption that language development progresses in a non-linear fashion serves as a starting point for our study. We will use the theoretical framework of Dynamic Systems Theory (DST) and Complexity Theory (CT) to explore whether there is a non-linear language development in the English language of these two advanced learners of English. DST and CT are fairly similar approaches and overlap greatly with each other, but they arise from within different disciplines. In a review of De Bot et al.’s article on DST (2007) by Larsen-Freeman, she compares the principles of DST and CT and concludes “certain of the issues that DBL&V lead with are well known in C/CT – the non-linearity, the interconnectedness, the butterfly effect, the attractor states [...] I believe C/CT and DST to be complementary” (Larsen-Freeman, 2007, p. 36). Since the difference between DST and CT is very small, as from now we will refer to DST/CT. DST/CT argues that Second Language Development (SLD) is a process of change and non-linearity. The aim of these theories is to explain how individuals and their complex language systems develop over time owing to many interacting variables. Spoelman & Verspoor (2010) explain that “within a Dynamic System Theory (DST) approach, it is assumed that language is in a constant flux, but that differences in the degree of variability can give insight into the developmental process” (p. 532). Variability plays an important role when we are looking at language development and the way it progresses. Although variability has until recently not been considered to be an important phenomenon, Verspoor et al. (2008) point out that variability helps to create a better understanding of how and when a language system is developing. Language development refers to “characteristics of a learner’s output that reveal some point or stage along a developmental
continuum” (Wolfe-Quintero, Inagaki, & Kim, p. 1-2). We will use the framework of DST/CT to find an answer to the question: Does the language development of the two learners prove to be a dynamic system of change, and if so, in what way does this dynamic process become visible?

Furthermore, this study will focus on measures of Complexity, Accuracy, and Fluency (CAF). These measures are used to indicate how a language develops over time by looking at different aspects of language processing, and how these subsystems are connected and influence each other’s development. These measures help reveal how second language learners develop their linguistic competence and performance. According to Wolfe-Quintero et al. (1998):

Complexity and accuracy reflect the second language learner’s current level of language knowledge; while complexity reveals the scope of expanding or restructured second language knowledge, accuracy shows the conformity of second language knowledge to target language norms (p. 4).

Complexity is a very important measure for our study, because it demonstrates how the quality of writing develops over time. Complexity can be divided into two categories: grammatical complexity and lexical complexity. Grammatical complexity is concerned with how varied or sophisticated grammatical structures are. We would expect the two learners of English to write more complex sentence constructions as they become more advanced. Lexical complexity is concerned with how varied and sophisticated a writer’s lexicon is, which means that a more advanced learner will have a large lexicon available that can be accessed quickly. Furthermore, we will focus on fluency by looking at the development of vocabulary use of certain types of words and the use of formulaic sequences (FS). Formulaic sequences are said to be of great importance in the process of SLD, because the use of FS reveals how easily the learner produces the language. The higher the number of FS the more fluent the learner’s language is. FS is also important for starting learners, because they rely on formulaicity when starting to speak a new language (Wray & Perkins, 2000).

Formulaic sequences (at least those that are ‘correctly’ committed to memory) may help speakers reach a degree of linguistic accuracy, because these prefabricated chunks constitute ‘zones of safety’ and appropriate use of them may thus confine the risk of ‘erring’ to the spaces in between the formulaic sequences in one’s discourse (Boers et al., 2006, p.247).

Second language learners become more sensitive to formulaicity and collocations as their language development progresses (Wray, 2000; Ellis, 2009). It has been argued that “memory for chunks is the source of all second language development, including phonology, grammar, lexis, and discourse” (Wolfe-Quintero et al., 1998, p. 5). We are not really addressing accuracy in our study, except that we are looking at both FS that are used incorrectly and error-free FS. The types of incorrect FS are identified as “learner chunks”, and the error-free FS include idioms and proverbs, collocations, compounds, phrasal and prepositional verbs, and simple fillers. These different types of FS reflect the
learner’s ability to use accurate language, and thus represent fluency and accuracy. By looking at these CAF measures, we will try to find an answer to the questions: Will complexity, accuracy, and fluency progress in a non-linear fashion, and if so, to what extent do they illustrate the dynamic process of SLD? Furthermore, what do the different measures say about the developmental process and level of writing proficiency? Lastly, we will investigate the use of different types of FS to find an answer to the question: Will the use of FS illustrate an increase in fluency and accuracy over time? This will help to create a better understanding of what fluency and accuracy say about the developmental process and level of writing proficiency of second language learners.

There is a difference between first language and second language development with regard to writing proficiency. Although L2 acquisition goes through similar developmental stages as L1 acquisition, in second language development additional factors play a role, such as “prior knowledge of another language, type of instructions, possible critical period effects, and individual differences in motivation, among others” (O’Grady, 2008, p. 161). From a DST/CT point of view it can be argued that the L1 is part of the initial condition and can serve as a basis for the L2. However, the process of SLD is not entirely the same for all learners, because languages do not develop following a predetermined scheme. Therefore, there can be much variation both on an inter-individual and on an intra-individual level. Both differences within and between individuals are essential elements in a developmental system and should be taken into account when analyzing language development from a DST/CT perspective. This study investigates two individuals who are in many respects similar. Not only do they have a similar linguistic background, but they also share a similar context in which their development took place. We will try to find an answer to the question: Will there be differences in the SLD between two learners who share not only a similar linguistic background but also a similar context in which their language development took place, and if so, how and where will these differences appear?

Another important focus of this study is the difference in writing between formal and informal writing genres. During the course of studies the participants had to write different types of assignments. This varied from free and creative writing assignments to graded essays on academic topics. These different genres ask for a different approach. It is assumed that a text on an academic topic features more words from the Academic Word List (AWL) than for example a piece of prose. Therefore, these texts should not be analyzed all together since this can create a rather distorting view on development. We have chosen to analyze texts for development on the different area’s mentioned before per writing genre. This will give us a better idea of how language has developed and help us find an answer to the question: Will there be differences in the various aspects of SLD between formal and informal writing genres, and if so, how and where will these differences appear?
In the following paragraphs we will explain the process of SLD in relation to DST/CT, which will serve as a starting point for our study. The most important characteristics of DST/CT in relation with SLD will be clarified. We will explain the relevance of Emergentism and Universal Grammar (UG) and the role of variability for SLD in a DST/CT perspective. Next, the relevance of Complexity, Accuracy, and Fluency (CAF) for our study will be explained. Complexity is an important focus in our study, because it illustrates how the quality of writing of a learner develops over time. The background section continues with an elaborate exploration of formulaic sequences. Finally, we will explore the importance of acknowledging differences between and within learners and differences between writing genres. In sum, we will focus mainly on how complexity and fluency develop over time by looking at grammatical complexity measures, lexical complexity measures, and formulaic sequences. In order to find out how this development takes place we have formed five research questions and six connected hypothesis which serve as the basis for this study. It must be noted, however, that our study is of the exploratory rather than hypothesis-testing type. The results will be analyzed and interpreted according to Dynamic Systems Theory (De Bot et al., 2007; Verspoor et al., 2008; Spoelman & Verspoor, 2010; Lowie, forthcoming), which will provide an answer to our research questions.
CHAPTER 2 – BACKGROUND

2.1 Dynamic Systems Theory and Complexity Theory

This study will try to provide insights into the development of English as an L2 by looking into written assignments of students of English. Whereas most Second Language Development (SLD) studies have focused on cross-sectional data and traditional longitudinal data, more recent studies have pointed out that the process of SLD occurs in a more dynamic fashion. In this study the framework of DST/CT will be used. The application of DST/CT to language and cognition is relatively new, but the amount of literature that has been written on it is growing. According to DST/CT, the acquisition of a second language is a process of change (Verspoor et al., 2008). Lowie explains DST in short as following: “Essentially, Dynamic Systems Theory (DST) is an application of mathematics, in which change of complex systems over time is expressed in dynamic equations that describe how these changes take place as a function of time” (Lowie, forthcoming). The process of language learning is a process of change and dynamics; therefore SLD is regarded as a non-linear development in this study. Non-linearity is the interaction between elements and agents (agents refer to individuals and other animate creatures and also to features and combinations of individual humans and other animate creatures) in a complex system change during a period of time (Larsen-Freeman & Cameron, 2008). An important idea in the non-linear approach of SLD is the interconnectedness of all components in the language system and of the language systems in its context. Larsen-Freeman & Cameron (2008) summarize this: “We cannot properly understand a system and how it behaves without understanding how the different parts of the system interact with each other; it is not enough to understand the parts just in themselves” (p. 39).

A dynamic system can change gradually over certain periods of time or it can change suddenly and more dramatically. There are three important arguments for seeing SLD in a DST/CT perspective: “the existence of interconnected subsystems, the tendency to self-organization, the occurrence of non-linear, chaotic patterns of development” (Lowie, forthcoming). As the name of the theory already indicates, DST/CT is a theory of dynamics and change. In a DST/CT perspective language is a complex dynamic system consisting of several interacting subsystems, “none of which will be completely stable during any length of time” (Verspoor et al., 2008, p. 215). These subsystems are for example; syntax, semantics, phonology, morphology, etc. In a DST/CT approach several languages are seen as several subsystems stored in the same part of the brain. These subsystems interact dynamically with each other, resulting in the idea that aspects of L1 can affect aspects of other languages over time, and vice versa. As mentioned previously, the interaction is dynamic and varies continuously. The acquisition of a second language develops over time in a dynamic process...
due to environmental factors, e.g. interaction with other speakers in a social context, but also due to individual development and self-organization. All changes, no matter how small they may be, can be important for a learner’s L2 development (Verspoor et al., 2008).

2.1.1 Emergentism and Universal Grammar

In a DST/CT perspective language acquisition “emerges through interaction with other human beings within a social context” (De Bot et al., 2007). Learning a language is both an individual process as well as a process between individuals when they are interacting socially. Principles of DST/CT are compatible with an emergentist view of language: “Emergentism is a general approach to cognition that emphasizes the interaction between organism and environment and denies the need for predetermined, domain-specific faculties or capacities” (Spoelman & Verspoor, 2010, p. 534).

Emergentists believe that the complexity of language emerges from basic developmental processes that are influenced by a massive and complex environment (Ellis, 2003). Emergentists see language in a usage-based framework, meaning that external factors like frequency and quality of input are important in the process of SLD. In the process of SLD a learner acquires language representations from the frequency of use, which strengthens the activation and association process of these representations. Linguistic knowledge thus emerges from exposure to patterns underlying the L1 or L2 linguistic input (Norris & Ortega, 2003). This is in line with a DST/CT view on language, since DST/CT claims that the interaction of social and cognitive aspects can provide details on language development. In addition, emergentism and DST/CT both claim there is no universal grammar in the minds of language learners, but that a learner has to be inclined to learn a language. According to an emergentist view, “the entire grammar is the product of the interaction of the acquisition device with experience; no grammatical knowledge is inborn” (O’Grady, 2003, p. 44). In a DST/CT point of view, it is due to the learner whether she or he is able to use the language and not because of an innate mechanism DST/CT does not entirely reject the possibility of innateness; rather it claims that a DST/CT perspective does not necessarily require innate linguistic abilities (De Bot et al., 2007).

However, according to Larsen-Freeman & Cameron (2008) DST/CT and UG do not exclude each other. They claim there is a link between UG and DST/CT, and the principles of UG serve as the initial state of a developing system. In other words, UG can be seen as a part of the initial condition of SLD. Although we do not reject the idea of innateness, we believe these innate principles are not necessary to account for the process of language development. We believe that innate linguistic properties are not important in a DST/CT approach, because DST/CT argues that complexity in language use increases due to interaction and repetition and not so much because of innateness. In this view, language acquisition emerges through individual learning and learning through interaction with other human beings within a social context (De Bot et al., 2007). Furthermore, the process of
language acquisition relies strongly on the use of formulaic sequences. Sinclair (1991) explains the patterning of words does not occur at random, but rather largely consists of collocational sets. Wolfe-Quintero et al. (1998) have even argued that memory for chunks is the source of all second language development. Therefore, instead of taking an UG point of view on language development, this study takes an emergentist perspective which is based on the assumption that language development relies heavily on repetition and formulaic sequences. Since an important part of our study is the analysis of the use of formulaic sequences, this is more in line with an emergentist perspective than with UG. Formulaic sequences are considered important for learners, because learners of a second language rely on the use of formulaic sequences (Wray & Perkins, 2000). We believe that language naturally emerges from use through interaction and repetition. Language development does not follow a predetermined schedule, but it is rather an individual process which naturally emerges as a person uses the language.

2.1.2 Variability

A central element in DST/CT is variability. Although variability has not always been seen as a factor of interest in the field of SLD, many studies were dedicated to the subject of variability in the seventies and eighties of the previous century “whose main focus was to discover the causes of variability and the order of acquisition” (Verspoor et al., 2008, p. 215). However, most of these studies did not consider the role of variability both within an individual and between individuals. There are only a few linguists who included both intra-individual and inter-individual differences in SLD, one of them being Ellis (1994). According to Verspoor et al. (2008), Ellis was one of the applied linguists who explicitly stated “variability could give us insight, not only into an individual’s stages of SLD, but more specifically into the developmental process of L2 acquisition” (p. 216). Variability in language acquisition results from continuous interaction between a learner and her or his environment (Verspoor et al., 2008).

