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Structural Iconicity and Possessive Constructions: Explorations in Artificial Language Learning

Strukturní ikonicita a posesivní konstrukce: Výzkum v osvojování umělého jazyka

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Prohlášení:

Prohlašuji, že jsem tuto diplomovou práci vypracoval samostatně a výhradně s použitím citovaných pramenů, literatury a dalších odborných zdrojů.

V Praze, dne 11. sprna 2014

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Jméno a příjmení

Klíčová slova (česky)

posesivita – nezcizitelnost – adnominální posese – strukturní ikonicita – osvojování umělého jazyka – jazyková typologie

Klíčová slova (anglicky):

possession – inalienability – adnominal possession – structural iconicity – artificial language learning – linguistic typology

Abstrakt

Předkládaná práce se zabývala projevy strukturní ikonicity v posesivní klasifikaci. Hypotéza o ikonicitě vzdálenosti předpokládá, že lingvistická vzdálenost mezi posesorem a posesem odráží konceptuální vzdálenost, a je tak menší u nezcizitelného vlastnictví. Role ikonicity vzdálenosti ve zpracování jazyka byla otestována s využitím experimentální metody osvojování umělého jazyka. Navržený experiment sledoval, zda se čeští mluvčí dokážou lépe naučit gramatiku strukturovanou ikonicky. Experiment provedený se 40 účastníky sice neukázal statisticky významné rozdíly ve výkonnosti obou skupin, ovšem výsledky jsou nejednoznačné a získaná data naznačují, že strukturní ikonicita by mohla mít vliv na zpracování jazyka. Výsledky experimentu zároveň naznačují, že mluvčí češtiny dokáží používat zcizitelnost jako jazykovou kategorii.

Abstract

This thesis is concerned with structural iconicity and its effects on possessive classification. The Iconicity-of-distance hypothesis argues that the linguistic distance between a possessor and a possessum reflects the conceptual distance, and is therefore smaller in inalienable possession. The role of distance iconicity in language processing was tested using the artificial language learning paradigm. An experiment was designed to investigate whether speakers of Czech will learn an iconically structured grammar better. The experiment conducted with 40 participants did not show significant differences between the two experimental groups. However, the evidence is inconlusive and the data suggest that structural iconicity could influence processing. The results also suggest that speaker of Czech are able to use alienability as a category of language.

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List of abbreviations

A – adjective

AL – artificial language

ALL – artificial language learning

GDP – gross domestic product

N – noun

NP – noun phrase

PM – possessum

PP – prepositional phrase

PR – possessor

1 Introduction

There has been an ongoing debate in linguistics about the nature of language and its relation to the outside world. Is language completely arbitrary and independent of human environment? Are utterances of languages created by language users and passed on to descending generations with no direct link to real world entities that are communicated? Or does reality shape language? Do speakers as organisms interacting with their environment somehow reflect the structure of reality in the way they talk about it, and mimic it?

There have been different views in the linguistic community in this respect. Some authors have stressed that language is an arbitrary system created and transmitted by speakers on completely conventional grounds. Other linguists, whom I will call iconicists in this text, believe that language is to varying extents directly shaped by our perception of the world. They claim that the structure of language is motivated by language-external factors to a much greater degree than has been commonly maintained in general linguistics. The iconicists argue that the bulk of grammar is essentially driven by iconicity, i.e., in rough terms, the similarity between the structure of language and the structure of reality. On the other hand, there are differing views even within this general line of thinking. The exact nature of iconicity is not entirely clear from the literature. Some authors use iconicity as a category in descriptive analyses, while others argue that the perception of similarity shapes language structure directly and plays an important role in processing. Drawing on this argument, linguistic typology employs iconicity as an important explanatory mechanism in accounting for cross-linguistically frequent patterns.

