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CHOMSKY AND PINKER: A COMPARISON OF TWO LINGUISTS CONCERNING
MODERN LINGUISTIC ISSUES

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ANOTACE

Noam Chomsky je považován za zakladatele moderní lingvistiky. Jeho práce přinesla řadu nových teorií a poznatků a zásadně ovlivnila pohled teoretické lingvistiky na osvojování a fungování jazyka. Tato práce shrnuje jeho přínos a inovativní teorie (zabývá se především Univerzální gramatikou, argumentem lidské vrozené lingvistické kompetence a Generativní gramatikou), jejich odlišnost od názorů, které v lingvistice převládaly před příchodem Chomského. Komparativní část práce se zabývá především vlivem Chomského teorií na dalšího amerického lingvistu, Stevena Pinkera a je realizovaná metodou porovnání jejich názorových shod i odlišností, argumentů a důkazů, kterými je podporují. Cílem práce je zmapovat a porovnat názory těchto dvou vědců na témata moderní lingvistiky a shrnout možný přínos plynoucí ze vzájemné vědecké diskuze a kritiky.

ABSTRACT

Noam Chomsky is considered to be the father of modern linguistics. His innovative theories and ideas influenced the view on language acquisition and language in general. This thesis summarises his contribution and innovations (namely the Universal Grammar, the innateness of human language faculty and Generative Grammar). It focuses on the way Chomsky´s ideas differ from behaviourism and structuralism. The comparative part of the thesis deals with the impact of Chomsky´s theories on another American linguist, Steven Pinker. The method of comparison of their ideological disagreements as well as agreements is used. The thesis aims to bring the overview of Chomsky´s and Pinker´s ideas concerning modern linguistic issues. It also aims to summarise the possible contribution of the scientific discussion and criticism.

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1. Introduction

This thesis deals primarily with an American linguist Noam Chomsky. The aim is to describe his contribution to the field of theoretical linguistics and discuss the perception of his controversial hypotheses by another linguist, Steven Pinker.

The thesis is divided into four main chapters: Noam Chomsky´s revolution, Chomsky vs Pinker, Response and Summary of Chomsky´s vs Pinker´s arguments. The chapter Noam Chomsky´s revolution introduces what is sometimes called "the Chomskyan linguistic revolution" that began by Chomsky´s critique and rejection of behaviourism, namely F.D. Skinner´s work called *Verbal Behaviour*. This chapter is also presenting the description and explanation of Chomsky´s most discussed and innovative theories; Universal Grammar and Generative grammar. In order to show Chomsky´s influence, it is also important to present his supporters and critics.

Chomsky´s impact is demonstrated in greater detail in the chapter Chomsky vs Pinker. This part of the thesis focuses on the perception of some of the Chomsky´s theories by Pinker and his colleagues. Although Pinker was at the beginning of his career strongly influenced by Chomsky´s approach to linguistics, he later developed his own hypotheses and opinions. Pinker´s theories were initially strongly influenced and aligned with those of Chomsky, however, as Pinker evolved as a linguist, number of significant disagreements started to emerge.

The thesis examines three of Chomsky´s propositions that Pinker disagrees with. It presents Chomsky´s statements and arguments that are being challenged by Pinker, who is trying to doubt some of Chomsky ´s theories. The aim is to present and explain some of Chomsky´s influential propositions and then compare them with Pinker´s viewpoints and counterarguments. The three of Chomsky´s hypotheses Pinker disagrees with (discussed in this thesis) are following:

1) Recursion-only hypothesis; the claim that recursion is the only trait that distinguished humans from other animals concerning language faculty. As a source material concerning this hypothesis is used the article "The Faculty of Language: What Is It, Who Has It, and How Did It Evolve?" written by Marc D. Hauser, Noam Chomsky and Tecumseh Fitch (HCF hereafter). Recursion is the property of language that makes it possible for human language to produce infinite variety of sentences by applying grammatical processes repeatedly (Fasold and Connor-Linton 3). Pinker defends the theory of more uniquely human linguistic features. Pinker´s counter-arguments are presented in the article "The faculty of language: what's special about it?". Pinker wrote

this article with Ray Jackendoff as a criticism of HCF´s paper.

2) The question of evolution; Chomsky doubts the explanation of the emergence of language by natural selection. He also suggests that the main purpose of certain changes leading to human speech might not primarily have had the purpose to develop language. Chomsky et al. claim that human language faculty might rather be a by-product of a primarily different evolutionary change (Hauser, Chomsky, and Fitch 1569). This suggestion has generated numerous passionate discussions. The majority of modern scientists believe that evolution by natural selection can explain most of the changes, including the development of the faculty of human language. The suggestion of another possible explanation is rather controversial and Pinker is one of those scientists, who do not accept it. Instead, he proposes arguments that are aiming to disprove Chomsky´s theory and supporting the theory of language as an adaptation by natural selection (Pinker and Jackendoff).

The chapter Response is focused on the later development of Pinker and Chomsky´s ideas. After the publication of Pinker and Jackendoff´s review of hypotheses made by Chomsky and his colleagues Hauser and Finch, Chomsky et al. reacted to Pinker´s criticism. HCF tried to defend their ideas, explain them better and state some additional explanations. Pinker and Jackendoff react with another paper. The mutual criticism is in fact a linguistic discussion with well-supported arguments that helps to develop theoretical linguistics further.

The final part – Summary – includes an overview of Chomsky and Pinker´s arguments concerning discussed topics and their possible contribution to the field of theoretical linguistics.

Overall, the thesis aims to provide a well-arranged overview of Noam Chomsky´s impact on the field of theoretical linguistics and on Steven Pinker. The method of discussing the critical papers and ideological differences between two linguists is being used to reach the closer understanding of the issues discussed.

2. Noam Chomsky´s revolution

Noam Chomsky is an American linguist, philosopher, social critic and political activist. He is well-known for his open commentaries of current political events. These have often raised controversial reactions as they are usually directed against American politics. For example, in the time of Vietnam War, Chomsky was a strong anti-Vietnam war activist. He also became famous for his critique of American interventions in the

Israel-Palestine conflict.

In addition to his political activities, Chomsky is also frequently described as the "father of modern linguistics". His influence on the field of theoretical and applied linguistics has been considerable and his unique contribution internationally recognised. Chomsky´s linguistic career began officially with the publication of his first book *The Syntactic Structures* in 1957, in which he presented, a number of (at that time) revolutionary ideas. During his life-long work he has elaborated and evolved his hypotheses and is still actively contributing to the field of theoretical linguistics.

2.1. Chomsky vs. Behaviourists

B.F. Skinner, a well-known behaviourist, assumes that human or animal behaviour is the result of the influence of the environment and individual´s history. Concerning the study of human behaviour, behaviourism traditionally views mind as a "tabula rasa". This follows that everything a person knows and is able to do is purely a result of a learning process acquired during one´s life. Skinner´s theory thus implies that everything is learned thanks to reinforcement and punishment. Skinner defines verbal behaviour in the first chapter of his book *Verbal Behaviour* as "behaviour reinforced through the mediation of other persons" (2). Skinner assumes that language is a learned behaviour, shaped by our environment and by other speakers who surround us. As such, it is learned through Pavlovian conditioning (aka respondent conditioning), that is, by means of reinforcement and punishment (Skinner 20).

Chomsky strongly disagreed with behaviourism, which led to his "Review of B.F. Skinner´s Verbal Behaviour", published in 1959. This book contributed to the decline of the behaviourist movement, which was prevailing in the first half of 20th century in linguistics and other fields. In the review, Chomsky criticised Skinner´s theory in detail and finally stated that: "The fact that all normal children acquire essentially comparable grammars of great complexity with remarkable rapidity suggests that human beings are somehow specially designed to do this (...)" (Chomsky 29).

Chomsky´s well-supported criticism of the behaviourist approach disproved the theory of language as a "verbal behaviour" in the eyes of many scientists. As Chomsky points out in his review, Skinner´s hypothesis ignores many aspects of the human language faculty. An example and strong argument against behaviourism is what Chomsky calls "the poverty of the stimulus argument". The definition of this term is explained for example in the introduction to the book *The Science of Language*, written

by James McGilvray. With the minimal amount of theoretical information concerning grammar, children are able to rapidly acquire grammar rules of particular language, regardless of the complexity and difficulty of the grammar (McGilvray 5).

By the criticism of B.F. Skinner and behaviourism in general, Chomsky not only modified the predominant linguistic theory, but he turned it around by stating that the language faculty is not learned by the usage of the reinforcement and punishment method. According to Chomsky, it is rather an innate faculty. Considering the speed and complexity with which language is acquired by children, the language faculty simply cannot be "learned" in a classical sense, without any "device" already innately present in every human being. As Chomsky´s claims were in many aspects the exact opposite of the key behaviourist ideas, Chomsky initiated what may be described a revolution in linguistics.

2.2. Influential theories

The criticism of behaviourism was just the beginning of Chomsky´s influence. Chomsky developed completely different points of view concerning a number of key linguistic issues. He elaborated on his rejection of behaviourism and the poverty of the stimulus argument, supporting the nativist school of thought which is the opposite of behaviourism. His influential theories include the Universal Grammar and Generative grammar.

2.2.1 Universal Grammar

Closely connected to linguistic nativism is Chomsky´s theory of Universal Grammar. It is defined by Chomsky in *Knowledge of Language: Its Nature, Origin and Use* as "an intricate and highly constrained structure" (148) consisting of "various subsystems of principles" (146). These definitions are rather abstract and require closer explanation. He argues that humans have a hard-wired innate system (consisting of many "subsystems and principles") that enables them to be able to learn language.

To support this thesis, Chomsky simply uses the clear evidence from the child language acquisition: the poverty of the stimulus argument, the rapidity of acquiring first language: indeed emphasising the inherent ease of acquiring and understanding specific and complex grammatical rules as well as the rapidity of learning new words. Chomsky´s further argument connected to first language acquisition is the fact that all children go through the same stages of language acquisition in the course of more or less same time span.