Not only the behavior of a learner is subject to change, but the environment and the interaction with her or his environment is also likely to change during the language acquisition process. Since a learner is able to choose her or his own environment, the environment is actually a dependent factor in itself. Moreover, the learner is responsible for the interaction with her or his environment, thus shaping the effect the environmental factors have on the learner’s language development (Verspoor et al, 2008). However, despite similar environmental factors, such as L1, motivation, and input, the process of SLD is different for each learner. These different learning patterns result from variability. Variability is needed in the process of SLD; it is only possible for development to take place when learners have the possibility to choose from a wide range of options and then select what they need to use (Spoelman & Verspoor, 2010). The degree of variability changes when the language system is
changing. According to Spoelman & Verspoor (2010) “a relatively more unstable period is often a sign that the system is moving from one phase to another” (p. 550). In other words, if a learner goes through a relatively unstable period with a high amount of variability in the acquisition process, this is often a sign that the system is changing. Therefore, the degree and patterns of variability between and within individuals helps to understand the developmental process (Verspoor et al., 2008).

Previous research considered these unstable periods as noise in the data and dismissed it, but Lowie (forthcoming) argues “DST regards variability as an essential characteristic of the system’s process of self-organization that may signal changes and transitions” (p. 6). The changes enable us to look at the way the different subsystems are changing and how they develop and relate to each other. This development and the degree of development are an important phenomenon in SLD from a DST/CT perspective (Spoelman & Verspoor, 2010). From a traditional point of view, language development had a clear starting and end point, but in a DST/CT perspective there is no end state in language development. This can be accounted for, because in a DST/CT framework language is always changing due to cultural changes, age, motivation, etcetera. Therefore, the development of language in the separate subsystems may slow down, but it is unlikely that it will ever come to an end (Lowie, forthcoming). In addition, variability should not completely be explained by changing environmental factors, because that does not take into account the fact that much variability actually comes from the learner itself. Variability emerges because the learner and the environment constantly influence each other. Both the learner’s attitude and motivation may change over time, as may the environment. Furthermore, variability is essential in a DST/CT approach, because it shows transitions and changes in the process of acquiring a second language. Spoelman & Verspoor (2010) performed a longitudinal study of a learner of Finnish and were able to observe from their data that developmental jumps were preceded by variability. In addition, they found most variability in the early stages of language acquisition followed by stabilization in later texts. However, even during stable periods of time variability may occur (Van Dijk, Verspoor & Lowie, 2011). Van Dijk et al. (2011) summarize the importance of variability in relation with DST/CT as follows:

From a DST perspective, variability is inherent in any complex system and reflects actual data that should not be ignored but looked at closely to detect how a system changes from one phase to the next and how it behaves when it is in a stable state (p.61).

In other words, it is important to look at variability to be able to closely observe how and where the development of a learner in a second language takes place in periods of change and stability.
2.2 Complexity, Accuracy, and Fluency

Progress in language development cannot be measured by analyzing just one subsystem. "[F]rom a DST point of view, the language system can be assumed to consist of embedded sub-systems for all levels of language production and perception, like conceptualization, semantics, syntax, lexicon, phonology, and phonetics" (Lowie, forthcoming). Subsystems are interconnected and influence each other’s development. According to Lowie (forthcoming) “[a]dditional languages are not stored in different anatomical localizations, but may be considered as embedded functional subsystems in the dynamic sense” (p.2). This results in the idea that aspects of L1, for example lexical aspects, may affect development of the L2 lexicon. The interaction between the subsystems varies over time, resulting in a dynamic process of development. There are three measures in SLD that are conceived as independent subsystems: Complexity, Accuracy and Fluency (CAF) (Wolfe-Quintero et al., 1998; Larsen-Freeman, 2006; Larsen-Freeman & Cameron, 2008). In SLD studies these three (CAF) measures have been used to assess the performance of second language learners on both oral and written language use. Larsen-Freeman (2006) has put it this way:

"[T]he emergence of complexity, fluency, and accuracy can be seen, not as the unfolding of some prearranged plan, but rather as the system adapting to a changing context, in which the language resources of each individual are uniquely transformed through use (p. 590)."

It is assumed that CAF-measures show the relationship between language use and the context of use (Wolfe-Quintero et al., 1998). Complexity, accuracy, and fluency are conceived to have an independent position, because learners can have different linguistic goals at different times when performing in a second language (Larsen-Freeman & Cameron, 2008). The previously mentioned study by Spoelman & Verspoor (2010) also focused on accuracy rates and complexity measures in language proficiency of a learner of Finnish. They were able to conclude that complexity and accuracy measures were irregular, or dynamic, over a period of time and that their subject developed following the principles of DST/CT. Their results show peaks and instances of reversion. Their subject’s language developed in a non-linear fashion. At some points the participant showed progress, but there were also relapses. After periods with variability either a developmental jump or a transition between two stages in SLD occurred. Spoelman & Verspoor (2010) claim this finding to be evidence of the assumption that before the system is changing a relatively unstable period can be detected. They also show that the interaction between accuracy and complexity varies over time, although the interaction seemed quite random especially in the beginning.

The first measure to analyze language development is complexity. This measure is very important for our study, because it illustrates how the quality of writing of a learner develops over time. Complexity can be divided into two categories: grammatical complexity and lexical complexity.
Grammatical complexity in a text tells something about the width of the range of grammatical structures and vocabulary a writer is able to use. Wolfe-Quintero et al. (1998) relate grammatical complexity to ‘sophistication’; a learner who knows both basic and more refined grammatical structures will produce texts that are grammatically complex and therefore more sophisticated. The most frequently used measures for grammatical complexity often refer to “the length of the utterance, either sentence, t-unit, or clause, or refer to the amount of subordination” (Verspoor et al., 2008, p. 220). Especially the number of words per T-unit is often used as a measure for complexity, which Hunt (1965) defines as “a main clause and all its dependent clauses” (cited in Wolfe-Quintero et al., 1998, p. 70). However, the use of T-units has been criticized by a number of researchers, because they do not account for all aspects of the development of grammatical complexity, for example because t-units contain subordination and not coordination. A t-unit can be seen as nothing more than the representation of independent clauses (Wolfe-Quintero et al., 1998). Therefore, it has been argued that clauses are a better way to examine grammatical complexity because a clause is smaller than a t-unit thus providing better insight into the complexity of a sentence. This study will look at the number of finite dependent and independent clauses and non-finite clauses per sentence to measure the development of grammatical complexity, because Verspoor et al. (2011) explain that “the proportion of simple sentence constructions would decrease and a higher proportion of more complex constructions would be visible in the course of language development” (p. 48). A simple sentence consists of only main clauses, whereas complex sentences have dependent clauses. A dependent clause expresses “a whole event or situation with a subject and a predicate” (Verspoor & Sauter, 2000, p. 34). It starts with a subordinator (e.g. because, who, if, although, that, etc.) and functions as a constituent which cannot stand on its own. The higher the number of dependent clauses per sentence, the more complex the sentence is. Furthermore, we will also look at sentence length and the total number of sentences per text to capture a complete picture of the degree of complexity. When analyzing grammatical complexity, it is not important to look at the total number of clauses or sentences, but it is especially important to look at how varied the use of several grammatical structures is. When a learner becomes more advanced, she or he will be able to use a wider range of grammatical structures, but an advanced learner will not necessarily dismiss simple structures (Wolfe-Quintero et al., 1998). A useful measure to define the complexity of sentence constructions is to calculate the occurrence of independent and different types of dependent clauses, finite and non-finite. We will focus on the following types of clauses: independent clauses, adverbial clauses, nominal clauses, relative clauses, non-finite clauses, and fragments. The following table gives definitions of the different types of clauses, based on Verspoor & Sauter (2000), with examples from our data.
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<th>Types of clauses</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent or main clause</td>
<td>An independent clause which can stand by itself and forms a grammatically complete sentence.</td>
<td><em>Part A and B were handed in together.</em></td>
</tr>
<tr>
<td>Adverbial or subordinate clause</td>
<td>Finite clause which cannot stand on its own because it functions as an adverbial.</td>
<td><em>The men miss the clues, because they simply are no women.</em></td>
</tr>
<tr>
<td>Nominal or noun clause</td>
<td>Finite clause which functions as a subject, object, or other nominal and acts as a noun phrase.</td>
<td><em>I think I will need about 50 participants.</em></td>
</tr>
<tr>
<td>Relative or adjective clause</td>
<td>Finite clause which modifies one particular noun in a phrase.</td>
<td><em>He is watching the other people who are waiting for the train.</em></td>
</tr>
<tr>
<td>Non-finite clause</td>
<td>Non-finite construction which functions as an adverbial, nominal or noun-modifier.</td>
<td><em>He arranges a deal to get out earlier.</em></td>
</tr>
<tr>
<td>Fragment</td>
<td>Incomplete sentences which do not present a complete thought.</td>
<td><em>A logical reaction maybe.</em></td>
</tr>
</tbody>
</table>

Table 1 – Definitions and examples of different types of clauses

Adverbial clauses are always connected to independent clauses by a subordinator, whereas nominal and relative clauses are always embedded within independent or adverbial clauses. Therefore, it is important not to merge the different types of dependent clauses into one subcategory, but rather look at each distinct category. Wolfe-Quintero et al. (1998) provide an example of a study by Hunt (1965), who found that “adverbial clauses did not increase significantly with language development, while nominal clauses and adjective clauses did” (cited in Wolfe-Quintero et al., p. 73). There have been several discussions about how grammatical complexity develops in written language. A general assumption is that writers move from coordination to subordination in the beginning stages, and to an increase of nominal and relative clauses at later stages of language development (Wolfe-Quintero et al., 1998). In other words, a learner will use more adverbial clauses in the beginning stages of development and more nominal and relative clauses in later stages of development. Grammatical complexity can also be determined by looking at the use of tense/aspect, passives, coordinating connectors, or other specific types of words. However, this study will use different types of clauses as a measure of grammatical complexity, because this also allows us to look at non-finite clauses in addition to independent and dependent clauses and FVR. Wolfe-Quintero et al. (1998) and Spoelman & Verspoor (2010) both indicate that clauses are an important measure for language complexity, because they are an important feature of language development. In addition to clauses, this study will also look into Finite Verb Ratio (FVR) as a measure of grammatical complexity. Verspoor et al. (2008) recommend FVR to measure complexity, because it gives a better view of “the overall degree of sentence complexity” (p. 220). FVR refers to the number of words per finite verbs in a sentence. This will provide a smooth and detailed insight into the overall degree of sentence complexity. This measure is to be preferred over T-units and sentence length for instance because those measures do
not sufficiently provide details about the grammatical complexity of advanced learners’ language use, e.g. FVR can also show non-finite constructions and long clauses. By using FVR, we are able to analyze the complexity of the sentence as a whole (Verspoor et al, 2008).

The term ‘sophistication’, mentioned in the previous paragraph, is also used in relation with lexical complexity (Verspoor et al., 2011). Lexical complexity means that “a wide variety of basic and sophisticated words are available and can be accessed quickly” (Wolfe-Quintero et al., 1998, p. 101). Lexical complexity in SLD can refer to lexical variation (range) or lexical sophistication (size). Lexical complexity measures are not about the number of words used in a text, but rather about how many different types of words are used and how advanced these words are. The majority of lexical measures that relate to complexity are ratios measures. There are different lexical measures that are used to determine variation, density, and sophistication. We will look at Type Token Ratio (TTR), which is the number of different words in a text divided by the total number of words they were based on (Cobbs, 2004). TTR illustrates how varied someone’s use of words is, and thus relates to lexical diversity or variation. A high TTR indicates that there is a great deal of variety in vocabulary in the text, which relates to the level of language proficiency. Verspoor et al (2008) found that when sentence length went up, TTR decreased and vice versa. Their findings suggested a complex relation between varied vocabulary use and sentence length. It is possible that this relationship between these two measures disappears at later stages in SLD, because highly proficient or (near) native speakers do not use longer sentences as a sign of elaborate vocabulary use. Verspoor et al (2008) were able to conclude that “when academic writing proficiency increases, there seems to be a tradeoff between a more varied word use and longer sentences at different stages in the developmental process” (p. 225). Type Token Ratio measures have been criticized because of their sensitivity to text length. However, we only used texts with approximately the same length to account for this inaccuracy. Furthermore, we were familiar with the use of TTR and therefore chose to use this measure to account for lexical variation.

Measures of complexity, accuracy, and fluency also relate to the lexicon. Another lexical complexity measure is word length (WL), which is used to measure the use of vocabulary. Word length can be linked to sophistication, or originality, and it reveals how complex a language is (Wolfe-Quintero et al., 1998). According to Verspoor & Xu (forthcoming), “low frequency words tend to be longer than many high frequency words”. In other words, the higher the average word length the greater the lexical complexity is. Furthermore, the more types of words a second language learner knows how to use, the more fluent and accurate her or his language productions become. Lexical fluency measures are used to count the number of different types of words and how often these occur. Wolfe-Quintero et al. (1998) explain that “these frequency counts measure quantity, not variation or sophistication, so they are considered fluency measures rather than complexity.
measures” (p. 101). The different types of words that will be examined in this study are: K1 words, K2 words, off-list words, and words from the Academic Wordlist (AWL). The use of these different word-types will give us insight into lexical fluency of the writers. K1 words are words from the list of the 1000 most frequent word families, and K2 words are words from the second 1000 most frequent word families. Off-list words are words that do not appear on any word list. These may include proper nouns, misspellings, unusual words, acronyms, and abbreviations. However, Vocabprofile does not distinguish between the different types of off-list words; therefore it is difficult to draw valid conclusions with regard to the CAF measures. The AWL consists of 570 high-frequency words that appear in academic texts (Cobb, 2004).