One of the main issues of the iconicist approach is in my opinion the fact that typological data do not provide direct evidence that the patterns are motivated and to be explained by iconicity. It is impossible to say whether the patterns derive directly from the workings of iconicity in processing or if the linguists see iconicity because they want to find it in the data. To resolve this problem it is necessary to complement conventional analyses of natural language data with experimental research. A growing body of experimental evidence suggests that motivated sounds facilitates processing, no such researches has addressed grammatical iconicity. It is my aim to open this topic in this thesis. I have designed a behavioral experiment that tests the possibility that iconicity plays a role in language processing and that grammar based on iconicity is prefered over counter-iconic structures. This way, I would like to relate my experi-

ment to a proposal raised by J. Haiman in one of the pioneering studies of structural iconicity. The proposal was made in relation to one of the first experiments conducted in the field of sound iconicity: “The empirical validity of the isomorphism and motivation hypotheses is attested by established natural languages, and may even be confirmable by experiments similar to Wolfgang Kohler’s famous takete and maluma” (Haiman 1985a).

I discuss the historical and theoretical background of the study of iconicity in language in chapter 2, showing that the notion is both very complex, and controversial. I proceed to the instances of iconicity in sound patterns, and in grammar described in the literature. All the important notions and phenomena covered by the study of linguistic iconicity are discussed. I then review the Iconicity-of-distance hypothesis that was tested in the experiment. Chapter 2 concludes with a discussion of challenging views. Haspelmath’s frequency-driven model is discussed as an alternative to the Iconicity-of-distance hypothesis, and accounts of diachronic development in both models are described.

In chapter 3, I discuss the differential marking of possession as a phenomenon treated by the Iconicity-of-distance hypothesis. Possessive classification, and obligatory possession as instances of alienability splits are discussed from a typological perspective. I also address the question of semantic vs. structural motivation for the rise of alienability splits, and generally accepted scenarios for the emergence of differential possession marking are discussed. The second part of the chapter is concerned with the expression of possession in Czech. The focus is on external possessive constructions and possible role of alienability in the distribution of this construction in Czech.

The Artificial Language Learning paradigm is introduced in chapter 4. Theoretical and methodological background of the method is discussed. I review possible applications of the paradigm in linguistic typology where it can complement quantitative data from natural languages.

The experiment is described in chapter 5. I have designed an artificial language learning experiment to test the Iconicity-of-distance hypothesis and the role of iconicity in the processing of differential possession marking. The topics addressed in the previous chapters are brought together in form of a hypothesis about iconicity of distance and alienability splits. The design of the experiment is described. In the remainder of the chapter, I present the results of the experiment.

2. Iconicity in language

2.1 Iconicity in language: a brief historical overview

Like many other great challenges for human thinking the debate over the nature of the connection between sounds and meanings can be traced back to antiquity. May it be that sounds and words of languages are somehow naturally paired with the corresponding concepts based on their qualities? One of the first authors to discuss the matter is Plato in his dialogue Cratylus, in which the nature of 'word-thing pairings' is treated, summarizing the views of Ancient Greece. Is language *physei* or *thesei*, is it given by nature or by convention? The former position claims that a specific sound pattern is by its nature suitable for a real-world concept it labels. The latter sees words as conventional units of language created by speakers and transmitted through generations. The former is called the Platonic or substantialist paradigm in Simone, while the latter the Aristotelian or conventionalist paradigm. Throughout the history of thinking about language the Aristotelian paradigm was the one more prominent. However, that is not to say that there were no opposite views. Modist grammarians in the middle ages and later Leibniz and Vico are quoted as proponents of challenging views (Simone 1995a; Gensini 1995; De Cuypere 2008).

The conventionalist position was further strengthened with the emergence of linguistics as a science in the 19th century. The founding figure of modern linguistics, Ferdinand de Saussure introduced in his theoretical considerations the concept of *l'arbitraire du signe*. He claimed that arbitrariness is the "primordial principle" of the linguistic sign (Ahlner and Zlatev 2010, 303). Any natural connections between acoustic images and concepts are excluded. This view is supported by the fact that speakers of different languages label a particular concept with different sound-patterns, which in turn are based on tradition, being creations of the respective language communities.[1] Although Saussure acknowledged the existence of onomatopoeia as exceptions from the arbitrariness principle, these were said to be peripheral, few in number and "never organic elements of the linguistic system." (Ahlner and Zlatev 2010, 304). As Ahlner & Zlatev (2010) note, it is important to keep in mind that the historical context was of great importance for the arbitrariness postulate's rise in prominence. The prevailing comparativist view rejected onomatopoeia as inorganic, inert and uninteresting for the comparative