In the article "Approaching UG from Below", Chomsky states three factors that are needed for the development of language in every individual: "(1) genetic endowment, which sets limits on the attainable languages, thereby making language acquisition possible; (2) external data, converted to the experience that selects one or another language within a narrow range; (3) principles not specific to faculty of language" (3). This follows that in order to acquire language a human individual has some "language acquisition device" that he/she was born with (1), must be exposed to at least some stimulus (2) and other faculty of language non-specific principles (3). Although (2) states the need of some stimulus, it is still an anti-behaviourist thesis, since without the "genetic endowment" any stimulus is useless, therefore language is not primarily a result of a learned behaviour. Another of the supporting arguments is the existence of universal properties of language; features shared among all human languages. These include for example: Modularity, Constituency, Recursion or Productivity, and are listed and explained for example in the book *An Introduction to Language and Linguistics* (Fasold and Connor-Linton 1-7). The universal properties of language are an important feature; in the words of Hauser, Chomsky and Fitch:

> If a Martian graced our planet, it would be struck by one remarkable similarity among Earth's living creatures and a key difference. Concerning similarity, it would note that all living things are designed on the basis of highly conserved developmental systems that read an (almost) universal language encoded in DNA base pairs. (1569)

2.2.2. Generative Grammar

Generative grammar, a concept closely connected to syntax, has undergone a long journey of defining, specifying and re-defining.

The earliest definition of generative grammar appear in Chomsky´s *Syntactic Structures*, where he presented the word "generative" for the first time. He described it as "an abstract device that generates all the grammatical sequences of (a language) and none of the ungrammatical ones" (11). The first's notions of generative grammar also contained what Chomsky calls in *Aspects of the Theory of Syntax* a syntactic component. The syntactic component generates for every sentence: "deep structure that determines its semantic interpretation and a surface structure that determines its phonetic interpretation" (*Aspects of the Theory of Syntax* 16-17). Concerning this issue, it is important to state that in later development of generative grammar, the theory of deep and surface structure was abandoned and substituted.

One of the purposes of introducing the idea of generative grammar was to criticise – at the time of Chomsky´s beginnings – prevailing structuralism in syntactic analyses. Therefore, by proposing the notion of generative grammar or, more specifically, transformative generative grammar, Chomsky is challenging the traditional Saussurean structural linguistic theory. The Saussurean theory is aiming to examine language as a static system of interconnected units. By the definition of John R. Searle, it is "attempting to classify all of the elements of the corpus at their different linguistic levels". Chomsky felt that structuralism is rather superficial and cannot be able to sufficiently describe the complexity of sentences.

Chomsky later elaborated on his theory of generative grammar, mainly in the work *Aspects of the Theory of Syntax*. He is stating that some essential parts of speech cannot be generalised since they do not follow any concrete, classifiable rules but rather are connected to thoughts. In Chomsky´s words: "the rules of sentence formation do not really belong to grammar but to some other subject in which the "order of thoughts" is studied" (6). Therefore, sentence formation is according to Chomsky irrelevant to grammar since it is connected to the concept of thoughts, not to classifiable grammar in the linguistic sense.

In *Aspects of the Theory of Syntax*, Chomsky also redefines generative grammar, taking a more abstract point of view: "(...) by a generative grammar I mean simply a system of rules that in some explicit and well defined way assigns structural descriptions to sentences" (8). This differs from speaker to speaker, but generative grammar proposes no perception or production model for speaker-hearer: "When we speak of a grammar as generating a sentence with a certain structural description, we mean simply that the grammar assigns this structural description to the sentence" (Chomsky 9).

Chomsky considers grammar to be more than just mere description of syntactic rules. Thus, in *Aspects of the Theory of Syntax*, he criticises traditional grammars and descriptive linguistic approach: "However, valuable as they obviously are, traditional grammars are deficient in that they leave unexpressed many of the basic regularities of the language with which they are concerned" (5). This is clear evidence that to Chomsky the descriptive, structuralist approach as well as traditional grammars are not sufficient and detailed enough. Chomsky also states, again in *Aspects of the Theory of Syntax* that: "This fact [that traditional approach is not sufficient] is particularly clear on the level of syntax, where no traditional or structuralist grammar goes beyond classification of

particular examples to the stage of formulation of generative rules on any significant scale" (9).

Using the theory of generative grammar, Chomsky is trying to do more than just classify syntactic rules into categories. However, even traditional grammars acknowledge that "one of the qualities that all languages have in common is their creative aspect" (*Aspects of the Theory of Syntax* 6). Chomsky sees this as a contradiction – if language is creative, meaning it is able to produce an infinite number of combination, how can structuralists achieve anything by classifying it?

Another point mentioned in *Aspects of the Theory of Syntax* is that: "Hence a generative grammar must be a system of rules that can iterate to generate an indefinitely large number of structures" (15-16). By an indefinite number of structures Chomsky clearly means grammatical structures. Generative grammar simply enables humans to understand every sentence that was composed according to grammatical rules – even though every sentence can be a unique combination of words, never uttered before.

As one can see, generative grammar is connected to Universal Grammar. It would be impossible to learn and remember every possible word combination and its meaning, since there is an infinite number of possibilities. Therefore an innate component enabling humans to do this – in Chomsky´s terms Universal Grammar, is needed. The Universal Grammar theory state that as children, humans acquire theoretical grammatical rules of their mother language with an unexpected ease. Thanks to some innate mechanism, hard-wired in human brain, children are able to attain the understanding of the basic grammatical rules of their mother language. And that is without any difficulty one would logically expect when acquiring a system of such complexity.

Since the beginning of 1990s, Chomsky was focusing mainly on his Minimalist program which is closely connected to generative grammar. As a source for Chomsky´s ideas connected to minimalism, his book *The Minimalist Program*, is used. This ideological direction sidelines the notions of deep and surface structure, stating that "Suppose that D-Structure is eliminable along these lines" (Chomsky 191). This suggests that Universal Grammar contains only necessary properties used to link sound to meaning and properties shared among all human languages. The Minimalist program aims to determine, among other things, which these are and why are they necessary. The notion of generative grammar was again re-defined in the sense of the Minimalist program: "The more complex assumption is that there is a compound operation – you

take the phrase, you attach it somewhere else and then you delete the original (...)" (Chomsky 24).

However, even after all those developments of the concept of generative grammar, the core idea remains the same – as is defined in *Aspects of the Theory of Syntax,* generative grammar is a system of rules connected to UG (since it is innate as well) that generates exactly those combinations of words that form grammatical sentences (13). Along with UG it enables humans to produce and understand language

As it is argued in this thesis, Noam Chomsky´s contribution to the field of theoretical linguistics is both substantial and controversial. The aim is to outline and explain some of Chomsky´s most influential hypotheses. The purpose is to present the extent and depth of his work, its interdisciplinary influence, and wide-ranging nature since he touches on a considerable number of topics and cuts across a vast array of research areas.

2.3. Reception of Chomsky

Chomsky is an original thinker and, as a consequence, many of his ideas are both unique and controversial. Although many of his theories are considered to be the leading ones in the view of modern linguistic issues, Chomsky still remains a highly controversial person. He is respected, at least in the linguistics area, but his theories are raising discussions among psychologists, linguists even now (however, the most passionate discussions about his opinions are related to his political views and analyses of the society).

2.3.1. Chomsky´s Supporters

Chomsky changed the face of linguistics as it was known. It can be said that his theories and approaches helped to establish the modern linguistics the status of natural science. Therefore, every linguist dealing with modern theoretical issues has to acknowledge Chomsky´s contribution. From the outset of his work, there were many who admired his genius and anticipated and examined his novel theories with excitement. Even Chomsky´s critics respect his original thinking, innovation, his challenges, and criticism. They may not agree with all of Chomsky´s claims but they respect Chomsky as a linguist and acknowledge his substantial contribution to the field of theoretical linguistics.

Worth mentioning is for example Ray Jackendoff, a linguist dealing with topics closely connected to Chomsky. Even though he is refusing to accept some of

Chomsky´s most controversial theories, he is a big supporter of Universal Grammar and generative grammar. He broadened the understanding of the latter by proposing further possible applications than the traditional Chomskyan ones.

Interesting are Jackendoff´s studies about the link between human capacity for language and human capacity for music. On this subject he wrote in 1983 with Fred Lerdahl a book called *A Generative Theory of Tonal Music*. Jackendoff´s application of Chomsky´s theory of generative grammar on music proves that Chomsky´s contribution is not restricted to linguistics, it can be applied to other fields as well.

As for the school of thought, Chomsky calls himself a rationalist. Rationalists are in fact nativists, they believe in the innateness of language. In the introduction to the book *The Science of Language,* the author James McGilvray summarises the core of rationalist idea concerning language in following words: "Children develop a language automatically, with little or no training in conditions where data are sometimes limited and often corrupt (...)" (McGilvray 5). This definition is basically the Chomskyan' poverty of the stimulus argument and creates a basis for the rationalist view on language.

2.3.2. Chomsky´s Critics

As already stated above, Chomsky himself and his theories meets many critics from a range of different fields

Some of the former students of Chomsky took another course of ideology in the course of time. This controversy resulted in what is colloquially called "Linguistic Wars", taking place mostly in 1960s and 1970. Worth mentioning are for example John Ross, Paul Postal, George Lakoff and James McCawley who proposed another possible view of generative grammar, focusing on semantics rather than grammar in the deep structure.[1] Their approach, developed from Chomsky´s transformative generative grammar, became to be known as Generative Semantics and decades of passionate debates followed. The debate resulted in an extension of the knowledge of linguistics and of some alterations in Chomsky´s theories. One of them being the renunciation of the notion of deep structure in his works, rendering it rather to the study of thoughts and semantics than to the study of grammars.

Even though the most intensive Linguistic wars belong to 1960s and 70s, even today the critics of Chomsky are challenging linguistic theories and have widened this to such related topics as that of the credibility of Chomsky as an author.

As an example can serve the publication from 2004 called *The Anti-Chomsky*

Reader, edited by Peter Collier and David Horowitz. It deals mostly with Chomsky´s political views, but the eight chapter reflects on his linguistic views. Paul M. Postal from New York University again contributed to this work along with another former student of Chomsky, D. Levine from Ohio State University. They are attacking the honesty of Chomsky´s work, stating that he is appropriating theories and ideas that are not primarily his without stating the original source properly. According to Postal and Levine, Chomsky ignores giving credit to those who really deserve it, especially concerning the "recognition of the nonexistence of anything corresponding to his notion deep structure" (212). Renunciation of this idea was primarily advocated by other linguists (the first being John Robert Ross). Chomsky fails to mention this fact and does not acknowledge Rosses´s suggestion (Postal and Levine).