The second measure to analyze language development is accuracy. Accuracy refers to “the ability to be free from errors while using language to communicate in either writing or speech” (Wolfe-Quintero et al., 1998, p. 31). Error analysis plays an important role in SLD research. The general assumption is that “as writers become more proficient, it becomes easier for them to produce increasingly accurate language” (Wolfe-Quintero et al., 1998, p. 34). Accuracy of a text can be tested by analyzing the target-like use. In other words, accuracy can be measured by counting errors in several levels such as punctuation errors, morphosyntactic errors, and lexical errors. In addition, it is also possible to look at correctness instead of errors to determine accuracy. When analyzing errors it is useful to classify error types in order to be able to identify a pattern in development more accurately. However, the advanced learners in our study make very few errors. Therefore, accuracy will not be a major focus in our study. Nevertheless, we will look at some aspects of accuracy in relation to fluency. We will study the incorrect use of formulaic sequences to account for accuracy, and investigate the use of other correct FS to account for fluency. The use of formulaic sequences (see chapter 2.3) is closely linked to a learner’s ability to produce accurate language and the level of proficiency. Learners will come across as more proficient L2 speakers when they master the use of FS, for FS “may help speakers reach a degree of linguistic accuracy, because these prefabricated chunks constitute ‘zones of safety’” (Boers et al., 2006, p. 247). As a learner becomes more proficient, they will thus produce more accurate language and more accurate formulaic sequences. We will look at different types of chunks to account for the accuracy measure, such as learner chunks, idioms and proverbs, compounds, phrasal and prepositional verbs, collocations, and simple fillers. Learner chunks are combinations of words which either have an incorrect meaning or contain lexical or grammatical errors. We will count the use of learner chunks and other FS to see whether the number of learner chunks decreases and the number of error-free FS increases.

The third measure to analyze language development is fluency. Fluency can be interpreted in various ways. Fluency in spoken language is often a measure of how rapidly a speaker is able to convey her or his message. The same definition for fluency can be used for written language; fluency
in writing is a measure of how quick a writer can write her or his message. It can also be used to determine how complex or creative someone’s language production is. Within this view, the way to measure fluency would be to count the number, length, or rate of production units such as sentences, T-units, clauses, and phrases (Wolfe-Quintero et al., 1998). However, these fluency measures seem to be more related to complexity and how varied a language is than to fluency. Therefore, for this study another definition of fluency will be used. Fluency will be regarded as the “automaticity of language use” (Wolfe-Quintero et al., 1998), because it provides a better understanding of the ease with which someone can produce a language. Schmidt (1992) argues that “what appear to be rules in learners’ language may be sophisticated applications of memory retrieval, strengthening, or chunking, and that these result in automaticity in processing and thus fluency in language use” (cited in Wolfe-Quintero, 1998, p. 13). In other words, fluency is related to the development of vocabulary use and the use of formulaic sequences as a result of automatic processing. This will be worked out in further detail in the following paragraphs. Fluency is closely linked to accuracy, because “they essentially capture the fluency of a writer within the context of writing accurate sentences” (Wolfe-Quintero et al., 1998, p. 15). Therefore, we will also focus on the use of FS to account for fluency. The more instances of error-free FS a writer uses, the more fluent her or his language is. Formulaic sequences are retrieved from memory as ready-made chunks and therefore they make it easier for speakers to become fluent in a language (Boers et al., 2006). It is assumed that the increase of fluency corresponds to the increase of complexity and accuracy. However, the relationship between errors in language use and second language development has not been proven yet (Wolfe-Quintero et al., 1998). The distinction between complexity, accuracy, and fluency is not very clear, because there is a lot of overlap between the CAF measures.

2.3 Formulaic sequences
The process of language acquisition relies heavily on the use of formulaic sequences (Wray & Perkins, 2000). The patterning of words does not occur at random, but rather consists to a large extent of collocational ‘sets’ (Sinclair, 1991). A range of corpus studies has shown that “natural language makes considerable use of recurrent multi-word patterns or ‘formulas’” (Ellis and Vlach, 2009, p. 61). According to Sinclair’s Idiom Principle “a language user has available to him or her a large number of semi-preconstructed phrases that constitute single choices, even though they might appear to be analyzable into segments” (1991, p. 110). FS can serve as a basis on which a learner can build their utterances. This way one does not have to make completely new sentences every time language is used, but there is a set of phrases which can help create new sentences. Wray and Perkins (2000) state that FS can serve as a short-cutting process, especially for beginning learners. They found that participants were able to retell a story almost identically for the third or fourth time and attribute
this finding to the use of FS. In other words, using FS is an effective and efficient way of expressing yourself verbally. As a language learner becomes more advanced in a language, his or her use of formulaic sequences also progresses. Second language learners become more sensitive to formulaicity and collocations as their language development advances (Wray, 2000; Ellis, 2009). It has been argued that “memory for chunks is the source of all second language development, including phonology, grammar, lexis, and discourse” (Wolfe-Quintero et al., 1998, p. 5). FS has been subject in several studies on SLD in recent years. For a learner to achieve a high proficiency level in the English language it is essential to become proficient in formulaic sequences, because the use of FS can help speakers to come across as proficient language learners (Boers et al., 2006). Therefore, it is vital for a learner in order to become successful in an L2 to use FS fluently and regularly, because FS is also often used in native speech (Ellis & Simpson-Vlach, 2009). FS helps the speaker to sound more native-like and it might even facilitate and increase the pace of linguistic development (Eyckmans et al. in Smiskova, 2011). Use of FS is also found often in speech of starting learners, but Girard & Sionis (2004) found that FS remains a processing strategy. The acquisition process begins with a heavy reliance on formulaic language (Wray & Perkins, 2000). Some of these formulaic sequences are non-native like and can be found in the output of beginning learners; however learners also use native-like formulaic sequences that are very different from their first language. These native-like sequences may later disappear or persist, but as Wray and Perkins explain “it is often the failure to use native-like formulaic sequences that ultimately marks out the advanced L2 learner as non-native” (2000, p. 2). In other words, FS can also be used to distinguish advanced non-native speakers from native speakers. In sum, FS may seem as a rather confusing feature of language, because it is often found in speech of starting learners. However, the FS used by starting learners consist of both correct and incorrect FS. As the learners become more advanced they will use less incorrect FS and more native-like FS. FS can thus be used to distinguish native speakers from non-native speakers. Therefore, FS is important for both starting and more advanced learners.

Although FS is an important element of language use it is found more in spoken speech than written language (Ellis & Simpson-Vlach, 2009). Many studies on SLD report on FS, but not all studies have the same working definition of FS. Since there are many different forms of formulaic sequences it is difficult to develop an accurate and comprehensive definition. In short, FS is a pair or group of words that is often used together and stored in the mental lexicon as one expression. We have decided to use Wray’s definition of formulaic sequences as the basis for our paper (Wray & Perkins, 2000, p. 1):

A sequence, continuous or discontinuous, of words or other meaning elements, which is, or appears to be, prefabricated: that is stored and retrieved whole from memory at the time of use, rather than being subject to generation or analysis by the language grammar.
Wray’s definition states in short that formulaic sequences are “stored and retrieved whole from memory at the time of use”. This would mean that “any quantity of our language” (Wray, 2000) even single words and morphemes can be seen as formulaic sequences, but this definition is much too broad to use for the purpose of this research. We need a more clear-cut definition to be able to see how the use of formulaic sequences by second language learners develops over time. Wray and Perkins (2000) have provided an extensive list with characteristics of formulaic sentences, which can help to identify formulaic sequences in a text. We added this list in appendix i. Schmitt (2004) has also provided a short list with some of the most important characteristics from the original list by Wray and Perkins (Schmitt, 2004, pp. 4-9):

1. Formulaic sequences appear to be stored in the mind as holistic units, but they may not be acquired in an all-or nothing manner.
2. Formulaic sequences can have slots to enable flexibility of use, but the slots typically have semantic constraints.
3. Formulaic sequences can have semantic prosody.
4. Formulaic sequences are often tied to particular conditions of use.

There are several procedures that can be used for identification and classification of formulaic sequences. One frequently used procedure to identify FS is through frequency in a corpus-based approach. Instead of having to locate and count all the different sequences, “corpus software can search for specified headwords, combinations of words and even discontinuous sequences of words” (Schmitt, 2004, p. 30). Corpus-based studies have based their distinction of FS and non-FS on frequency measures, but this is not an entirely satisfying way of measurement. Wray (2000) explores the difficulty of establishing FS by means of frequency counts. Some instances of FS may be identified as FS, but it is possible that these FS are hardly ever used in everyday language use and that they are thus low-frequent but familiar to most speakers of the language as the following example from Wray (2000) shows: “The King is dead, long live the King” (p. 466); this is a sentence that is hardly ever used, but it is easily identified as FS. Another problem with taking frequency as a measurement means for distinguishing between FS and non-FS is that one cannot simply assume that high-frequency series of words are automatically FS. In other words, FS may sometimes look identical to non-formulaic sequences. Furthermore, Wray (2000) explains that “some formulaic sequences that are widely accepted as such by native speakers are actually not very frequent in normal discourse” (Wray, 2000, p. 466). Finally, this procedure is also very time-consuming. However, Wray and Perkins (2000) do acknowledge that there is some role for frequency in FS: “There is undoubtedly some sort of relationship between frequency and formulaicity, both in the sense that some formulaic sequences are very frequent, and that formulaic output is frequently called upon” (p. 6). We have chosen to use a different procedure that is based on researcher’s intuition and linguistic knowledge. This procedure does require that a definition of formulaic sequences is formulated before the actual
start of the research. Although intuition is not a very reliable measurement, the list by Wray & Perkins (2000) serves as a good basis to extract FS from a written text.

In order to define our FS, we first divided the formulaic sequences into 6 categories: learner chunks, idioms and proverbs, collocations, compounds, phrasal and prepositional verbs, and simple fillers. Learner chunks are combinations of words which either have an incorrect meaning or contain lexical or grammatical errors, and these are low-frequent (e.g. language acquiring process). Idioms and proverbs are fixed expressions or sayings that are widely used (e.g. it's raining cats and dogs). We used various online idiom dictionaries to identify idioms and proverbs. Verspoor & Xu (forthcoming) define collocations as “collocating nouns, adjectives, verbs and also adverbs, prepositions, pronouns” (p. 16). However, this definition is very broad. We defined collocations as combinations of words that are frequent uses or institutionalized chunks, which consist mainly of more than two words (e.g. on the other hand). Compounds are semantic units that are difficult to interrupt, or as Verspoor & Xu (forthcoming) explain “fixed combinations of nouns, adjectives, prepositions or participles” (p. 16). For compounds we used stress as an indicator, because compounds usually have stress on the first word (e.g. organ donation). Phrasal and prepositional verbs are frequent combinations of verbs or verbs with a preposition (e.g. tell about). Finally, simple fillers are combinations of words that are used to fill up a pause in a sentence without adding an extra meaning to the sentence (e.g. kind of). We used the Corpus of Contemporary American English (COCA) to determine whether a particular expression was high-frequent or low-frequent, which helped us to define in what category of FS the expression belonged. We expect that non-native speakers will use more learner chunks in the beginning and that these will gradually disappear to be replaced by error-free FS as they become more advanced in their second language.

2.4 Inter-individual and intra-individual differences
Both language acquisition and language development are influenced by a number of factors. For example, the context in which language is used plays an important role in both L1 and L2 acquisition (De Bot et al., 2007; Spoelman & Verspoor, 2010). Furthermore, the development of a second language is also influenced by additional factors. The L1 plays an important role in SLD, because representations of the first language may surpass the activation of newer representations from the second language. As the second language develops over time the learner will have strengthened the L2 representations and they are more likely to get activated. Constructions and lexical or morphological similarities can serve as both a help and an obstacle in the process of acquiring a second language (Spoelman & Verspoor, 2010). In a DST/CT point of view, the dynamic subsystems of all languages are strongly connected which makes it possible for languages to interfere. The interaction between these subsystems is said to vary over time, which causes a non-linear
development. In other words, the acquisition of a second language is even more complex than L1 acquisition. However, there are still many questions unanswered with regards to L1 and L2 acquisition and the effect of L1 on L2 in the process of acquisition (O’Grady, 2008). The SLD process is not exactly the same for all learners and from a DST/CT point of view, and it is even doubtful whether learners can have similar L1 systems to start with (De Bot et al., 2007; Verspoor et al., 2010).

Languages do not develop following a pre-determined scheme; therefore there can be much variation both on an inter-individual and on an intra-individual level. In addition, language acquisition is an individual process. Even when people are exposed to the same amount and the same quality of language (although it is impossible to be exposed to exactly the same amount) it is possible that their development alters from others. Larsen-Freeman (2006) conducted a study on the process of learning English as a second language for 5 women from the People’s Republic of China. Her subjects all followed the same course and made the same assignments in order to account for the idea that they were exposed to the same amount of English. She found deviating patterns of development in the areas of complexity, accuracy and fluency for all 5 participants:

Such variation is only magnified in SLA, where there is an influential L1, not to mention a cognitive and experiential maturity on the part of learners that affect the process. Thus, although it could be said that the learners were exposed to similar instructional procedures during the course of this study, they actually exhibit diverging patterns of development, due perhaps to the way that individuals have chosen to allocate their limited resources (Larsen-Freeman, 2006).