1 Ahlner and Zlatev are correct to note that none of the arguments in favor of arbitrariness given by Saussure necessarily imply it.

linguistics' enterprise. It was also generally accepted that "[there is no] essential connection between idea [...] and word in any language upon earth" (Whitney 1867). Perhaps the most important factor was the highly biased sample used in linguistics at the time. The research was focused on Indo-European languages and among these Latin, Greek or Sanskrit, i.e. highly complex, inflecting languages with highly developed literary tradition, were seen as culminating points of language development. Having said this, it should be noted that the arbitrariness position was not formulated as an unchangeable truth or a dogma. Saussure used it as a (highly plausible) working hypothesis underlying his linguistic theory. One more concept deserves to be mentioned here. Although arbitrariness is the primary principle governing the linguistic system, not all signs and especially sign combinations (syntagms) are necessarily completely arbitrary upon the structuralist view. That is where Saussure's term *la motivation relative* comes to play. Relative motivation is best illustrated by Saussure's example: the French cardinal number *vingt* 'twenty' is non-motivated, while the expression *dix-neuf* 'nineteen' is relatively motivated. *Dix-neuf* is said to bring about associations with the component parts and other related terms which enables the speakers to arrive at the meaning of the word. Relative motivation is thus system internal and has much in common with concepts like transparency vs. opacity, compositionality, and analyzability.

The arbitrariness principle has remained at the heart of 'mainstream' linguistic analysis for most of the 20th century. It was accepted and maintained by structuralism and, subsequently, by the generative theory.[2] Jakobson (1966) article "*The quest for the essence of language*" marks the emergence of an opposing view that challenges the Saussurean dictum. Jakobson reviews the Peircean sign typology and names Jaspersen, Bloomfield, Benveniste and Bolinger as linguists who relativized Saussure's arbitrariness. Jakobson then focuses on iconicity as a nonarbitrary relation and aims to demonstrate that it exists cross-linguistically at various points of the linguistic system to an extent much greater than had been previously maintained. Jakobson's examples are drawn from Indo-European languages and are argued to be instances of what might be labeled ordering and quantity iconicity (cf. section 2.3). He likewise argues that words that are close together semantically or conceptually tend to have (or rather acquire) similar phonological shapes (e.g. phonesthemes or the quasi-phonesthetic groups like *mother* - *father* - *brother*). The *Quest* article set the agenda for the iconicity oriented linguistic research to come.

2 But see Newmeyer who argues that iconicity is one of the foundational principles in the generative enterprise, albeit not very convincingly.

As the knowledge of world languages and the wide variety of their structures grew and new branches of linguistics emerged these isolated voices found their audience especially in the typological community. The works by Haiman and Givón introduced iconicity as an important principle in accounting for typological patterns (see section 2.4). Iconicity continues to be used in functional typological and cognitively oriented research. The topic has been drawing attention of an increasing number of authors since the 1980s and a growing body of research has been conducted on a range of topics with direct relevance to linguistic iconicity. In the late 1990s scholars concerned with iconicity and non-arbitrariness in language were brought together by the annual symposia *Iconicity in Language and Literature* organized by O. Fischer, C. Ljungberg, and M. Nänny and its namesake edition published by John Benjamins.[3]

We have seen that the debate about the nature of language has a rich history and remains far from resolved. Much research into the interplay arbitrariness and non-arbitrary motivations is still needed to show the extent to which the environment shapes language structure. Before I proceed to the discussion of different instances of iconicity in language, I will first discuss the concept of iconicity and related phenomena, a field which is, indeed, itself a non-trivial one.