Postal and Levine are also claiming that the fame and praise concerning his work is rather undeserved because it is "driven by uncritical acceptance (often by non-linguists) of claims and promises made during the early years of his academic activity; the claims have over time largely proved to be wrong or without real content and the promises unfulfilled" (Postal and Levine 203). Another of their anti-Chomsky arguments states that "the two strands of Chomsky's work manifest the same key properties" (204) and even more, Postal and Levine state that "independently unsupported remarks in interviews and lectures or anecdotal comments as part of articles" (Postal and Levine 204). This has, according to the authors, nothing to do with serious and scientific study and professionalism.

Whether these critiques are plausible or not is for each individual to decide. It is natural that such a controversial person with unusual ideas stays in the middle of the battlefield of discussion. It is the way every science is able to develop and move to another level: thanks to innovative ideas of people like Chomsky who are not afraid to say them aloud. The discussions following his statements are awaited and even desired in order to prove or disprove these hypotheses – both cases mean contribution to the field, therefore it cannot be denied that Chomsky remains a person that undeniably brought many contributions to the field of theoretical linguistics. His ideas, whether completely accurate or not, are definitely encouraging the process of creating a scientific debate.

There is another issue that needs to be discussed; namely empiricism. Empiricism takes a completely opposite direction in the study of human language. James McGilvray contrasts empiricism with rationalism "For them [empiricists],

language tends to be seen as a human invention (...)" (McGilvray 7). Empiricists also believe that "a science of language should in some measure be a science of linguistic behaviour" (McGilvray 7). This follows that empiricism, at least in some way, draws on behaviourism, since it sees the language as a behaviour. Based on the core ideas of empiricism, it is clear that it represents, in the study and understanding of language, the exact opposite of rationalism. However, empiricism can hardly be seen as "critique of Chomskyan views"; it is simply a completely different direction of thought and this pluralism of competing ideas is an inseparable part of science.

2.3.3. Steven Pinker

This thesis is concerned with the relationship of Chomsky´s ideas contrasted to the opinions of another North American linguist, Steven Pinker.

Pinker, born in Canada on September 18, 1954, is a psychologist, cognitive scientist and an author of popular scientific literature. By writing scientific books for non- scientific readers, he is aiming to bring complicated scientific ideas and theories closer to general audience. In his works, he is dealing for example with psycholinguistic topics, child language acquisition, experimental psychology or visual cognition.

Among Pinker´s most famous books for general audience belong *The Language Instinct* (1994), *How the Mind Works* (1997), *Words and Rules* (1999), *The Blank Slate* (2002), and *The Stuff of Thought* (2007). Pinker´s works often include his own research in psycholinguistics. He is dealing for example with the notion of language being an innate instinct or the refusal of the behaviouristic and empiristic idea of mind being "tabula rasa". In his book *Words and Rules*, Pinker is dealing with regular and irregular verbs, examining this phenomena in the English language. With the support of his own research, carried out on children, Pinker is trying to contradict connectivism and an orthodox Chomskyan theory of irregular past tenses. These theories explain irregular forms as a result of rules applied on the basis of phonological similarities. From the results of his own research Pinker concludes that "The evidence, then, supports the hypothesis that the design of human language comprises two mental mechanisms: memory, for the arbitrary sign underlying words, and symbolic computation, for the infinite use of finite media underlying grammar " (Pinker 27). This combines the use of words and rules theory with an altered generative phonology, based on Chomsky.

It is difficult to label Pinker as purely a critic or supporter of Chomsky, since he is in fact both. He was inspired by Chomsky´s work in the early stages of his career, but later he diverted from some of Chomsky´s theories, taking his own original stand.

However, it is clear that his work is deeply influenced by Noam Chomsky, as Pinker himself admits on various occasions. He studied Chomsky in detail and openly appreciates his contribution. In the preface of Pinker´s famous book called *The Language Instinct*, he devoted few words to Chomsky. In this preface, Pinker acknowledges Chomsky's contribution and his hypothesis about language being like an instinct. Pinker is describing Chomsky´s influence, which began in 1950s, and recognises him as "perhaps the person most responsible for the modern revolution in language and cognitive science" (*The Language Instinct* 21).

This follows, that Pinker is not an anti-Chomskyan per se, since he is admitting his genius, great intellectual power and enormous contributions. However, in the preface of *The Language Instinct* he also states that "The story I will tell in this book has, of course, been deeply influenced by Chomsky. But it is not his story exactly, and I will not tell it as he would" (*The Language Instinct* 24). Pinker surely is taking another route, supposing for example language evolving as an adaptation in a Darwinian sense. This is the opposite of what Chomsky is suggesting, since he is doubting the adaptation hypothesis, claiming that language is probably a result of some other evolutionary process (Hause, Chomsky, and Fitch).

There are other cases in which Pinker fails to agree with traditional Chomsky´s theories. These concern mainly the problem of the reason for the evolution of language and uniquely human traits within the faculty of language. Over the course of Pinker´s career he became engaged in a scientific discussion with Chomsky concerning these topics.

3. Chomsky vs Pinker

Chomsky´s and Pinker´s mutual criticism of scientific research, hypotheses and papers began with Pinker and Jackendoff´s publication of the article "The faculty of language: what's special about it?" Pinker and Jackendoff wrote this article in 2005 as a reaction and criticism of a controversial paper "The Faculty of Language: What is it, Who has it and How did it evolve", published by Hauser, Chomsky and Finch in Science in 2002.

3.1. Recursion-only Hypothesis

Marc D. Hauser, Noam Chomsky and Tecumseh Fitch (HCF) in their article "The Faculty of Language: What Is It, Who Has It, and How Did It Evolve?" address

the topic of the faculty of language. They are proposing that recursion is the only faculty which is uniquely human. Recursion, as explained in *An Introduction to Language and Linguistics*, refers to: " the property of language, which allows grammatical processes to by applied repeatedly, combining constituents to produce an infinite variety of sentences of indefinite length" (Fasold and Connor-Linton 3). Fasold and Connor-Linton state that recursion belongs to the "universal properties of language" (3). There is a number of different languages in the world that seem to have nothing in common at the first sight. However, "they are all made possible by the same genetic information" (Fasold and Connor-Linton 2), meaning all human language have the same origin. Therefore, all human languages "share certain fundamental design features and structural characteristics" (2), which is basically what we call the universal properties of language. Other than recursion, they include for example arbitrariness; the lack of any "principled or systematic connection" (Fasold, Connor-Linton 2) with the sound of the word and its meaning or reliance on context.

Hauser, Chomsky and Fitch in arriving at their hypothesis identified that a distinction is needed to be drawn between the Broad Language Faculty (FLB) and Narrow Language Faculty (FLN). It is crucial not to confuse those two terms. According to HCF: "FLB includes a sensory-motor system, a conceptual-intentional system, and the computational mechanisms for recursion, providing the capacity to generate an infinite range of expressions from a finite set of elements" (1569). In other words, to the FLB belong the properties of human languages shared with the communication systems of other species or those used by cognitive systems other than creating meaningful sentences.

HCF argue that the only occupant of the FLN is recursion (recursion-only hypothesis). More specifically, they present the following argument: "Although many aspects of FLB are shared with other vertebrates, the core recursive aspect of FLN currently appears to lack any analog in animal communication and possibly other domains as well" (1571). This implies the only action that distinguishes human faculty of language from any other species is the ability to apply recursion. The FLB/FLN theory meets its many critics. Steven Pinker and Ray Jackendoff (PJ hereafter) are discussing this issue in their linguistic article "The faculty of Language: What's Special about it". Although the authors agree with some part of HCF´s hypothesis, they reject or at least bring into question a number of its key arguments.

One of them being the recursion-only hypothesis, the other being the possibility,

proposed by HCF that what we call a language faculty may not be a result of evolutionary change, primarily happening to enable humans to use language (they are against the "argument from design" theory). Pinker and Jackendoff agree that:

> [I]t is conceptually useful to distinguish between the language faculty in its broad and narrow sense, to dissect the broad language faculty into sensorimotor, conceptual, and grammatical components, and to differentiate among the issues of shared versus unique abilities, gradual versus saltational evolution, and continuity versus change of evolutionary function. (205)

However, Pinker and Jackendoff challenge the idea that recursion is the only part of FLN. PJ are proposing the theory that there are other concepts – unique parts of the human language faculty – and these deserve to be included in FLN as well. And it goes further; in fact, they present not only one, but more propositions (including arguments and evidence) of which concepts are possibly uniquely human and therefore should be included in the FLN. According to them, phonology, speech perception, word-learning and certain parts of syntax (apart from recursion) are complex and remarkable enough to be labelled as "unique to human language".

The areas in HCF´s proposals in which Pinker and Jackendoff agree are important as well. They accept HCF´s claim that some parts of the conceptual system can be found in chimpanzees and other primates, therefore are not unique to humans. In PJ´s words: "The primate literature, incisively analysed in HCF, gives us good reason to believe that some of the foundations of the human conceptual system are present in other primates, such as the major subsystems dealing with spatial, causal, and social reasoning" (Pinker and Jackendoff 205). This follows that concepts seemingly human-specific at the first sight, were proved to be present in other species (even though in a simplified way). Therefore, those concepts cannot be included in FLN.

Closely connected is the second issue; namely the existence of the conceptual systems unique to humans but not unique to language, on which both linguists agree. Pinker and Jackendoff describe those systems by using few examples: the concept of romantic love, moral, and ownership (Pinker and Jackendoff 205). As another conceptual system that is clearly unique to humans (since no evidence has yet been found in other species), PJ state the human ability to manipulate others or lie using language. Such behaviour, however is associated with other abilities, not primarily the language. Such concepts (ownership, romantic love, manipulation etc.) are unique to humans but not to language faculty in its narrow, linguistic sense. So as for the

conceptual structure, PJ more or less accepts that although there are some concepts uniquely human, these have no place in FLN (205), since they are either human-specific but not language-connected or language-connected but not human-specific (the core mechanisms of those concepts can be found in other species).

Despite PJ´s agreements to HCF´s theses, there is still a number of key arguments that PJ strongly reject. To challenge HCF´s proposals, Pinker and Jackendoff offer a number of counter-arguments to the recursion only hypothesis of FLN. For example, Pinker and Jackendoff propose that speech perception, phonology, words and word-learning should be included in the FLN (206-216).

