Effects of Native Language in Ambiguity Resolution: Two Experiments in Psycholinguistics

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Tässä opinnäytetyössä tarkastellaan äidinkielen merkitystä englannin leksikaalisesti ja rakenteellisesti moniselitteisten ilmaisujen tulkinnassa. Mielenkiinto kohdistuu kahteen keskeiseen tutkimuskysymykseen: tulkitsevatko eri kieliä äidinkielenään puhuvat ihmiset moniselitteisiä ilmaisuja rajatussa kontekstissa eri tavoin ja poikkeavatko heidän tapansa selittää omaa tulkintaprosessiaan toisistaan.

Työssä esitellään kolme erilaista ja keskenään ristiriitaista psykolingvistiikan teoriaa – universaalikielioppi, konnektionismi ja lingvistinen suhteellisuus, jota tässä edustaa lähinnä radikaali Sapirin-Whorfin hypoteesi – historioineen, kriitikoineen ja nykyisine asemineen. Erityistä huomiota kiinnitetään teorioiden näkemyksiin vieraan kielen oppimisesta sekä moniselitteisistä ilmaisuista. Työn empiirisen osan havaintoja arvioidaan näiden teorioiden kautta.

Suurimman osan työstä muodostaa kahden empiirisen kokeen kuvaus ja niiden tulosten analysointi. Ensimmäisessä kokeessa suomea ja englantia äidinkielenään puhuvien ryhmien tehtävänä oli valita kymmenen sanan autenttisissa englanninkielisissä lausekatkelmissa *but*-sanan suomenkieliseksi käännökseksi joko *mutta* tai *vaan* ja omin sanoin kuvailla, miten päätyivät valitsemaansa käännösvaihtoehtoon. Toisessa kokeessa suomea ja lukuisia muita kieliä äidinkielenään puhuvien ryhmien tuli monivalintatehtävässä valita rakenteellisesti moniselitteisten englanninkielisten lauseiden tulkinnoista mielestään oikea ja jälleen omin sanoin kuvailla, miten päätyivät valintaansa. Molemmat kokeet toteutettiin tehtäväpapereilla kirjallisesti Tampereen yliopiston opiskelijoiden ja henkilökunnan keskuudessa. Ensimmäiseen kokeeseen osallistui 18 henkilöä, suurimuotoisempaan toiseen kokeeseen 134 henkilöä.

Ensimmäisessä kokeessa molemmat kieliryhmät päätyivät pitkälti samoihin käännösvaihtoehtoihin, mutta englanninkieliset selittivät ratkaisunsa puhtaasti semanttisin perustein, kun taas suomenkieliset käyttivät sekä semanttisia että kieliopillisia selityksiä. Toisen kokeen monivalintaosuudessa korrelaatioita äidinkielen ja tulkintavalinnan välillä löytyi ja kaikki kieliryhmät antoivat pääasiassa samankaltaisia kieliopillisia selityksiä, mutta vastauksissa oli myös runsaasti sisäisiä epäjohdonmukaisuuksia. Jälkimmäisen koejärjestelyn selkeys ei lopulta ollut täysin tyydyttävä.

Tutkimustulokset antavat jonkin verran tukea sekä universaalikieliopin että konnektionismin teorioille, mutta varsinkin yllämainitut sisäiset epäjohdonmukaisuudet heikentävät tiedeyhteisössä muutenkin kritisoidun Sapirin-Whorfin hypoteesin asemaa. Toisin kuin eräät universaalikielioppia ja vieraan kielen oppimista käsittelevät teoriat otaksuvat, äidinkielellä ja vieraan kielen rakenteiden prosessoinnilla vaikuttaa tulosten perusteella olevan melko selkeä yhteys.

Avainsanat: psykolingvistiikka, universaalikielioppi, konnektionismi, lingvistinen suhteellisuus, moniselitteiset ilmaisut

Table of contents

1. Introduction

It is fair to say that the ways in which the human mind handles language are, by and large, still in the dark. With varying success, linguists and other scholars have come up with numerous theories both to analyse particular psycholinguistic phenomena and to tackle the entire process of understanding and producing speech and writing (for an incomplete but interesting list, see Steinberg et al., 2001, pp. 245-265). Many of these theories fully contradict each other and few are in total agreement about anything. All in all, the scientific community has failed to reach any kind of consensus on what is the best approach on the subject, despite the decades – if not centuries – spent on it.

One endlessly disputed psycholinguistic topic is how humans come to possess their native language and what kind of an influence it has on their thought processes, ranging from the learning and use of a second language to such fundamental concepts as the perception of the world itself. The classic theory on the latter subject is the Sapir-Whorf hypothesis, which assumes that this influence not only exists, but is very strong (Whorf 1956). The hypothesis is quite controversial and in some ways even debunked.

Numerous other, more recent theories, meanwhile, have concentrated in great detail on the processes of language acquisition. These include Noam Chomsky's theory of a universal grammar (e.g. Chomsky 1968) and McClelland and Rumelhart's connectionist model (described in Christiansen & Chater 2001a). Debates surrounding all of these theories and their applications are likely to continue for a long time, but even small-scale research that touches upon the central themes of some or even all of them might provide more food for thought. One clearly relevant subject for such research is the study of the exact effects of native language on the production of a second language.

It is a widely-known and well-respected fact that processes such as transfer and some level of generalization based on the native language have a notable influence on the learning of new

language, on the errors that the speaker makes and on the patterns and grammatical structures that he or she chooses – consciously or unconsciously – to use. Nevertheless, many questions concerning exactly how the native language affects the processing of a second language, or whether the former might even play a part in the actual perception of the latter, remain unanswered to varying degrees. What kind of a frame does one's native language create for second language use? How do native speakers of different languages approach second languages? How much do the inner mechanics of second language processing differ from those of first language processing?

In the light of various theories on how human grammar is acquired, how it operates and whether it has any kind of effect on perceiving the extra-linguistic world, it might be valuable not only to observe what kind of choices natives of different languages make in second language production, but also to find out how people from different linguistic backgrounds themselves see their particular linguistic processes in dealing with a second language. While context in itself is a highly important factor, cutting context down to a minimum might lead to more relevant results from the point of view of second language processing. For a number of reasons, any results that managed to shed light on these issues would be highly interesting. It goes without saying that there are many obstacles to overcome in obtaining them. Nevertheless, one of the most important goals for this thesis was to make an effort at coming up with at least some tentative results in the field – no matter how small they were.

The principal area in which I set out to hunt for those results is the study of the effects of native language on the interpretation of potentially ambiguous expressions in written text. Waldron defines ambiguity in itself as follows:

> An expression X is ambiguous if there are two predicates P and Q which look exactly like X, but which apply to different, though possibly overlapping, sets of objects, with the meaning of each predicate amounting to a different way of identifying objects as within or outside its extension.
> (1994, quoted in Solan 2005, p. 74)

This means that ambiguity can exist in lexical form, in the references of words, as well as in structural form, in the parsing of phrases and clauses. A person confronted with an ambiguous expression goes through a series of psycholinguistic processes that are far from simple. As stated, linguistic theories view these processes in altogether different ways, and different theories have conflicting ideas on how ambiguities are ultimately resolved. The ground is thus fertile for research.

More specifically, I intend to explore two main research questions: *do native speakers of different languages analyse differently their processing of ambiguous expressions?* and *do native speakers of different languages interpret ambiguous expressions differently in a limited-context environment?* Both of the questions, despite their seemingly straightforward nature, are somewhat open-ended and – perhaps fittingly – ambiguous in some ways, and it is not my goal in this work to reach an absolute or completely conclusive answer to either question. I intend to, however, pursue results that are relevant and useful in their own right. For this end, I employ a method of psycholinguistic empirical experimentation that also draws on corpus linguistics.

The experimental and most significant part of this work is divided into two parts. The first part, an English-Finnish translation task in which natives of both languages translate the same series of sample sentences with very little context provided and then analyse their thinking, serves as a kind of trial run of some my research hypotheses. It focuses particularly on the first of my research questions. The second part, a slightly more large-scale experiment conducted during the year 2006 in the University of Tampere, takes the somewhat surprising results of the first experiment and approaches the questions of native language influence on second language from another angle, by tasking a sizable sample of Finns and natives of other languages with the interpretation of a series of opaque, ambiguous English sentences. From the combined results of these two experiments, I hope to be able to provide some preliminary answers for the questions outlined above.

Both experiments are discussed in detail below. In describing the experiments, I also assess the experimental arrangements in terms of their functionality, strengths and weaknesses. The results are

analysed in the light of three fairly famous and distinctly different theories of language production: Universal Grammar (UG for short), connectionism and the Sapir-Whorf hypothesis. While these theories do not have equal groundings, goals and ambitions as linguistic theories go (and are certainly not purported here to be similar in these terms), they are nonetheless to some extent pitted against each other in explaining the results of the experiments. In this, I follow the general example of Pinker (1999), who used the inflection of regular and irregular verbs as a battleground for the theories of UG and connectionism.

In the first part of the thesis, I introduce at some length the aforementioned theories, summarise their histories, their current positions and notable advocates, as well as some of the criticisms they have encountered. Major concepts, related to the practical aspects of the experiments or to the grand theories, are defined as they are encountered in the course of the thesis.

2. Theoretical background

In the field of psycholinguistics, it is hard to find two well-known and fairly recent theories that are more in disagreement with each other than Noam Chomsky's idea of a universal grammar and the model of connectionism developed by, among others, James McClelland and David Rumelhart. Their basic principles are fully contradictory. One states that the language faculty and a deeper structure of language are biologically innate to each human being, something that comes to us from deep within (e.g. White 2003, p. 20), while the other holds the *emergentist* view that humans come to possess a structure of language simply by a learning mechanism based on endless association and generalization drawing from the language they are exposed to (e.g. Ellis 2003, p. 63). Therefore, these two polar extremes provide useful competing methods for analysing the results of a linguistic experiment. In the following, I shall mostly keep to introducing these theories in such a form as is useful for the scope of this particular work. The evolutionary history of language, for example, will not be discussed from either viewpoint.

Meanwhile, theories of linguistic relativity or determinism offer a broad viewpoint that is at least partly missing from the previous theories: that of a deeper relationship between language and thought. Although the experiments discussed in this thesis deal exclusively with language processing and not with other dimensions of human thought, linguistic relativity and determinism offer even in the present context unique tools for analysis that neither Universal Grammar nor connectionism provide. To remain in the spirit of using polar opposites and even extreme positions, I will focus mostly on the deterministic Sapir-Whorf hypothesis as an explanation schema, while bearing in mind that it has been mostly abandoned by contemporary linguistic relativists (Kramsch 2004, p. 239).

As a very brief definition of the manner in which the main concepts are used in this text, it is reasonably accurate to say that what is understood here by the term *Universal Grammar* is derived

from mostly Chomsky (1995). The terminology concerning the links between second language acquisition and UG follows White's (2004) usage. Likewise, the use of the term *connectionism* is based on the definitions of Christiansen and Chater (2001a and b). *The Sapir-Whorf hypothesis* is used, as in most literature, to describe the position taken by Whorf (1956). Other terms are generally based on the definitions of the works cited when the terms are first mentioned.

General linguistic concepts are used mostly according to standard practice. Thus, all language acquisition beyond that of the first language is called *second language acquisition* (SLA for short), and the abbreviation *L2* is used to refer to any language acquired through the process of second language acquisition. *L1*, as usual, refers to the first language.

2.1. Universal Grammar

In the glossary of his introductory booklet to psycholinguistics, Scovel (2000, p. 131)) defines Universal Grammar as "[a]n abstract set of rules and principles which govern the syntax of all languages and which many linguists believe innately specified in all humans". This description is certainly an accurate summary of the theory, even though some might say it downplays both the immense impact of the theory of Universal Grammar and the range of opinions it has provoked in the course of decades.

It has met with criticism over the years, but UG remains an influential and comprehensive take on the subject of human language as a whole. Originally developed in the 1950s and put forth in a more extensive form first in the 1960s (Chomsky 1968 in particular), the UG model is based on the idea that the human mind contains, deep down, something that could be described as a kind of a basic mental grammar that is shared by all. This shared 'universal' grammar limits and constrains the form of individual grammars by creating certain very broad grammatical categories, as well as controlling the ways in which the grammars operate (White 2003, p. 20).

Apart from this shared grammar, the components of language include the so-called 'peripheral grammar' and the 'mental lexicon', which are not universal but specific to particular languages (Chomsky 1988, pp. 69-71). In a way, the universal grammar is filtered through the language-specific components, resulting in the actual languages spoken worldwide. The universal level is commonly described as the deep structure of grammar, the language-specific level as the surface structure. This is the fundamental dynamic in which the acquisition of language takes place. As Pinker (1999, p. 219) puts it, the innate structure of universal grammar is not "an alternative to learning but rather an explanation of how learning works". Proponents of UG often quote the so-called *poverty of stimulus* argument as one of the strongest pieces of evidence for the theory, referring to the lack of both quantity and quality in the primary linguistic data that a child is exposed to and, on the other hand, the massively abstract and subtle linguistic knowledge that every child ends up possessing (White 2003, p. 20 and Steinberg et al. 2001, pp. 294-296, among others).

Chomsky has revised and developed his theory over the years, both reacting to criticism and spontaneously refining it further. He has, for example, proceeded to elaborate on the relations between the deep structure and the surface structure by introducing the concept known as principles-and-parameters (1988, pp. 93-94). Essentially, principles are features of the underlying universal grammar that manifest themselves on the surface level only after a wide range of parameters has been applied to them. Each existing language has a unique set of parameters, detailing a huge number of structural features from word order to tense systems. By these parameters, language progresses from the deep level to reach its phonetic and logical forms, specifying sound and meaning (1988, pp. 69-70; see also Chomsky 1995, p. 21).

In his more recent book, *The Minimalist Program* (1995), Chomsky considerably streamlines the UG model by applying "principles of economy" (p. 168) to it. This approach simplifies the theory, shifting its main focus to a perspective of economy and "optimal coding" (p. 235). In other words, the language-generating universal grammar faculty is based on simplicity, functionality and

optimality. This renders UG, in essence, minimalist. This dovetails well into the basic concept of principles-and-parameters, although many of Chomsky's earlier musings on the structure of language differ markedly from these ideas (Steinberg et al 2001, p. 372). The concept of principles-and-parameters and the idea of minimalism as a starting point seem to form the solid core of present-day Chomskyan linguistics.

Although Chomsky's universal grammar is a highly respected linguistic theory that has a great number of proponents worldwide, it has received plenty of criticism from various scholars. Some have drawn attention to particular inconsistencies within the grand theory. Pinker (1999, pp. 113-114), for example, writes at length about the model's inadequacy at explaining patterns in such grammatical phenomena as English irregular verbs and plural nouns, while Brody (1998, pp. 212-213) discusses the internal conflicts of the minimalist theory, pointing out that the role of the economy conditions "seems to shrink considerably by the end of the book" (p. 213). These authors do, however, accept the general premises and framework of Chomsky's model as correct, and could thus be dubbed his followers.

By contrast, others (including Steinberg and his co-authors, as well as numerous other researchers who belong to the connectionist or emergentist schools of thought) contest its fundamental plausibility. A user review on the bookstore website Amazon.com goes as far as to call Chomsky the "Freud of linguistics" (Reina 2007), an immensely influential figure who nonetheless has been proven wrong and debunked in more or less all relevant areas. According to many of Chomsky's modern scientific opponents, his views on language acquisition and the function that input plays in the process are deeply flawed at the core, and even "if [UG] exists, as Chomsky claims, as yet there is *no* credible evidence which supports it" (Steinberg et al 2001, p. 307).

Most of these theorists hold the opinion that, to put it very broadly, language is closer to a straightforward collection of processing mechanisms than to a complex set of innate parameters and principles built into the mind of every human being. Steinberg et al are especially forceful in

refuting the poverty-of-the-stimulus argument by citing test results seeming to prove that children actually do receive plenty of relevant, grammatical and not impoverished input from the speech of their mothers and other people around them (pp. 37, 295-297). In addition to these criticisms, more philosophically-minded scholars, such as Nagel (2000), might even reject the entire dichotomy of innateness versus learning as alien to the concept of thinking. As stated before, the psycholinguistic community remains divided on the topic. One can, however, see the elevated status which the theory of Universal Grammar enjoys today from the fact that the authors of scientific works built on UG do not, as a rule, seem to consider it necessary to spend a portion of their text defending the theory against its detractors. This is markedly different from connectionist authors, discussed in the next section.