2.2 Iconicity: sign theoretic considerations and beyond

Naturally, it is not possible to avoid defining iconicity and related notions in the discussion of linguistic iconicity. The term iconicity originates with the philosopher C. S. Peirce, the founding father of semiotics. Peirce defined three classes of signs in his sign typology, based on the relationship between a sign and its denoted object. The three classes are well known: *icons*, *indices* and *symbols*. Hiraga (1994) defines the three subtypes as follows. "An icon is defined as a sign which represents an object mainly by its similarity to that object; an index as a sign which represents its object by its existential relation to the object; and a symbol as a sign which signifies its object by a law or a convention."

Icons are further divided into three non-exclusive subtypes based on the degree of abstraction as well as the dominance of characteristics of similarity such as mimicry, analogy and parallelism: *Images*, *diagrams* and *metaphors*. The similarity in images is achieved through a simple sensory resemblance: A portrait resembles visually the person portrayed. Diagrams are based on structural similarities between an object and a sign: Different lengths of columns in a bar chart reflect differences in, say, GDP in different years. Metaphors signify their object by

3 For more information see the project's website www.iconicity.ch

pointing to a parallelism between an object and something else: In the famous figure of islamic poetry there is a parallelism between a moth attracted by a flame and the lover and the beloved (Hiraga 1994).

This classification is taken as a basis for further analyses in most studies on linguistic iconicity. All three subtypes of iconicity can be found in language to various extents. However, studies on linguistic iconicity concerned with grammar deal primarily with diagrammatic iconicity. Iconicity is for this reason frequently used synonymously with diagrammatic iconicity in many studies. As evidenced by this situation, this field of study may be characterized in terms of 'a mild terminological chaos.' This is further enhanced by the fact that some phenomena grouped under iconicity are in semiotic terms *sensu stricto* not necessarily instances of iconicity proper. However, as long as the 'motivatedness' condition holds, iconicity is oftentimes used in the typological and cognitive functional literature in the sense of 'non-arbitrariness.' Based on the literature, I understand motivation as the fact that linguistic units are not assemblies of sounds generated completely by random, but that they are influenced either by speakers' perceptions of reality or system-internally by speakers' interactions with the language material itself. Typically, crude definitions of iconicity are given such as "sameness of sentence space and perceptual space" (Seiler 1995), "structural imitation" (Engler 1995), or "the reflection in linguistic structure of some aspect of the content of the message" (Kirsner 1985). Haiman (1985a, 9) defines diagrammaticity as follows (original italics removed):

> "Diagram is a complex sign, representing a complex concept. There is therefore some correspondence between the parts of a diagram and the parts of the concept which it represents. The parts of a diagram do not necessarily resemble the parts of the corresponding concept. In Peirce's terminology, each of these parts may therefore be a symbol rather than an icon of its referent. But the essence of a diagram is that the relationship among the parts of the diagram does resemble the relationship among the parts of the concept which it represents. This (attenuated) resemblance justifies our calling a diagram a kind of icon: a diagrammatic icon. […] Ideally an iconic diagram is homologous with what it represents: not only will every point in the diagram correspond to some point in the reality depicted, but the relationships among these points will correspond to the relationships among the points in reality."

This definition raises the question of what is exactly reflected in linguistic iconicity, the reality or our conceptualization thereof? While Simone (1995b) deems the question unimportant, conflating real and mental world in "extra-language," according to Givón (1985) "language

codes thoughts, conceptualizations, perceptions of the real world." Or as Garcia puts it, "language is not about scenes, it is about how people see scenes" (Garcia 1975).[4]

Garcia's quote leads us to another important fact regarding iconicity. Iconic relationship is not something given or pre-existing, the iconic relation is established in an interpretive act on the part of speakers. It is not a factual relationship but an activity, act of hypothesizing. Deacon (1997, 74) in his broad analysis of signs claims that "[o]nly *after* we recognize an iconic relationship can we say exactly what we saw in common..." The process behind iconicity, Deacon further argues, is best conceived of as a negative act of *not distinguishing*. Iconicity arises when the interpreting subject applies the same interpretive perceptual process to the icon as they would to the object it comes to resemble. Givón (1985) in a similar vein suggests that "the notion of similarity [which underlies iconicity] requires the consciousness of similarity on the part of some cognizing mind… [S]imilarity is context-dependent and assigned subjectively by some observer."