This study will also analyze the SLD of two advanced learners that are exposed to approximately the same quality and amount of language. It is important to note that these learners already had a fairly advanced level of writing proficiency at the beginning of their academic studies, therefore it can be expected that the starting point will be higher than for beginning or intermediate learners. Furthermore, the advanced learners will go through different developmental stages than starting learners. We expect there will be a lot of variability in the development of the written language of the two learners in this study, because previous studies that investigated the written language use of native speakers also found a lot of variability. The previously discussed study by Spoelman & Verspoor (2010) showed that most variability and developmental jumps were found in the early stages of language acquisition. Therefore, it might be assumed that there will be less clear developmental jumps in the SLD of advanced learners in this study compared to beginning and intermediate learners, because there will be a lot of variability throughout the developmental process. Variability is essential in a DST/CT approach to SLD because it shows transitions and changes in the process of acquiring a second language. As mentioned before, both external and individual factors play a role in SLD, such as “prior knowledge of another language, type of instructions, possible critical period effects, and individual differences in motivation, among others”
Prior knowledge, critical period effects, and type of instruction are fairly similar for both participants in this study, because the learning conditions and educational background of the two learners have been virtually the same. However, individual motivation and aptitude might have been different in certain periods of time. These possible differences between the participants can influence the course of L2 development. The results will show how and where these differences in language development of the two learners will appear, which will shed some light on the influence of intra-individual and inter-individual differences in the process of SLD.

2.5 Writing genres

Another important focus of this study is the difference in writing genres. Over the course of their academic studies, the learners have been exposed to different types of writing. They have written a large number of texts for all sorts of different purposes, which will have challenged them in various ways. The different writing genres include free writing assignments, creative writing assignments, assignments meant to be spoken (presentations), instructed writing assignments, and graded essays. These different writing genres are merged into two different general groups: formal and informal writing genres. The difference in writing genre is treated as an environmental factor. This study is not the first one to mention this factor as important when analyzing language development. There has been a sociolinguistic group, according to Verspoor et al. (2008), which looked at a number of environmental factors:

Another sociolinguistic group, inspired by theories such as Labov’s (1963), looked at a great number of factors such as interlocutor (first language or L2 speaker); situational context (formal, informal); task (speaking, writing); form-function relations (e.g. certain types of article errors occur with certain types of nouns); and the like to account for the variability observed (p. 215).

However, previous studies have not considered a difference in writing genres as a major focus in their analysis. We believe these different writing genres are important factors in SLD that should be taken into account in the analysis, because they help to understand what factors influence language development. Different writing genres should not be analyzed all together, because this can create a distorting picture of the developmental process. Instructed writing assignments and graded essays are more likely to follow a pre-determined structure (e.g. comparison, argumentative, etc.) that fits within the expectations of an academic audience and thus demands a higher standard of language use. In uninstructed assignments, however, there is much more room for creativity and the level of language use is not prescribed but rather a free choice of the writer. In other words, it can be expected that instructed writing assignments and graded essays will show a more sophisticated vocabulary and more complex sentence constructions than uninstructed or free writing assignments.
We have chosen to analyze the language development in two areas of writing, namely formal and informal writing genres. Formal writing genres include instructed writing assignments and graded essays, and informal writing genres include free writing assignments, creative writing assignments, and assignments that are meant to be spoken. Including the different writing genres in the analysis will provide a better view of how the language of the two learners has developed and what factors influence SLD.

2.6 Research questions and hypotheses
This study investigates the language development of two advanced Dutch learners of English. We will examine the development of the quality of writing of these two learners by looking at their written work over the course of 3,5 to 4 years. Our study is based on Dynamic Systems Theory and Complexity Theory, which supports the assumption that language development progresses in a non-linear fashion and includes variability in analyses. The research questions that will be addressed in this study are:

1. Does the language development of the two learners prove to be a dynamic system of change?
   a. In what way does this dynamic process become visible?
2. Will complexity, accuracy, and fluency progress in a non-linear fashion?
   a. To what extent do they illustrate the dynamic process of SLD?
   b. What do the different measures say about the developmental process and level of writing proficiency?
3. Will the use of FS illustrate an increase in fluency and accuracy over time?
   a. What do fluency and accuracy say about the development and level of writing proficiency of second language learners?
4. Will there be differences in the SLD between two learners who share not only a similar linguistic background but also a similar context in which their language development took place?
   a. How and where will these differences between the two learners appear?
5. Will there be differences in the various aspects of SLD between formal and informal writing genres?
   a. How and where will these differences between formal and informal writing genres appear?

We expect the language development of student A and B to progress in a non-linear fashion. This fits within the DST/CT perspective, which claims that SLD is a dynamic system of change. In addition, following the principles of DST/CT we will also analyze the variability in the participants’ data. In
order to find out how the quality of writing progresses, we will focus on the development of complexity, accuracy, and fluency by looking at grammatical and lexical complexity measures and the use of formulaic sequences. The aim of this study is to find out how complexity, accuracy, and fluency develop over time according to non-linear development by explaining how these systems are connected. Furthermore, we are interested in what the different measures say about the developmental process and level of writing proficiency. We expect there will be much variability in the development of complexity, accuracy, and fluency because variability analyses have proven that variability is a central element in language development and DST/CT. We also expect a general increasing trend in the development of the CAF measures, which means that the degree of complexity, accuracy, and fluency will have increased. We will examine the development of grammatical and lexical complexity measures by looking at how these correlate with each other. We expect the sentence constructions to become more complex and the vocabulary to become more varied and sophisticated as a learner becomes more advanced (Wolfe-Quintero et al. 1998). Furthermore, we will investigate how the use of formulaic sequences by a second language learner develops over time as he or she becomes more advanced. We expect the learners will use more error-free FS and that the use of learner chunks will gradually disappear as the learners become more advanced, which means the degree of fluency and accuracy will have increased. Wray and Perkins explain “it is often the failure to use native-like formulaic sequences that ultimately marks out the advanced L2 learner as non-native” (2000, p. 2). We also expect a difference in the language development in student A and B because the differences within and between the individual learners play an important role in how a language develops (De Bot et al., 2007; Verspoor et al., 2010). Finally, we distinguish between different writing genres to account for the various aspects of SLD. Previous studies in SLD have not taken different styles of writing as a main focus in their analysis. The reason that we included this to our research is that although we expect growth in both writing genres, we expect a different development and the degree of complexity and fluency to start off at a higher rate in the formal writing genres and to remain at a higher rate during the course of development. The hypotheses that we used for this study are numbered and formulated more explicitly in chapter 3.4 in the design and analysis.
CHAPTER 3 - METHOD

This study will look into the second language development of two advanced learners of English, hereafter called student A and student B. During their studies they have written a large number of texts for various assignments, which were all collected for the purpose of this study. A random sample of 200 to 250 words was taken from each written text. In total, a number of 156 texts samples were collected, which serve as data for this study. There is a minor difference in the time span in which both students have written their texts. Student A has been studying a year longer than student B. However, student A was not able to collect samples from the first semester; therefore the starting point for student A will be the second semester and not the very beginning. Thus, the time span for student A amounts to 4 years and for student B to 3.5 years. Nevertheless, the number of text samples is about the same for both students (77 for student A versus 79 for student B). The time period between the texts is not always the same. Sometimes two or more texts were written in one week and in some weeks no texts were written at all. We have divided the text samples into 6 categories to account for the different writing genres: graded essays, writing assignments, creative writing, free writing, spoken texts, and translations. These categories were then subdivided into two categories, formal and informal, because for some writing genres there were too few text samples to be able to make a representative analysis. The formal writing genres include graded essays and writing assignments, and the informal writing genres include all other writing genres. We have joined multiple text samples per week with the same writing genre by calculating the averages. There are still some instances of two or more texts per week, but these have different writing genres and could not be combined. The text samples were analyzed for grammatical complexity, lexical complexity, and fluency by looking at different characteristics of the texts. We used Vocabprofile to analyze the different lexical frequency measures, and WordSmith for the grammatical and lexical complexity measures. Finally, we looked at the number and different types of formulaic sequences to account for accuracy and fluency. We will look at the use of incorrect FS, indicated as ‘learner chunks’, to account for accuracy and we will look at the other FS to account for fluency. Formulaic sequences are retrieved from memory as ready-made chunks (Boers et al., 2006) and they reflect someone’s level of fluency. The more instances of error-free formulaic sequences a writer uses, the more fluent her or his language is. All the results for the grammatical complexity measures, lexical complexity measures, fluency measures, and the different types of FS were processed and analyzed in Microsoft Excel using tables, scattered graphs, moving min-max graphs, moving averages, and moving correlations.
3.1 Participants

The subjects in this study are two native speakers of Dutch who are advanced learners of English. They studied English Language & Culture for three years at the University of Groningen. They are currently in the first year of their Master in the English Teacher Training Program. The participants are both female and are the same age. They have approximately the same level of proficiency in English and have a similar educational background. Both participants have a secondary school degree for pre-university secondary schooling (VWO in Dutch), which means that they have been educated for six years on a similar level and worked towards the same central exam. The aims in their English education have therefore been the same. However, the participants did not visit the same secondary school and have not used the same teaching methods during their education. Nevertheless, as mentioned before, they were both working towards the central exam, thus pursuing the same linguistic goals. Both participants were first introduced to the English language in the year before their final year of primary education and have since then been educated in the English language on a weekly basis. Overall, it can be argued that the English education of both participants is based on the same foundations. Following their decision to enroll in English Language and Culture program at the University of Groningen, it can be argued that their motivation to learn the language is the same. Both participants have successfully completed their Bachelor degrees, which means that according to the requirements set out for the program they have acquired a high degree of language proficiency in English that is ‘near native’ (CEFR C1/C2). Furthermore, both students have completed most of the courses at once with approximately the same grades, indicating a same level of aptitude. Although the learners are similar in that they had both roughly the same educational background and the same context in which their development took place, it is impossible to state that input, motivation, and aptitude have been exactly the same during the entire time of their studies. Furthermore, there may also be differences between the two learners due to individual preferences or personality differences. For example, a learner might perform better in a specific area of SLD because she has an individual preference for this area. Another difference could be a personality difference, for example one of the learners may be more precise as the other, whereas the other may be sloppier.

3.2 Materials

The data consists of 156 written samples on academic topics from short regular intervals over the course of respectively 4 and 3,5 years. The samples result from assignments that were written at home without any time pressure and for which academic sources were consulted. From each written assignment a random sample of 200-250 words was selected. These samples were changed into .txt files to account for formatting irregularities. In addition, all files were put together in one big Microsoft Word file to have an overview of all the texts and to be able to count the formulaic
sequences, finite verbs, and different types of clauses. Counting the clauses served as an extra check for the finite verb ratio, because the number of finite clauses needed to be the same as the number of finite verbs. Finally, all the results for the different complexity measures and formulaic sequences were gathered in an Excel file for each participant. These files were arranged chronologically per text for both participants. The results for the grammatical complexity, lexical complexity, and lexical fluency measures of each text were entered into an Excel file, followed by the occurrences of the different types of formulaic sequences. When possible, multiple texts that were written in one week were merged together into one entry. This was only possible if the texts were written in the same writing genre. Next, the file was copied and divided into two separate sheets for each participant: one for the results of the formal texts and one for the informal texts. The sheets were built up in the following order: number, week, year, semester, TTR, AWL, K1 words, K2 words, Off-list words, word length (WL), standard deviation WL, sentence length (SL), standard deviation SL, number of sentences, writing genre, different types of clauses (independent, adverbial, nominal, relative, non-finite, and fragments), and different types of FS (learner chunks, idioms and proverbs, collocations, compounds, phrasal and prepositional verbs, and simple fillers). Number refers to the numbers of the texts in chronological order for each participant. We will also use the numbers of the texts in the results section to draw graphs and tables and to illustrate our findings. Week, year, and semester refer to the actual week numbers of that particular year and semester.

3.3 Procedures
The text files were processed in Vocabprofile to look for words from the Academic Word List (AWL), K1 words, K2 words, off-list words, and Type Token Ratio (TTR). These measures reflect the degree of lexical fluency. K1 words are words from the list of the most frequent 1000 word families, and K2 words are from the second 1000 most frequent word families. Off-list words are words that do not appear on any word list. They may include acronyms, abbreviations, proper nouns, unusual words, and misspellings. The AWL consists of 570 high-frequency words that appear in academic texts (Cobb, 2004). Type Token Ratio measures have been criticized because of their sensitivity to text length. To account for inaccuracies concerning TTR measures this study only used texts with approximately the same length between 200 and 250 words. The percentages for the lexical fluency measures were incorporated in an Excel file. To be able to say something about the grammatical complexity of our data we used WordSmith to analyze the total number of sentences, sentence length (SL), and Finite Verb Ratio (FVR). We also counted the number of independent clauses, adverbial clauses, nominal clauses, relative clauses, non-finite clauses, and fragments. These measures were also inserted into the same file. The average word length was also found with WordSmith, but this reflects lexical complexity. All the original written samples were also combined
in one Word file to get a clear overview of all the texts. We used the Word file to count the number of finite verbs, dependent clauses, and formulaic sequences manually. The number of finite verbs per sentence is used to analyze the grammatical complexity of the sentence constructions as a whole. FVR reflects the ability of a learner to create new sentence constructions, which helps to understand the linguistic development of a learner over time (Verspoor et al., 2008). In order to measure FVR all texts were carefully read and the finite verbs were underlined manually. The ratio was calculated as follows: the number of words per sentence divided by the number of finite verbs (SL/FV). The higher the number of finite verbs per sentence, the smaller the SL/FV ratio is. Furthermore, we counted the number of independent, finite dependent clauses, and non-finite dependent clauses. We used Verspoor & Sauter’s (2000) handbook as a guideline to identify the different types of clauses (see table 1 in chapter 2.2). The independent clauses and finite and non-finite dependent clauses per sentence were highlighted and counted manually. Next, the average number of the different types of clauses per text was calculated and inserted in the Excel file.