The role of UG in second language acquisition is disputed to a degree, even among strong proponents of the theory. Not everyone thinks that UG works even remotely in the same way as with the first language. Some researchers have argued that the universal grammar affects L2 learning more or less in the same way as it affects L1 learning, while others claim that L2 acquisition is in fact not controlled by UG at all, or that UG can only be accessed through the ever-present L1 grammar (White 2003, pp. 22-23). These views are known respectively as the *direct* (or *full*) *access* hypothesis, the *no access* hypothesis and the *indirect* (or *partial*) *access* hypothesis. These definitions, though, do not seem to be as clear as one might hope, and confusion has risen particularly as to whether full access means complete independence from L1 or just a situation where legitimate parameter setting for L2 can take place (p. 27).

These confusions might be why White and others have modified and specified the terminology in their work. White divides different UG hypotheses into categories such as Full Transfer Full Access (in which, first formulated by Schwartz and Sprouse in 1996, the L1 grammar is thought to be the initial state in the acquisition, but UG is also explicitly stated to remain completely accessible), Full Access without Transfer (in which UG is available for access and the L1 grammar

plays absolutely no role) and Local and Global Impairment (in which the L1 grammar causes UG to become partly or fully inaccessible) (White 2004, pp. 61, 118 and 128). In the end, despite many features of the process remaining in the dark and even the existence of some conflicting evidence, studies suggest that second-language grammars do conform to the rules of the Universal Grammar. White says that studies of several L2s have shown that the learners display "abstract, complex and subtle properties of grammar" (p. 22) uninduced by the L2 input. This would, of course, indicate that the principles of UG have a part to play in the L2 acquisition, either on their own or through the parameters of the first language.

Most of the recent studies concerning universal grammar and second language acquisition have been based on this controversial question. Particularly the initial state of the L2 learning in relation to the UG, as well as the existence and nature of the so-called interlanguage grammars (unfinished or finished grammars of the second language) have received a lot of attention (e.g. White, pp. 58-99). To briefly formulate the matter from the viewpoint of my research question, one could say that if the L1 has a considerable effect on the L2, the first language should also clearly influence the perception of second language.

2.2 Connectionism

The theory of connectionism is not entirely on a par with that of Universal Grammar in terms of its background and theoretical framework. UG is essentially Noam Chomsky's brainchild of several decades, elaborated and refined by his followers, whereas connectionism could easily be seen as a particular offshoot of the theoretical school of *emergentism* (O'Grady 2003, p. 44), which is itself one representative of a vast body of theories on constructivist linguistics. Even so, the extremely marked contrasts between the two theories make them appealing choices for the kind of use I put them to in the paper at hand.

Proponents of the linguistic school of emergentism hold that regularities in language structures "emerge from the mutual interactions of the billions of associations that are acquired during language usage" (Ellis, p. 64). Thus, what come across as rules in any language emerge from a collection of myriad interactions and connections borne from experience, not from a deep-seated set of principles and parameters. According to the school, there is no special mental language acquisition device, language ability emerges simply by processing sentences encountered in the communication of others (O'Grady 2008, p. 456). Connectionism, then, is a model on how exactly the structure emerges and how the connections are created (p. 84). Connectionism takes language processing to the level of the physical brain, "characterizing language knowledge […] in distributed, probabilistic terms" instead of the classical, Chomskyan view of language requiring symbolic representation (Harrington 2002, p. 126). While Chomskyan-leaning linguists like Pinker claim that UG explains how learning works, connectionists counter that the symbolic accounts of language structure neglect the actual processes of learning, and that connectionist models are in fact the ones providing some insight to them (Christiansen & Chater 2001a, p. 13).

All things considered, it is safe to say that compared to the theory of Universal Grammar, connectionism has never gained such a firm and stable standing as a model to describe the workings of the mind. The theory has many followers, but even its adherents acknowledge that it is a "highly controversial" approach to language (Christiansen & Chater 2001b, p. 19). Based in many ways more on computer science and other natural sciences than traditional linguistics, often seeing itself as a complete break from the old symbolic theories of language (ibid.) and creating a kind of a paradigm shift in the whole field of science (according to Pinker 1999, p. 116, the *Times Literary Supplement* heralded the first major connectionist experiments as "A TURNING POINT IN LINGUISTICS" [capitals in the original]), connectionism probably deserves rather well this reputation as a cause of controversy.

The most central idea of connectionism is a view of the mind as complex neural network in which a very large number of neurons serve as "simple processors" (Christiansen & Chater 2001b, p. 21). These neurons, typically known as units or nodes, cooperate to process information. Essentially all mental processes, including the production and acquisition of language, take place in these networks. The archetypal example of connectionist networks is the so-called *feed-forward network*, in which the aforementioned units are grouped into layers of input and output units. When the network is activated, information flows from input units to output units through a hidden layer of internal units. The actual processing of information takes place in the hidden layer (pp. 21-22). Learning happens generally by exposure to examples: the mind stores and later generalises associations that it has once experienced. For instance, in McClelland and Rumelhart's model of morphology in speech production, things such as past tense forms of new verbs are produced by the network, solely depending on the verbs' resemblance to previously known verbs that are already stored in the model's memory (Pinker 1999, p. 97). The network, then, computes the representation used in comprehending a sentence (or any other form of linguistic input) from the basis of constraints that are determined "by the weights on connections between units" (Seidenberg & MacDonald 2001, p. 289) – in other words, based on what input the learner has been exposed to.

This basic concept, with slightly varying and more complex network designs for different purposes, has been applied to numerous psycholinguistic fields, from speech and sentence processing to morphology and reading (Christiansen & Chater 2001b, pp. 27-60). Many researchers have constructed computational models following these principles to simulate the human mind in order to try out their theories. McClelland and Rumelhart's past tense model, first introduced to the public in 1986, is arguably one of the most famous, and they are sometimes even dubbed fathers of the entire school of thought (Pinker 1999, p. 97).

Dell et al. (1986, quoted in Christiansen & Chater 2001b, pp. 48-49) tested one version of the network model in general language production. Although this model, like most of the ones

mentioned above, suffered from being based only on "small fragments of natural language" (p. 51), the results of the experiment are described as promising on several levels. Some connectionists have been optimistic enough to suggest that the model could be used to capture the entire process of a child's language learning (Steedman 2001, p. 365).

However, a large number of linguists are much less convinced about the potential of the connectionist model. Despite admitting that it has many worthwhile qualities, especially in dealing with irregular inflections and other parts of the language where conventional grammar rules do not work well (pp. 130-131), Pinker calls connectionism "overhyped" (p. 122) and proceeds to take apart McClelland and Rumelhart's pattern association model, demonstrating the severe problems it faces even in the relatively limited task of producing verb inflections. Pinker disapproves of the feed-forward network model in general and its hidden processing unit layer in particular. He essentially regards the hidden layer as a laborious and artificial attempt at making the computational connectionist models more human-like in their processing of 'difficult' and 'easy' words (p. 150). Seidenberg and MacDonald defend recent connectionist theory against Pinker's claims by saying that his critique remains too focused on McClelland and Rumelhart's primitive model and that later models do not share the possible weaknesses of their predecessor (pp. 308-309).

Many others, like Fodor & Pylyshyn (1988) and Parsell (2005), criticise the entire connectionist model of intelligence and the way in which the human mind functions. They say that none of our mental processes can be reduced to the level of generalisation by association, and the massive difficulties encountered in developing artificial intelligence almost directly show the failure of the connectionist principles. According to this school, the entire concept comes across as simply inadequate (Parsell, p. 2).

It appears that although some works have been written on the connectionist approach to second language acquisition, the connectionist view of SLA has not been set apart in any particularly notable way from that of first language learning. After all, the basic associational dynamics are not

dependent on whether one has already learned a language. O'Grady goes as far as to say that the entire emergentist theory on SLA "is still in its infancy" (2008, p. 459), citing a number of factors that complicate the learning situation, including the knowledge of a first language. Ellis (p. 87) adds that the lack of connectionist SLA studies is mainly because of the fact that "ground is still being broken for first language", although he also refers to experiments (including Ellis and Schmidt, 1998) which seem to prove that connectionist models can successfully simulate SLA acquisition just as well as first language acquisition (Ellis, pp. 88-90). Connectionist scholars' research into language acquisition tends to strongly emphasise, as could be expected, input-based learning mechanisms and experience (Seidenberg & MacDonald 2001, pp. 281-282).

2.3. The Sapir-Whorf hypothesis and linguistic relativity

The Sapir-Whorf hypothesis in itself is even less of a complete model on the mental origin and operation of language than connectionism. Rather, it is a bold theory on the relationship between language and human thought in general, a field where neither Universal Grammar nor connectionism have treaded. The hypothesis was developed in the first half of the 20th century by the linguists Edward Sapir and Benjamin Whorf, as a crucial part of a theoretical concept dubbed *linguistic relativity* or, in its stronger form, *linguistic determinism* (e.g. Kramsch 2004, p. 237 and 239). Their ideas were partly based on the thoughts of the eminent cultural anthropologist Franz Boas. Boas, who had travelled extensively among different cultural and linguistic communities, adopted the view that a people's way of life is reflected in its language. His thoughts were developed and elaborated mostly by Whorf, a chemical engineer by training (Chase 1956, p. v), who came to believe that human thought is influenced by both the grammar and the lexicon of the language the human speaks (Whorf 1956, pp. 212-213).

"[A]ll observers", wrote Whorf, "are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated"

(p. 214). Whorf set out to explore the particular manner in which this influence and calibration happens, famously describing at length the language of North American Hopi Indians. Whorf argued that since the Hopi language did not appear to contain any explicit or implicit reference to the concept of time, the Hopi worldview and metaphysics differed radically from the Western standard (pp. 57-58). The focus of the Hopi language on what Whorf deems as the inner, subjective, world thus renders the Hopi view of action, causation and existence very different from ours (pp. 60-63). It was only after Whorf's early death in 1944 that his ideas concerning linguistic determinism became more known to the scientific community and the general populace, but they received considerable publicity particularly in the 1950s (Lee 1996, pp. xv-xvi).

The popularity of the Sapir-Whorf hypothesis fell in the 1960s with the rise of an entirely new brand of linguistics, that of Noam Chomsky, and has since at least partly come to resemble a historical curiosity. The hypothesis has been aggressively criticized innumerable times (Pinker 1994, p. 60, says that "the more you examine Whorf's arguments, the less sense they make"). Indeed, some of its more outlandish claims have been conclusively disproved. People who have two or more native languages are more or less able to live using both of them without major metaphysical problems, and it is clear in the globalising world that people who speak the same language can have very different worldviews, and that people with no common language are capable of sharing essentially the same ideas of how the world works (Kramsch 2004, p. 239). Modern anthropologists have gone as far as to characterise Whorf's theory as representing "a naïve and racist universalism in grammar, and an equally vulgar evolutionism in anthropology and history" (Hill and Mannheim 1992, p. 384). Some rare current proponents of Whorf hold that his views have been distorted or "misread, unread and superficially treated" (Lee 1996, p. 14), but the vast majority of the linguistics community seems to agree that the hypothesis is largely flawed.

However, many of the ideas Sapir and Whorf introduced continue to elicit debate to this day (for an example of one of these debates, see Laakso 2001 and Anhava 2001). The central concept of

language serving to direct thoughts and attitudes is certainly everything but obsolete. Present-day discussions concerning politically correct language or so-called *framing*, the use of powerful and charged terms such as "nanny state" or "tax relief" by politicians to persuade voters (Reeves 2005, p. 30), show that to some level, language is widely seen as influencing thought. A major current proponent of this type of linguistic relativism is George Lakoff, who argues that grammar and cognition are intimately tied, using grammatical categories as an example and describing at length Dyirbal, an Australian aboriginal language, whose myth-based categorization distinguishes between things based on their presumed dangerousness (Lakoff 1987, pp. 92-95). As the everyday use of Dyirbal dies, this danger dimension disappears, which profoundly affects the language (pp. 97-98). In Lakoff's opinion, "[t]here is nothing more basic than categorization to our thought, perception, action and speech (p. 5), and he is strongly opposed to the hard rationalist view of language, which he calls the "mind-as-machine paradigm" (p. 338).

Lakoff later has applied this thinking to the analysis of politics and political discourse. He has devoted time particularly to the study of metaphors, which he thinks could even be considered as a holistic way to understanding and interpreting the mindsets of people of different political stripes (Lakoff 1996, pp. 33-34 – according to him, American liberals see the state as a "Nurturing Parent", conservatives as a "Strict Father"). Since there is never any neutral language in political discourse even if people were to assume otherwise (p. 385), he says, those who are more skilled in tying language and morality together have a clear upper hand in politics (pp. 386-387). His highly political work on metaphors has earned him several earfuls from Pinker, who describes a recent book of Lakoff's as a "train wreck", saying that the effect of metaphors in language on the human mind is much smaller than Lakoff purports, and that most metaphors are not only ignored but not processed at all (2006, p. 25). Lakoff (2006), in turn, claims that Pinker has him saying the exact opposite of what he really says, and that Pinker is either "being nasty and underhanded" because he

feels his traditional viewpoint is being threatened, or so constricted by his "old frames" that he cannot comprehend Lakoff's message.

The Lakoffian perspective is, of course, a far cry from the radical Whorfian position that the regular grammar of a person's native language crucially shapes that person's thought patterns and the way in which they perceive the world. In a like fashion, other 'light' forms of linguistic relativity enjoy a fairly good current standing, remaining "generally accepted" (Kramsch, p. 239). Slobin studied the narration styles children with different native languages used in describing a series of pictures (2000, quoted in Kramsch, p. 244), and came up with apparently different temporal and spatial orientation that correlated with the native languages. In a somewhat similar vein, Vygotsky (1939/1962, among others) has explored child language acquisition and the relationship between language and thought. Instead of saying that the grammatical structures of the language significantly shape the child's worldview, however, he focuses on how thought is translated into speech as the child learns to express herself through the abstract properties of language (Kramsch 2004, p. 242). While Vygotsky, who was a contemporary of Whorf's, spends considerable time musing about how vital language is for thinking (Vygotsky 1962, pp. 125-127), he seems to be describing *any* language, not making differences between native languages.

According to Kramsch, studies on second language acquisition and linguistic relativity were essentially non-existent until the 1990s, and continue to be a kind of an undiscovered country (2004, pp. 250-251). Indeed, research on the subject seems quite rare. To my mind, this is something of a surprise, even a clear lack. One might think that if the first language creates such differences between individuals as Slobin's research suggests, second language acquisition would offer a highly appealing subject for study.

2.4 Perspectives on ambiguity

Before we fully embark on describing the two experiments, it is important to look at the approaches that our three linguistic theories take on the subject of ambiguity. The first experiment utilises a form of lexical ambiguity, which is replaced in the second experiment by structural ambiguity, a somewhat more challenging and complex concept. Lexical ambiguity is focused on the level of a single word, whereas in cases of structural ambiguity, the different interpretations emerge not from the readings of a single word, but from parsing the way in which an entire phrase is made up. While discussing ambiguity, one should keep in mind that in processing solely written text, as in the experiments featured in this thesis, people do not have access to the numerous prosodic features that influence the interpretation of ambiguous speech (Jackson et al. 2006, p. 276-277).

According to Steinberg et al., Chomskyan linguists think that structurally ambiguous constructions have two or more different "underlying syntactic structures" that happen to share the same surface structure, whereas cognitive grammar assumes that structurally ambiguous sentences simply have two or more different meaning structures that are distinguished from each other through syntactic means (2001, p. 364). The two approaches thus both rely on syntax as the chief means for ambiguity resolution. Crain and Thornton, who are proponents of UG, further argue that a natural rule in grammar is 'Avoid Ambiguity' (1998, p. 268). In a nutshell, this means that the listener or reader typically picks the interpretation that is more inclined to force the speaker or writer to use the ambiguous form. Chomsky himself confirms that in structurally ambiguous cases, interpretive options depend at least partly on the grammar of the surrounding words (1995, pp. 206-207).