At first, the argument concerning speech perception will be examined. As it will be shown, PJ´s counter-argument manages to at least weaken the recursion-only hypothesis. Pinker and Jackendoff point out, for example that "young infants, including neonates, prefer speech sounds to non-speech sounds with similar spectral and temporal properties. These include sounds that would have been indistinguishable in the womb, so the preference cannot be explained by learning in utero" (Pinker and Jackendoff 207). Those arguments suggest that even humans who never heard speech sounds before show an automatic reaction to them; therefore there might be something naturally present in our genetic endowment.

Furthermore, Pinker and Jackendoff refer to the research undertaken by Peña et al. "Sounds and silence: an optical tomography study of language recognition at birt".[2] This research established that the parts of the infant brain which are proven to be connected to speech, more specifically they "subserve language in adults" (Pinker and Jackendoff 208) – the left-hemisphere temporal regions of new-born's brains (208) – are able to distinguish between normal speech and spectrally similar reversed speech (208). Even though reversed speech and human speech are similar in many ways (especially for someone unable to understand words), infants and neonates seem to be able to distinguish them. These outcomes indicate that human infants naturally incline and respond to human language (which was never proven with animals). However, this evidence is not so strong, concerning that it does not take into account some important factors. For example, it does not discuss the possibility that infants might already have gotten used to the human voice. This is natural to other species as well. It is a known fact that some very young animals respond to the noises of their own species rather than any other. This is not so problematic with neonates for whose many of the sounds heard in the womb are indistinguishable, therefore they could not become accustomed to the

human speech. However, from the moment of their birth, they are usually immediately exposed to human language, therefore can quickly become accustomed to it. This certainly does not disprove the research carried out by Peña et al., these doubts can easily be dispelled, however until this issue is clarified, it weakens the results, making PJ´s argument less strong.

As a further example of an exclusively human quality, Pinker and Jackendoff state certain parts of phonology. They claim that phonology provides not only one but at least three pieces of evidence to challenge the recursion-only hypothesis. The first one being that HCF do not discuss phonology and its impact, or lack of it, on FLN sufficiently. They do discuss this briefly stating the following conclusion: "Although the mechanisms underlying the acquisition of birdsong and human language are clearly analogs and not homologs, their core components share a deeply conserved neural and developmental foundation. (Hauser, Chomsky, and Fitch 1572)". To support this claim, HCF use the similarities among infant babbling and young bird´s phase of song development in which they spontaneously produce amorphous versions of adult song (1572).

Pinker and Jackendoff attempt to discredit the recursion-only hypothesis using following arguments: phonology is not recursive, therefore not every solely human faculty applies recursion; although some parts of phonological ability may be similar to bird song, it does not actually prove anything, because these are not found in other primates, therefore they would have to have evolved separately in humans (Pinker and Jackendoff 211). In PJ´s words: "It is undeniable that phonology constitutes a distinct level of organization of all human languages" (Pinker and Jackendoff 212). The lack of investigation and evidence concerning phonology provided by HCF is used to support PJ´s anti-recursion-only claim. The lack of discussion provided by HCF is quite surprising as it is a topic closely connected to the faculty of language.

The distinction between applying phonology by humans and other species is quite striking. Firstly, Pinker and Jackendoff claim that phonological structure, although made of infinite number of possible combination, is not recursive. Recursion is defined as a process of "embedding a constituent in a constituent of the same type" (Pinker and Jackendoff 211). According to PJ, "this does not exist in phonological structure: a syllable, for instance, cannot be embedded in another syllable" (211). It follows, that although syllables are constituents of the same type, they can only be concatenated (put into chains). They cannot be meaningfully embedded like relative clauses.

Concatenation is a significantly less complex process than recursion (Pinker and Jackendoff 211). This brings into question HCF´s claim that recursion is present in all major parts of every human language. And to challenge it even more, PJ are stating that this claim has actually already been proven to be false.

The evidence disproving the presence of recursion in every human language was discovered by Daniel Everett. After examining the language of an isolated group, living in Amazonas, Brazil, Daniel Everett came to a very interesting conclusion. Pirahã, the language of Pirahã people, differs significantly and in many aspects from all of the widely known and used languages. The lack of recursion is a distinction relevant for the issue discussed in this thesis. Everett claims that cultural constrains can have an impact even on the parts of the universal grammar, the essence and core of every human language. This has the power to disprove Chomsky´s theory about the universal language properties characteristic to all humans. To support this thesis, he wrote a paper called "Cultural Constraints on Grammar and Cognition in Pirahã: Another Look at the Design Features of Human Language". Providing the concrete examples based on his own experience, Everett proves that the process of recursion is not present in the Pirahã language.

> If the form or absence of things such as recursion, sound structure, word structure, quantification, numerals, number, and so on is tightly constrained by a specific culture, as I have argued, then the case for an autonomous, biologically determined module of language is seriously weakened. (Everett 26)

This research is used to support Pinker´s and Jackendoff´s assertion. Namely, their hypothesis against Chomsky´s claim that recursion underlies every unique human language quality.

To further support their argument concerning phonology, PJ raise the question of human-uniqueness: "The rhythmic properties of language and music may well be unique to humans: informal observations suggest that no other primate can easily be trained to move to an auditory beat, as in marching, dancing, tapping the feet, or clapping the hands..."(211). Although an "informal observation" does not provide sufficient amount of credibility, it has not been disproven so far. Only humans are, without much effort, able to perform those activities. This logically means that this part of the phonological capability is unique to humans and, as a consequence, should be considered as a possible contribution to the FLN. In the light of these findings, the issue of the content of FLN should probably be re-examined.

In conclusion, Pinker and Jackendoff make it clear that "major characteristics of phonology are specific to language (or to language and music), uniquely human, discretely infinite, and not recursive" (212). This follows that thanks to phonology many counter-arguments to the HCF´s hypothesis arise and considering the fact they do not offer any closer examination or explanation of this issue, Pinker´s doubts are reasonable and have not been disproved so far.

A further issue, connected to the question of unique parts of the faculty of language, is the notion of words. The usage of words is unique to human speech and not even remotely similar in any way to how other species communicate. If we consider the complexity of this concept, the huge number of words that are actively used and known, not to mention the speed in which children learn new words, it is clear that such rarities are nowhere else to be found than with humans. These are all clear facts, which would theoretically disprove the recursion-only hypothesis. However, HCF point out that although word learning certainly is unique to humans – in its amount, manner and speed, it is not unique to language. According to HCF, it is achieved thanks to the Theory of mind, a mechanism specific to the domain of intuitive psychology, possibly unique to humans (1577). This would mean, that the ability to learn and use words in a way only humans do is not thanks to the specific linguistic ability but is connected more to other human-specific psychological abilities.

Pinker and Jackendoff bring this into question as well, citing for example the research carried out by Diesendruck and Markson (2001), concerning the differences in children´s word-learning versus fact-learning. Diesendruck and Markson conclude, after stating the satisfactory amount of convincing evidence that: "Interestingly, the present findings lend indirect support to the idea that in some respects, word learning is special" (qtd. in Pinker and Jackendoff 214).

In conclusion, Pinker and Jackendoff are undeniably presenting some well-supported arguments against very fundamental parts of HCF´s hypotheses. Using logic as well as concrete data (for example the Pirahã research) Pinker and Jackendoff conclude that recursion probably is not a core part of every essentially human faculty concerning language. The absence of any recursive process in phonology is another example. The complexity of using phonology is certainly unique to humans, but the underlying principle is in this case not recursion. Therefore, there might be other unique processes present in human language faculty.

The research carried out by Peña et al. presents some evidence proving that even

infant´s brain reacts more to the sound of natural speech. Whether it is because humans have the speech naturally encoded or for any other reason, remains to be discovered.

However, other arguments concerning phonology seem to have strong foundations. It is clear that only humans use the phonology in this specific way. The inability of other primates to move to an auditory beat, as in marching, dancing, tapping the feet, or clapping the hands (Pinker and Jackendoff 211) follows that there is at least something uniquely human concerning phonology. In supporting this thesis is also helpful that HCF do not discuss this issue properly, therefore do not provide any arguments and evidence supporting their hypothesis.

As Chomsky himself admits, there is not enough empirical evidence to make a clear conclusion, no definite proof. This follows, that the recursion-only hypothesis is at least open to further discussion, because it is quite restricted. As ones of its opponents, Pinker and Jackendoff are succeeding in weakening it.

3.2. The Evolution of Language

The notions of FLB and FLN and the recursion-only hypothesis itself open two interesting ideas on which Pinker and Chomsky fail to agree. One problem being, whether the traits which enable humans to speak have evolved primarily for this purpose. The second problem raises the question whether human speech is a result of an evolutionary adaptation by natural selection or not.

In the first case, Chomsky and his supporters claim that recursion and other changes needed for the origin of speech may have not evolved primarily for this purpose, while Pinker is strongly against this thesis. As for the second disagreement, Pinker is a strong supporter of the prevailing idea of adaptation by natural selection, while Chomsky is doubting it.

3.2.1. Natural selection or not- Chomsky

Chomsky was dealing with the problem of the origin of language even before the publication of the controversial article by HCF. However, it could be said that his previous assumptions do not go into great detail. For example, in his lecture "Language and its Design" delivered in Delhi in January 1996, Chomsky is meditating on the similarities of the properties of language faculty in the animal word. This lecture is part of the book *The Architecture of Language.* He states that there is a striking lack of any systems that would be similar to those of human language faculty in the species with "relevantly common evolutionary origin" (for example the primates) (*The Architecture*

of Language 4). Chomsky is suggesting that it almost seems "as if there was some higher primate wandering around a long time ago and some random mutation took place, maybe after some strange cosmic ray of shower, and it reorganized the brain, implanting a language organ in an otherwise primate brain" (*The Architecture of Language* 4). Of course, as he himself states, this is not to be taken literally. However, in a simplified way, accessible to a broader, non-scientific audience, the fact that there has not yet been found anything resembling human language faculty in non-human species is very important. It describes the core of Chomsky´s hypothesis concerning the origin of the human faculty of language.