While many studies 'make do' with very general, crude definitions of iconicity or leave out the discussion altogether, there are indeed some exceptions which offer theoretical framework more firmly grounded in sign theory. I would like to summarize briefly the framework proposed by Ahlner & Zlatev (2010). The authors elaborate on some notions discussed previously by Sonesson (2008), and De Cuypere (2008). They introduce the terms *iconic ground*, *primary* and *secondary iconicity*. Distinguishing between similarity and iconicity, iconic ground is, roughly speaking, the observation of similarity between a sign and its denotatum which creates a potential for iconicity proper. In De Cuypere's view (2008, 48) "similarity between linguistic structure [...] qualifies as iconicity when the similarity motivates the linguistic structure, that is, when iconicity conveys extra meaning and/or when the similarity determines the construction (i.e. creation and interpretation) of the linguistic structure [...]." In this view linguistic iconicity is only justified provided the relation of similarity gives the analyzed construction an additional meaning. De Cuypere (ibid. 201) quotes in this regard a statement of president Clinton: "I did not have sexual relations with that woman, Ms. Lewinsky." He argues that this sentence is an instance of distance iconicity (cf. section 2.3), reflecting the real world distance between the two discourse participants. This utterance is contrasted with a less distanced variant: "We didn't have sex."

4 This question, as many others, goes far beyond the scope of my work. For an interesting discussion of neurocognitive models of perception, linguistic relativity, and iconicity see Bouissac or Slobin in outside-in inside-out.

Iconicity proper is further divided into two subtypes, primary and secondary iconicity. In primary iconicity, the iconic ground is sufficient for establishing the sign. No matter what the particular stylistic conventions are, we recognize a picture of a face as a face (as far as classical painting is concerned). On the other hand, in case of secondary iconicity, the sign is established by other means, i.e. by convention, by telling the interpreter what "something means." (Ahlner and Zlatev 2010, 315) Any iconic ground is found by the interpreter only later and is thus secondary in the semiotic process. Sonesson illustrates secondary iconicity with *droodles*. As evidenced in figure 1 the moment one finds out the name of Zappa's album it becomes obvious that the seemingly nonsensical drawing cannot possibly depict anything else but a "ship arriving too late to save a drowning witch." Sonesson downplays the role of linguistic iconicity by stating that it is overwhelmingly secondary, De Cuypere similarly argues that most instances of structural iconicity found in the literature present only possibilities of iconicity, or iconic grounds, because they do not convey extra meaning in their own right. Ahlner & Zlatev propose that instances of iconicity in language can be analyzed as different points on a primary-secondary iconicity cline.

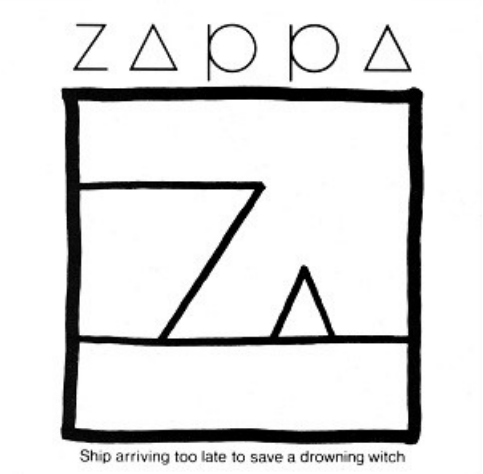

Figure 1: A droodle from Zappa's album 'Ship arriving too late to save a drowning witch'

Even though Sonesson and De Cuypere argue with their notion of secondary iconicity against overestimating the value of iconicity-driven explanations in linguistics, I believe that positing secondary iconicity does not make it any less important for linguistic theory. Although it may lose some of its explanatory power in certain cases, it is one of the strong and deeply

grounded communicative strategies that is manifested in a variety of contexts as I will show in the following sections. It is also widely accepted that analogy and similarity are domain-general cognitive mechanisms (e.g. (Bybee 2010)) that play an important role in language processing and change.[5] Furthermore, I believe that secondary iconicity may play an important role in language change as a possible strong case of folks linguistics.