This position, too, is shared to some extent by connectionists. Seidenberg and MacDonald state that the surrounding structures are crucial in interpreting ambiguities, citing in particular the importance of verbs in constraining interpretations (2001, p. 292). In line with the key ideas of connectionist thinking, however, the effect that these surrounding structures have on the ambiguity

is based mostly on the frequency in which structure occur together (pp. 290-291). In other words, if a particular verb is more frequently followed by a noun phrase, then an ambiguous structure preceded by such a verb is more likely to be identified as a noun phrase (rather than, for example, two separate nouns). The common ground that UG and connectionism share in this area can hardly be regarded as much more than coincidental.

White (2004) summarizes some experimental results focused on L2 learners and phrases that are somehow ambiguous. It appears that at least as far as lexical ambiguity is concerned, people are not constrained by ambiguities in their native language that are not present in L2 (pp. 138-139; the experiment in question dealt with the understanding of Spanish gender-specific articles by native speakers of English). On the other hand, structural ambiguities in L2 do not seem to be easy to recognise when no such ambiguities exist in L1 (pp. 217-218; this experiment dealt with the understanding of English prepositional phrases by natives of Japanese).

In addition, Crain and Thornton observe that in interpreting ambiguities, adults are more likely to be influenced by real-life events and the broader context than children (1998, p. 41). Papadopoulou and Clahsen (2006, p. 135), on the other hand, found in their study of Greek natives that while discourse-level information did affect the resolution of ambiguities, the primary resource used in interpreting them was sentence-level information, by which they refer to syntactic structure and lexical content. Thus, depriving participants of larger-scale context does not presumably have a major effect on their interpretation process. On the connectionist side, there is little talk about the effect of information beyond the nearby grammatical structure, although Seidenberg and MacDonald mention lexical context as playing a part in the interpretation of ambiguities (2001, p. 292).

3. The first experiment

In the first experiment that I undertook to arrange, my primary goal was to obtain some results on how native speakers of different languages analyse their linguistic processes in a task related to a second language. I chose not to create an entire research arrangement from scratch, but instead to apply and slightly adapt a procedure developed by Sinclair et al (1996, p. 172) for use in the wider field of corpus linguistics. This procedure is centred around a translation task, but is in itself quite relevant from the perspective of language processing. As defined by Sinclair and the other participants in the Malvern Workshop for corpus linguistics, the procedure in its entirety runs as follows:

a) engage the services of a bilingual (not yourself)
b) choose a word that has at least two prominent meanings in one language (language A), both of which are regularly translated by two different words in the other language (language B)
c) gather a number of *real* examples of the word in language A, making sure that there are several of each meaning. [...]
d) select five examples of each meaning, with a context of five words on either side of the chosen word. Mix the examples up.
e) ask the bilingual to supply a translation equivalent for the word in each example.
f) assuming that the results satisfy your expectation [...], then ask the bilingual to explain how he or she came to the decision in the case of each translation equivalent.
g) since the only differentiation between successive instances of the same words lies in the other words around it, any explanation must relate to the context. It may be explained in terms of the concepts expressed in the surrounding words, but without those words, the concepts could not be referred to.

(p. 173)

Within the scope of this thesis, it is impossible to delve into the study of translation. Even so, it is worth noting that Sinclair's experiment, which involves asking bilingual persons to select one of the two possible translations of a word based on the very limited context around the word and then to explain their choice, appears to be fairly similar to the "process of commutation" used by Catford (1965, p. 28) in his research related to translation equivalence. Catford's notion was that translation

relies on unstable, relative textual equivalence. His idea was to request a bilingual consultant to tell how he or she perceived the changes in the target text when the source sentences were partly altered (pp. 27-28). Catford does not use many paragraphs in the description of this procedure, but his approach is clearly built on test subjects' understanding of what translation to use. One of Catford's other key concepts was formal correspondence, an idea that translation depends to a large extent on whether the linguistic categories of the source language (word classes, structures, etc.) have clear counterparts in the target language (p. 32). One could see somewhat primitive Universal Grammar – like undertones in this.

Although the simplified form of Catford's views concerning textual equivalence and formal correspondence has attracted strong criticism in the field of translation research (e.g. Leonardi 2000), his theories are not without their proponents, and the experimental procedure described above is appealing for my research interests. A slight change in the arrangement makes it even more so. One could switch the *bona fide* language A - language B bilinguals of the original procedure to members of two groups: native speakers of language A who speak language B as a second language, and native speakers of language B who speak language A as a second language. Such a change creates the opportunity to investigate, firstly, whether the two groups come up with similar translations in the first place, and, secondly, whether they analyse their translation process in a similar manner.

The discovery of consistent rule-like patterns in the translations and the explanations would lend credence to the theory of Universal Grammar. Different theories of the connection between UG and SLA would predict different types of correlation between the native languages of the participants and the answers. While no major theories on connectionism and SLA exist, connectionism might assume slightly less clear patterns in the translations (due to differences in the input received by participants) but some association-related trends in the explanations. Any considerable differences

in the explanations given by natives of different languages, on the other hand, would offer some support to linguistic relativity and the Sapir-Whorf hypothesis.

Metalinguistic tasks, such as the analysis part of this experimental arrangement, have been criticised by White (2004, p. 252) for testing "speakers' ability to talk about the language rather than reflecting their unconscious knowledge of the language". In the experiments detailed in this thesis, the scope of the metalinguistic explanation task is considerably narrower than in the ones White comments upon, but her criticism is certainly not unfounded. In both my experiments, I take this factor into account as much as possible by letting the participants express themselves freely as the situation allows. Participants have also been allowed to use their native language whenever possible.

Conducting a Sinclairian experiment with the aforementioned changes seemed a useful step in advancing towards my goals. The experiment was carried out in two parts during the spring and autumn of 2004. The first part was conducted in the spring among native speakers of Finnish who were also skilled speakers of English, the second with a 'mirror image' group of English natives also proficient in Finnish. Both groups translated from English to Finnish. The English word chosen as the ambiguous key word was the conjunction *but*, which can be translated into Finnish in numerous ways, among them the conjunctions *mutta* or *vaan,* which share some similarities in use but are nonetheless clearly recognisable from one another. In Catford's terms, Finnish and English are effectively in formal correspondence as far as conjunctions are concerned.

But, a very common grammatical word whose meanings are somewhat abstract, was chosen because the factors that affect its translation seemed much less obvious and therefore more fascinating than is the case with many nouns (for example, it would appear quite self-explanatory that *bat* means an animal if the context words concern flying by night and eating insects, and a piece of sports equipment when the words deal with hitting balls and making home runs). As Sinclair (1996, p. 180) says, examining common words ensures, firstly, that adequate data are

always available and, secondly, that "there is no risk of the words in question having simple [translation equivalents]". The lexical ambiguity under consideration is thus not easy to resolve but, presumably, not considerably harder than with many other common grammatical words.

Below, native speakers of Finnish and other languages are referred to with terms such as *Finn* and *non-Finn.* These are accorded on the basis of the languages that the individuals concerned have named as their native languages, not their nationalities. The same goes for all words denoting language and nationality that are mentioned. These terms, although they are slightly off-the-mark, are used to render the text simpler and easier to read.

Next, I shall describe the preparation and execution of the experiment in more detail and then proceed to discuss its results. Some conclusions are also drawn. Final concluding discussion takes place after the second experiment in chapter 6, alongside comparison between the results of the two experiments and their implications.

3.1 Materials and methods

A glance into some dictionaries shows that the actual meanings of the word *but* are without a doubt manifold and complex. The *Collins Cobuild English Language Dictionary* (ed. Sinclair, 1987) gives thirteen different functions for the word, the first of which is "a statement about what is in fact the case [after] a negative statement" ("This is not the result of unemployment but the result of vandalism", p. 189) and the second "a statement which contradicts or makes a contrast with what has just been said" ("It was a long walk but it was worth it", p. 190). Both *buts* are classified as coordinating conjunctions. Hornby's *Oxford Advanced Learner's Dictionary of Current English* (1983) starts its list of meanings with the contrastive/contradicting conjunction ("We tried to do it but couldn't", p. 115), but apparently does not contain at all the use listed first in *Cobuild.* Hornby perhaps counts the two uses as one – in English their difference is rather elusive. *The Concise Oxford Dictionary* (Fowler & Fowler, 1964), meanwhile, lists nine different functions (pp. 161-

162), starting with a synonym for *only* ("she is but a child") and then for *except* ("no one but me"). Only the uses grouped under the last meaning – *on the contrary, nevertheless, however, on the other hand, moreover, yet* – approach the contrastive uses listed first in the other dictionaries. All three of these randomly-chosen dictionaries are, thus, in some disagreement about the exact uses of *but*.

According to one of the major English-Finnish dictionaries on the market (Hurme et al, 1984), *but* has three separate meanings as a conjunction. Under the first, the dictionary groups the ones translated into Finnish as *mutta* ("he wanted to but he didn't", "but you just said the opposite") and *vaan* ("not difficult but easy"). These are the first two meanings given by the *Collins Cobuild Dictionary*, much more clearly distinguishable from each other in Finnish. The second meaning features the translations *kuin* ("no choice but to marry her") and *ilman että* ("I never think of it but it fills me with horror"), while the third one has *ettei* ("he wasn't so stupid but he could do it"). Although the division into three seems somewhat arbitrary, the latter two meanings could be dubbed quite old-fashioned. My assumption based on all the dictionaries consulted was that the translations under the first meaning, especially *mutta*, were the most prominent ones. Therefore they were tentatively selected as the two translation alternatives to be used in the experiment.

I employed the British corpus collections *MicroConcord A* and *MicroConcord B* (originally created in 1993 by Mike Scott, both containing five 200,000-word corpora), compiled mostly from newspapers and academic publications, to examine if my notion about *mutta* and *vaan* really held true. These corpora were chosen because of their relatively neutral content and conventional written language, which was considered important for an exercise that was supposed to deal with standard English. A combination of both *MCA* and *MCB* was used to take advantage of the maximum amount of all usages. The two were accessed and pooled together with the concordance program *WordSmith Tools 3.0* (published by Oxford University Press, 1999).

Initial searches showed that the word *but* appears a total of 9643 times in these two corpora and, indeed, its use as an equivalent of the Finnish *mutta* is by far the most common one. In a random

concordance of 50 entries from the joint corpora (Appendix 1), arguably all 50 *buts* belong to the *mutta* category. To ascertain the truthfulness of this large figure in actual translation and to find out whether the *vaan* usage was any less obscure than the others, I consulted yet another corpus. This was a collection of Finnish translations of English-language fiction, fed into the program *TCE* (*Translation Corpus Explorer*, developed by Jarle Ebeling for the University of Oslo, 1998). Naturally, the amount of *buts* was again huge, and *mutta* was the most popular translation by a great margin. However, there were others: in the first ten TCE entries, *but* was translated seven times as *mutta,* once as *muuta kun* and twice as *vaan.* All this makes it incontestable that the "what is in fact the case" use of *but*, translatable as *vaan*, is by no means as common as the *mutta* form. On the other hand, the evidence strongly suggests that the *vaan* translation is at least as common as any of the other forms, possibly even more typical than the others. My choice of *mutta* and *vaan* as the alternatives in the study thus seemed justified.

However, a quick comparison of the typical uses of the *vaan* and *mutta* translations shows that they are otherwise perhaps not best suited for this kind of experiment. As the *Collins Cobuild* says, the "in-fact" meaning of *but* regularly translated as *vaan* appears after a negative statement. From the full MCA/MCB concordances, it is immediately obvious even to the casual observer that when the word is used in the "in-fact" sense, it appears to always have a negative word preceding it. This negative word can have many words separating it from *but* (like in one of the TCE samples, "you *don't* look back along time *but* down through it, like water" [emphasis mine]), but it most often seems to occupy either the 2L or the 3L position (second or third word on the left, like in "this is not difficult but easy"). When translation is *mutta*, no rule of this kind applies. Hence, even a quick glance reveals that while all instances of *but* translatable as *vaan* seem to accompanied by a negative word, most instances translatable as *mutta* are not. This means that if a selection of standard *mutta* cases and standard *vaan* cases were used, the difference between would be very easy

to spot and the entire experiment would seem slightly redundant. However, some of the *mutta* cases *are* in fact accompanied by the negative word.

To make both the translation task and the subsequent explanation task somewhat harder and less predictable, I narrowed the search down to all *buts* that have the word *not* in the 2L position as a part of the same sentence, eliminating the most obvious of the *mutta* cases. Seventy-nine such instances were found in the combined corpora (the first 50 entries are included here as Appendix 3). Most of these types of *but* were translatable as *vaan*, but there were many unclear cases and possible instances where *mutta* could be used instead. This is where the data from both MCA and MCB became necessary, as either one alone would not have given enough non-*vaan* instances of *not* and *but* together. Although one could still spot a grammatical regularity dividing the *vaan* forms from the others, it was much less conspicuous than the word *not* and similar negative words had been in the earlier concordances (this regularity and its effects will be discussed in more detail later in this chapter). The newly-created mini-corpus of 79 entries seemed a suitable place to finally begin the experiment.

The ten sample text entries to be used in the experiment were picked from this *not-but* concordance. They were selected simply on the basis that I would have intuitively used the translation *vaan* in five of them, *mutta* in the other five. Thus I used myself, a Finnish speaker reasonably proficient in English, as a kind of a control person in the experiment. One of the crucial parts of the test was to see not only whether the other "bilinguals" would agree with each other about the translations, but also whether they would agree with me. For the sake of simplicity and conceptual clarity, the five samples that seemed to take *mutta* as their translation will be referred to as "the *mutta* forms" for the rest of this paper, the others correspondingly as "the *vaan* forms".

Following Sinclair's procedure, the chosen entries were cut down to a context of five words on both sides of the word *but*. Next, they were mixed up and collected on a paper, along with an instruction to first translate the word *but* as either *mutta* or *vaan* in each sentence and then to

explain the choice. In many fundamental ways, this experimental set-up resembled the *truth value judgment* procedure used and praised by Crain and Thornton (1998, pp. 209-211) to collect children's interpretations of ambiguous sentences. To use Crain and Thornton's terminology, my experimental hypothesis (1998, pp. 129-130) was, firstly, that the respondents would pick the 'correct' *vaan* and *mutta* forms (as Sinclair et al. suggested would happen) and, secondly, that the explanations provided for the chosen forms would, in some way, correlate with the native languages of the participants. I tried, however, to heed Crain and Thornton's methodological advice and "stack the cards" (p. 130) against the experimental hypothesis so as to not let it influence the results.

The task paper (included here as Appendix 3, with my own 'correct' answers later added in italics below each text sample), was first distributed among ten students of English Philology or English Translation in the University of Tampere. These students formed a reasonably homogenous group. All were third or fourth year main subject students who were in their early twenties, and all had Finnish as their native language. Their language student status was taken as proof of their skills in English. The number of males and females was roughly equal.

The 'mirror image' group consisted of eight University of Tampere faculty or staff members who spoke English as their native language (the paper was identical to the one given to the first group, except that the instructions in the beginning were now in English – see Appendix 4). These eight people had all lived in Finland for more than five years, many had Finnish spouses, and most had had some formal training in the language. Each estimated that their level of skill in Finnish was adequate for this sort of task before actually starting to work on the paper. Three of the participants were teachers of English Philology in the School of Modern Languages and Translation Studies, four taught English on a more basic level in the university language centre, and one worked as a translator of academic texts. All were between the ages 40 and 60. Males dominated this group five to three.

Both the students and the staff/faculty members did the task alone, with no knowledge of how I or the others had filled it. They were first given a fairly short amount of time to do the translation part on the paper (all completed it in under ten minutes). After this, they were asked to elaborate on their word selections. All received at this point a verbal instruction to try to trace back and analyse their earlier intuition instead of straining to find tangible rules to explain their selections. The time limit for this part of the experiment was 10-15 minutes. Everyone had the choice to describe their choice for every entry separately or to give one general explanation, either written down on the task paper or given orally. Most participants, regardless of their background, ended up combining all these alternatives in their answers, using a few entries as a justification for their general theory and clarifying in speech the points which they had made in their written explanations.

3.2 Results

3.2.1 The translations

The first and most striking fact that emerged from the results of the experiment was the practically unbroken agreement about which translation should go with each *but.* Table 1 shows that all ten students (and myself) were totally unanimous about the translations for text samples 1-4 and 6-10. Only sample number 5 ("feel alert is not known, but it is certain to be") was slightly controversial. Seven out of ten agreed with me and said it was *mutta*, one opined for *vaan*, and the remaining two considered both translations possible. This was also the only instance where anyone suggested two alternatives as an answer. In all other cases, only one translation was supplied.