A few years later, Hauser, Chomsky and Fitch elaborated on this thesis in a greater depth. They claim that some parts of the FLB have been present in human as well as non-human genetic code for centuries and are very complex; in HCL´s words, have "ancient evolutionary history, long predating the emergence of language, and a comparative analysis is necessary to understand this complex system" (Hauser, Chomsky, and Fitch 1573). However, HCF state that "the computations underlying FLN may be quite limited. If FLN is indeed this restricted, this hypothesis has the interesting effect of nullifying the argument from design, and thus rendering the status of FLN as an adaptation open to question" (Hauser, Chomsky, and Fitch 1573). This would of course mean that there are just a few things concerning language that distinguish humans from other animals. That follows (as HCF are suggesting) that there is no clear evidence (and it would be difficult to find one) of the origin of human language faculty. If it was adaptation, it would suggest the presence of some proto-language faculty or at least some similar mechanism in animal species, from which the speech could have evolved.

In a more recent essay "How could language have evolved", the authors (Johan J. Bolhuis, Ian Tattersall, Noam Chomsky and Robert C. Berwick) are proposing the argument that "there has been no detectable evolution of the language faculty since it emerged, with no known group differences. This is another signature of relatively recent and rapid origin." In other words, Chomsky et al. believe in some kind of sudden change, happening possibly by a coincidence. This change made it possible only for humans to develop language. The argument supporting the thesis of the recent and rapid origin of human language faculty is that there seems to be no major development, no improvements. The core mechanisms and principles enabling humans to form sentences are now same as in the instant of its emergence.

Closely connected to this is Chomsky´s another claim that grammar was a complex system from its very beginning. In other words that the first language with grammar was as complex and evolved as is any contemporary grammar. This argument is denying the natural selection explanation. Natural selection is described in Merriam-Webster dictionary as "the process by which plants and animals that can adapt to changes in their environment are able to survive and reproduce while those that cannot adapt do not survive". Chomsky´s hypothesis contradicts this definition, namely the word "process". In his opinion, there was no gradual evolution, no adaptation but rather a sudden change, happening possibly by a coincidence or for another purpose than language. And because there is no clear process of "making the language more perfect" – no gradual progression from its emergence – it seems that language is still as perfect as it was from the beginning. And this certainly contradicts the theory of adaptation by natural selection.

HCF discuss the possibility of language as an adaptation, because this theory is the most accepted one between scientists. However, they conclude that:

> At present, however, we see little reason to believe either that FLN can be anatomized into many independent but interacting traits, each with its own independent evolutionary history, or that each of these traits could have been strongly shaped by natural selection, given their tenuous connection to communicative efficacy. (1574)

According to HCF it is highly unlikely and would be a great coincidence if natural selection was the explanation of the origin of human language faculty.

3.2.2 Natural selection or not: Pinker

As it was mentioned above, Pinker is a supporter of the argument from design. The argument from design in this case suggests, that language capacity is "(i) too complex to have arisen by chance, and (ii) appears to be specifically designed for processing natural languages" (O'Donnell 1).

Pinker and Bloom are dealing with these hypotheses in their study "Natural Language and Natural Selection". They are defending the evolutionary theory of language as the adaptation evolved by natural selection. They argue against Chomsky´s refusal of the development of language and its motivation.

Pinker wrote later another paper dealing with the adaptation theory in greater detail: "Language as an Adaptation to the Cognitive Niche". In this essay he is reacting to Chomsky´s refusal of natural selection. More specifically, he focuses on Chomsky´s

argument that it was some kind of a sudden change that distinguished humans from their animal ancestors; not a gradual process of adapting. In Pinker´s view, the absence of any sign even similar to the language faculty in chimpanzees does not necessarily mean sudden change. It could still have evolved gradually, but simply from our extinct lineage of ancestors:

> Language could well have evolved gradually after the chimp/human split, in the 200,000–300,000 generations that make up the lineage leading to modern humans. Language, that is, could be an autapomorphy: a trait that evolved in one lineage but not its sister lineages. (Pinker 25)

By stating this, Pinker is trying to propose and support the idea of language being a gradual adaptation, even though chimpanzees, who are generally considered to be human´s ancestors, do not show any signs of a trait even remotely similar to human language faculty. As he states, opposing to Chomsky, chimpanzees were not the only predecessors of humans, they are just the only species that survived.

Pinker and Jackendoff also claim that evidence supporting the sudden change is much less powerful than those of natural selection: "It is consistent with behavioural and genetic evidence that language shows multiple signs of partial specialization for this task rather than grafting one component (recursion) onto a completely unchanged primate base" (Pinker and Jackendoff 231).

Another issue HCF discuss is "whether particular components of the faculty of language evolved specifically for human language and, therefore (by extension), are unique to humans" (1572). Hauser et al. propose their own possible explanation. In their opinion, language originated as a "spandrel" – a by-product of some other change: "We consider the possibility that certain specific aspects of the faculty of language are "spandrels"—by-products of preexisting constraints rather than end products of a history of natural selection" (Hauser, Chomsky, and Fitch 1574). By stating this, HCF are trying to support that some human properties closely connected to the ability to speak evolved primarily for another purpose. The result of these "spandrels" clearly brought humans the enormous advantage of speech, even though the changes were initially meant to serve other purposes.

3.2.3. Main Purpose of: Descended Larynx

An example of these "spandrels" and its explanation is needed to support this hypothesis. The authors of earlier-mentioned essay (Johan J. Bolhuis, Ian Tattersall,

Noam Chomsky and Robert C. Berwick) "How could language have evolved" and HCF as well use the descended larynx as one of the examples of the "spandrel".

HCF claim that for example the descended larynx, which is one of the traits that enables humans to speak is not a uniquely human trait: "new evidence shows that several other mammalian species also have a descended larynx" (Hauser, Chomsky, and Fitch 1574). This fact is used by HCF to support their idea that there is no apparent change happening primarily to enable humans to speak. Because it is found in other than human species, which do not have the ability to speak, they contemplate that this change did not primarily happen in order to enable humans to speak. According to HCF it is clear that it was a spandrel and that the main purpose of the descended larynx was possibly exaggerating its apparent size (Hauser, Chomsky, and Fitch 1574).

In conclusion, the human speech would certainly be impossible without the descended larynx. This however, does not mean that larynx necessarily descended in order to make speech possible. In HCF´s opinion, it was a result of a fortunate coincidence that humans made use of this change and started speaking. However, Pinker as the supporter of the adaptation thesis, states in his essay "Language as an Adaptation to the Cognitive Niche" the very opposite:

> [A]t least some aspects of them may have evolved specifically to mesh with language. A likely example is the vocal tract (…) The human vocal tract has a low larynx compared to those of most other mammals, an arrangement that compromises a number of physiological functions but allows us to articulate a large range of vowel sounds. (Pinker 21)

In Pinker´s point of view, the reason for the low larynx is the ability to produce speech – it complicates many other important functions (for example it raises the possibility of choking to death). But in Darwinian sense, these complications must be outweighed by something and according to Pinker they are, by the "benefit of rapid, expressive communication" (Pinker 21).

Pinker is later presenting (again, in his essay written with Jackendoff) a number of counter arguments to disprove HCF´s hypothesis. Firstly, even if larynx descended primarily for another function than language, this does not mean that it was not later adapted and changed in order to enable humans to speak. "Thus even if the larynx originally descended to exaggerate size that says nothing about whether its current anatomical position was subsequently maintained, extended, or altered by selection pressures to enhance speech" (Pinker and Jackendoff 210-211). This is quite powerful

and logical argument, concerning that this process of later evolving one trait for other function is frequent in evolution. And it does not speak against anything because later alternations of the larynx could possibly happen in order to make speech possible, which rather supports than disproves the adaptation hypothesis.

Pinker and Jackendoff go even further. They state it is actually more likely that the larynx descended for speech than for the size exaggeration. It is found in women and children as well as in adults of reproductive age, therefore there would be no logical reason for its lowering – it would have no use concerning introsexual competition with women and children. Another argument is that there were another "vocal-tract modifications in human evolution, including changes in the shape of the tongue and jaw, resulting later in the ability to speak" (Pinker and Jackendoff 211-212). However, HCF are not even mentioning these, not bringing any possible explanations for those, other than producing speech. It follows that the human vocal tract has certainly undergone changes. And although there might possibly be other reason than language leading to some of those changes, there is no other explanation presented by HCF to suggest what these changes might be. And because those changes made it possible for humans to develop and produce speech, without finding and proving other reason motivating these changes, there is no other option but to mark them as "evolved by adaptation in order to enable speech".

A serious question arises when we consider the descended larynx problem in a way it is being presented by HCF. If other mammals have it as well and theoretically could use it to speak, why don´t they? Doesn´t it mean that this is not the right way leading to an explanation of the origin of the language faculty? Could it suggest that there is some other explanation, not yet known? And that by discussing the descended larynx problem, scientists aiming to find the explanation of the creation of the language faculty and its purpose are wasting their time? Logically, there must be something else which distinguishes humans from animals in this matter, since the descended larynx is a shared trait; nothing human-specific. Therefore the pure presence of the descended larynx in a human body can hardly be a reason why humans (and no other species) are able to speak. However, even though the trait is shared, the way of its usage certainly is unique to humans since no other animal with descended larynx is able to use it in a way humans do. This follows that there probably is some other factor, combination of factors or a system, connected with the larynx that is enabling humans to produce speech.

3.2.4. Main Purpose of: Recursion

As the second example of a possible "spandrel" HCF state recursion. Although they themselves claim, that it is (in a sense humans use it) the one and only trait uniquely human, they bring into question its original purpose, raising the possibility that recursion may have primarily evolved for other reasons than communication. Simply, that it could just by another "spandrel", by-product of some other evolutionary change.

They propose for example the navigation as one possible primary usage of recursion. There is of course a big difference between recursion in language and possible recursion in animal navigation. However, HCF claim that "recursion in animals represents a modular system designed for a particular function (e.g., navigation) and impenetrable with respect to other systems" (Hauser, Chomsky, and Fitch 1578). As they explain this issue further, during evolution the system of recursion somehow became penetrable and allowed humans to use it over a broad range of elements, not only for one particular function. This change made the use of recursive system much more complex, making it possible to create speech. However again, it would be a by-product or rather an extension of already existing animal ability, not a system primarily evolved to make humans speak. As for this issue, HCF themselves emphasise the need for a research and state that these are only suggestions, given that no proof has yet been found.