Another important variable for this study is the use of formulaic sequences to account for accuracy and fluency. Based on Broers et al. (2006), we divided the formulaic sequences into 6 categories: learner chunks, idioms and proverbs, collocations, compounds, phrasal and prepositional verbs, and simple fillers (see chapter 2.3). The division was made to see whether there is a development in and between the different categories of formulaic sequences. The formulaic sequences were identified with help from Wray & Perkins’ checklist for formulaic sequences (2000), Schmitt’s list of characteristics (2004), and our own linguistic experience. Subsequently, we used the Corpus of Contemporary American English (COCA) reference corpus (Davies, 2004) to determine whether a particular chunk is a frequently used expression. Learner chunks are combinations of words which either have an incorrect meaning or contain lexical or grammatical errors and have low frequencies. Collocations are combinations of words that are highly frequent. Therefore, we used the COCA corpus to calculate the frequency of the chunks to identify learner chunks and collocations. We also used several idiom dictionaries on the internet to identify the idioms and proverbs. In order to identify compounds, we used stress as a main indicator, because compounds usually have stress on the first word. Compounds are semantic units, which are difficult to interrupt. Phrasal and prepositional verbs are frequent combinations of verbs or verbs with a preposition. We used the Oxford Collocations Dictionary to check whether a particular combination of verbs or a verb with a preposition was a chunk. Finally, simple fillers are combinations of words that are used to fill up a pause in a sentence and which do not add an extra meaning to a sentence. All the text files were checked several times for formulaic sequences, at least twice by the author herself and also once by the other researcher. Initially, we also included lengthy standardized phrases and functions (e.g. excuse me) as types of FS. However, there were not enough instances of these types of FS to be able
to draw any conclusions about them. Therefore, we re-categorized lengthy standardized phrases and functions into the other categories that were best for each separate instance. They were often included in the collocations category.

Ultimately, the data was entered in the spreadsheet and we made graphs. We used a scatter with straight lines and markers. In addition, we added a polynomial trend line of the second degree as a smoothing technique which gives a rather broad generalization of the data (Van Dijk et al., 2011). We also made moving correlations, moving averages, and moving min-max graphs to be able to see how the developmental process took place and in order to look at variation in relation to developmental jumps. A moving min-max graph is a smoothing technique that can help to visualize the degree of variability in data. When a min-max graph shows a wide bandwidth it means there is much variability. Subsequently, a narrow bandwidth means a stable period with little variability. All moving min-max graphs have a window size of five data points. These min-max graphs were important for this study in order to analyze variability in the process of language development.

3.4 Design and analysis

After all the data was collected, the Excel file was organized in the right order. Weeks with more than one text sample in the same writing genre were combined by calculating the averages of the numbers for the different measures per week. The results from student A and student B were processed separately from each other, and also for the formal and informal writing genres. We examined each factor individually, but also looked at correlations between several data types. For example, we calculated the correlations for different complexity measures to see whether there is a significant relationship between specific complexity measures. On the basis of previous studies and the assumptions that are made in this study, the following hypotheses were drawn:

1. The language development of student A and B will progress in a non-linear fashion.

   Based on a DST/CT approach to SLD we expect to find non-linear progression in the development of both students. Language development is a process of change and dynamics (Lowie, forthcoming); therefore we expect to find dynamic patterns in all measures.

2. There will be a lot of variability in the development of complexity, accuracy, and fluency; nevertheless there will also be a general increasing trend.

   Although we expect some growth in all complexity, accuracy, and fluency measures, we also expect to find variability in our data for all measures. Variability is a central element in the DST/CT framework, and it is needed in the process of SLD. It is only possible for development to take place when learners have the possibility to choose from a wide range of options and then select what they
need to use (Spoelman & Verspoor, 2010). In sum, we will see variability in all measures used to determine complexity, accuracy, and fluency.

3. The degree of grammatical and lexical complexity will increase as the learners become more advanced, because the sentence constructions become more complex and the vocabulary more varied and sophisticated.

For grammatical complexity we will look at the number of sentences, sentence length, Finite Verb Ratio, independent clauses, adverbial clauses, nominal clauses, relative clauses, non-finite clauses, and fragments. We expect the degree of grammatical complexity to increase, because the sentence constructions become more complex as the learners become more advanced. A complex sentence consists of an independent clause and one or more dependent clauses, both finite and non-finite. The sentence constructions will have become more complex if the results show an increase in the average sentence length, FVR, nominal clauses, relative clauses, and non-finite clauses. The number of sentences will decrease, and the number of independent clauses and adverbial clauses will remain approximately the same. For lexical complexity we will look at the number of K1 words, K2 words, off-list words, academic words, TTR, and word length. We expect the degree of lexical complexity to increase, because the vocabulary becomes more varied and sophisticated. The vocabulary will have become more varied and sophisticated if the results show a decrease in the number of K1 words, and an increase in the number of academic words, TTR and word length. The number of K2 words and off-list words will remain approximately the same.

4. The degree of fluency and accuracy will increase as a learner becomes more advanced, because they will use more error-free FS over time and the use of learner chunks will gradually disappear.

For accuracy and fluency we will look at the use of learner chunks, idioms and proverbs, collocations, compounds, phrasal and prepositional verbs, and simple fillers. We expect an increase in the use of error-free FS, especially collocations, and we expect the use of learner chunks to gradually disappear.

5. There will be a difference between the language development of student A and student B, because of both inter-individual and intra-individual differences.

All measures from student A and student B will be compared in order to analyze the inter-individual differences. The learning conditions of both participants have been roughly the same. However, it is impossible to state that input, motivation, aptitude, etc. have been entirely the same for both students during their time of studies. Furthermore, there might also be differences in personality. These possible differences between the participants can influence the course of L2 development. We
expect to find differences in the ways of how student A and B have acquired certain aspects of language (De Bot et al., 2007; Verspoor et al., 2010). It is difficult to say which aspects exactly, but it is foremost important to stress that differences in the learning curve will appear. In addition, the results will also show differences within the learning development of the separate students, i.e. intra-individual variability. The learning curve will not be linear, but will rather show variability in the process of language development. Both aspects of variability will shed some light on the influence of intra-individual and inter-individual differences on the process of SLD.

6. There will be growth in the degree of complexity and fluency in both writing genres, however in the formal writing genres the degree of complexity and fluency will start off at a higher rate and will remain at a higher rate during the course of development.

Different writing genres should not be analyzed all together, because this can create a distorting picture of the developmental process. We believe there is a difference in the manner of writing for formal and informal assignments. Formal writing assignments and graded essays are more likely to follow a pre-determined structure (e.g. comparison, argumentative, etc.) that fits within the expectations of an academic audience and thus demands a higher standard of language use. In uninstructed and informal assignments, however, there is much more room for creativity and the level of language use is not prescribed but rather a choice of the writer. In other words, we expect that instructed writing assignments and graded essays will show a more sophisticated vocabulary and more complex sentence constructions than uninstructed or free writing assignments. Since formal assignments demand a higher standard of language use, we assume that the starting rates and overall height for the formal texts will be higher than for the informal texts, also due to the overall more casual tone of the latter.
CHAPTER 4 – RESULTS

In this section, the results for the three analyses of this study will be discussed. These analyses include: a grammatical complexity analysis, a lexical complexity analysis, and an analysis of formulaic sequences. The results will be discussed for both the formal and informal writing genres, and separately for student A and B.

4.1 Grammatical complexity

For the grammatical complexity analysis we looked at the number of sentences, sentence length, Finite Verb Ratio, and different types of clauses. These different types of clauses include: independent clauses, adverbial clauses, nominal clauses, relative clauses, non-finite clauses, and fragments.

4.1.1 Student A

The number of sentences in the formal texts shows an increasing trend, but the number of sentences in the informal texts shows a decreasing trend. The difference between the two writing genres becomes smaller towards the end; subsequently average sentence length is higher in formal texts. The average number of sentences in the informal texts is higher than the average number in the formal texts. There is strong negative correlation between the number of sentences and sentence length in both writing genres of -0.94. The number of sentences decreases in the informal texts and the sentence length increases. For the formal texts, this is the other way around: number of sentences increases and the sentence length decreases. The min-max graphs for informal texts show much variability in the beginning, especially between text 25 and 35 and a rather small amount of variability towards the end. The formal texts show a rather large amount of variability from text 50 to 58 and another large bandwidth from text 60 onwards. In addition, when comparing the min-max graphs of the number of sentences and SL, the bandwidths are constantly approximately the same. However, a peak in the number of sentences means a low in sentence length and the other way around. Average sentence length is shorter for informal texts than formal texts. On average, the formal texts have sentences with a length of 19.70, the informal texts are 18.41 words long.
FVR starts off and stays higher in the formal texts with a clear ascending trend line, but the informal texts show a slightly different development (figure 2). There is an ascending line towards the peak in text 45 in the informal texts, followed by regression and a rather stable FVR with little variability. The formal texts show variability from text 0 – 18, followed by a period of relative stability. There is also a peak in the formal texts, but it occurs in text 47 and 50 which is later than in the informal texts. From text 45 onwards the min-max shows a period with much variability followed by a period in which the variability decreases. There is a moderately strong negative correlation between FVR and the number of sentences of all texts together of -0,50. There is also a moderately strong correlation of FVR and sentence length of all texts together of 0,49. The formal texts have an average FVR of 11,48, the informal texts have an average FVR of 9,68. There is a moderately strong correlation between FVR and word length of 0,35.

The use of independent clauses in formal texts decreases while the use of independent clauses in informal texts only decreases in the beginning and shows an increase after text 50. Overall, there is a slight increase in the use of independent clauses in informal texts. The formal texts show a
high amount of variability in the beginning and the informal texts show a high amount of variability towards the end.

The formal texts show much variability in the use of adverbial clauses. There are three periods of time with a large bandwidth visible in the moving min-max graph on three different periods during the time of measurement and periods of little variability in between. The informal texts show gradually increasing variability with a peak between text 40 and 55 (figure 3). After those texts, variability gradually decreases. Both writing genres show an increase in the use of adverbial clauses until text 40, where the amount of adverbial clauses used is the same in the two writing genres and a decreasing number of adverbial clauses after that peak. There were more adverbial clauses in formal texts in the beginning but in the end most adverbial clauses are found in informal texts.

![Figure 3 – Moving min-max graph of adverbial clauses in informal texts for student A](image)

The nominal clauses show a decreasing trend but after text 50 the use of nominal clauses increases in the formal texts. Especially the first ten week show a high degree of variability. However, bandwidth does not become narrow anywhere in the data, indicating that the use of nominal clauses remained unstable during the entire period. There are more nominal clauses in the informal texts although this difference disappears towards the end.

The polynomial trend line shows a linear decrease of the use of relative clauses in formal texts. In the informal texts it also decreases but it tends to go up a little after text 60. Both writing genres have much variability in the first 20 texts. Between text 35 and 50 there is another period of variability in the informal texts. The formal texts show a slight increase of variability between text 50 and 58, but overall the bandwidth is narrower than in the informal texts. The use of relative clauses decreases in the formal texts and is constantly higher in informal texts.

The use of non-finite clauses increases in informal texts and stays the same in the formal texts. The formal texts show much variability in the first 18 texts and slightly more from text 58
onwards, with little variability in between. The informal texts show one big period of variability, bandwidth is quite big during the entire period (figure 4). No correlations have been found between any of the clauses.

![Figure 4 – Moving min-max graph of non-finite clauses in informal texts for student A](image)

**4.1.2 Student B**

The number of sentences for student B decreases in both writing genres, whereas the average sentence length shows an increasing trend in both writing genres. However, this increasing trend of the average sentence length is much more obvious in the informal writing genres than it is in the formal writing genres (figure 5). Overall, the average sentence length is also higher in the formal texts (19.95) than in the informal texts (17.01). Furthermore, the number of sentences shows a more clear descending line in the informal texts than it does in the formal texts. The average number of sentences is also higher in the informal texts (13) than in the formal texts (11.2).

![Figure 5 – Average sentence length (SL) in both writing genres together for student B](image)

The min-max graphs for the number of sentences and sentence length have a similar bandwidth for throughout the developmental process for both writing genres. There is overall little variability in
both writing genres, except for a sudden growth in variability in the informal writing genres in both the number of sentences and sentence length between text 45 and 53. There is also a very strong correlation of -0.97 between the number of sentences and average sentence length in both writing genres. The min-max graphs for the average sentence length and number of sentences also show a similar developmental pattern in both writing genres; however they mirror each other (figure 6). This means that the number of sentences decreases when the average sentence length increases in both formal and informal writing genres.

The Finite Verb Ratio (FVR) shows an increasing trend in both writing genres (figure 7). This increasing trend is most clearly visible in the formal writing genres. FVR also seems to start off at a higher rate in the formal writing genres and remains higher than it is in the informal writing genres throughout the developmental process. The min-max graphs also show different results for the formal and informal writing genres. In the formal writing genres there is a short period with much variability in the beginning followed by a long period of relatively stable development, whereas the FVR in the informal writing genres shows a sudden growth in variability at the end preceded by a period of relatively stable development. Furthermore, there are several peaks in both writing genres, but these peaks occur at different moments in time. In the informal texts there are peaks in text 31, 41, and 61. In the formal texts these peaks occur later in text 47, 60, and 47. There is also a striking peak in the beginning, but this peak is accidental. There is a moderately strong correlation of 0.54 between FVR and word length in both writing genres. Furthermore, there is a less strong correlation of 0.43 between FVR and sentence length in both writing genres, and a complementary negative correlation of -0.43 between FVR and number of sentences.
The independent clauses remain at approximately the same height in both writing genres throughout the development process. The number of independent clauses slightly decreases in the formal writing genres, whereas it first goes up in the informal writing genres and then goes down again. A trend line with a moving average of 4 also illustrates a similar developmental pattern in both writing genres, however there is a notable peak in the informal writing genres in the first semester of the third year (around text 50) that does not occur in the formal writing genres (figure 8). This can also be found in the min-max graph for the informal writing genres where there is a notable growth in variability around text 50, whereas the rest of the graph shows a relatively stable development with a small bandwidth.