While the various instances of grammatical (or structural) iconicity will be treated in detail in section 2.4, I want to give a brief account of the ways in which iconicity might be involved in processing. Since Haiman's 1980s papers, iconicity has been argued to play a role in a variety of communicative situations. Grammatical structure is said to be shaped by tensions between iconicity and economy. Behind the latter is the Zipfian tendency for more familiar chunks of language to become shorter. I will return to the problem of economy in a slightly different manner later. I quote Haiman (1985a, 5)'s observation which may be summarized as the iconization-de-iconization-re-iconization cycle:

> "A number of fortuitous tendencies, notably sound change, may obscure these [non-arbitrary] patterns and result in paradigms in which formal contrasts do not reflect semantic or conceptual contrasts. Nevertheless, there is good evidence, even in languages where the correlation between structure and meaning has been obscure, that this correlation has more than a fortuitous character. For there is a well-documented tendency to *restore* this correlation by a variety of different processes."

This process is well illustrated by DeLancey (1985)'s analysis of the come/go distinction in Tibeto-Burman languages. The come-verbs are analyzed as conceptually compositional (move + hither) and were coded accordingly in earlier stages of these languages. The come-verb is subject to phonological erosion due to its high frequency. Delancey argues that this economy consideration is combined with and enhanced by the come-situation's being non-compositional as an action. These mutually supporting tendencies had led to syntheticization of the construction. Recent patterns show again a tendency for analytic constructions, which is motivated by the tendency toward a transparent, compositional coding.

Different languages and different structures exhibit varying degrees of iconicity at different stages of development. Routinization and phonetic erosion in grammaticalization and rise in morphosyntactic complexity diminish iconicity. A fully iconic language in this view would

5 As suggested by the term, domain-general processes are such processes which operate in all domains of cognition and are thus not restricted to e.g. language.

contain only the most basic, i.e. iconic grammar. Bare lexical stems would be related to one another solely on iconic grounds, i.e. by grammatical devices such as word order, reduplication, or intonation patterns. Semantically complex concepts would be expressed by periphrastic descriptions using simple (non-compositional) concepts, resembling crude dictionary entries. Along these lines, iconicity is hypothesized to have played a major role in language evolution as a more basic representational device (Meir et al. 2013; Sadowski 2009; Herlofsky 2001). The basic idea common to all these hypotheses is that early pre-grammatical language(s) emerging from sound signals and imitative sounds were iconic (imagic and diagrammatic). These icons underwent the process of indexicalization and finally symbolization allowing for the emergence of modern type languages with conventionalized lexical items and grammatical inventories. Similarly, Givón (1985; 1995; 2002) sees the communicating human as an organism interacting with its environment, which should be logically reflected in such an interaction (e.g. categorization). In his strictly 'biologically' and evolutionarily oriented account Givón maintains that iconicity and isomorphism are biologically grounded. According to Givón, diagrammaticity is a transparent, and phylogenetically older mechanism for expressing relations between words. On the other hand, it is greatly demanding in terms of cognitive effort and processing time. Grammar is then argued to have evolved consequently by adaptive pressures as an automatized, highly efficient discourse-organizing device. This process is called the icon-to-symbol continuum, i.e. "the process of syntacticization, via which a more transparent, iconic mode of communication - the pragmatic mode - gives rise eventually to the more abstract and less obviously iconic syntactic mode." These considerations are also reflected in Givón (1985)'s two "meta-iconicity" principles. While a) claims that an iconic language is easier to process, b) relates to the observation that real world phenomena that are more important to a particular language community are more subtly differentiated in the particular language.