In Pinker and Jackendoff´s point of view, this hypothesis is as false as the one concerning the descended larynx. One of their counter-arguments is even more or less the same. If recursion was already used before human language originated, there must have been some additional changes, given that recursion in navigation and that of human language certainly differ. This re-shaping of recursion already present in animals would have been a major change primarily happening to enable humans to use language. Therefore a completely novel ability would arise, not just an adjusted old one (Pinker and Jackendoff 231).

But even this is probably false, according to Pinker and Jackendoff. They consider the thesis that linguistic recursion is a relative of animal navigation ability a questionable one. They are attempting to support the argument that navigation is not powered by recursion. Although Chomsky frequently characterizes linguistic recursion as "discrete infinity," the two principal navigation systems documented in non-human animals show no such property. Pinker and Jackendoff draw on the study "Animal Navigation: Path Integration, Visual Landmarks and Cognitive Maps", carried out by

Thomas Collet and Paul Graham[3]. Dead reckoning[4] is infinite but not discrete; recognition of landmarks[5] is discrete but not infinite (Pinker and Jackendoff 230). This follows that whatever mechanism underlies the animal navigation, it is certainly not recursion in Chomsky´s terms. Therefore it is probably not an animal ancestor of linguistic recursion, which is not a by-product but rather a unique trait that was not based on nor has any real similarities to animal navigation.

4. Response

The publication of Pinker´s and Jackendoff´s critical paper concerning HCF´s work resulted in HCF´s reaction. In 2005, the same authors (Hauser, Chomsky and Fitch) published an article in the scientific journal Cognition. Their article, entitled "The evolution of the language faculty: Clarifications and implications "is responding to PJ´s criticism of certain HCF´s ideas; more specifically of those concerning evolution and recursion-only hypothesis. This article is aiming to provide additional information on evolution and recursion which, according to PJ, was missing in HCF´s original hypotheses.

4.1. The FLB/FLN distinction

The topic of Finch, Hauser and Chomsky´s (FHC hereafter) 2005 essay is, once again, evolution and uniquely human properties. FHC feel the need to clarify the FLB/FLN distinction in order to avoid further misunderstandings resulting from the incorrect interpretation of their work. PJ´s misunderstanding of the original publication therefore erroneously underpins a number of critical points that in FHC´s view make PJ´s critique irrelevant. To make the distinction between the two concepts (FLB and FLN) more clear, FHC are stating:

This term [FLB] is meant to be inclusive, describing all of the capacities that support language independently of whether they are specific to language and uniquely human. Second, given that language as a whole is unique to our species, it seems likely that some subset of the mechanisms of FLB is both unique to humans, and to language itself. We dubbed this subset of mechanisms the faculty of language in the narrow sense (FLN). (181)

Saying that FLB includes every trait and ability that is somehow connected to human speech. Some of them are found in other species, some of them serve more

purposes than that of language. It is clear that human ability to produce, use and understand language is a result of a complex system of mechanisms cooperating in a particular way. And all those mechanisms are part of the FLB. FLN is, according to FHC, part of the FLB. It is specific in the way that this subset includes only those traits unique to language and at the same time, to humans. More specifically, "FLN is composed of those components of the overall faculty of language (FLB) that are both unique to humans and unique to or clearly specialized for language. The contents of FLN are to be empirically determined" (Fitch, Hauser, and Chomsky 182). By stating this, FHC strongly refuse PJ´s (mis)interpretation of HCF´s hypothesis "that recursion is the only aspect of language that is special to it, that it evolved for functions other than language, and that this nullifies 'the argument from design' that sees language as an adaptation".(qtd in Finch, Hauser, and Chomsky 181). Chomsky et al. are only proposing the possibility of recursion being the only concept belonging to FLN, since there is not enough empirical evidence to either prove or reject this hypothesis.

4.2. Recursion-only Hypothesis – re-examining of evidence

A big part of FHC´s paper is dedicated to the re-examination of evidence about what could possibly be included in FLN. They address PJ´s suggestions point by point, looking deeper into particular issues. It is probably unnecessary to go into much detail, describing every issue, since most of the issues discussed are concluded to be based on PJ´s misinterpretation of the FLB/FLN distinction. However, FHC themselves admit that the issue of conceptual structure, speech production, speech perception, words and syntax offer an interesting field for discussion and could lead to surprising contributions. After discussing these concepts more profoundly, FHC conclude that there is a possibility of other uniquely human concepts. Meaning that some of PJ´s suggestions (conceptual structure, speech, words, syntax) might be proven to be true.

4.2.1. Conceptual structure

FHC are trying to weaken some of PJ´s suggestions of what could be included in FLN. FHC are encouraging the empirical research in these areas, since the results can bring answers to questions such as what traits are shared with other animals. However, FHC are, for example, rejecting the idea of labelling the concept of ownership or time as uniquely human:

But there are many aspects of animal territorial behaviour that are difficult to explain without some primitive notion of ownership, such as a "home court

advantage" effect that persists even when both contestants are equally familiar with the territory. (Fitch, Hauser, and Chomsky 191)

Saying this, FHC are proving that animals have the ability to recognize and conceptualise ownership, even though probably only on a primitive level. Animals are able to recognize trespassers, therefore they must have the sense of ownership (in this case, of ownership of a territory).

It would seem like a huge mistake, omission or maybe even a conscious overseeing of a clear fact by PJ. However, PJ are offering an explanation in their reaction to FHC "The nature of the language faculty and its implications for evolution of language (Reply to Fitch, Hauser, and Chomsky) ", published again in Cognition in 2005. It appears that PJ´s conception of ownership was deeper than the core characterization of this concept. However, they accept the ambiguity of their statement and the need to express it more clearly: "FHC are correct that one finds a rough parallel in animals' territoriality, but the human notion of ownership, involving rights and obligations and the possibility of trade, appears unique" (215).

The same goes for PJ´s claim of the understanding the concept of time being specific to humans. FHC are rejecting this hypothesis by stating that: "Similarly, we find recent experimental demonstrations of episodic-like memory in jays and rhesus monkeys to be an impressive example of a cognitive representation of time (and space) by non-linguistic animals" (Fitch, Hauser, and Chomsky192). This, again is not what PJ had in mind when discussing this issue in their first paper: "just because various animals demonstrate evidence of recognizing the passage of time does not mean they could ever attain something like the human concept of a week" ("The nature of the language faculty and its implications for evolution of language (Reply to Fitch, Hauser, and Chomsky" 215). However, it seems that FHC have a point by easily weakening some of PJ´s propositions. PJ should have been clearer from the beginning, presupposing that they were aware of the evidence. PJ should have probably stated that they are aware that animals were proven to be able to understand the concepts of ownership or time. Since PJ did not mention the existence of this evidence, their claims are easily disprovable. The lack of precision could undermine PJ´s hypothesis and the whole paper in general, since this omission left the field for doubting.

As for the conceptual structure, the question of what the animals are able to do or conceptualize still remains unanswered. As is mentioned in FHC (191), some researchers (for example M.D. Hauser himself)[6] came out with the result that the

Theory of mind is absent in animals. Others have concluded the very opposite; the article "Chimpanzees know what conspecifics do and do not see"[7] provides evidence of the presence of Theory of mind in chimpanzees. Its plausibility and connection to language, however, remains unclear.

4.2.2 Words

A further topic for discussion is the suggestion about words, (namely the word learning and word meaning) being uniquely human ability tied to speech. Concerning the word meaning, FHC admit that symbols learned by some kinds of animals certainly differ from words and therefore it cannot be stated that animals and humans share the ability to comprehend word meaning. Again, no unquestionable conclusion can be drawn without further research, since all that can be said for sure, as FHC admit, is that: "Word meaning may well have characteristics unique to language and distinct from fact learning, or it might not" (202).

Regarding the concept of words, there is another topic being discussed; namely the word learning. FHC state that "the ability to link novel arbitrary noises to some referent appears to be quite general among vertebrates, present in some form not only in chimpanzees but in parrots, dogs and other species" (202) therefore it is a part of FLB not FLN. However, they themselves call this an "unfalsifiable hypothesis" (Fitch, Hauser, and Chomky 202). In PJ´s original paper ("The faculty of language: what's special about it?") is stated that "A demonstration that word learning and fact learning have this property [to link novel arbitrary noises to some referent] in common does not prove they have all their properties in common" (Pinker and Jackendoff 213). As FHC are saying, even with a number of evidence, words are such a complex system that one can always bring up some detail or phenomenon of word, disproving the theory of animal ability to word learning (202). This follows that there probably must be some mechanisms – or a combination of them – that are uniquely human. However, these mechanisms has not yet been determined and FHC claim that they probably never will be. Pursuing this direction would not (according to FHC) bring any valuable contribution, since it is "too vague and weak to be useful spurs to the kind of empirical research upon which progress depends" (Fitch, Haser, and Chomsky 202).

The question is, whether it is not just a conscious omission in order to support the recursion being probably the only part of FLN. The ability to learn words might possibly hide some mechanism uniquely human, since no other species seem to be able to learn words in a way and speed humans do. FHC discuss the vastness of human

lexicon, which is a thing undoubtedly found only in humans. However, their explanation might seem rather peculiar: "There are many aspects of lexical acquisition that are remarkable, which led us in HCF to the suggestions that the learning capabilities underlying the lexicon might represent an independent, evolved component of language (FLB)" (Fitch, Hauser and Chomsky 202). Traits like fact-learning and vocal imitation appear (according to FHC) "to overlap with language without being specific to it (hence are part of FLB)" (202). As already discussed, vocal imitation is not tied only to language. It is difficult to imagine fact-learning (especially concerning its speed and extend) without the usage of speech. The possible outcome thus might be that all those traits are shared in some way, although the human-specific extensions and completely different properties should not be undermined, since this is what makes human language distinct and therefore unique.

However, FHC are actually conceding PJ´s proposition that word learning might be unique to humans – they are open to this idea and encourage empirical research concerning this issue: "In our view, the most promising data in this regard remain those that we cited in HCF, particularly mechanisms for word learning that can plausibly be hypothesized to constitute human- and language-specific mechanisms" (Fitch, Hauser and Chomsky 204). This follows that by their criticism of HCF ´s paper, PJ certainly contributed to the debate concerning word learning by proposing the possible evidence of why it could be part of FLN. FHC, the creators of the recursion-only hypothesis, find PJ´s propositions about word learning promising in a way that it could be proven to be unique to humans. This fact shows how beneficial critical discussion can be.