The staff/faculty members were nearly, but not quite, as unanimous as the Finns about the translations. Four agreed with the majority of the Finnish speakers on every point, two disagreed on one text sample, and the remaining two on three samples. Details can be found in Table 2. Even so, each participant agreed with the others in at least seven samples out of ten. Text sample number 6

("said they had not slept but had spent the night moving") seemed to be the most problematic, since three of the four dissenters marked it as a *mutta*. No other real patterns can be discerned from the deviating answers: text samples numbered 1, 7 and 8 had one "wrong" translation each, number 4 two. In addition, two participants remarked that sample number 5, which had caused controversy already among the Finns, could basically be translated either way.

	mutta	*vaan*	both
1. liberty really cherished liberty *but* something else. Justice, equality, some		**10**	
2. with, Nutty could not imagine, *but* that wasn't her department.	**10**		
3. Peking was not interested, *but* in 1979 Lisbon formally renounced	**10**		
4. his judgment was not impulsive, *but* rather a carefully thought through		**10**	
5. feel alert is not known, *but* it is certain to be	**7**	1	2
6. said they had not slept *but* had spent the night moving		**10**	
7. then not 980, not 1020, *but* exactly the 1000 calories should		**10**	
8. The cancer was not eliminated, *but* its growth ceased, and	**10**		
9. this was not unnatural, *but* he soon gave up the	**10**		
10. universe takes place not once, *but* over and over again		**10**	

Table 1. Finnish natives' answers to the translation task in the first experiment.

	mutta	*vaan*	both
1. liberty really cherished liberty *but* something else. Justice, equality, some	1	**7**	
2. with, Nutty could not imagine, *but* that wasn't her department.	**8**		
3. Peking was not interested, *but* in 1979 Lisbon formally renounced	**8**		
4. his judgment was not impulsive, *but* rather a carefully thought through	2	**6**	
5. feel alert is not known, *but* it is certain to be	**7**		1
6. said they had not slept *but* had spent the night moving	2	**5**	1
7. then not 980, not 1020, *but* exactly the 1000 calories should	1	**7**	
8. The cancer was not eliminated, *but* its growth ceased, and	**7**	1	
9. this was not unnatural, *but* he soon gave up the	**8**		
10. universe takes place not once, *but* over and over again		**8**	

Table 2. English natives' answers to the translation task in the first experiment.

3.2.2 The explanations

In the second part of the task, responses diverged. No two answers were exactly alike, but it was possible to identify at least one major division among them: semantic explanations and grammatical explanations. Four out of ten answers given by Finnish participants could be classified as semantic, the remaining six as grammatical.

The semantic explanations focused on the difference in the meanings of the text samples. Three Finns said, in essence, that the *vaan* clauses were about "something *instead of* something else", one that they corrected or specified something stated in the preceding clause. The *mutta* forms, by contrast, were seen as adding new information or introducing an element but also, as one person put it, "happening not *instead of* something, but *nonetheless*". Interestingly, all four natives of Finnish who gave a semantic explanation said that the logic in the *vaan* forms was much easier to define than in the *mutta* forms.

As mentioned before, a close examination of the text samples revealed that there apparently was a distinct grammatical difference between the *vaan* forms and the *mutta* forms. The *mutta* samples (numbers 2, 3, 5, 8 and 9 on the task paper) all have a separate subject in the *but* clause, while the *vaan* samples do not. It was not easy to determine whether all the people who gave a grammatical explanation were in fact referring to this or not, as they approached the topic in distinctly different ways. Three of the six students with a grammatical explanation actually used the grammatical term "subject" and stated that the *vaan* forms did not have one. One spontaneously added that this rule had not occurred to her while she was working on the translation part, and that she did not think it had affected her answers – at least not consciously.

The remaining three Finns articulated their ideas differently. One student from this group commented that the *mutta* forms "went with nouns". Because she underlined the subjects in the *but* clauses of the *mutta* samples as an illustration of this, even though in four of these cases the subject is actually a pronoun, it seems safe to assume that she was describing the same phenomenon as the others. According to another respondent, *mutta* tends to occur in clauses with verbs, *vaan* when no verb is present. This notion could be seen as another echo of the missing subjects, but also as a potent idea in its own right: all the *mutta* forms are indeed followed by verbs, while most of the *vaan* forms are not. As the interviewee said, though, there are exceptions to this. The *but* in text

sample number 6 ("said they had not slept but had spent the night moving"), for instance, is followed by a verb, but the word was translated as *vaan* by all ten students.

The third and final student in this subgroup, on the other hand, said that *but* is translated as *mutta* when it begins a subordinate clause and *vaan* when it is located in the middle of a clause. Grammatically speaking, this is wrong. As Hurme et al and the *Collins Cobuild* (p. 146 and p. 189, respectively) state, both *buts* are coordinating, not subordinating, conjunctions. However, if the incorrect terminology is ignored, the explanation must be seen as good as any other. *Mutta* forms clearly tend to be followed by a complete main clause that features a distinct subject and a verb. Hence, they certainly can be seen as differing from the *vaan* forms on clause level.

To summarise, it seems that the grammatical explanations given by the Finnish natives share the common idea of the *vaan* forms being somehow "less complete" than the *mutta* forms, much like the semantic explanations share the idea of the *vaan* forms describing something that takes place instead of something else.

	Semantic explanation	Grammatical explanation
Finnish	4	**6**
English	**8**	-

Table 3. Explanations given by natives of Finnish and English, broadly categorised by explanation type.

A marked difference arose between the two participant groups in the explanation part of the experiment. This is shown in Table 3. None of the eight respondents who spoke English as their native language used the grammatical explanation to argue why they had made their original choices of translation. Everyone gave instead an explanation that could be clearly classified as semantic. However, despite this fundamental similarity, there was some interesting variation among the answers.

Four of these respondents said, like their Finnish counterparts, that the *vaan* form occurs when something happens *instead of* something else. They also resembled the Finns in that they apparently

found it easier to describe the *vaan* usage than the *mutta* usage: three out of these four did not note down a similar explanation for the *mutta* form. One used the word *however* as a synonym for *but* used in the meaning of *mutta.*

Two English natives were more thorough in their analysis of the text samples, and provided a specific description for each of the ten instances. Although both used their own explanation terminology not encountered elsewhere in the answers, such as "emphasis" for *mutta* and "only" for *vaan*, an apparent consistency with the first group could be spotted. One of these two said that there was a "lack of connection" among the two clauses with some of the *mutta* forms, the other used the expression "in addition to" to describe the relationship between the clauses. A third respondent also argued that after the *mutta* form, "a different idea follows", and a fourth spoke of a "separate idea" after a *but* of this type. Hence, the English natives and all the Finnish natives who gave a semantic explanation seemed to agree that nature of the *mutta* form is clearly less tangible than that of the *vaan* form – possibly because the links between the clauses joined together by the *but* are indeed much more tenuous.

In addition, several members of the English native group sought to make a distinction between the two uses of *but* by characterizing them as "contradicting" and "contrasting". Interestingly, though, it does not seem to be at all clear exactly when a *but* is used in contradicting or contrasting. While two participants said that the *vaan* form "contradicts some presupposed idea", another two argued that the *mutta* form is in fact used when the second clause "contradicts the first". The difference between these two ways of thinking is not easily identifiable . Similarly, one respondent applied the word "contrasting" in description of the *mutta* forms in general, but another said explicitly that in one instance (number 8: "the cancer was not eliminated, but its growth ceased, and"), there was "no contrast" between the clauses. This individual, on the other hand, described many of the *vaan* forms as "contrastive", as did one other, who said that the slightly controversial text sample number 6 ("said they had not...") could be translated as *vaan*, if the sense of the word

was contrastive. Yet despite these gross differences in their arguments, most of these English speakers were in total agreement with each other and the Finns about which translation should go with each *but*. In the end, the nature of concepts like "contradictive" and "contrastive" seems to be more open to interpretation than the nature of the *mutta* and *vaan* forms ever was.

All in all, the explanation part of the test provided a somewhat surprising contrast between natives of English and Finnish. It answered some of the questions raised by the first part, but also established new ones. The relevance of the results from both parts will be reviewed both in the next section and in chapter 6.

3.3 Discussion

Based on the results described above, the modified Sinclair procedure is a reasonably relevant tool in studying how people process and perceive language in a translation task. The near-unanimousness of the respondents on the translation task indicates that the results are far from random, and the obvious differences in the explanations invite many kinds of inspired speculation.

3.3.1 The translations

The fact that all ten Finnish participants were in complete agreement about the translations in nine out of ten text samples, despite the relative lack of context, shows that the mental translation process neither is random nor requires lines of surrounding text. The answers given by the English natives were not quite so strikingly unanimous, but the similarities greatly outweighed the differences in this group as well. The reason for the slight disagreements among the English speakers was most likely their actual skills in Finnish language: although all had resided in Finland for years, some were quick to point out that they often speak English even among Finns, and not all had received any formal schooling in Finnish.

The few text samples that did not get a unanimous translation might give hints as to what kind of context *is* necessary. For example, in the only sample that caused disagreement among the Finnish natives (number 5, "feel alert is not known, but it is certain to be"), the construction in the five words before *but* in the sample is markedly more difficult to understand than in the other samples, which evidently makes the translation task harder. An unambiguous translation requires a comprehensible and meaningful context, regardless of how big that context is. The sample that divided the English natives' opinions (number 6: "said they had not slept but had spent the night moving"), on the other hand, is slightly more problematic. The fact that there is a verb form but no new subject following the word *but*, a unique combination in the task paper, would offer an obvious explanation, but this is clearly in the territory of the grammatical explanation, and all the English natives gave a semantic explanation for their translations.

This relative agreement on the translation choices can be seen, first of all, as a victory for Universal Grammar. The fact that natives of different languages converge on the same translation alternatives, despite the extremely limited context, is easy to see as an indication of subtle linguistic properties beneath the surface level of the language guiding the respondents to the same conclusions. However, it is almost as easy to explain the agreement in connectionist terms. Even the very limited word context of the text samples could certainly contain enough fodder for a powerful network of associations and connections to reach a solution. If the input to which the respondents had been previously exposed was homogenous enough, the convergence described above would be a natural consequence. Further, one might go on to argue that the slight differences in the answers were in fact due to equally slight differences in the earlier input that individual had received.

In a way, the similarities in the stances UG and connectionism take toward ambiguity are highlighted by this failure of the results to make a difference between the two schools of thought. Later results, however, make the differences more concrete.

3.3.2 The explanations

The way in which the test groups' explanations for their translations fell into two explicit categories creates fertile ground for speculation on the influence of first language influence on second language processing. At least on the surface, it appears that different people use two very different methods in assigning the translations, and still arrive at the same conclusions. Notably, neither Finns nor English natives outright proposed both the grammatical and the semantic techniques, or a combination of the two, as their explanation. These two camps must be seen as quite separate.

At a glance, the emergence of these two camps could be seen as devastating to a particularly simplistic offshoot from the connectionist school of thought. If one were to view second language processing simply as a series of associations independent from first language, it would seem highly improbable for people from different linguistic backgrounds to analyse their translation in such different manners. However, it seems that no emergentist theorist has been bold enough to propose that the associations and connections in second language learning take place independently from the first language association and connections. Among the Universal Grammar SLA theories, such an idea does exist – the Full Access without Transfer hypothesis, according to which the underlying UG is accessed without any influence from the first language. If my results are to be taken seriously, they certainly seem to spell doom for the Full Access without Transfer hypothesis.

On the other hand, the results seem to add to the credibility of linguistic relativity. If many natives of Finnish base their translation on grammatical cues and all natives of English on semantic cues, even the Whorfian idea of native language affecting the perception of reality does not appear groundless in this particular context. An eager follower of Whorf's might be quick to ask why differences such as these would not exist just as well in the fields of conceptual thinking and perception of the environment, even though the English natives' confusion regarding concepts such as 'contradicting' and 'contrasting' hardly speaks of a great conceptual agreement amidst people who share the same native language.

3.3.3 Reviewing the experiment

As stated, the experimental arrangement has proved fairly successful. It has provided useful and somewhat surprising results. Even so, overly rapid conclusions and generalizations should not be made on the basis of this experiment, especially considering such apparent discrepancies as the one described above. Firstly, it should perhaps be noted that the Finnish language students' education might have a considerable effect on the way they approach a task of this kind. Their studies have "primed" them to look for linguistic differences. In addition, like Steven Pinker says, "university students treat anything that looks like a test as a test" (1999, p. 94).

Much as Pinker believes that his students took his verb inflection tasks as a challenge to their creativity rather than as a questionnaire measuring what kind of inflections they would actually use, one could suspect that a number of students in this experiment were looking for the "correct" answer instead of simply using their intuition and then trying to explain it. The comment made by one person about not believing that the linguistic regularity influenced her decisions – even though it was the only explanation she gave – would seem to support this interpretation. Also, the off-the-mark grammatical terminology used by two participants could be seen as a sign of them trying to complete the task like a school exercise, even though they did not remember the necessary words.

Alternatively, though, it could be argued that this is a case of the opposite: lacking the words to properly describe their thought process, the participants had to resort to half-remembered technical terms. The fact that all English natives gave a semantic explanation could be interpreted in a number of ways. One reasonable assumption might be that they, no longer students, were able to see beyond the test-like task paper and be more true to their intuition. But most of these teachers had actually spent more time studying languages than the students, and so it would be prudent to keep in mind that their own training and research could have made them approach the task in some particular way that affected their explanations. The conflicting use of the words "contrasting" and

"contradicting" highlights one obvious inconsistency in this group's answers, showing that their logic is certainly not infallible.

In a similar vein, it is worth mentioning that all three people who translated the *but* in sample 5 as *vaan* or said that both translations were possible later explained their choice of translation grammatically. In a way, this is inconsistent with the mechanism of the explanation. The *but* clause has a subject ("it") and a verb ("is"), so it should be a clear-cut case of *mutta*. Again, one could say that this is another piece of evidence for the unreliability of the grammatical explanation as a real mental translation process. However, the reason for the inconsistency might also lie in some contents of the grammatical mechanism that the explanation simply does not manage to put into words. Regardless of the interpretation, this is a kind of a reversal of the English natives' problems with sample number 6: all gave semantic explanations, but ended up disagreeing over a phrase that was linguistically atypical. This, too, could be also alternatively viewed as something that is consistent with the original semantic explanation in some underlying way. The results are not, ultimately, completely conclusive as far as the semantic/grammatical division and its consequences for different language processing theories are concerned.

To summarise, both parts of my original experimental hypothesis appeared to have been proved correct here. The results seemed to indicate that L1 indeed plays a role in the analysis of L2, but that natives of different languages clearly gravitate towards the same choices in the actual translation part of Sinclair's research procedure. From these positions, I set out to further study how native speakers of different languages treat and analyse ambiguous sentences in situations with very limited contexts. The experiment detailed in the next chapter explores these themes, trying to avoid some of the research setting problems mentioned above and – as we shall see – running into new ones.

4. The second experiment

The concept of first language influence on the understanding and, consequently, processing a second language is somewhat elusive. As stated before, it is essentially self-evident that the L1 grammar affects the learning and the utilisation of the L2 grammar in some ways. The results from the modified Sinclair research procedure, described at length in the previous chapter, created some grounds for thinking that this influence could run fairly deep and have a major effect on the ways in which natives of different languages make and analyse linguistic choices.

In order to come up with evidence that would either corroborate or weaken the earlier results, I now approach the subject of L1-L2 interaction from a slightly different direction, whilst retaining the key elements of linguistic self-analysis and interpretation of ambiguous expressions. Sinclair et al.'s translation angle was retired, but the general shape of the task retained the same.

The task of translating an ambiguous word was replaced by a task of interpreting a series of ambiguous phrases. This was a kind of a dead-end task compared to the first experiment, since the sentences used were chosen on the basis of their sheer ambiguity, without any Sinclairian indication that the small context provided would lead to clear results. With this change, I hoped to receive noteworthy differences not only in respondents' analysis of the choices made, but also in the choices themselves. After all, if native language influence seemed to have an effect on the mental translation process, might it not have one on the selection of an interpretation when no correct interpretations existed? Also, moving from the authentic context of the first experiment to a more artificial, textbook-like context gave an opportunity to observe the effect of context variation on the outcome of the experiment. On the other hand, the expected outcomes in the light of different theories did not change greatly from the first experiment. The emergence of rule-like patterns would support the theory of Universal Grammar and explanatory strategies drawing on associations would

be favourable to connectionism, while linguistic relativity and the Sapir-Whorf hypothesis might predict correlations between a participant's native language and her chosen approach to the task.