The adverbial clauses show a different result for the formal and informal writing genres. In the formal writing genres there is a descending line in the adverbial clauses, and an ascending line in the informal writing genres (figure 9). The min-max graphs reveal there is a lot of variability throughout the developmental process in both writing genres. A trend line with a moving average of 4 shows that the adverbial clauses are higher in the first half of the developmental process in the
formal writing genres and there is a clear peak around text 25 (semester 1 of year 2). However, in the second half the adverbial clauses are higher in the informal writing genres with a striking peak around text 55 and another peak around text 73.

![Figure 9](image)

**Figure 9** – Average number of adverbial clauses in both writing genres together for student B

The average use of nominal clauses remains at approximately the same height and a slight increase at the end in both writing genres. However, the results for min-max graphs show a difference in the development of nominal clauses between the formal and informal writing genres. There is a lot of variability in the formal writing genres from beginning to end, whereas the informal writing genres show a period of relatively stable development with a narrow bandwidth followed by a sudden increase in variability at the end (figure 10). A moving average of the informal texts shows a clear peak at text 60 and reaches up to almost 1, which is the highest number of occurrence for the nominal clauses in both writing genres.

![Figure 10](image)

**Figure 10** – Moving min-max graph of average occurrence of nominal clauses in informal texts for student B

The relative clauses show a slight increasing trend in both writing genres with the most growth occurring at the end (figure 11). The min-max graphs for both writing genres show a long period of relatively stable development followed by some peaks and a wide bandwidth at the end.
Again, these peaks occur at different moments in time in the formal and informal texts. In the informal texts the peak occurs in text 69, whereas in the formal texts there is a peak in text 71. There is slightly more variability in the middle of the development in the formal writing genres, however this variability is relatively little in comparison to the striking variability that occurs at the end of the developmental process in both writing genres. A polynomial trend line illustrates that the average occurrence of relative clauses starts off at a higher rate in the formal writing genres than it does in the informal genres, and it remains at a higher rate in the formal genres until the end.

Figure 11 – Average occurrence of relative clauses per sentence in both writing genres together for student B

There is a descending line in the non-finite clauses in the formal writing genres followed by an ascending line, which increases to the same height as it were in the beginning from text 40 onwards. In the informal writing genres the non-finite clauses increase up to text 40 and then remains at approximately the same height until the end. The min-max graph for the non-finite clauses in the formal writing genres shows there is little variability throughout the developmental process. There is much more variability in the informal writing genres, especially in the latter half of the developmental process. No significant correlations have been found between any of the different types of clauses for student B.

4.2 Lexical complexity

For the lexical complexity analysis we looked at both lexical complexity measures and lexical fluency measures. The lexical complexity measures include; Type Token Ratio (TTR) and word length (WL). TTR reflects the development of lexical variation, and WL is used to look at lexical sophistication. For lexical fluency we looked at the number of words from the academic word list (AWL), K1 words, K2 words, and off-list words.
4.2.1 Student A

To measure lexical variation we used type-token ratio (TTR). Student’s A results show that TTR in formal texts slightly increases; TTR in informal texts slightly increases until text 40 and decreases after until a little below starting point (figure 12). The informal texts show increased variability in the beginning and a rather stable period afterwards until the end point. The formal texts show many periods with variability, only between text 40 and 50 it is relatively stable. TTR is in general higher in informal texts than formal texts.

![Figure 12 – Type Token Ratio (TTR) in both writing genres together for student A](image)

We use word length (WL) to analyze lexical sophistication. The formal texts show increasing word length, the informal texts show decreasing word length. The formal texts show one period with much variability, which is at the end between text 60 and 78. Before that, the increase seems to progress steadily (figure 13). The informal texts show two periods with relatively much variability between text 12 and 20 and between text 38 and 50. Variability decreases after those periods.

Words in formal texts are overall longer than words in informal texts.

![Figure 13 - Moving min-max graph of average word length (WL) in formal texts for student A](image)
To analyze lexical fluency we used AWL, K1 words, K2 words and off-list words. Both writing genres show an overall increasing use of academic words (figure 14). The formal texts show a slightly decreasing line until text 30, but the use of academic words almost doubles at the end. The min-max graphs shows that there is quite some variability, especially in the beginning and towards the end (from text 55 onwards). The use of academic words is relatively stable during text 28 to 45, the other periods show variability. In the informal texts the use of academic words seems to be more stable, except for the first 23 texts. AWL is the measure which shows most development overall compared to all measures and in both formal and informal texts. However, the numbers for informal texts are overall lower than the numbers for the formal texts: The average use of AWL for informal texts is 3.62, for formal texts this is 6.46. Furthermore, the peaks occur at different moments in time in the informal and formal texts. In the informal texts there is a peak in text 12, followed by a peak in the formal texts in text 22 and another one in text 52. A moderately strong correlation of 0.55 has been found between AWL and WL in the formal texts and of 0.49 in the informal texts.

Figure 14 – Average use of academic words (AWL) in both writing genres together for student A

The use of K1 words in formal texts decreases and stabilizes around text 48, as the polynomial trend line of the second order shows (figure 15). However, from text 43 onwards the min-max graphs show much variability in the formal texts. There is another period (between text 20 and 30) of variability; the remaining weeks show stable progress. The use of K1 words in informal texts shows more variability than in the formal texts. There are no periods with stable progress in the informal texts. The polynomial trend line shows that the use of K1 words increases from 80 to 86 (figure 15). There is a shift from more K1 words in formal texts in the beginning to more K1 words in informal texts in the end. In the formal texts a moderately strong correlation of 0.50 has been found for K1 words and WL, the informal texts show a correlation of 0.45 for K1 words and WL.
The use of K2 words decreases both in formal and informal texts. However, the formal texts show an increase until text 40 and a decreasing line until the end. The end point is lower than the starting point. After text 20 there are more instances of K2 words in formal texts. The min-max graph for the informal texts shows much variability until text 25, after that the development progresses in a relatively stable way (figure 16). The formal min-max graph shows more and shorter periods with much variability: text 1 to 10, text 28 to 32 and text 45 to 55. In general, there are more K2 words in formal texts than in informal texts.

The informal texts show an obvious descending line for off-list words (figure 17). The use of off-list words increases until text 45 in the formal texts and decreases slightly after. The formal min-max graph shows more periods with heavy variability than the informal texts. Especially between text 20 and 35 there is much variability in the formal texts in the use of off-list words. Until text 55 there are more off-list words in informal texts, after text 55 the amount of off-list words is the same in formal and informal texts.
4.2.2 Student B

The results for TTR do not show and increasing or decreasing trend, but rather fluctuate around an average of 0.55. In the informal genres a trend line with a moving average of 4 shows the average development of TTR remains relatively stable around 0.55. However, the moving average in the formal genres shows more variability with a peak at text 32 and a low at text 62. The min-max graphs show a similar developmental pattern for TTR in both writing genres. The bandwidth is both fairly wide and relatively stable in both writing genres, which shows there is a constant amount of variability throughout the developmental process.

There is an increasing trend in word length in both writing genres. Furthermore, a polynomial trend line illustrates the average word length starts off at a higher rate in the formal writing genres and continuous to be at a higher rate until the end than in the informal writing genres (figure 18). The min-max graphs show that in the informal writing genres there is a lot of variability at the beginning and the end, whereas in the informal writing genres the variability occurs in the middle of the developmental process. Overall, the bandwidths in both writing genres are relatively small. The moving average in the formal writing genres shows a fairly stable increasing trend, but in the informal writing genres there is a clear low around text 54 after which it quickly increases again. A strong correlation of 0.61 has been found between WL and academic words in the formal writing genres and 0.60 in the informal writing genres, which means that when the average word length increases the number of academic words also increases. Furthermore, there is a moderately strong negative correlation of -0.53 between WL and K1 words in the formal writing genres and -0.57 in the informal writing genres, which means that when the average word length increases the number of K1 words decreases.
The use of academic words shows a clear ascending line in the informal writing genres with a sudden drop at text 48, but which increases again from text 53 onwards. The use of academic words in the formal writing genres first goes down, but goes up again from text 50 until the end (figure 19). The min-max graph for the formal writing genres shows there is much variability throughout the developmental process, whereas the min-max graph for the informal writing genres is relatively stable with a small bandwidth and only shows much variability between text 38 and 50.

The number of K1 words decreases in both writing genres. However, a polynomial trend line indicates that the average use of K1 words starts off at a higher rate in the informal writing genres and remains higher than in the formal writing genres until the end. The min-max graphs show a similar developmental pattern in both writing genres, namely there is a lot of variability in the first part of the developmental process and less variability at the end. In the formal writing genres the bandwidth narrows from text 45 onwards, and in the informal writing genres it narrows from text 60 onwards. The moving average in the formal writing genres is similar to the polynomial trend line and
also shows a clear descending line, but in the informal writing genres there is a sudden peak around text 55 in the use of K1 words after which it decreases again (figure 20).

Figure 20 – Moving average for the use of K1 words in both writing genres together for student B

The number of K2 words does not show a clear increasing or decreasing trend in both writing genres, but rather fluctuates around an average of approximately 5. The results show there is a lot of variability in the informal writing genres with a wide bandwidth from beginning to end. In the formal writing genres there is also a lot of variability in the first half, but in the second half the bandwidth is fairly small (figure 21). The moving averages show that in both writing genres the average number of K2 words has two small peaks, but in the informal writing genres these peaks occur at later stages than in the formal writing genres. The polynomial trend lines show that the average use of K2 words develop in a similar pattern, for they first slightly increase in both writing genres and then decrease again. The starting rate and overall height of the average use of K2 words is also fairly the same in both writing genres.

Figure 21 – Moving min-max graph for average use of K2 words in formal texts for student B

The number of off-list words does not show a clear ascending or descending line in either of the writing genres, but a trend line with a moving average of 4 shows that it fluctuates around
approximately 10 in the formal writing genres and around an average of 8 in the informal writing genres. The min-max graphs that there is also a lot of variability in both writing genres.

4.3 Formulaic sequences

The use of formulaic sequences can be related to both accuracy and fluency. For accuracy we looked at the occurrence of learner chunks, and for fluency we looked at a number of different formulaic sequences, including: idioms and proverbs, collocations, compounds, phrasal and prepositional verbs, and simple fillers.

4.3.1 Student A

To measure accuracy of the language learners we used learner chunks. The last learner chunk in student A’s data is found in text 51 (figure 22). Especially in the first 20 texts there are some learner chunks to be found, after that only 3 more learner chunks appear. The use of learner chunks clearly decreases. There are more learner chunks in the formal texts (11) than in the informal texts (3). It must be noted that student A’s data has 10 more formal texts than informal texts.

![Figure 22 – Number of learner chunks in both writing genres together for student A](image)

The use of idiom and proverbs shows a similar development in both writing genres (figure 23). First, the use of idiom increases and then it decreases. However, the peak is higher and longer in the informal texts. In both writing genres there are two instances with much variability. It must be noted that the total number of idiom use is too low to be able to make valuable analyses. The formal and informal texts have 10 instances each of idioms and proverbs.
We used all other types of formulaic sequences to determine the development of fluency. The use of collocations slightly increases in the formal texts. The informal texts show an increase until week 40 and a decreasing line afterwards. The min-max graphs show much variability at the beginning and a shorter period of variability at the end for the informal texts but the formal texts show much variability from text 60 onwards and a rather stable period before (figure 24).

Collocations are the most used type of formulaic sequences, they occur 635 times in the formal texts and 395,5 times in the informal texts. Overall, more collocations are found in formal texts relatively.

The use of compounds in formal texts has much variability. Only in a few separate texts it seems to stabilize. The informal texts only show a period of variability between text 35 and 50, the remaining periods are relatively stable. In the period of text 35 to 50 the use of compounds in informal texts reaches a peak and decreases after ending at the same point as the beginning (figure 25). The formal texts show a decrease in the use of compounds until text 30 and a rather steep increasing trend line until the end. There are 136 compounds in the formal texts and 79,5 in the informal texts.
Phrasal and prepositional verbs show a decreasing trend line in both formal and informal texts. The informal texts show a steeper decreasing line which goes up slightly at the end, while the formal texts have a gradually decreasing polynomial trend line. The development of phrasal and prepositional verbs does not seem to be steady at one point in time; the min-max graphs show almost continuous variability, except for the formal texts in the period before a peak with much variability and from text 50 onwards it seems to stabilize (figure 26). In the formal texts, there are 199 phrasal and prepositional verbs, in the informal texts 140 phrasal verbs occur.

The formal texts have 4 instances of simple fillers; the informal texts have 3 instances of simple fillers. The last formal simple filler is found in text 18; the spread of informal simple fillers is more gradual. The last simple filler in informal texts is found in text 65.

4.3.2 Student B

Although there are in total only a few occurrences of learner chunks, there is a clear descending trend in both writing genres. There are no more learner chunks at all from text 48 onwards except for
one in the informal writing genres at text 72 (figure 27). The most learner chunks can be found in the first year, after that only 4 more learner chunks appear. The number of texts in both writing genres is nearly the same. There is only one text more in the informal writing genres; therefore it might be interesting to mention the total number of occurrences of the different types of FS for comparison. In total, there are 8,5 learner chunks in the formal texts and 11 learner chunks in the informal texts. In other words, there are overall more learner chunks in the informal texts.