4.2.3 Syntax

The core of PJ´s critique concerning the use of recursive operations in syntax centres around their proposition that not every human language uses recursive operations when creating sentences.

Recursion is the mechanism underlying syntax and thus enabling humans to express an infinite number of meanings. However, PJ´s Pirahã argument is not taken as relevant by FHC (203). The fact that recursion is absent from some of human languages proves nothing about the inability of the Pirahã people to learn recursive rules. Although their language lacks recursive operations, their mental processes (thinking) surely does not. Therefore, the absence of recursion in their language does not disprove the recursion-only hypothesis. It may alter it a little, since in the light of this evidence, recursion is not present in the oral use of every human language for unknown reasons.

Taking the number of languages in the world into account, identifying only one without recursion is a weak evidence. In addition to this, it should be taken into account that the mental capacity of the Pirahã people certainly does not lack the ability of recursion.

4.2.4. Speech

The topic of speech is very complex since it contains speech perception, speech production and many of the mechanisms underlying these. FHC are dealing in their paper mainly with the rejection of the hypothesis that "speech is special" (192). They criticize PJ for ignoring a substantial number of data concerning animal research in speech perception. One outcome of these researches is for example that: "cotton-top tamarins can extract the word-like units (trigrams) within a continuous stream of speech" (Fitch, Hauser, and Chomsky 195). Such evidence are supporting the idea of humans and animals sharing some mechanism concerning speech perception. Considering the lack of more specific data and taking into account the incomplete evidence available at present, FHC conclude that probably "the mechanisms underlying human speech perception were largely in place before language evolved, based on either general auditory or vocalization-specific perceptual processes" (Fitch, Hauser, and Chomsky 195-196). This claim would certainly disprove PJ´s suggestion to include speech perception into FLN.

FHC´s main critique of the "speech is special hypothesis" lies in the fact that it is based only on assumptions, not on the sufficient amount of empirical data. As they are logically and simply noting: "don't state that something is not there until you've looked for it" (193). In other words, just assuming that speech is special to humans because it is the first impression we have got, is not a scientifically acceptable hypothesis, since it lacks any evidence.

The issue concerning speech production is, even after re-examining the evidence, in FHC´s opinion still part of the FLB, thus not unique to humans. This thesis is supported by the appearance of vocal imitation, shared with other species; as an example can be stated birdsong. Another evidence against labelling speech production as a part of FLN is the fact that it can be found in other domains than speech: namely, in music (Fitch, Hauser and Chomsky 197-198).

Closely tied to the speech production is the issue of anatomical alternations, mainly the "descended larynx". In spite of PJ´s criticism, FHC still stand behind the idea that the motivation behind the descending of larynx could have and probably had other roots than speech production. The evidence supporting this thesis is quite solid: "The

discovery of permanently descended larynges in nonhuman animals demonstrates that a permanently descended larynx is not uniquely human" (198-199).

FHC also retain the possible explanation for this; the size exaggeration. As a new argument is stated "the fact that the human larynx undergoes an additional descent, at puberty, and only in males" (199). This has certainly nothing to do with improving the ability of speech production. It can be seen that the body of evidence concerning the primary reason for the descendent larynx is quite strong, since it is found in other than human species (therefore, not part of the FLN) and its original function was probably other than language since some of it still remained in human lineage (the change of voice in human males). An important point is that FHC are certainly being clear on the fact that they are not labelling the recursion as the only component present in FLN. In order to emphasise this, FHC are proposing other possible alternatives, for example that all the traits needed for the human speech are shared "either with other species, or with other non-linguistic cognitive domains in humans, and only their combination and organization are unique to humans and language" (Fitch, Hauser, and Chomsky 182). Until some results of biological research are accessible, PJ, FHC and everyone else can only try to guess the truth. However, the central point FHC is trying to make concerning this topic is, that they are only proposing NOT stating as a fact that recursion is the only uniquely human and simultaneously language specific trait.

This follows, that PJ and HCF are in fact agreeing on the recursion issue. At least in the sense that recursion should probably be part of the FLN, in HCF´s words "at a minimum, then, FLN includes the capacity of recursion" (Hauser, Chomsky, and Fitch 1571). This is a statement PJ can hardly disagree on. Actually, PJ accept recursion as a component of FLN; they only disagreed on the thesis that it is the only part of FLN. And as it was demonstrated and clarified by FHC, this claim should not be taken as a dogmatic fact, it was meant to be merely a suggestion of a possible state of reality. Furthermore, Chomsky et al. are actually encouraging science to research this area, because more components that should be included in FLN can be found. By no means are HCF disproving the existence of additional FLN components which follows that rather than discrepancy, the problem of recursion represents consensus between HCF and PJ.

This agreement was reached with the use of the method of scientific discussion between linguists and could possibly be seen as a contribution to the field of theoretical linguistics. If so, it should be attributed to PJ as well as HCF, since PJ´s support of

HCF´s idea makes it stronger and more plausible.

4.3. The debate about the purpose of language

As for the issue of the original purpose of language, FHC emphasise they have already stated that language is an adaptation: "language evolved, shows signs of adaptive design, and comparative data and interdisciplinary cooperation will be necessary to figure out the details of the evolutionary process" (185). Saying this, it might seem that they are on the same page as PJ. However, the problem arises when the term adaptation is defined more closely. FHC discuss two points of view. The first one concerns the current utility of language which is a testable and actually already answered problem and communication is not the only possible answer ("recursive thought would appear to be quite useful in such functions as planning, problem solving, or social cognition" (Fitch, Hauser and Chomsky 186). This follows that FLB and FLN are adaptation and that one of the primary reasons for this adaptation was communication. However, it was not the only reason and thus labelling language as an adaptation for communication is rather inaccurate.

More problematic is the question about the original function of language. There is not enough evidence and probably not even a way to figure out the functional origins of language. FHC see the most promising area of research in the study of homology: "Homologous traits, those shared via common descent, play a central role in comparative biology because they are the key to reconstructing phylogeny" (187). By studying a trait that evolved from a common ancestor, it might be possible to find out the reason of its evolving. As for FLB, even this approach is difficult since there are many mechanisms in FLB, shared among more species that fit a range of different functions, therefore it cannot be said that FLB´s main purpose is communication. PJ discuss this issue in their second article and agree on the importance of research of homologous traits. They are offering another useful research method, namely reverse-engineering. Using this method, the evolutionary history of a trait can be determined by stating what came first (213-214). Applying this to language, namely the ordering of the evolution of syntax and lexicon, it brings results using only the logical thinking: "(...) it would make little sense for syntax to evolve before words, since there would be nothing for it to combine into utterances" ("The nature of the language faculty and its implications for evolution of language (Reply to Fitch, Hauser, and Chomsky)" 214). By contrasting syntax with lexicon and its uses, it is clear what must have come earlier.

As for the original function of FLN, it is a different story than that of FLB. Since FLN is, according to HCF´s own definition, uniquely human capacity used for language, it should be easier to study it since it´s only connection is probably to language. The core of PJ´s disagreement with HCF lies in the suggestion that FLN and its component might have "evolved for reasons other than communication, but after they proved to have utility in communication, were altered because of constraints imposed at both the periphery and more central levels" (Hauser, Chomsky, and Fitch 1569–1570). According to FHC, PJ are misinterpreting this hypothesis as language evolving for other reasons than communication, which is a completely different theory never stated or indicated by HCF. This follows that concerning this issue, FHC are still supporting their original theory, stated in HCF, they do not feel the need to re-examine it, since PJ´s criticism is based on their false assumption. In FHC´s words: "Thus, while accepting that FLB is an adaptation, we hypothesized that FLN is not an adaptation "for communication" Note that there is absolutely no contradiction between these two statements, as long as the distinction between FLN and FLB is kept clear" (189).

PJ also accuse FHC of omitting the third possible view apart from current utility of language and functional origins. According to PJ, these are not the most interesting approaches from a biological point of view. This would be the current adaptation, defined by PJ as:

> [W]hat the trait was selected for in the species being considered. In the case of the human leg, this would be adaptation to bipedal locomotion, where adaptation is defined by shaping of innate structure through its reproduction-relevant consequences in the species' evolutionary history. ("The nature of the language

faculty and its implications for evolution of language (Reply to Fitch, Hauser, and Chomsky)" 212)

This view considers the reasons for the actual current utility of a trait and its history. It goes deeper, beyond the questions "what was the trait´s primary function" and "what its current function is". In short, as PJ are stating in their second article, the current adaptation approach deals with "what happened that its original function have evolved into its current function and why" ("The nature of the language faculty and its implications for evolution of language (Reply to Fitch, Hauser, and Chomsky)"212).

By omitting the question of the current adaptation, FHC are ignoring an issue of major importance. What a primary function of a specific trait was and what its current function is, are certainly questions important to the understanding of this trait´s

evolution. However, comparably significant is the question of its current adaptation. All three approaches should be taken into account when aiming to understand the process of evolution of a trait, otherwise the possible results would be incomplete.

5. Summary of Chomsky´s vs Pinker´s ideas

Chomsky and Pinker both present a number of original theses, supported by a range of complex arguments. Figures below provide an overview of Chomsky´s and Pinker´s work and a summary of their propositions and respective counterarguments that were discussed in detail in this thesis. The first figure summarises Chomsky´s propositions and Pinker´s reactions concerning the recursion-only hypothesis. The second figure presents their arguments about evolution. While an in-depth discussion of the individual concepts may be found in the analytical chapters of the thesis, the charts aim to provide a visual synopsis of the work undertaken.