In the course of this experiment, I proceeded to try to eliminate the age and background differences among the participating groups that caused some problems in reviewing the results of the previous experiment. The general experimental set-up, while more of my own design than that of the first experiment, borrowed much from Crain and Thornton's basic truth value judgment procedure (pp. 209-211) and, to some extent, continued to borrow from Sinclair's task.

In devising and later analysing this second experiment, I made an effort at taking theorists' observations concerning structural ambiguity into account. In the light of Papadopoulou and Clahsen's (2006) results, for example, my research arrangement did not rely on the respondents' ability to spot a L2 ambiguity on their own. Alas, the effects of such factors as willingness to employ extra-linguistic knowledge could not be entirely eliminated, and will be discussed later in the text.

As with the first experiment, I shall next describe in some detail the experimental procedure that I employed. After this, I shall proceed to the results of the experiment. The final section of this chapter features some discussion and conclusions based on these results. General discussion that compares and contrasts the results of both experiments takes place in chapter 6.

4.1 Materials and methods

Following in the vein of Sinclair et al.'s general research procedure, I compiled a multiple-choice English-language task paper to be distributed among students of the University of Tampere who originated from different linguistic backgrounds. Due to practical reasons, the two main groups of the people participating were envisaged as Finnish natives and non-Finnish natives. The tentative plan for the division of these two groups was to collect one third of the answers from Finns and two thirds from natives of other languages.

The paper (included here as Appendix 5) consisted of a total of sixteen full sentences for which the participants had to select a synonymous sentence from a set of two or three alternative solutions. They were told that only one alternative could be chosen. As with the earlier experiment, after finishing the multiple-choice part, the participants were instructed to briefly explain on the paper why they had chosen the sentences they had. The sentences were not picked from a corpus but simply created for the paper by myself, partly because of the insufficiency of suitable sentences in the readily available corpora and partly because of the decision to eschew word-for-word authenticity for the purposes of the experiment.

Of the sixteen sentences, nine (numbers 2, 3, 5, 8, 9, 10, 12, 13 and 15) represented what might be called classic ambiguous English sentences. They formed the actual core of the experiment. Sentences 2, 8 and 12 (the "The patriotic Americans are proud of their country" construction, referred to from now on as the *patriotic Americans* construction) have a non-restrictive adjective in front of the proper noun, and thus can be read in two ways ("All Americans..." or "Some Americans..."; Leech and Svartvik 1994, p. 64). The unchanging tense forms of the verbs in sentences 3, 10 and 13 ("put", "cut" and "read"; these sentences are henceforth referred to as the *cut/put/read* sentences) render their time reference unclear: it is possible to see the sentences referring to past, future, or habitual events. Sentences 5, 9 and 15 are based on a principle somewhat similar to the first set of three sentences, with the interpretation depending on whether the key phrase ("red rats eater", "torn receipts envelope"; these sentences are from now on referred to as the *red rats eater* sentences) is read as an adjective and two separate nouns ("a red eater of rats") or as a noun and a noun phrase ("an eater of red rats"). Phrases of this type were used by Pinker and his colleagues (Pinker 1999, p. 207) to study how adults and children parsed them and whether the perceived meaning of the phrase is affected when the middle word is changed from singular to plural – a theme not entirely unlike the one I set out to study. In Pinker's study, the majority of both

age groups seemed to prefer the noun-and-noun-phrase construction. The focus of the study was on age, not language, but apparently all participants spoke English as their native language.

In choosing to use these ambiguous sentences, I attempted to come up with a way of creating a linguistic task that did not have a right answer and could not be interfered by the native language of the respondents in any outright fashion. Since the latter part was extremely hard to achieve, considering that the participants might be natives of extremely wide range of different languages, I settled for using sentences that had structures more or less unique to English and no obvious link to Finnish. My primary research goal was to find out if any differences arose between the Finns and the non-Finns either in the multiple-choice answers to these nine sentences or in the explanations that followed them.

The remaining seven sentences (numbers 1, 4, 6, 7, 11, 14 and 16) were placed on the paper mostly to create a distraction for the person completing the task, in order to prevent them from detecting the patterns and beginning to overanalyse their own answers. Such behaviour cannot, of course, be avoided completely. These seven sentences were simple and unambiguous, and the multiple-choice task for each always had one and no more than one grammatically correct answer (these correct answers are included in Appendix 5). Consequently, these tasks were also to function as a guiding basic indicator for the general English skills of each respondent. If a person provided a correct answer to all or most of these seven task sentences, it could be assumed that their English skills were sufficient to take part in the experiment.

To once again define the set-up in Crain and Thornton's terms (1998, pp. 129-130), my experimental hypothesis was that, firstly, there would be some differences in the interpretations chosen for the ambiguous sentences that correlated with the respondents' native languages and, secondly, that such differences would also exist in the explanations provided by the respondents. As with the previous experiment, I attempted to let the hypotheses not influence the actual experiment in any way.

This task paper was distributed among a total of roughly 70 students in the spring of 2006 and among a little less than a hundred students in the autumn of the same year. This was done during classes. The students had about 20 minutes to finish the paper, with instructions to do the multiple-choice part as quickly as possible and then to spend a little time explaining the choices. The papers were then immediately collected away.

The research was conducted on open-for-everyone English, Finnish and International Communication Studies courses held by the language centre of the University of Tampere, which meant that the students attending them came from a wide variety of academic backgrounds. However, it should be reiterated that all of the people attending the courses were university students, either enrolled in the Finnish system or participating in an exchange program. According to the language centre specifications, all of the English courses represented the European standard B2 level of language skill. No such classification was provided for the English-language International Communication courses. Since all of the classes were taught principally in English, a reasonable working knowledge of the language was a *de facto* requirement for participation on them.

A satisfactory total of 134 completed task papers were received. 36 of the people who returned them were Finnish natives, while 98 spoke another language as their L1. Thus, a little more than one quarter of the total sample spoke Finnish as their native language. While no information other than the native language was collected from the respondents, nearly all of them could be broadly characterised as being in their early-to-mid-20s. There were more females than males, particularly among the Finnish-speaking group, but not to a completely disproportional degree.

The group formed by the 98 non-Finnish respondents consisted mostly of Europeans, but languages from more distant countries were not completely without representation. Among these 98 students, a total of 25 different native languages were spoken. The entire sample was divided into native speakers of French (22 respondents), Polish (19), German (18), Spanish (6), Dutch (3),

Hungarian (3), Lithuanian (3), Slovak (3), Czech (2), Hindi (2), Italian (2), Arabic (1), Bengali (1), Catalan (1), Chinese (1), Greek (1), Kazakh (1), Korean (1), Portuguese (1), Russian (1), Slovenian (1), Swahili (1), Turkish (1), Ukrainian (1) and Urdu (1). This means that languages of Indo-European origin formed the vast majority of this part of the sample, creating something of a contrast with Finnish, which is part of the Uralic language family. Since French, Polish and German were represented in the sample considerably better than the other languages, possibly well enough to merit some observations on the particular behaviour of their specific native speakers, the answers given by the natives of these three languages will be given some attention below.

4.2 Results

The results received from the experiment were varied and sometimes inconclusive, but nonetheless reasonably interesting. In accordance with the original research plan, they are discussed here mostly as a comparison between native speakers of Finnish and native speakers of other languages. However, a brief and speculative analysis of some the special features of the biggest other language groups is also included. Answers that violated the instructions by actions such as choosing several of the alternatives, were noted, but do not figure in the numbers mentioned below.

4.2.1 The distraction sentences

As far as the less relevant distraction sentences are concerned, the entire base sample of 134 respondents was more or less homogenous. It is difficult to surmise how well the sentences fulfilled their duty as a distraction for respondents. They did not distract the participants to such a degree that the patterns in the ambiguous central sentences would have gone unnoticed. In the explanation part of the task, several of the respondents referred to earlier explanations to similar sentences (for example, the explanation to Sentence 13, a *cut/put/read* sentence, would be a note along the lines of "see Sentence 10", another *cut/put/read* sentence). However, fewer than ten participants appeared to

have at any point altered the multiple-choice answers they had given. This means that if some portion of the respondents attempted to respond in a consistent manner because of spotting the patterns in the sentences, they did so already during the multiple-choice task, in spite of the instructions to complete the paper as fast as they could. Judging by the number of internal inconsistencies found in the answers (and discussed below in this section and the next one), such behaviour was quite rare, if it occurred at all.

The dummy sentences appeared to fulfil their other function as a test of the participants' English skills. The vast majority of both Finns and non-Finns chose the right answers for all seven entries. Sentence 4 ("We should leave straight away") turned out to be the easiest to select a meaning for, with only four participants supplying an incorrect answer to it. By contrast, sentence 14 ("Michael should have written by now") seems to have been the hardest one, with nine Finns and as many as thirty-three non-Finns choosing the incorrect alternative (in retrospect, the sentence might actually be interpreted as ambiguous – one could think that the speaker is in fact *unaware* of whether Michael has written) . Finnish speakers gave completely correct answers slightly more often than non-Finns, but no truly significant difference between the two language groups could be discerned in any of these sentences. All in all, based on this very cursory and random test of the respondents' fluency in English, both groups seemed to be competent enough to take part in this kind of experiment.

4.2.2 The *patriotic Americans* construction

The nine ambiguous key sentences provided some variation between the groups – at least, some of them did. Sentences 2, 8 and 12 (the *patriotic Americans* construction that depended on the use of non-restrictive adjectives) tended to yield rather similar results among all participants, regardless of their background. Most of them were generally of the opinion that the phrasing referred to just some Americans (or students or workers), not all. The responses to the three sentences were not identical,

though, and the treatment of the last two sentences slightly contrasted with that of the first. This is shown in Table 4. Relatively few participants thought that sentence 2 ("The patriotic Americans are proud of their country") made a reference to all Americans. Just nine Finns and fifteen non-Finns selected this alternative. Sentence 8 ("The nervous students kept looking at the clock") persuaded fourteen Finns and sixteen non-Finns to think that all of the students were concerned.

In sentence 12 ("The hungry workers decided to eat some lunch"), however, no more than eighteen Finns – exactly half of their group – thought that the sentence did in fact refer to just some workers. This opinion was shared by 63 out of 98 non-Finns. The views of the large French, Polish and German subgroups among the non-Finn part of the sample were very much in unison with the entirety of the non-Finns in all three sentences. The results from this section could thus be summarized by stating that non-Finns consistently preferred the "some Americans" interpretation by a clear margin, while Finns shared this preference in the first sentence and split their opinion more evenly in the other two.

	Finns, n	non-Finns, n	Finns, %	non-Finns, %
2. The patriotic Americans are proud of their country.				
a) All Americans are proud of their country.	9	15	23	15
b) Some Americans are proud of their country.	**27**	**83**	**77**	**85**
8. The nervous students kept looking at the clock.				
a) Some students kept looking at the clock.	**22**	**78**	**61**	**83**
b) All students kept looking at the clock.	14	16	39	17
12. The hungry workers decided to eat some lunch.				
a) Some workers decided to eat some lunch.	**18**	**63**	**50**	**69**
b) All workers decided to eat come lunch.	**18**	28	**50**	31

Table 4. Answers to the *patriotic Americans* sentences.

4.2.3 The *cut/put/read* construction

The tense form ambiguities of sentences 3, 10 and 13 created even more of a division between the groups. All of the three alternatives given for each sentence (interpreting the verb form as referring to future, past or habitual action) received some support, regardless of the native language. As seen in Table 5, in sentence 2 ("On Wednesday I cut the grass") 28 non-Finns opted for alternative *a*

(past) and fourteen chose *b* (future), while a majority of 54 favoured *c* (habitual usage). The Finns'
corresponding choices were eighteen for *a*, nine for *b* and nine again for *c*. The selections made for
sentence 10 ("I put some effort to doing my homework on Saturday and Sunday") were slightly
more balanced: 33 non-Finns chose the past interpretation and 42 the habitual one, with nineteen
favouring the future one. Among Finns, the corresponding numbers were fifteen, eleven and ten.
Sentence 13 ("I read the paper on Sunday morning") had 62 non-Finns choose the habitual
interpretation and 28 the past one, while the future interpretation received just four votes. This
sentence elicited the most 'illegal' answers, with three respondents insisting on choosing both the
habitual and the past alternatives. Fifteen Finnish natives favoured the habitual interpretation for
this sentence and another fifteen chose the past interpretation, with the six votes going for the future
one.

Put together, this means that the habitual interpretation was consistently more popular among
the non-Finns, while the Finns effectively favoured the past interpretation in all three sentences
(although its victory was tied in Sentence 13). Within the non-Finn sample, French natives were
particularly unanimous in their support for the habitual reading, with as much as 18 out of 22 giving
it as their interpretation for Sentence 13. Although the Germans and the Poles clearly preferred the
habitual interpretation as well, their ranks held more dissenters.

	Finns, *n*	non-Finns, *n*	Finns, %	non-Finns, %
3. On Wednesday I cut the grass.				
a) Last Wednesday I cut the grass.	**18**	28	**50**	29
b) Next Wednesday I cut the grass.	9	14	25	15
c) I usually cut the grass on Wednesdays.	9	**54**	25	**56**
10. I put some effort to doing my homework on Saturday and Sunday.				
a) I put some effort to doing my homework last weekend.	**15**	33	**42**	35
b) I put some effort to doing my homework on weekends.	11	**42**	31	**45**
c) I put some effort to doing my homework next weekend.	10	19	28	20
13. I read the paper on Sunday morning.				
a) I usually read the paper on Sunday morning.	**15**	**62**	**42**	**66**
b) Last Sunday morning I read the paper.	**15**	28	**42**	30
c) Next Sunday morning I will read the paper.	6	4	17	4

Table 5. Answers to the *cut/put/read* sentences.

4.2.4 The *red rats eater* construction

Finally, the three sentences that depended on how the structure of the key phrase was interpreted were the most divisive ones. Table 6 shows that in sentence 5 ("Julia went to the zoo and saw a red rats eater"), 69 non-Finns felt that the creature was an eater of red rats, while 27 regarded it as a red eater of rats. By contrast, 22 Finns thought that the latter interpretation was correct, and only fourteen shared the opinion of the other group's majority. Sentence 9 ("Mary found the torn receipts envelope") split the non-Finns' views almost evenly. 44 respondents parsed the sentence as concerning an envelope for torn receipts and 47 considered it a receipts envelope that was torn. Among Finns, the first view was shared by eleven people, the second one by 25. In sentence 15 ("The bookshop owner took his old books bag with him"), 37 non-Finns chose the 'old bag for books' interpretation, and 59 favoured the 'bag for old books' one. For the native speakers of Finnish, the corresponding numbers were fifteen and 21.

Again, a difference in the two main groups' preferences can be discerned. The non-Finns were more favourable to the noun-and-noun-phrase construction ("eater of red rats"), rewarding it a clear majority in two of sentences and an almost-tie in the other one. Curiously, while the opinions of the natives of Polish and French went hand in hand with those of the total non-Finn sample, the Germans disliked the noun-and-noun-phrase construction in Sentence 9, giving it just five votes of seventeen. The natives of Finnish, on the other hand, clearly preferred adjective-and-separate-nouns construction ("red eater of rats") in two sentences, while the noun-and-noun-phrase variant received a small majority in the last sentence.

	Finns, *n*	non-Finns, *n*	Finns, %	non-Finns, %
5. Julia went to the zoo and saw a red rats eater.				
a) Julia saw an eater of red rats.	14	**69**	39	**72**
b) Julia saw a red eater of rats.	**22**	27	**61**	28
9. Mary found the torn receipts envelope.				
a) Mary found the envelope for torn receipts.	11	44	31	48
b) Mary found the receipts envelope that was torn.	**25**	**47**	**69**	**52**
15. The bookshop owner took his old books bag with him.				
a) The bookshop owner took his old bag for books with him.	15	37	42	44
b) The bookshop owner took his bag for old books with him.	**21**	**59**	**58**	**56**

Table 6. Answers to the *red rats eater* sentences.