> a) "All the other things being equal, a coded experience is easier to *store, retrieve* and *communicate* if the code is maximally isomorphic to the experience."
>
> (ibid. 189)
>
> b) "The more *important* a facet of experience is to the organism or culture, in term of pragmatic, adaptive, real-world needs, the more distinctly it is coded in language."
>
> (ibid. 210)

Such claims are said to be supported by different 'non-standard' processing situations, like acquisition and learning, heavy contact situations, or speech impairment. The un-grammatical or pre-grammatical language encountered in such situations may be interpreted in terms of reversal from grammar to diagrammaticity, i.e. to the more basic and transparent communicative strategies. Slobin (1985) notes that children often reshape the material of the parental language to make it more iconic in acquisition, which he shows, among other things, on the example of negation scope in Turkish. Instead of the grammatical affixal form *koymadïm* 'I did not lay' children use the sentential negator *koydum yok* lit. 'I no laid.' Ramat (1995) reports "earlier emergence of a morphological 'sensibility'" in learners of Italian when compared to French, English, or German due to a higher degree of diagrammatic iconicity in the language. She also notes that learners use regularization, favor semantically or grammatically transparent patterns, and repeat grammaticalization paths in the learning process. There is also a growing body of experimental research especially in sound symbolism that suggests facilitatory effects of iconicity in acquisition and processing (cf. *inter alia* Imai et al. (2008), Yoshida (2012), or Kanero et al. (2014)).

Another important area that provides evidence for iconicity in language is sign language linguistics. The development of iconicity study in sign languages is particularly interesting and illustrates well the controversies around linguistic iconicity. As sign languages struggled to be accepted as 'real, normal' languages on a par with spoken languages, iconicity was strongly denied under the influence of the Saussurean arbitrariness dictum, even though it was objectively there: In order to be a real language, you needed to be as arbitrary as it gets. Herlofsky (2005) shows several 'denial strategies' found in sign language linguistics concerning iconicity. Now that the status of sign languages is undisputed by the scientific community, the situation has changed significantly and sign languages are used to demonstrate that iconicity plays an important role in language processing and structural makeup (see Thompson (2011) for a review of experimental research). Authors like Wilcox (2004) provide interesting frameworks for linguistic iconicity that are readily applicable to both language modalities. As Meir et al. (2013) note "[t]he visual medium and the manual and corporeal nature of sign languages afford a richer environment for the exploitation of iconicity." Another characteristic feature of sign languages is the wide use of imagic iconicity which is not restricted to lexical items, but can be found in some grammatical morphemes as well. Perniss et al. (2010, 4) comment in similar fashion:

> "Much of what we communicate about is visually perceived (e.g., where things are, where they are going, how they are interacting, and what they look like), and the visual-spatial modality affords a visually iconic depiction of such information through the placement of the hands (as primary articulators) in the space in front of the body (i.e., the signing space). Thus, whereas in spoken languages the existence of lexical and sentential iconicity can be called into question, this is not the case across sign languages, given that iconicity is so abundantly represented within any one language as well as across all signed languages researched to date."

2.2 Sound symbolism: a brief summary of the relevant concepts

As noted above, the one case of motivated signs maintained by Saussure in his arbitrariness-of-linguistic-sign postulate is that of onomatopoeia. Recent iconicity-oriented research has shown that onomatopoeia are but one of the many instances of a direct sound-meaning or sound-reality pairings.[6] Sound symbolism is a term covering the whole range of these phenomena. To make the terminology even more confusing, the symbolism in this case denotes a situation where certain vocalization patterns can be mapped directly onto certain perceptual qualities of reality. Different sound symbolic phenomena can be in strictly semiotic terms classified as indices, imagic or diagrammatic icons or symbols. The interaction of sound symbolism and grammar leads in some cases to an interesting interplay between sound symbolism and structural iconicity (cf. Shinzato and Masuda (2009)). Although my work is not directly concerned with this field, I will in the following section briefly discuss the major concepts of sound symbolism as found in the literature for the sake of clarity. For detailed reviews see Nuckolls (1999) or Schmidtke & al. (2014), for a cross-linguistic perspective and case studies on sound symbolism manifestations in languages of the world see Hinton, Nichols, and Ohala (1994a). I will more or less follow the classification in Feist (2013), who uses the Peircean sign typology. All of these subtypes can cover two different situations: a) a sound mimics sound, or b) a sound mimics a percept from other modality. The b) situation is called cross-modal sound symbolism, or synesthetic sound symbolism in the literature (Ahlner and Zlatev 2010; Hinton, et al. 1994b).