Chomsky's theory	Explanation of the theory	Support	Pinker's statement	Pinker's arguments		Explanation of Pinker's arguments
recursion-only hypothesis	recursion is probably the only uniquely human, language-connected mechanism	lack of its analog in animal communication	disagreement	the existence of human specific concepts other than recursion; suggestions: speech perception, phonology, the notion of words	speech perception	infant reaction to human speech
					phonology	not discussed sufficiently by HCF, rhytmic properties unique to humans
					words	human-specific concept, unique usage, complexity, speed of word learning in first language acquisition
	recursion is present in every human language, essential part of all major components of the faculty of language	syntax of English and other languages is based on recursive mechanisms	disagreement	lack of recursion in Pirahã language	phonology is not recursive	

Topic	Claim	Argument	Pro the theory	Counter	Rebuttal
The evolution of language: not adaptation by natural selection	There is possibly another explanation of the emergence of language	lack of any analogy, any protolanguage or similar mechanism concerning communication in species with relatively common origin	pro the theory of adaptation by natural selection	the absence of protolanguage has not been proven	language could still have evolved gradually, but simply from our extinct lineage of ancestors
		no development of language, no gradual progression since its emergence: complexity of grammar still the same: "not a process"		time is needed to evolve a complex system	language as a system is too complex to have arisen by chance
The evolution of language: not primarily for the purpose of communication	by product of other change: "spandrel"; there is another original purpose of: descended larynx	descended larynx: found in other species, possible original purpose: exaggerration its apparent size	language is designed for communication	descened larynx evolved primarily for communication	descended larynx complicates many other activities: must be somehow outweighed; language is the benefit, larynx could have later adapted, changed in order to enable speech, descended in women and children not only men
	by product of other change: "spandrel"; there is another original purpose of: recursion	recursion already present before language: animal navigation		recursion not present in other concepts	recursion might have been already present but must have undergone considerable changes; primarily to enable speech, animal navigation probably not recursive (either not discrete or not infinite)

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6. Conclusion and Discussion

The aim of the presented thesis was to provide an overview of Noam Chomsky´s contribution to the field of theoretical linguistics and to consider the influence of his theories on his contemporaries. The approach taken was to introduce what may be his controversial theories and contrast them with the views of another American linguist, Steven Pinker. The thesis discussed in greater detail Chomsky´s theories which Pinker disagrees on. It provides a comparison of Chomsky´s and Pinker´s linguistic stances, including a number of arguments they use to support their own hypotheses. A number of their debates are important and fundamental to linguists and seek to answer some of the key questions regarding the uniqueness of the human faculty of language and how it occurred.

The chapter Noam Chomsky´s revolution includes introductory information about Chomsky. Specifically, it focuses on Chomsky´s contribution to the field of theoretical linguistics. It is a theoretical part of the thesis and it aims to track his influence from the very beginning: starting with Chomsky´s critique of the then prevailing school of behaviourism, namely B.F. Skinner´s theories on verbal behaviour, presented in the book *Verbal Behaviour*. According to Chomsky, behaviourism represents a rather unsatisfactory explanation for such complex system as language. By stating the simple fact that human beings acquire words and grammar with remarkable ease and rapidity, Chomsky managed to disprove Skinner´s behaviourist theory about language being a purely learned behaviour shaped only by the environment of an individual. This theory later became to be known as the "poverty of the stimulus argument" and it started the decline of behaviouristic theorists´ influence in linguistics.

The theoretical chapter of this thesis also introduced and explained other Chomsky´s theories, namely Universal Grammar and Generative grammar, since they are considered to belong among Chomsky´s most influential concepts. Arguments supporting those theories are presented, along with the development they have undergone.

The section Reception of Chomsky showed how influential and controversial Chomsky´s hypotheses are. His early theories are still discussed today by linguists, are drawn on, very often further developed, and continue to influence the field of theoretical linguistics. The core of his ideological direction has been shared among linguists for decades; that Chomskyan theories offer more satisfying explanations than behaviourism is clear. Ray Jackendoff, for example, used Chomsky´s theories and applied them to

tonal music. This showed that the core of Chomsky´s ideas (even though these undergo further development and modifications) may be applied in fields other than theoretical linguistics.

The fact that Chomsky is considered to be a controversial person follows that he is often criticised. Challenges to and rejections of Chomsky´s theories and criticism of them as well as of him as a scientist were presented in the section Chomsky´s Critics. As it was shown in this thesis, Chomsky´s ideas are encouraging the critical discussion. However, the influence and contribution of Chomsky´s ideas can hardly be devaluated, since they have been the leading hypotheses in the field of theoretical linguistics for decades. This follows that Chomsky as a person should be respected although different opinions and well-supported criticism is appreciated in order to develop the scientific discussion further.

Finally, Steven Pinker and his relation to Chomsky were discussed. Since Pinker´s Chomsky-related ideas are an important part of this thesis, Pinker´s ideological and scientific stands must have been considered. He is neither an outright supporter of Chomsky, nor a total adversary. Pinker shares some ideas with Chomsky: Pinker´s refusal of the theory of tabula rasa actually corresponds to Chomsky´s critique of behaviourists. The presence of an innate faculty enabling humans to be able to create and produce language is a stand taken by Pinker as well as Chomsky. Pinker also examines Chomsky´s propositions and indeed contributes with his own ideas and modifications. Pinker is correct in his approach that every theoretical claim should be examined and re-examined, and the resultant arguments challenged. In this way Pinker by creating a scientific debate with Chomsky, contributes to the development of theoretical linguistics.

The chapter Chomsky vs Pinker aims to critically evaluate differences between those linguists concerning specific linguistic issues. It was shown that the strongest debate concerns basically two problems: which concepts are part of the uniquely human language faculty (discussed in the chapter "Recursion-only Hypothesis") and the relation between human language faculty and evolution (discussed in the chapter "The Evolution of Language").

The main source used to demonstrate and support Chomsky´s ideas was an article, written in 2002 by Marc D. Hauser, Noam Chomsky and Tecumseh Fitch (HCF), entitled "The Faculty of Language: What Is It, Who Has It, and How Did It Evolve?". The source used to present Pinker´s agreements as well as disagreements with HCF was

an article written as a reaction to HCF´s paper in 2004. Steven Pinker is trying, along with Ray Jackendoff (PJ) to analyse HCF´s paper and oppose some of its key arguments. PJ´s article is called "The faculty of language: What´s special about it?".

The subchapter Recursion-only Hypothesis provides the official definition of recursion and explanation of terms used by HCF in order to make HCF´s arguments understandable. The distinction between the faculty of language in a narrow sense (FLN) and in a broad sense (FLB) is a term crucial to the understanding of the recursion-only hypothesis. The core of disagreement lies in the potential content of FLN – in other words, in determining what mechanisms and concepts that are language-related, are to be found in humans only. Humans were endowed by the faculty of language which is undoubtedly unique among other animals. HCF claim that what is unique about it is actually only one mechanism- namely recursion. PJ strongly disagree with this thesis, as is shown in the chapter concerning recursion-only hypothesis. After stating and further-explaining PJ´s counter-arguments, PJ seem to manage to weaken HCF´s recursion-only hypothesis. PJ´s remarks about speech perception, phonology and words suggest that there might be something more than recursion that is unique to humans. The fact that the results of an empirical studies were used to support PJ´s proposals (Pirahã language research, Diesendruck and Markson´s study) add a plausibility to their theses. The lack of HCF´s explanations concerning for example phonology makes it easier for PJ to make their point. Since Hauser et al. provide no further discussion of the topic, it creates the opportunity for PJ to cast doubt upon HCF´s thesis. Although, as they as well as HCF state, in order to establish PJ´s arguments as plausible or completely wrong, further research in the fields of biology, neuroscience and many more is needed. The fact that both linguists acknowledge that further research is required to say ´yes´ or ´no ´ to their arguments with some certainty means that no final decision has been made.

The subchapter entitled The Evolution of Language mainly draws on the same sources as the Recursion-only Hypothesis part. Two crucial differences are discussed: the purpose of the evolution of language other than communication and the way of language evolution; whether it was adaptation by natural selection or not. HCF propose following controversial ideas: the core mechanisms of the faculty of language evolved primarily for other reasons (they are only a by-products of other evolutionary changes) and language did not evolve by adaptation. HCF present and discuss arguments supporting their theses in depth. These claims are posed in contrast to PJ´s counter-

arguments. Both papers present some strongly supported hypotheses and the fact that the result is not clearly determined again suggests that some further research must be undertaken.

The fact that none of the arguments presented either by HCF or by PJ make the individual issue indubitable suggests also a possibility of a further discussion.

In the chapter Response was discussed the further development of those debates. As a reaction to PJ´s paper, HCF published their response in order to clarify some of their points that were misunderstood by PJ. This article was entitled "The evolution of the language faculty: Clarifications and implications" and was written by the same authors; Fitch, Chomsky and Hauser (for the purpose of avoiding ambiguity, the second article; the "response" is being referred to as FHC).) HCF are also trying to come up with a stronger support for their arguments so they can withstand PJ´s criticism. It follows that PJ´s critical paper demonstrated the importance of examining and, if appropriate, challenging papers and publications. As a result, HCF re-thought and explained better their ideas on the theory of language acquisition in their later paper.

The Response chapter is also using PJ´s reaction to FHC´s paper, "The nature of the language faculty and its implications for evolution of language (Reply to Fitch, Hauser, and Chomsky)."   The aim of the chapter Response is to show that many question in linguistics remain unanswered, however the discussion among linguists contributes to the further development as it helps to clarify at least some points and to continue the debate.

The overall aim of the thesis was to present Chomsky´s controversial hypotheses and Pinker´s relationship to them. Both authors make valid points, articulate persuasive arguments, and engage in reasoned debate. However, by describing and explaining Chomsky´s arguments as well as Pinker´s counter-arguments it was shown that an indubitable conclusion cannot be drawn. Neither is able to, without doubt, answer the question regarding how the human faculty for language emerged. It is so for reasons including the lack of scientific support (research results) and the fact that human brain and its mechanisms are still an unexplored territory. However, this thesis serves as a demonstration and analysis of Pinker and Chomsky´s arguments and their mutual relations. The thesis managed to provide a well-arranged and organised overview of Chomsky´s and Pinker´s claims and the analysis of their arguments concerning discussed issues as well as the development of those arguments.

Notes

[1] for further information on the topic, see Randy Allen Harris: *The Linguistics Wars*

[2] For additional information, see Peña et al. in Proceedings of the National Academy of Science (2003) 11702–11705

[3] For more information, see Collet and Graham´s article in Current Biology, pR475–R477.

[4] Death reckoning or path integration is a mechanism using which an animal keeps a continuously updated record of its current direction and distance from some reference point as it moves away from that place. (putting together of cues from different sensory sources within the body, without reference to visual or other external landmarks, to estimate position relative to a known starting point continuously while travelling on a path that is not necessarily straight).

[5] visual landmarks is the ability of remembering visual landmarks and using these when navigating.

[6] Hauser is dealing with this topic in his book *Wild Minds: What animals really think*,

[7] For more detailed information, se Hare, Call, Agnetta, and Tomasello´s article in Animal Behaviour 58(4), 771–785.

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