4.2.5 The explanations

The instructions for the explanation part of the task paper were purposefully left fairly open to interpretation, and thus it is no surprise that a very wide range of different answers was received. Here, we see the downside of the free rein that was given to participants in response to White's critique on metalinguistic tasks (2004, p. 252). Due to this heterogeneity and flux nature of the explanations, they will not be numerically categorised or tabulated here. Some trends among the language groups will be highlighted, and actual numbers of participants who gave a certain kind of explanation will be used where such groupings are possible.

Among both main groups, several participants ended up giving explanations that essentially just summarised the content of the multiple-choice alternatives they had chosen. A typical example of this type of recursive explanation, in the context of sentence 2, would be "I think this sentence means some Americans, not all Americans". Explanations like this are not, as far as I can surmise, very relevant for research purposes. Other problematic explanation techniques were saying things like "*a* just sounds better for me" (German native), "Don't know how to explain" (Czech native), "Intuition ☺" (Polish native) or even "I have just chosen it by accident" (Polish native), underlining some words from the sentences and simply writing in what appeared to be a translation of the selected interpretation of a sentence. Each of these types of answer was used several times by respondents from different linguistic backgrounds, except the translations, which were only provided by Finnish natives (presumably because they knew I was Finnish and would be able to read the translation). I considered these vague explanations only marginally useful.

In addition, sometimes respondents failed to provide any explanations for some or even any of the sentences. Possible reasons for this include an inability to formulate an explanation in a foreign language, a lack of time or a failure to understand the instructions. Put together, these different 'non-explanation' explanations formed a sizable portion of all explanations given. From the total sample of 134 respondents, as many as 84 respondents (17 of whom were Finns and 67 non-Finns)

gave a 'non-explanation' explanation for at least one of the three relevant ambiguous sentence groups. Of these 84 participants, 20 non-Finns and one Finn provided no meaningful explanation for any of the ambiguous sentence types. Papers in which the explanation part was left completely blank numbered less than a dozen. This means that almost two-thirds of the respondents gave a partially incomplete answer for the explanation task, and more than 15 % gave no meaningful answer at all.

Luckily, many meaningful and detailed explanations were also given. For the trio of sentences with the *patriotic Americans* construction, some trends could be detected among both the Finns and the non-Finns. Several members of the two groups set out to explore the plausibility of content of the sentences, giving explanations like "all Americans are definitely not patriotic" or "in my experience, workers are usually hungry". In particular, Sentence 2 caused this reaction: a total of 42 respondents (11 Finns, 31 non-Finns) reported that not all Americans are patriotic. While this type of approach to the matter draws on out-of-context experience and thus crosses the boundaries of linguistic thinking by a wide margin, it is nonetheless worth mentioning that this particular explanation was by far the most common and consistent one for any of the sentences among the entire sample of 134 participants. It seems that Finnish natives employed the method even more than non-Finns, but the relative difference is so small that it very well could be just coincidental.

The other, contrasting tendency of many Finns was to take a more grammatically-oriented stance and focus on the word *the* in front of the key phrase, saying that this restricted the group concerned to only some Americans/workers/students. This view was shared by some non-Finns, although some of them actually claimed the opposite. As a very general observation, one could say that more detailed explanations were given for the *some* interpretation than for the *all* interpretation, and that internal inconsistencies (i.e. the same person using both of the interpretations in different sentences) were slightly more common in non-Finns' answers.

In the three *cut/put/read* sentences, members of both groups seemed to exercise a kind of logical deduction. According to their reasoning, since the sentences featured neither the future auxiliary *will* nor a generalising plural form for the weekday nouns, they had to be in the past tense (many mentioned only one or the other – natives of Finnish and French were mindful of the plural –*s*, Poles and Germans remarked often that the verb had to be in the past form. A slightly similar line of thinking, also mentioned by several respondents in their explanations, suggested that since neither past or present reference was specifically included in the sentences, they referred to habitual actions. These occurred in both language groups.

However, there were also strategies of explaining the choices that were more common in one of the two main groups. Many Finns said that the past form "just seemed right" to them. They sometimes wrote the verb form down to drive the point home. On the other hand, a considerable number of non-Finns simply said that the present tense meant habitual usage in sentences of this kind, and almost as many said that the sentences expressed "habit" or "routine" – using these exact words. Contrasted with the three *patriotic Americans* sentences, the respondents were noticeably more verbose in explaining the individual methods utilised in interpreting these three sentences. Internal inconsistencies occurred steadily among both groups.

The three sentences with the structure-dependent *red rats eater* construction caused the most confusion and uncertainty among all respondents. Participants engaged in speculating what exactly is a red rats eater, whether one is more likely to encounter red rats or a red eater of rats, and whether red rats do in fact exist. Many also expressed their frustration at the sentences, saying that they did not quite understand them. Especially among the non-Finns, even though the multiple-choice part was very rarely left unanswered, these three sentences prompted the most instances of a total lack of explanations and statements in which the respondent confessed that they could not explain their choice.

Compared to the natives of other languages, a large number of Finns pondered the actual contents of the phrases, wondering in their explanations why someone would put torn receipts in an envelope or have special bag for old books (out of the 36 Finns, a total of nine gave an answer that belonged in this category). These answers thus tended to depend on this assessment of the extra-linguistic plausibility of the two alternative interpretations of each sentence. Some did take a more grammatical approach, however, and discussed the structure of the phrase and the words to which adjective referred to in their explanations, often saying that the adjective modified the noun (this usually prompted the "red eater of rats" interpretation). These sentences also elicited many translations from the Finnish-speaking participants, written on the paper in an effort to justify the answer chosen.

The non-Finns, by contrast, gave more grammatical explanations that focused on how the key phrase was constructed, often referring to word order and the place of the adjective in the phrase. In this, they were similar to the grammatically-oriented participants in the Finnish-speaking group. Many non-Finns also said something akin to "the words belong together", which at least fringes upon grammatical territory as an explanation. Wondering about the plausibility of the different meanings of the phrase was not unknown, though far less frequent than among Finns (only six respondents out of 98 gave an explanation of this kind). As with other sentence types, explanation form and the actual answer did not necessarily correlate with each other: A native of German justified the "eater of red rats" interpretation by opining that "red rats is more interesting", while a Dutch-speaking participant explained her choice of "red eater of rats" by stating that rats are not red. Despite this rather *ad hoc* explanation, though, her answers to all three *red rats eater* type sentences were of the two-separate-nouns variety. Generally, internal inconsistencies among individual participants' answers took place in the language groups in equal amounts.

One can also detect some slight general trends in the explanations given by the French, Polish and German subgroups. They are certainly fleeting enough to pass off as anecdotal, but since

noticeable patterns could be detected, they are included here for the sake of completeness. German natives, though they were not more grammatically-oriented than average in the non-Finn sample, seemed much keener than others on using sophisticated grammatical terminology, saying that the *cut/put/read* sentences were in "past participle" or "past perfect". Natives of French, meanwhile, adhered more strictly to giving general grammatically-oriented explanations than other groups – except for Sentence 2, where nearly everyone wrote something like "not all Americans are necessarily patriotic". Natives of Polish and Finnish, on the other hand, were more willing to simply state that they had followed their intuition or that the interpretation they had chosen "just seemed best" (Polish native).

4.2.6 Internal inconsistencies

To conclude this section, it is worthwhile to briefly review the internal inconsistencies mentioned above. By the term internal inconsistency, I mean an instance where the same individual treats the same ambiguous structure differently on the three occasions that it occurs on the task paper. All in all, it was extremely common for respondents among all language groups to interpret structurally similar sentences in essentially conflicting ways as far as the meaning of the sentence was concerned. The same individual could, for example, interpret Sentence 3 as "last Wednesday", Sentence 10 as "on weekends" and Sentence 13 as "next Sunday morning" (more typically, however, even such an inconsistent respondent would pick two of the same interpretation and one outlier).

A comparison of the occurrence of inconsistencies in the Finn and non-Finn groups is shown in Table 7. The *patriotic Americans* construction prompted 42 respondents (15 Finns and 27 non-Finns) to give internally inconsistent multiple-choice answers, while the *cut/put/read* sentences produced 68 inconsistencies (19 Finns and 49 non-Finns) and the *red rats eater* construction 82 inconsistencies (28 Finns and 54 non-Finns). Thus, the *red rats eater* sentence type proved the most

problematic and the *patriotic Americans* sentence type the most straightforward in this regard. In the entire base sample, only 15 papers were completely free from inconsistencies. Natives of French and Polish were somewhat less prone to inconsistencies than Finnish natives or the rest of the non-Finn sample, but this variation was essentially negligible.

	Finns	non-Finns
The *patriotic Americans* construction	15	27
The *cut/put/read* construction	19	49
The *red rats eater* construction	**28**	**54**

Table 7. Internal inconsistencies divided by sentence type.

4.3 Discussion

The results of the first experiment led me to form a two-part experimental hypothesis for the second experiment: that natives speakers of different languages would interpret the ambiguous sentences differently, and that differences that correlated with native language would also exist in the explanations given by the respondents. From the perspective of this hypothesis, the results of the second experiment can hardly be seen as anything other than somewhat mixed, inconclusive and often even contradictory. Answers to both tasks on the task paper were sometimes markedly different, frequently quite similar, and usually to some extent inconsistent on a number of levels. Nonetheless, they provide not only an apparent counterpoint to the earlier results, but also grounds for discussion on their own right.

4.3.1 The interpretations

Among the nine ambiguous multiple-choice task sentences on the paper, some relative differences between Finns and non-Finns arose in all three sentence groups. These differences were the least prominent with *the patriotic Americans* construction (sentences 2, 8 and 12) and the most prominent with the *red rats eater* construction (sentences 5, 9 and 15). The division in the explanation part was more elusive and far less clear-cut, but similar to the multiple-choice part in

that the most distinguishable differences occurred in the *red rats eater* sentences. These broad lines gleaned from the results can be examined in a number of ways.

First, the lack of similarities in the answers could be seen as boding ill for some of the theories discussed in chapter 3, particularly the Full Access without Transfer hypothesis of some Universal Grammar theorists (White 2004, pp. 88-89). According to this school, the UG is accessed more or less directly even in the process of learning and using a second language. The strong agreement among all participants that the phrase *patriotic Americans* in Sentence 2 only refers to some Americans and the way in which members of all language groups tend to employ similar strategies in their approach to the entire *patriotic Americans* construction are findings that might support such ideas. English grammar leaves the sentences ambiguous, but these similarities could doubtlessly be seen as an example of the "abstract, complex and subtle properties of grammar" mentioned earlier. After all, despite ambiguity of the sentences, the respondents all appear to feel the same way about what Sentence 2 means and how its ilk should be treated. Some unknown, underlying common force could indeed be guiding respondents' thought processes.

Unfortunately for the Full Access without Transfer hypothesis, this appears to be the only piece of evidence in its favour, and it is vastly outweighed by evidence against it. There are at least some differences between Finns and non-Finns in all the other sentences (including Sentences 8 and 12, which sport the same construction) and the explanation strategies. The clear across-the-board existence of these differences, in fact, makes this one of the most solid findings from the second experiment. Even the general agreement concerning Sentence 2 is simple to explain: It was the one that led 42 respondents out of 134 to explicitly comment that all Americans are not patriotic. One could easily argue that the topical and political nature of the sentence caused the participating students to stray from purely linguistic ambiguity resolution.

The differences strongly indicate that on some level, people's grammatical thinking and intuition do depend on their native language. The way in which Finns and non-Finns disagree about the

meaning of *red rats eater* is telling, as is the way in which one group contextualized the sentences, the other focused on their linguistic level. Equally significant was the non-Finns' tendency to interpret the verb in the *cut/put/read* sentences as being habitual, while Finns were more inclined towards reading it in the past tense. The emergence of these differences is more in line with the impairment hypotheses of some UG researchers (White 2004, pp. 102-118). Curiously, the majority of non-Finns parsed the *red rats eater* sentences differently than the English natives in Pinker's (1999, p. 207) sample, while Finns were slightly more inclined to agree with Pinker's respondents. This might indeed be an example of L1 influence on L2 processing.

The emergence of the differences in itself also seems to dovetail reasonably well with connectionist theory. The effects of association and generalisation, particularly the influence created by prior knowledge of a first language, might indeed lead to patterns such as the ones listed above. As stated in section 4.3, no emergentist theorist has apparently proposed that the associations and connections in second language learning take place independently from the associations and connections established by the first language. If such a theory exists, my results cast it in the same dubious light as they cast the Full Access without Transfer school on the UG side.

As an aside, it would be a fitting subject for an entirely different study to examine the kind of L2 input individuals are exposed to while learning English and to see whether this input would credibly lead to results like mine when combined with possible effects of existing L1 connections. Since such a study would require far more in-depth exploration of connectionist theory than is possible to go to here, and perhaps even a functional network model, we must leave these dimensions uncharted for now. However, very brief (nary unscientific) look into the free online *BYU Corpus of American English* compiled by Mark Davies for the Brigham Young University in 2007 suggests that association based on the immediate contexts in which the ambiguous expressions featured in the experiment tend to appear might indeed lead people to the interpretations they gave in the experiment. For example, *I read* tends to occur most often in habitual and past contexts, and *the*

[adjective] students almost always refers to a specific group of students. If one were to properly research this, though, it would be necessary to delve into what kind of language L2 learners and users of English tend to be exposed to. It is even likely that the newspaper texts that the BYU Corpus collects are not such language.

The differences in the multiple-choice results also bring support to the theory of linguistic relativity and certainly do not weaken the credibility of the Sapir-Whorf hypothesis. Based on this evidence, natives of different languages choose different solutions when put in a linguistic dead-end situation where no immediate correct solution is available. The eager student of Whorf's that we briefly encountered in the previous chapter might speculate on whether these tendencies to interpret ambiguities differently signal greater and more holistic differences in thinking.

4.3.2 The explanations

So far, the second experiment has yielded fairly clear results. However, waters become murkier when one turns to the explanation part of the task. Firstly, the large number of the different 'non-explanation' explanations has to be taken into account. Although a great diversity in the answers to the explanation task was to be expected, the relative lack of useful data was not. It appears that although very few participants had problems completing the multiple-choice task, the explanation task proved to be much harder. This is evident in answers that are sometimes uncertain or even frustrated in tone. It is possible that instructions on the task paper were not well-formed enough, or that the explanation task, not a simple feat even using one's native language, proved very challenging to do in English – the participants were, for the most part, just learners of English, albeit advanced ones. The fact that Finnish natives gave proportionally less 'non-explanation' explanations (53 % of Finns turned in papers that had meaningful explanations for all three of the ambiguous sentence types, while only 32 % of non-Finns did the same) might suggest that the chance to write the explanations in L1 made the effort easier.

In addition, the 'dead-end' nature of the task, being asked to choose a meaning for an ambiguous phrase that did not logically have one, possibly rendered the entire task unnatural and uncomfortable for the respondents. Whatever the reasons for the numerous 'non-explanation' explanations, their existence is proof of problems in the research arrangement that I used in the second experiment. Clearly, improvements are needed if the arrangement were to be used in the future.

This is certainly not to say that the explanation part of the task was a dismal failure – 85 % of all participants did return task papers with at least some relevant explanations in them. It is in these explanations, however, that the inconclusive and sometimes contradictory dimensions in the second experiment results become visible. With the exception of the *patriotic Americans* construction discussed above, differences between language groups in the vein of those in the multiple-choice part exist in the explanation part as well, but they are less straightforward and much more open to interpretation.

No such obvious distinction as the division between the semantic and grammatical explanations in the first experiment emerged here. Rather, the vast majority of all explanations (barring responses in which the participants repeated the content of the option they had chosen or just said they had used their intuition) could be described as broadly grammatical in nature. These grammatical explanations were given by both Finns and non-Finns of all language backgrounds. While there were some differences in the exact content of the explanations, such as the Finns' tendency to justify their choice for the *put/cut/read* sentences with lack of plural form in the weekday nouns as opposed to many non-Finns' focus on the verb form instead, these differences are generally too vague to be of statistical significance. In particular, this applies to all data mentioned above concerning the French, German and Polish subgroups.