The use of idioms and proverbs shows an increasing trend in both writing genres (figure 28). In the beginning there are only a few idioms and proverbs, but later on in the developmental process the numbers increase rapidly. There is a remarkable peak in the formal writing genres at text 31, which is the highest number of occurrence for idioms and proverbs. Finally, there are in total 29 idioms and proverbs in the formal texts and 23 in the informal texts. The number of idioms and proverbs is thus higher in the formal texts, but it is important to note that in comparison to the other types of FS there are overall not many idioms and proverbs.
The number of *collocations* increases in both writing genres. However, the peaks occur later in the formal texts than in the informal texts. In the informal texts there is variability in the beginning followed by a peak in text 45, whereas the peak in the formal texts occurs in text 67. Furthermore, the number of collocations starts off at a higher rate in the formal texts than it does in the informal texts and remains higher until the end (figure 29). Both the min-max graphs and the moving averages show a relatively stable increasing trend, except for an increase in height and variability in the formal texts between text 40 and 50 and in the informal texts between text 63 and 70. Collocations are the most frequently used types of FS in both writing genres. In total, there are 584 collocations in the formal texts and 508 in the informal texts.

![Figure 29 – Number of collocations in both writing genres together for student B](image)

The number of *compounds* does not show a clear developmental pattern. The min-max graphs have a very wide bandwidth for both writing genres, however it does narrow in the informal texts between text 40 and 60 after which it widens again (figure 30). The moving averages also show a lot of variability, for the line goes up and down several times with a major jump in the formal texts in text 62 and a clear drop at the same time in the informal texts. There are also two notable peaks in the informal texts, but these occur earlier in text 26 and 30. In total, there are 158 compounds in the formal texts and 133 in the informal texts.
The number of *phrasal verbs and prepositional verbs* slightly increases in both writing genres; however it decreases again at the end in both writing genres (figure 31). The min-max graph of the formal writing genres shows there is a lot of variability, except for the end of the process where the bandwidth narrows down. The min-max graph of the informal writing genres shows there is only a narrow bandwidth in the beginning followed by a high amount of variability that lasts until the end. In total, there are 244 phrasal and prepositional verbs in the formal texts and 298 in the informal texts.

There only a few occurrences of *simple fillers* in both writing genres, namely 4,5 in the formal texts and 7,5 in the informal texts. These numbers are too low to make a valuable analysis.

Finally, there is a clear increasing trend in the *total number of formulaic sequences* in both writing genres. This increase is most obvious in the formal writing genres with a notable jump in text 67. In the informal texts there is a clear peak in text 45 after which it decreases again. The phrasal and prepositional verbs start off at a lower rate than the informal texts, but then strongly increase (figure 32). From text 26 onwards the total number of formulaic sequences is higher in the formal
texts and remains higher until the end. The min-max graphs show a fairly narrow bandwidth and a relatively stable developmental pattern in both writing genres, which means there is not a lot of variability.

Figure 32 – Total number of formulaic sequences (FS) in both writing genres together for student B
CHAPTER 5 – DISCUSSION

In this section, the results from the section above will be discussed according to the order of the hypotheses. This will help to clarify to what extent the results fit within our expectations based on the research questions. Before we start our discussion, it must be noted that the learners already had a considerably advanced level of writing proficiency when the writing assignments started. Therefore, the starting points of the results are sometimes rather high and indiscriminate. Another possible complication for the interpretation of the results is that there are missing values in the variables due to a lack of writing assignments in certain periods. Therefore, when one measure strongly varies and the other one does not, this may be due to a lack of data points instead of a lack of variability.

5.1 Hypothesis 1

*The language development of student A and B will progress in a non-linear fashion.*

The results for both student A and student B show a non-linear progression in their language development. We found dynamic patterns in all measures. Every measure showed a different developmental pattern but not one measure showed a linear development. This finding meets our expectations and accounts for the theoretical framework of DST/CT which serves as a basis for our study. In a DST/CT approach language changes gradually over certain periods of time or it can change suddenly and more dramatically. Language is a complex dynamic system consisting of several interacting subsystems (syntax, semantics, etc.), “none of which will be completely stable during any length of time” (Verspoor et al., 2008, p. 215). The results for both students show there is a high degree of change and variability in their language development as we expected. Although we found some relatively stable periods, there we no completely stable periods of development during any length of time. Furthermore, the fact that we found non-linear developmental patterns in all measures supports the idea that language use is dynamic and constantly changing.

5.2 Hypothesis 2

*There will be a lot of variability in the development of complexity, accuracy, and fluency; nevertheless there will also be a general increasing trend.*
Variability in language acquisition results from continuous interaction between a learner and the environment (Verspoor et al., 2008). The interaction of a learner with the environment can change during the language acquisition process which may affect this process. The variability in the results suggests a change of interaction with the environment which may be caused by changes in motivation, aptitude or otherwise. The results for both student A and B show a high degree of variability for all measures. Often the measures do not show a clear ascending or descending line, but rather small peaks and lows. The moving min-max graphs are able to indicate periods of variability and periods with relative stability. All measures showed variability and change, although there are some periods with relative stability in the developmental process. According to principle of DST/CT it is assumed that when a learner goes through a relatively unstable period with a high amount of variability in the acquisition process, this is often a sign that the system is changing or it indicates an upcoming developmental jump. This developmental process is more obvious for beginning and intermediate learners, because their starting point is lower than it is for advanced learners. This study investigated quite advanced learners; therefore no obvious developmental jumps have been measured in the data. There are periods with much variability, but the development after these periods is not completely stable but still shows variability. We explain this by the fact that the learners were already fairly advanced when they started writing the assignments that were used for this study. Spoelman & Verspoor (2010), who studied an advanced learner of Finnish, found the most variability in the early stages of language acquisition followed by stabilization in later texts. However, Van Dijk et al. (2011) explain that even during stable periods of time variability may occur, which our results also show.

5.3 Hypothesis 3

The degree of grammatical and lexical complexity will increase as the learners become more advanced, because the sentence constructions become more complex and the vocabulary more varied and sophisticated.

Both student A and B have longer sentences in formal texts than informal texts. There is a difference in the development of sentence length and number of sentences between the students. Student B develops as expected, her sentences become longer and FVR goes up. Student A develops in a rather exceptional way concerning her sentence length in the formal texts, because this development shows a decreasing trend line and this is not as expected. However, on average student A’s sentences are approximately the same length as student B’s. The difference in sentence length is bigger in student B’s data because her formal sentences have an average length of 19,95 and her
informal sentences have an average length of 17.01. Student A’s informal sentences are 18.14 words long and the formal sentences have an average of 19.70. Although the development has progressed in a different manner, it could be argued that this feature of grammatical complexity is approximately the same for both students. Especially in the formal texts sentence length was quite high on average, probably because both students are advanced learners. It might be that we are speaking of a ‘ceiling effect’ for this variable. Therefore, the minimal development in sentence length is not entirely strange. Subsequently, the number of sentences has also developed differently for both students. However, this development correlates strongly with the feature of sentence length and thus needs no further explanation.

We expected an increase in FVR, which indicates that sentences become more complex (Verspoor et al., 2008). Overall, FVR goes up for both students when analyzing all texts together. This finding is in line with our expectations. However, student A again shows a rather peculiar development because FVR in informal texts initially increases but then decreases after week 50, which means that sentences have become less complex towards the end. This trend is only visible in the informal texts of student A, formal texts and student B’s data show an increase in FVR. It is uncertain why student A developed differently in the informal texts. A possible explanation is that most of the informal assignments written from week 55 onwards include writing journals that had to be written weekly. Often, this was something that was done quickly and thus not very carefully. There might also be a personality difference between student A and student B, for example it could be that student B is more precise in her sentence constructions than student A. Another finding related to FVR is a moderately strong correlation between FVR and word length in both students’ data. Although both are complexity measures (grammatical and lexical respectively) this is quite an odd and unexpected correlation.

We expected to see a high amount of nominal and relative clauses in later stages of development and much use of adverbial clauses in the beginning for both writing genres. Student A’s data does not show a developmental pattern like that. Student A’s use of adverbial clauses increases first and decreases after week 40. This finding does not entirely meet our expectations since we hypothesized to find a decreasing line, the formal texts have the same amount of adverbials in the end as in the beginning and the informal texts have even more than in the beginning. We expected the amount of adverbials to be higher in the beginning than in the end. Both nominal and relative clauses decrease as time progresses in formal and informal texts, which is against our expectations. If student A would have developed as hypothesized, the amount of relative and nominal clauses would have gone up. In general, student B’s use of adverbial clauses increases until week 40 and decreases afterwards, which is a similar development as student A. Unlike student A, student B shows a different developmental pattern in both writing genres. The adverbial clauses in formal texts
decrease, the adverbial clauses in informal texts increase. This finding is unexpected. Student B’s nominal clauses stay approximately the same although there is much variability in the texts. The amount of relative clauses increases and shows variability especially at the end where the average use goes up. This finding is as expected; student B uses more relative clauses at the end indicating more grammatical complexity in her texts. The use of independent clauses shows a different pattern for student A and B. Student A uses fewer independent clauses as time progresses and student B slightly increases her use of independent clauses. It is difficult to draw valid conclusions on the use of independent clauses because the use of independent clauses does not exclude the use of other types of clauses in a sentence. The non-finite clauses do not change much for both students; they both end with approximately the same amount of non-finite clauses as they started with.

Furthermore, both students use longer words in the formal texts than in the informal texts, which fits within our expectation that the vocabulary becomes more sophisticated as the learners become more advanced. Both show a clear ascending line in the formal texts, but student A’s word length clearly decreases in the informal texts. Although this finding is unexpected, the overall word length is approximately the same for both students. TTR does not show a clear developmental trend for both students. TTR shows a slight increasing trend in the formal texts by student A, whereas student B’s TTR decreases in the formal texts. In the informal texts TTR stays approximately the same for both students. This does not meet our expectation with regard to lexical variation. The reason for this might be that TTR is not a perfect measure for lexical variation. We chose this measure because we were familiar with it, but perhaps another measure like Giraud’s Index would have provided a clearer picture of the development of lexical variation. The use of academic words increases for both students, especially in the formal texts. This is as expected and indicates that lexical fluency increases as the learners become more advanced. Overall, the number of K1 and K2 words decreases over time for both students. This is also expected, because it indicates progress. Since the number of words per texts is constant, it is safe to assume that fewer K1 and K2 words mean that more other types of words are used, for example academic words. As mentioned earlier, lexical fluency measures are considered fluency measures rather than complexity measures.

In sum, grammatical and lexical complexity do not develop entirely as expected and both students show different patterns of development for most measures. Especially the different clauses are used in different ways by student A and B. The development of grammatical complexity can be seen quite clearly in the FVR, which increases for both students indicating more complex sentences. The length of the sentences is approximately the same, although the development is slightly different from each other. The development of lexical complexity is less obvious. Although both students show a development in lexical sophistication which is reflected in their average word length, they do not show a development in lexical variation. Lexical fluency does, however, show progression. The
dynamics found in the results are in line with previous research: Spoelman & Verspoor (2010) were also able to conclude that complexity and accuracy measures were dynamic over a period of time and that their subject developed following the principles of DST/CT.

5.4 Hypothesis 4

The degree of accuracy and fluency will increase as a learner becomes more advanced, because they will use more error-free FS over time and the use of learner chunks will gradually disappear.

For accuracy and fluency we looked at the use of formulaic sequences. The use of formulaic sequences is closely linked to a learner’s ability to produce accurate language and level of fluency. Learners will come across as more proficient L2 speakers when they master the use of FS, because it tells about the ease with which someone can produce a language (Wolfe-Quintero, et al., 1998). For accuracy we have investigated the use of incorrect FS, learner chunks, and for fluency we have looked at the use of other correct FS. The results have shown that the degree of accuracy increases as a learner becomes more advanced. The use of learner chunks decreases over time for both student A and B, and they almost use no more learner chunks at all in the last year of their Bachelor. This is in line with our expectations. However, the degree of fluency has not increased over time for both students. The results for student A show that the total number of formulaic sequences decreases in the informal texts and stays approximately the same in the formal texts. In contrast, student B shows a strong increase of formulaic sequences in both writing genres, but especially in formal texts. For student B all other types of formulaic sequences increase in both writing genres, but student A only shows an increasing trend in the use of collocations in formal texts. Collocations show the most obvious increasing trend in student B’s data and are overall the most frequently occurring type of formulaic sequences for both students. The use of compounds shows much variability without a clear developmental pattern for both students. Phrasal and prepositional verbs show a decreasing trend in both writing genres for both students. It can be argued that phrasal and prepositional verbs are rather simple forms of formulaic sequences, which are likely to be acquired at an early stage in SLD. It might be that the learners have already fully acquired these types of FS and therefore do not use them as often as in the initial stages of the developmental process. There are too few instances of simple fillers and idioms and proverbs to draw any valid conclusions about these types of FS for both students. In conclusion, the results from student B do fit within our expectations and show that the degree of fluency has increased for student B, whereas it has not increased as
obviously for student A. Nevertheless, student A does show some growth in the total number of FS and the use of collocations in the formal texts.

5.5 Hypothesis 5

There will be a difference between the language development of student A and student B, because of both inter-individual and intra-individual differences.

Different patterns of language development have been found in student A and student B’s data. The development of grammatical complexity develops differently for the two students. Both students show development in grammatical complexity but this growth is most obvious in the results for Student B. Although student A does develop in FVR and sentence length, this development is stronger for student B. Especially student B’s use of relative clauses is as expected since they increase in both genres. This increasing development is also visible in her use of nominal clauses, although this is not as obvious. Student A does not develop as expected with regards to her use of dependent clauses because her relative and nominal clauses decrease. In sum, student B’s results show stronger growth in the development of grammatically complex sentences. This might be the result of a difference in individual personality.