Perhaps the most pronounced differences can be discerned in the explanations for the *red rats eater* sentences. As mentioned in the previous section, Finns were more inclined to reflect on the

plausibility of the multiple-choice alternatives, whereas non-Finns more often justified their choices with grammatical explanations. This is undoubtedly reminiscent of the grammatical-semantic divide of the first experiment, and the distinction is further brought to the fore by the fact that many respondents were consistent in describing their approaches to all three relevant sentences. Despite these regularities, the explanation part does not yield major evidence for or against the three linguistic theories under consideration, though linguistic relativity receives again some support. As with the multiple-choice part of the experiment, any L1-based differences in L2 processing dovetail well with the positions of linguistic relativity and the Sapir-Whorf hypothesis. If perception of language correlates with L1, L1 could well be seen as shaping though within the context at hand. Conversely, markedly different approaches to analysing one's linguistic processing that correlate with native language come across as naturally contrary to both UG and emergentism. Both are framed as grand and general theories of language applicable to all, and considerable variation in individuals' language perception can thus be seen as against their premises. However, connectionism and most brands of UG assign L1 influence some role in L2 processing. This could account for the variation in perception.

Besides, the trends are not very strong. Less than a third of the Finnish natives gave an explanation of the plausibility-testing variety (nine out of 36, as opposed to seven who gave a grammatical-type explanation), and ultimately less than a fifth of all non-Finns gave a clearly grammatical explanation (17 out of 98, as opposed to five who gave a plausibility-testing explanation). Considering the prevalence of the 'non-explanation' explanations amid the respondents, it must be reiterated that all observations made on the basis of the explanation task rest on what is at best a highly shaky fundament.

4.3.3 Internal inconsistencies

One more inconclusive and rather tantalizing part of the results are the internal inconsistencies made by single individuals in the multiple choices within one or more of the three ambiguous sentence groups. They occurred in nearly 90 % of the task papers handed in. While this abundance of inconsistencies was unexpected and might cast some doubts over the reliability of the results, it also offers important insights to the mental processes of ambiguity resolution. It is notable that even in a situation where the respondent is the same, the structure of the sentences is the same and the explanations given for the choices made are similar, the choices themselves very often are different.

This phenomenon proves a challenge for the three linguistic theories we have considered. At first, the results seem contrary to the theory of Universal Grammar. It hardly appears logical that the deep structure of ambiguous sentences from the same set would somehow be different, regardless of whether the deep structure is accessed through a L1 grammar or independently. UG theorists (Chomsky 1995, pp. 206-207; Crain and Thornton, p. 268) have stated that the surrounding syntactic context affects the resolution of ambiguous expressions. It is not fully plausible that this could explain the inconsistencies. Although the syntax around the key phrase in, for example, the *red rats eater* sentences does vary, it is hard to see the ways in which this would affect the actual parsing of the words. Furthermore, the fact that all language groups contain inconsistent and consistent responses, without any clear patterns emerging, seems to be at odds with this way of explaining the inconsistencies. Even if UG was filtered through the L1 grammar, natives of the same language should produce more similar results.

Universal Grammar offers two more solid ways of explaining the inconsistencies. The first are the impairment hypotheses, particularly Global Impairment (White 2004, p. 102). According to these hypotheses, interlanguage grammars are not constrained by UG and "may demonstrate properties which are not otherwise characteristic of natural language" (p. 101). The inconsistent reactions to the task sentences could thus be attributed to these properties. Alternatively, one could

argue that ambiguous expressions, especially without meaningful syntactic or other context to help in interpreting them, are by definition something that Universal Grammar does not have solutions for. The 'black box' of UG, the mental device of language acquisition and processing, simply is silent when it encounters them. When forced to choose one interpretation for an ambiguous expression, people pick one at random, by association or by an accidental or intentional mis-application of a grammatical rule.

Connectionism, partly because proponents of the theory have not presented detailed hypotheses concerning the ways in which L1 affects L2, does not face major problems. Many of the questions raised by the internal inconsistencies can be answered just by generally pointing to the combined effects of L1- and L2-based associations and generalisations. Inconsistencies within an individual's reaction to certain constructions can be seen as resulting from a connection caused by particular words in the immediate context that tilt the balance to one possible resolution in one instance, to another resolution in another instance. Since the exact nature of the stimuli each person has been subjected to both in L1 and L2 is unknown, providing a counter-argument to this is rather difficult. It seems somewhat surprising that input differences alone could account for the wide range of discrepancies that came up in the experiment. A more critical observer might also argue that the input a language learner is subjected to is hardly variable enough produce this kind of results: If being exposed to the rules and patterns of a language caused a native speaker (or a learner) of that language to pick a particular interpretation of an ambiguity, the similarities in the results should be more numerous and consistent. If, on the other hand, the ambiguities could not be resolved through this generalisation, no similarities of any kind should emerge.

The theory of linguistic relativity fails to provide a viable answer to the inconsistencies, but – since it is not a holistic general theory of language acquisition and processing – this may not be regarded as a flaw in the theory as such. Even so, the support that many of the earlier results seem to grant to linguistic relativity becomes thinner here. This is especially true for the Sapir-Whorf

hypothesis, which has so far remained largely undamaged in the course of the experiments despite its reputation of being largely debunked. Since inconsistencies occur in single individuals' assessment of the ambiguous sentences, it hardly appears that native language directs their performance in such a powerful and all-encompassing way as had previously seemed possible. Our avid student of Whorf's could argue that the resolution of ambiguities just happens to be a field where the L1 hold on L2 is weak or non-existent, but he would have to admit that this approach strongly undermines most of the arguments in favour of the hypothesis that we have encountered.

4.3.4 Reviewing the experiment

What are we to make of the second experiment results as a whole? All in all, it appears that there is enough correlation between respondents' native language and the differences in their multiple-choice answers and explanations to strongly criticise the Full Access without Transfer hypothesis within the theory of Universal Grammar. Beyond this, none of the theories discussed escapes unscathed. While the results are compatible with several brands of UG and connectionism, and seem to actually support linguistic relativity, each of the theories runs into some trouble when confronted with the internal inconsistencies. In fact, the inconsistencies weaken the other results of the experiment to a notable degree.

As with the first experiment, it is easy to point out problems, unexplained phenomena and possible causes for distortions in the results. Although I tried to eliminate some of the distorting elements noted in the first experiment from the second one, the effects of the test-like nature of the experiment may have in fact been more prevalent. The classroom setting, the respondents' student background and the test-like form of the task paper may have affected their thinking, making them rely less on intuition and more on logic. Pinker's statement about students treating everything that looks like a test as a test (1999, p. 94) might not be the full truth, but it is probably not entirely in error. In addition, despite the testing done via the dummy sentences, the language skills of the

respondents were certainly not on the exact same level. This might be the cause of some of the discrepancies.

While the internal inconsistencies have been dealt with above at some length, there is yet awkwardness related to them, other inconsistent findings and the clear difficulties many respondents had in formulating their explanations. The fact that these inconsistencies exist could be seen as a justification for disputing or at least doubting many of the results of the experiment as a whole, since they show that few of the patterns and tendencies in the answers are formed in an entirely logical fashion. There is an unquestionable element of randomness in them. In a restricted multiple-choice task such as my experiment, participants are forced to choose one alternative, which could lead to possible distortions when no intuitively 'correct' answer exists. However, the patterns and correlations discernible from the answers hardly indicate such a level of meaninglessness as this line of thought would suggest.

Finally, the possible emergence of the individual strategies evident in the explanations – most prominently seen in the different linguistic cues used in explaining the *cut/put/read* sentences – should be noted. If individual strategy plays a greater role than the native language in the way a person approaches a linguistic task, all speculation based on the L1 or L2 is rendered more or less moot. In this case, any underlying grammar or automatic generalisation would have much less meaning than previously assumed. Since numerous apparent language correlations and trends could be detected in the course of my experiments, however, these individual strategies do not seem to have a dominant role in ambiguity resolution.

For a brief summary of this chapter, I return to the experimental hypotheses outlined in section 5.1. I originally predicted that, firstly, there would be some differences in the interpretations chosen for the ambiguous sentences that correlated with the respondents' native languages and, secondly, that such differences would also exist in the explanations provided by the respondents. On a general level, both hypotheses were proven true. L1-based patterns were indeed found both in the

interpretations of the ambiguous sentences and the explanations given for them. However, their exact nature and reliability were elusive and extremely open for interpretation in themselves. The clarity of the results obtained in the first experiment was not reached. In the next chapter, the results and conclusions of the two experiments will be compared, contrasted and discussed. In the last chapter, some final conclusions will be drawn and possibilities for future research outlined.

5. General discussion and conclusions

The aim of my study was to find answers to two principal research questions: *do native speakers of different languages analyse differently their processing of ambiguous expressions?* and *do native speakers of different languages interpret ambiguous expressions differently in a limited-context environment?* The answers that I came up with, as discussed in detail on the preceding pages, are essentially ambiguous in themselves. Differences both in interpretation of ambiguities and explanations for these interpretations could be discerned, but their nature is far from being undisputed. One reliable result seems to be that the first language does have a role in how the mind perceives the unsaid content, underlying structures and ambiguities of a second language. This role is open to interpretation in itself, however, and in some instances, native speakers of completely different languages interpret the said structures in a surprisingly similar manner.

The results of the first experiment showed fairly clearly that in an ambiguous translation situation, when a meaningful choice between translation equivalents exists, natives of Finnish and English converge on the same multiple-choice translation alternative (the 'correct' one), but justify this choice in markedly different ways: English natives say their thought process was directed by semantic cues, whereas many Finns say their translation was guided by grammatical cues. Despite the small sample size of the experiment, these distinctions were relatively strong.

The clarity of the first experiment was muddled by the second experiment. When asked to interpret structural ambiguities in English in an artificial situation where the limited context was rendered unhelpful, the answers given by natives of Finnish and other languages diverged considerably. Some patterns, but few thoroughly consistent ones, could be detected among the multiple-choice answers of the participating language groups. In the explanation part, varying grammatical explanations were – with the exception of one sentence type, the *patriotic Americans*

construction – by far the most prevalent ones, although Finnish natives favoured semantic-type explanations more than others with the *red rats eater* construction.

Thus, there are some similarities but many differences and even contradictions among the results of the two experiments. It seems that while even a small but relevant context allows natives of different languages to reach converging results, a lack of such context leads them to answers that diverge, correlating at least partly with the native language. In the explanations, some trends that correlate with L1 could also be detected in both experiments, but inconsistencies of various kinds were manifold. Notably, Finns chose a mix of semantic and grammatical explanations on both occasions (although the grammatical ones were more common in the second experiment), whereas English natives opted for solely semantic explanations in the first experiment and natives of most other languages involved almost solely grammatical explanations in the second experiment. Differences in the backgrounds of the respondents (participants of the first experiment were language students and older language professionals, those of the second experiment were students of various disciplines) might play an important part in this, however.

The experiments show that neither grammatical nor semantic explanations are uniform. Within each explanation type, the exact ways in which the explanations are formulated vary hugely. For example, the grammatical cues that people respond to seem to be dissimilar, and sometimes the phrasing of explanations differs so much that it is hard to determine whether they are referring to the same phenomenon. This is best demonstrated by the puzzle of the conflicting semantic explanations given by the English natives in the first experiment and the plethora of reasons given for choosing an answer for the *put/cut/read* sentences in the second experiment. Evidently, even if L1 dictates the resolution of L2 ambiguities, individual strategies and perceptions have a part to play as well.

In chapters 4 and 5, I have examined these results through the theories of Universal Grammar, connectionism and linguistic relativity, the latter of which was represented mostly by its rather

extreme incarnation, the Sapir-Whorf hypothesis. None of the theories could explain the results in an incontestable manner, and ultimately, the credibility of none of them became greatly weaker or stronger in the course of the experiments. The Sapir-Whorf hypothesis, in itself on many levels a more modest theoretical construction than either UG or connectionism, fared surprisingly well in the light of my results. It was only let down in the end by the ubiquitous internal inconsistencies, which a Whorfian perspective to the role of L1-influenced perception in L2 processing could not adequately explain. The lack of earlier studies connecting linguistic relativity to second language acquisition render a detailed examination of L2 ambiguity resolution from the perspective of linguistic relativity rather hard at present.

The two larger-scale theoretical constructions can accommodate my results with relative ease. The slight vagueness of connectionism, a hitherto less thoroughly developed and refined theory, perhaps means that it is at a more favourable position in relation to some of the more contrary pieces of evidence discussed. Since the field of connectionist SLA research is open and the exact effects of L1 on L2 remain in the dark, little direct evidence *per se* can be amassed against connectionism from my results. Even so, one might question if phenomena such as the near-unanimous agreement on translation equivalents in the first experiment can be explained simply by the existence of connections that everyone involved has by happenstance been exposed to.

Other, more serious problems with connectionist theory turn up in the explanation part of the experiments. The existence of the semantic-grammatical division in itself and the obvious distress that many respondents clearly felt while trying to explain their choices in the second experiment do not seem to coincide well with connectionism. If our language faculty is built around a series of endless associations, why would we strain ourselves to create such elaborate explanations for this simple process? Why would these explanations come to us fairly easily in one context and more awkwardly in another? In this field, connectionism falls decidedly short of its purported abilities to provide an "ultimate description of language" (Christiansen & Chater 2001b, p. 62).

Within the framework of Universal Grammar, one of the most convincing and consistent findings of my study is that the Full Access without Transfer hypothesis, also known as the direct access hypothesis (White 2004, p. 16), seems groundless. Both of the experiments show some correlation between L2 processing mechanisms and L1, which flatly contradicts the premise of the hypothesis. Otherwise, UG is no less compatible with my results than connectionism. The profusion of internal inconsistencies is fundamentally at odds with the rule-based logic of the theory, but, as stated in the previous chapter, one can avoid this pitfall by arguing either that L2 grammar is unconstrained by UG or that the rules of UG do not apply to context-less structural ambiguities, since they lack the syntactic factors necessary for successful resolution of an ambiguity. This latter idea, while somewhat *ad hoc* in nature, is supported by the fact that in the first experiment, where meaningful context was provided, participants neatly gravitated towards the same multiple-choice alternatives.

If we choose to favour the explanation that L2 grammar is unconstrained by UG, we plant ourselves in the camp of the Global (and, to some extent, Partial) Impairment hypothesis (pp. 101-102). White, however, strongly criticises the methodology used by proponents of this school, and questions earlier results that have led to establishing the impairment hypotheses (pp. 113-114). Indeed, this line of thought would be against the vogue of current thought in UG. If, on the other hand, we favour the idea that context-less structural ambiguities in particular are unconstrained by UG, we might end up near the position of Schwartz and Sprouse's Full Access Full Transfer hypothesis, an offshoot of earlier ideas known as the indirect or partial access hypothesis (p. 16), which White herself views the most positively (pp. 239, 268-269). This hypothesis combines UG-constrained interlanguage grammars with a powerful initial state presence of the first language grammar (p. 61). While the interlanguage grammar has access to UG, the L1 grammar as a whole is also involved (p. 67). Thus, in my results, the influence of the native language would explain the tendency to favour *eater of red rats* instead of *red eater of rats* or vice versa, while a common

grammatical deep structure could be the force behind the respondents' uniform *all Americans* interpretation of the *patriotic Americans* construction.

These analyses remain somewhat tentative, however, and my results – unsurprisingly – fail to convey any definitive evidence on the debate between Universal Grammar and connectionism. In a similar vein, while my final results do not seem favourable toward the Sapir-Whorf hypothesis, there is little to prove or disprove the key positions of the theory of linguistic relativity. Even though no major conclusions regarding the theories could be drawn, the trio of theories ultimately filled fairly well their function as an instrument of observing and discussing the results, despite the lack of connections between the theories and the experimental arrangement I employed.

For one final time, I return to my original research questions: *do native speakers of different languages analyse differently their processing of ambiguous expressions?* and *do native speakers of different languages interpret ambiguous expressions differently in a limited-context environment?* To the first question, the answer has to be *maybe* or an extremely cautious *yes*. It seems that there are differences that correlate with native language in the analyses, but as far as these results suggest, they are elusive, mixing with individual strategies and random elements.

The answer to the second question depends on the nature of the limited context. If the context has meaningful cues, as in the first experiment and the *patriotic Americans* construction in the second experiment, the answer seems to be *no*. If no sufficient cues can be gleaned from the context, as with the second experiment, the answer is a slightly cautious *yes*. Even though the results featured some problematic elements, the marked differences in the multiple-choice answers in the second experiment between Finns and non-Finns indicate that a connection with L1 exists.