The development of lexical complexity and lexical fluency also develops differently for the two students. Student A shows an obvious development in her use of academic words in both writing genres, whereas student B only shows a clear increase in informal texts. This might be due to a difference in individual preference. Both student A and B do not show a clear developmental trend for TTR but there is clear difference in the way it develops between the students. Although it is not very obvious, TTR of student A increases more in formal texts, whereas student B’s TTR decreases in formal assignments. The difference in development of K1 and K2 words is quite obvious. The biggest difference is that student A’s use of K1 words increases in the informal texts, whereas it decreases in formal texts and for student B in both writing genres. Both height and development are approximately the same for both students concerning word length in formal texts. However, student A’s word length decreases in informal texts and starts off at a higher rate than in the formal texts, which is unexpected.

The development of formulaic sequences also develops differently for the two students. The use of phrasal and prepositional verbs is quite similar in both students’ results. However, the development of compounds in formal texts is contradictory; student A shows a decrease followed by an increase and student B shows the opposite. Furthermore, the collocations of student A only show a slight increase in formal texts, whereas student B shows strong increase in the use of collocations in
both genres. This increase is also visible in student B’s use of idioms and proverbs, but student A shows an increase followed by a decrease. Overall, student A shows little development in the use of formulaic sequences, whereas student B shows a strongly increasing trend in her use of formulaic sequences.

In sum, the students show a different development. Student A’s lexical fluency has developed more towards an academic level as especially the increase in the use of academic words shows. Student B shows more development in lexical sophistication, which is demonstrated in word length. In addition, she also shows more growth in grammatical complexity for there is a stronger development in FVR and sentence length as well as in the different types of dependent clauses. The analyses of the different types of formulaic sequences also illustrate that student B developed more. The differences between the students were expected, and this can have several causes. For example, student A might have been more advanced than student B at the time that the first samples were collected, because student A does not have written samples from the very first semester. Therefore, the initial conditions of both students are not exactly the same. Another possible difference could be individual preference for a specific subject as a result of which one student might be better at using advanced vocabulary, while another is more interested in complex grammatical structures. It might also be that there are personality differences or differences in learning styles. The fact that student B shows more development in complexity could be because she is more precise in her sentence constructions. In conclusion, there may be several reasons for differences within learners (intra-individual) and between learners (inter-individual), such as individual preferences, personality differences, motivation, or aptitude. Larsen-Freeman (2006) also found deviating patterns in development in her study on the process of learning English as a second language for 5 women from the People’s Republic of China. Her subjects all followed the same course and made the same assignments in order to account for the idea that they were exposed to the same amount of English. Nonetheless, all women developed in their own individual way. This individual development is also visible in student A and B’s results; they too developed in their own way. It is rather difficult to say beforehand which measures will show a different developmental pattern, but the fact that these differences do occur strengthens the idea within DST/CT that language develops differently although learners generally have the same background, motivation, and aptitude.

5.6 Hypothesis 6

There will be growth in the degree of complexity and fluency in both writing genres, however in the formal writing genres the degree of complexity and fluency will start off at a higher rate and will remain at a higher rate during the course of development.
Finally, there are many differences in the results of both students between formal and informal writing genres. These differences can be found in starting rate as well as in the overall height of complexity and fluency measures. Although there were great differences, most complexity and fluency measures did show overall growth. The grammatical complexity measures develop in both writing genres, but generally start off at a higher rate in the formal writing genres and remain higher than in the informal writing genres until the end. This trend is most obvious in the results of FVR and sentence length for both student A and B. FVR and sentence length show growth in both writing genres, and they are constantly higher in the formal writing genres. The same trend can be found in the average number of relative clauses by student B, and for student A in the non-finite clauses. These results indicate that there are overall more complex sentence constructions in the formal writing genres than in the informal writing genres for both student A and B.

The lexical complexity and lexical fluency measures also develop in both writing genres, and are generally higher in the formal writing genres from beginning to end. For both student A and B the use of academic words grows and is generally higher in the formal writing genres throughout the developmental process. However, the use of K2 words and average word length does not show a similar developmental trend for both students. Student A’s use of K2 words slightly decreases in both writing genres and starts off at a higher rate in the informal texts, which is unexpected. The use of K2 words by student B increases in both writing genres, but is generally higher in the informal writing genres. Another unexpected result is that student A’s average word length only increases in the formal writing genres. Although the average word length of student A is generally higher in the formal texts, it starts off at a higher rate in the informal texts. However, the average word length of student B increases in both writing genres and is higher from beginning to end in the formal writing genres, which does fit within our expectations. Although not all measures for lexical complexity and lexical fluency fit within our expectations, the results show that both students use a more academic vocabulary and longer words in the formal writing genres. This supports our assumption that instructed writing assignments and graded essays would show a more sophisticated vocabulary.

The results for the different types of formulaic sequences also show that fluency develops in both writing genres, and are generally higher in the formal writing genres from beginning to end. This is most obvious for the use of collocations. For both student A and B the number of collocations grows in both writing genres, and starts and remains higher at a higher rate in the formal texts. The total number of chunks also increases for both student A and B. However, for student B it starts off at a lower rate in the formal writing genres. Nevertheless, the total number of chunks is generally higher in the formal texts for both students. The number of compounds also increases in both writing genres for student B and, although it starts off at a higher rate in the informal writing genres, the
number of compounds is generally higher in the formal texts. The number of idioms and proverbs
also increases in both writing genres and is generally higher in the formal texts. For student A the
number of compounds and idioms and proverbs do not show a clear ascending or descending line.
Finally, the number of phrasal and prepositional verbs decreases overall for both students in both
writing genres. A reason for this result could be that the learners are fairly advanced and these types
of FS are more likely to be acquired at an earlier stage in the developmental process. The results
support our expectation that both learners use overall more formulaic sequences in the formal
writing genres than in informal writing genres.

Furthermore, the informal texts often show a peak or development right before the formal
texts. This is most clearly visible in FVR for both students, in AWL for student A, and in relative
clauses, collocations, and total number of FS for student B. This is interesting, because it indicates a
possible precursor relationship between the different writing genres. The reason for this might be
that the students first practice their newly acquired knowledge in the informal texts before they start
applying it in the formal texts. The reason why they might first use these new language
representations in the informal texts is because these demand a less high standard of language use
than the formal texts. Furthermore, there is more room for creativity and experimentation in
informal texts.

In sum, we found striking differences between formal and informal assignments. Most
measures show that the formal texts have higher standards than the informal texts, which is
illustrated by the fact that both students usually have more complex sentence constructions, a more
sophisticated vocabulary, and more formulaic sequences in the formal writing genres. Especially the
results from student B illustrate that formal writing genres require more complex sentence
constructions than informal writing genres. The reason for this is that formal assignments demand a
higher standard of language use. Therefore, we assumed that the starting rates for the formal texts
would be higher than for the informal texts, also due to the overall more casual tone of the latter.
Most measure indeed showed these differences. The analyses do not give a clear-cut answer on what
exact differences can be found between the two writing genres, because the results of the two
students differ from each other. However, we believe that this study was able to show how
important it is to distinguish between the two writing genres, because we did find deviating
developments in the separate genres in both students’ results.
CHAPTER 6 – CONCLUSION

This study provides evidence for the development of a second language along the principles of DST/CT. The language development of students A and B has indeed progressed in a non-linear fashion, because there are no linear relationships between any of the variables. There were no completely stable periods during any length of time, which fits within a DST/CT perspective of language development. All measurements show variability and change over time. The fact that we found variability in all measures accounts for the assumption that a language is a dynamic system and is constantly changing. Although we found variability in all complexity, accuracy, and fluency measures, there is also a general increasing trend in most measures. Both student A and B have made developments in all complexity, accuracy, and fluency measures. However, their results show different developmental patterns for all measures. These deviations in the results are due to differences within and between student A and B, as well as to differences between formal and informal writing genres.

The results for grammatical complexity have shown that both learners use overall more complex sentence constructions at the end of their academic studies than in the beginning. Especially student B shows a clear increasing trend in most grammatical complexity measures. Furthermore, the lexical complexity and lexical fluency measures reveal that both students have acquired a more varied and sophisticated vocabulary as they have become more advanced. However, student A has made a more obvious development in lexical fluency, whereas student B has made more development in lexical complexity. Finally, the gradual disappearance of learner chunks and increase of other formulaic sequences show that both learners use more accurate language and produce it with more ease, which means that they have become more fluent in their language use.

Analysis of the written work of the two students of English shows that their separate development has progressed in a different way. Both students show other ways of progression in different places although their input and the context in which their development took place has been roughly the same. For example, a noteworthy difference is that student A has developed more towards an academic level of vocabulary use, and student B shows more growth in the use of complex sentence constructions. The reasons for these differences are mainly due to both individual preferences and personality differences. Student A seems to have an individual preference for academic language use, whereas student B is more precise in her language use. Furthermore, it must be noted that although for some measures both learners show growth, the developmental pattern is never entirely the same for both students. There are several possible explanations for these differences, such as individual preferences, personality differences, motivation, aptitude, and
etcetera. This proves that both inter-individual and intra-individual differences have an influence on the development of a second language system and should thus be taken into account. Considering the advanced level of the two learners, it might also be that there are ‘ceiling effects’ for many of the variables investigated. An interesting idea for further research is to compare these data to those of an educated native speaker to see if there would be any room for improvement in the first place.

The results for the different writing genres show that most complexity, accuracy, and fluency measures increase in both writing genres; however the overall rate is usually higher in the formal texts than in the informal texts during the course of development. Furthermore, the results show that development often occurs first in the informal texts and later in the formal texts. The reason for these differences in informal and formal writing genres is that formal writing assignments demand a higher standard of language use, because of the expectations concerning structure and vocabulary use that fit within an academic context. Although previous studies have not taken different writing genres into account in their analysis, our results prove that the difference between formal and informal writing assignments have an influence on the height at which a second language develops. Therefore, it is important to distinguish between writing genres.

We suggest further research to focus more on different writing genres, because our study has shown that there is a difference in the height of development between formal and informal writing genres. Furthermore, they help to account for the different aspects that influence the process of SLD. In order to make the most detailed analysis it is also recommended to gather data of both writing genres from every single week. This will make it easier to compare the results for the different writing genres. Another recommendation for further research is to include frequency for the different types of formulaic sequences to give a more complete view on the development of fluency. Although frequency is not an entirely satisfying measurement for fluency, according to Wray and Perkins (2000) frequency does play a role in formulaicity “in the sense that some formulaic sequences are very frequent, and that formulaic output is frequently called upon” (p. 6).

Nevertheless, this study serves as a useful starting point for further research. The results illustrate that SLD is a dynamic process, and it takes differences between writing genres and within and between learners into account. The study explains how complexity, accuracy, and fluency develop over time according to non-linear development and how these systems are connected. Furthermore, the study demonstrates how the use of formulaic sequences by a second language learner develops over time as he or she becomes more advanced.

Word count: 24.770
BIBLIOGRAPHY


APPENDIX

Appendix i:

Checklist for characteristics of formulaic sequences by Wray and Perkins (2000, p. 10):

- All types of speaker seem to use formulaic sequences to achieve specific interactional goals (e.g. greeting, chastising) and to sustain the interaction (e.g. backchanneling, etc).
- Formulaic sequences of entirely fixed form seem to be in the repertoire of all types of speaker.
- All groups, with the possible exception of aphasics, use formulaic sequences to express aspects of their individual and group identity. In the case of L2 learners this may feature the deliberate use of non-native-like forms.
- Native speaker adults, including aphasics, have a subset of formulaic sequences that are emotional expressions, swearwords, etc. These may be available to other groups too, just less likely to appear in the data normally collected.
- The use of formulaic sequences to hold the turn in conversation seems to be considerably more prevalent in normal adults, native and non-native, than other groups.
- The common use of sequences that are syntactically and/or semantically opaque, including metaphorical idioms, is apparently largely restricted to normal adult native speakers.
- Those in a sub-group that could be characterised as struggling to attain the adult native speaker norm (L1 and L2 learners and aphasics) all make use of ‘fused’ formulas, which feature non-target language forms or meanings, created by the immature, interlanguage or disordered grammar and, in the latter two cases, open to fossilisation.
- The ‘strugglers’ are also much more likely to rely on immediate imitation and repetition and, with the exception of non-improving aphasics, also use some sequences that later disappear again.
- Child, and some adult, learners appear to use formulaic sequences as input for an analysis of the language, as a way of augmenting their grammatical and lexical knowledge. Children appear able to differentiate between those formulaic sequences that can usefully be turned to this purpose, and those which would be misleading.
- When in a naturalistic environment, the speed and success of learning appears to correlate with the learner’s social integration with the native speaker group.
- Classroom-taught learners tend to over-generate, producing grammatical, but undiomatic language (spoken and written), and seem less sensitive than native speakers to a word’s collocational associates.
- Individual variation in the quantity of formulaic language used appears to be a characteristic of the sub-group who have learned naturally.
- Naturalistic learners (L1 and L2) are also the most likely to use formulaic sequences that they are either unable to (learners and aphasics), or simply have not ever needed to (all users), fully analyse.
- Those who gained their knowledge of the language during childhood are most likely to produce formulaic sequences in an undernunciated way, and to sound fully idiomatic when using them. Adult L2 learners may, however, also undernunciate some sequences in the early stages.
- Children seem to be more likely than adults to use formulaic sequences for private practice, though some adult learners may specifically select this as a strategy.
- The use of formulaic sequences as a random dummy carrier of unrelated messages appears to be restricted to aphasics though children may use them for articulatory practice.
- In general, fewer formulaic sequences are found in writing than speech, with non-natives tending to restrict themselves to a small selection which are over-used.
- Both natives and non-natives employ formulaic sequences in their writing as a stylistic device, particularly to indicate the discourse structure.