6. Assessment of the experimental procedure and future possibilities

I set out to study native language effect in ambiguity resolution by using two experimental arrangements. The first of these was an adaptation of a translation research procedure devised for use in corpus linguistics, the other more an invention of my own that focused on structurally ambiguous sentences without a translation component. Both were executed as pencil-and-paper truth value judgment tasks with an added self-analysis portion.

The first experiment was, background differences of participants notwithstanding, largely a success. Both parts of the task filled their function, and relevant results were achieved. In the form utilised here, the arrangement is always bound to two specific languages, the target and the source. This limits the scope of research the procedure can be easily applied to, since finding sizable samples of people skilled enough in both languages might prove difficult. Other than this, my adapted version of Sinclair et al.'s procedure fulfilled its purpose and is well recommended for future use in studies on the mental processes employed in translation.

The second experiment did not yield such clear success. Although the vast majority of respondents completed the multiple-choice part without difficulty and many relevant answers were received for the explanation part, the frustration and confusion apparent in the explanations, the sheer number of 'non-explanations' and the high levels of inconsistencies signal that the procedure did not function as well as one could have hoped. Using structural ambiguities presented without an authentic context ultimately proved an adequate tool in measuring the mental processes of ambiguity resolution, but the experimental arrangement obviously has plenty of room for improvement. It is imperative to try to eliminate elements of randomness, which now dominated large portions of the experiment.

One worthwhile direction for future research would be to apply the corpus-based approach of the first experiment to the basic outline of the second one. Picking ambiguous expressions structurally

similar to the ones I used in second experiment from corpora and placing them within a 10-word context might result in at least two distinct multiple-choice answer patterns: a convergence to certain choices as in the first experiment, or a slightly confused divergence as in the second experiment. These results, regardless of the exact form they took, would be valuable in further defining the role of context in ambiguity resolution.

In addition, one could take the existing framework of the second experiment and conduct the same experiment on students who speak English as their native language. Complementing my study with this kind of a native control group would be useful in assessing the effectiveness of Universal Grammar and connectionism in explaining my results. The contrast between mine and Pinker's (1999, p. 207) results for the *red rats eater* sentences suggests that interesting differences might be found. Unfortunately, no such group of English natives could be gathered in the University of Tampere when I was collecting data for the second experiment. Other possible research opportunities might include a detailed comparison of how lexical and structural ambiguities are interpreted and a more neurolinguistically oriented procedure where the exact eye and brain activity in ambiguity resolution was monitored. Of course, it goes without saying that any research regarding L2 and either connectionism or linguistic relativity would fill a conspicuous void.

The range of possibilities is great. Despite their flaws, my experiments have made it clear – if any further clarification was needed – that both ambiguity resolution and using the extremely limited field of a particular language phenomenon to test grand psycholinguistic theories are wide and fruitful territories. This study has scratched their surfaces, future ones can hopefully dig deeper.

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Appendices

Appendix 1: 50 random but *entries from the combination of MCA & MCB*

BUT: 50 entries (sort: 5L, 5L)

N   **Concordances**

1. d she wanted a job 'like a hole in the head". *But* she agreed to consider opposing Nebiolo
2. ague, five points adrift of the leaders, Napoli, *but* Toshack draws little comfort from that. 'T
3. mala is tourists' tonic _ All Blacks lose Kirwan *but* find an able successor   by STEVE
4. prominence as his collection has expanded –*but* also because his collection is almost una
5. pro-am tournament because of a heavy cold, *but* her first-round opponent, Malin Landehag
6. hich the All Black screw is traditionally turned *but*, when they looked at their lowest, Cardiff
7. okmakers benefiting, will doubtless continue, *but* all-weather racing is a necessary extensi
8. yder Cup partners burnt up the Burma Road *but* at the end it was Faldo who had the over
9. imal works, his Carl Andres or Donald Judds, *but* those are works that are still climbing in v
10. Committee disperses among the federations. *But* there is more prestige than power attach
11. All this could be confusing for a new captain, *but* Gregory's view of the significance of the t
12. n's nerve didn't exactly desert him on the day, *but* he was panicking because he felt weak.
13. iscomfited and discomforted. Their noble *but* ill-fated attempts to move the ball becam
14. , have not done particularly well this season; *but* Cardiff, the club, habitually rise to such gr
15. oal from Todd Bidner ensured a 9-7 win. *But* it is the Devils who are making the bigge
16. It had one for last June's European elections, *but* few prominent Greens have any clear ide
17. three metres per second for most of the day, *but* it dropped to minus one for my jump. If it
18. unexpected garland to Neil Kinnock's design. *But* even without that gift from the political go
19. of his job at Stoke had to be hammered out, *but* he expects to be working closely with Mill
20. 's morning kick-offs helped fill out the paper. *But* to get the product in the shops _ and in th
21. elhi Belly" of the tour, hence the loss of fluid, *but* otherwise all is well in that traditionally del
22. st about every imaginable facet of the game. *But* this year the San Francisco Giants may
23. mous black flag in the Portuguese Grand Prix *but* Ferrari have decided not to proceed for th
24. e said, and get money that was interest-free, *but* money was taken from their income supp
25. der-15 national knock-out tournament exists, *but* what would be the scenario when a scho
26. t Tongans have never heard of rugby league, *but* the game perfectly suits our physique and
27. al Madrid ....0 THERE was no 5-0 this time, *but* Real's return to the San Siro was another
28. an version of Gerrie Coetzee, was impassive, *but* he too appeared uncomfortable. Ego
29. himself with sleight of hand. He became lively *but* it didn't last, the eyelids soon coming dow
30. deration of University Sports since 1961. *But* the most prestigious has been the presid
31. g the game to drag on towards a turgid draw, *but* as both players came into time-trouble, Y
32. ed full-back, as one excuse for their collapse, *but* while Paul Mansell's inability to cope with
33. intment 'probably a mistake was made". *But* he was clearly of the view that the latest
34. I had no track record in ugby union coaching *but* union people are coming to realise what t
35. ing how their scout would recognise his man, *but* were represented, with Widnes, St Helen
36. ick himself and struck the ball firmly enough, *but* it was placed too close to the goalkeeper
37. atchi selling works that has upset the dealers, *but* the manner in which he has done so. It is
38. ks in 13 days' time. The two offered to resign *but* they will remain in their posts at east until
39. assured. The manager was taken aback, *but* recovered his composure to remind us th
40. amish French and the full-back Alex Clelland, *but* he does not see the tie being beyond his
41. 984 to find their beloved Colts in Indianapolis, *but* San Jose and Sacramento are preparing
42. Foreman sees this as a huge opportunity *but* as he is coming up to 42 it would be unde
43. n to him or to disclose their further contents. *But* he added that government departments h
44. hat it is difficult to make an accurate forecast. *But*, with the players we have, I can field a te
45. ach's utterances tend to be cryptically brief _ *but* the opening games of the tour, even befo
46. s believe the holes are too small in any case, *but* McNulty had a point. The 16th had shrun
47. rivals, the Pimenov twins of the Soviet Union. *But* Redgrave came second to their compatri
48. dlebars that Lemond used were ruled illegal _ *but* too late to change the result. Next year si
49. that his sport would adhere to that agreement *but* ASOIF will open negotiations to increase i
50. y day, I think Boston would not only have won *but* broken the world record as well." As i

Appendix 2: first 50 entries from the not-but *concordance*

BUT: 79 entries (sort: 5L, 5L)

N	Concordance
1.	ss regular (see Chapter 7). This need not matter *but* the following advice is aimed at those for who
2.	ambe and featuring a heroine called not Blanche *but* Bleach –which the actress and her allies perfo
3.	d be nice to have a man around, not permanently *but* for occasional companionship, theatre and fil
4.	ambe and featuring a heroine called not Blanche *but* Bleach –which the actress and her allies perfo
5.	ring the night and after lunch are not unexpected; *but* why are errors so frequent in the evening? I
6.	et-whatsit. I can do all those things. Not shooting, *but* any fool could learn that. Hey, Seb!" She lean
7.	of Conservatism as an ideology is not surprising, *but* a prominent British Marxist scholar has conce
8.	rity in Hungary and Poland represents not reform *but* treason, a betrayal that threatens to undermin
9.	s were made available, they were not dissipated, *but* concentrated in special units. The relevant nu
10.	damsel in distress" has been rescued by not one *but* two white knights. Richard Luce, the Minister
11.	int of view:'Similarly, time by itself does not exist; *but* from things themselves there results a sense
12.	back Macao to China. Peking was not interested, *but* in 1979 Lisbon formally renounced soverignt
13.	The judge of Locke's civil society is not absolute, *but* answerable to 'the will and determination of t
14.	criticism and self-criticism _ openly, not bleating, *but* by being hard and patient." After protests
15.	s variation: a difference which is not 'indifferent", *but* in which something is at stake; and a different
16.	nty", of First Division embarrassment if not failure *but* Rangers survived the early onslaught and, be
17.	tries that environmental issues are not conflicting *but* compatible with their compelling needs. The
18.	e attributed to factors which are not physiological, *but* psychological. For psychologists would rate
19.	hanging traditional farming practices is not easy, *but* it can be done, especially if the new measure
20.	lanation of what makes us alert is not known, *but* it is certain to be some function of brain active
21.	mopolitan. My own word for it is not cosmopolitan *but* colonial _ the very thing the Preview gro
22.	ance. The prospects for creditors were not good, *but* at least by the end of the classical period they
23.	of prostitutes. The reasons for this are not clear, *but* at the present time two diseases in particular,
24.	ly lucid, and that his judgment was not impulsive, *but* rather a carefully thought through and well-co
25.	est manager, said: 'His contract was not expiring *but* he deserved a rise for the contribution he has
26.	relief about Hitler's survival was not unanimous, *but* that 'part of the population would have welco
27.	anical affair of matter in motion did not originate, *but* rather was painted afresh, in the seventeenth
28.	m whether the transsexual is operated on or not, *but* is seen here in greater relief if he is not. The possi
29.	r. [two lines illegible] It was not intellectual; *but* I felt the living verve of the poet == who has f
30.	iece Las Meninas. Las Meninas has not travelled, *but* it is here that you find Velazquez's last and gr
31.	ould have attenuated latent inhibition is not clear, *but* evidently the presence of S2 can have this eff
32.	d of the value of liberty really cherished not liberty *but* something else. Justice, equality, some list of
33.	and then remained motionless; we did not speak *but* just stood and stared. I am certain that we re
34.	rion of musical phenomena was not mathematics *but* the ear. Long before the time of Aristoxe
35.	iple that is true of all life? Obviously I do not know *but,* if I had to bet, I would put my money on one f
36.	show that this state of affairs was not inevitable, *but* the product of a specific historical developme
37.	munities. The method of spread is not clear, *but* may be related to the more traumatic effects
38.	. Thus, the standard of selfcontrol is not constant *but* may vary, according to Camplin , with th
39.	nt within which party conflict was not superseded *but* rather contained _ in short, a power-sharing g
40.	xtra-testamentary. Perhaps this was not evolution *but* revolution. 6. POST-CLASSICAL DEVE
41.	cept of natural philosophy were, then, not private *but* public developments. So much is this the cas
42.	ges arise because our planet's axis is not vertical *but* tilted slightly. As a result, as the Earth goes a
43.	n't know whether she can play with sense or not; *but* she goes through her exercises admirably.
44.	to do lawfully what a private person might not do, *but* the question whether their acts are justified b
45.	icates that a rhythmic environment is not needed, *but* a possible effect from the rhythmic social and
46.	e night out of doors. Many said they had not slept *but* had spent the night moving around to keep w
47.	scovered. As the analyst said, it is not discovered *but* made. Ronald Fraser was not trying to d
48.	recently, rubbing shoulders with royalty, not once *but* twice within a week. First the Princess of Wal
49.	nutus). This stark contrast is not invention, *but* it is none the less unhistorical. It is worth seei
50.	s of sailors and stevedores, this was not unnatural, *but* he soon gave up the work. It was typical of hi

Appendix 3: The Finnish-language task paper used in the first experiment, with 'correct' answers added

Käännetäänkö sana *but* seuraavissa tekstiotteissa mielestäsi *mutta* vai *vaan*? Miksi? Mieti!

1. liberty really cherished not liberty but something else. Justice, equality, some
    vaan

2. with, Nutty could not imagine, but that wasn't her department.
    mutta

3. Peking was not interested, but in 1979 Lisbon formally renounced
    mutta

4. his judgment was not impulsive, but rather a carefully thought through
    vaan

5. feel alert is not known, but it is certain to be
    mutta

6. said they had not slept but had spent the night moving
    vaan

7. then not 980, not 1020, but exactly the 1000 calories should
    vaan

8. The cancer was not eliminated, but its growth ceased, and
    mutta

9. this was not unnatural, but he soon gave up the
    mutta

10. universe takes place not once, but over and over again
    vaan

Appendix 4: *The English-language task paper used in the first experiment, again with 'correct' answers added*

Would you translate the word *but* into Finnish as *mutta* or *vaan* in the following text samples? Which is it? Why?

1.   liberty really cherished not liberty but something else. Justice, equality, some
           vaan

2.   with, Nutty could not imagine, but that wasn't her department.
           mutta

3.   Peking was not interested, but in 1979 Lisbon formally renounced
           mutta

4.   his judgment was not impulsive, but rather a carefully thought through
           vaan

5.   feel alert is not known, but it is certain to be
           mutta

6.   said they had not slept but had spent the night moving
           vaan

7.   then not 980, not 1020, but exactly the 1000 calories should
           vaan

8.   The cancer was not eliminated, but its growth ceased, and
           mutta

9.   this was not unnatural, but he soon gave up the
           mutta

10.   universe takes place not once, but over and over again
           vaan

Appendix 5: *The task paper used in the second experiment, with correct answers to distraction questions added later*

Your native language: _____

What do these sentences mean? Please mark the answer that seems correct to you with a circle (just one for each sentence).

Do this as fast as you can! After you are done, explain each of your choices on the paper in a couple of words.

1. It is unlikely that they will do it.

    a) They will probably not do it.   *correct*
    b) They will not do it.

2. The patriotic Americans are proud of their country.

    a) All Americans are proud of their country.
    b) Some Americans are proud of their country.

3. On Wednesday I cut the grass.

    a) Last Wednesday I cut the grass
    b) Next Wednesday I will cut the grass.
    c) I usually cut the grass on Wednesdays.

4. We should leave straight away.

    a) We should leave later.
    b) We should leave right now.   *correct*

5. Julia went to the zoo and saw a red rats eater.

    a) Julia saw an eater of red rats.
    b) Julia saw a red eater of rats.

6. Either way it sounds like a bad solution.

    a) It definitely sounds like a bad solution.   *correct*
    b) It does not sound like a very bad solution.

7. John must have missed his train.

    a) John will miss his train.
    b) John has already missed his train.   *correct*
    c) John is missing his train right now, at this moment.

8. The nervous students kept looking at the clock.

    a) Some students kept looking at the clock.
    b) All students kept looking at the clock.

9. Mary found the torn receipts envelope.

    a)   Mary found the envelope for torn receipts.
    b)   Mary found the receipts envelope that was torn.

10. I put some effort to doing my homework on Saturday and Sunday.

    a)   I put some effort to doing my homework last weekend.
    b)   I put some effort to doing my homework on weekends.
    c)   I will put some effort to doing my homework next weekend.

11. We should leave this instant.

    a)   We should leave right now.   *correct*
    b)   We should leave later.

12. The hungry workers decided to eat some lunch.

    a)   Some workers decided to eat some lunch.
    b) All workers decided to eat some lunch.

13. I read the paper on Sunday morning.

    a)   I usually read the paper on Sunday morning.
    b)   Last Sunday morning I read the paper.
    c)   Next Sunday morning I will read the paper.

14. Michael should have written by now.

    a)   Michael has written already.
    b)   Michael has not written yet.   *correct*

15. The bookshop owner took his old books bag with him.

    a)   The bookshop owner took his old bag for books with him.
    b)   The bookshop owner took his bag for old books with him.

16. It is a given that they will do it.

    a)   They might do it.
    b)   They will definitely do it.   *correct*

Remember to write the explanations.

Thank you for taking part in this task!