6 As all the phenomena discussed here, sound symbolism is not non-controversial. Since the reality of sound symbolism is widely accepted by the functionalists and it is on the whole one of the less disputed lines of research into linguistic iconicity, I will treat it as real. See nuckolls quechua, or a case for detailed discussion.

Natural exclamations and interjections denote a class of sounds which are, for the most part, not even considered a part of language proper. They stand on the edges of sound symbolism and consequently language itself and can be thought of as the biological roots of sound symbolism. These sounds are basically indices of physical and emotional states of speakers. This class of symptomatic sounds includes physiologically conditioned involuntary sounds like coughing, "and ranges through expressive intonation, expressive voice quality, and interjections" (Hinton, Nichols, and Ohala 1994b, 2). Some of these sounds also serve for pragmatic purposes of conversation organization, such as back-channeling or signalling of turn-taking. Naturally, interjections may make use of regular linguistic units. However, they oftentimes lose the semantic content, taking on the emotion-signalling meaning, and are typically accompanied by expressive vocalization features.

Onomatopoeia are instances of imagic iconicity. Although always conventionalized to a certain extent, they are direct imitations of sounds found in the environment. Onomatopoetic words differ from language to language inasmuch that they stress different features of the imitated sounds, while using 'core language' sound patterns. Hinton, Nichols & Ohala (1994b) suggest that imitative sound symbolism may be linguistically highly structured, having its internal rules or grammar.

A great deal of literature has been also published on the topic of shape symbolism. The notion subsumes two phenomena whose common denominator is, roughly speaking, their associations with certain physical shape characteristics. As Ahlner & Zlatev (2010, 309) put it, "[s]ince the 1920s, numerous experiments have been performed to show that when people are asked to match certain kinds of meanings with fictive or unknown word forms, the outcome is significantly higher than chance." It has been argued repeatedly that high front vowels denote smallness, while low back vowels bear the opposite meaning. This tendency was first demonstrated by Sapir (1929) in his famous *mil* - *mal* experiment. Several cross-linguistic studies (Berlin 1994) investigated vowel distributions in words denoting 'small' and 'big' and show the predicted distribution of vowels in many languages of the world. South East Asia is quoted as an area where these features are very prominent. Ohala (1994) argues that there are underlying biological principles behind this phenomenon in what he called the frequency code hypothesis. He links the smallness - largeness vocalic and tonal associations in languages to animal vocalizations used in communicating threats or submission.

The second case in question is best characterized using the title of Aveyard (2012): "*Some*

consonants sound curvy." In the same year as Sapir tested the 'magnitude symbolism' for the first time, Kohler (1929) administered his no less famous *takete* - *maluma* experiment. In the task that has been frequently repeated, with various slight modifications (e.g. Ramachandran and Hubbard (2001)), Kohler found that voiceless stops represented by the pair's former word are associated with rectilinear, pointy shapes and the latter, representing voiced stops, sonorants, and rounded vowels, is associated with smooth, curvilinear shapes. A careful analysis of this phenomenon is given by Ahlner and Zlatev within their cross-modal iconicity framework (cf. section 2.1). Their explanation suggests that the subjects realize on some level vocalization patterns of sounds and sequences of sounds. Such construals of articulatory gestures make associations with different shapes possible.

Shape symbolism is closely related to the problem of phonesthemes. While the preceding phenomena have the same effect in speakers of different languages, phonesthemes are language specific mappings of sub-syllabic phoneme clusters onto certain meanings.[7] Bolinger (1950) was among the first authors to draw attention to these submorphemic elements that seem to bear certain semantic features. These effects are not system-wide, but some words sharing certain phonetic properties were found to group around some semantic fields. The notorious example is the *gl-* cluster in English related to vision or light (e.g. gleam, glitter, glow). There is to my knowledge only one study (Ueda 2007) that addresses phonesthemes, or rather sound-symbolic phenomena in general in Czech.[8] It appears to be the case that phonesthemes are not motivated system-externally. They are rather a case of language-internal iconicity and are explicable via usage-based models (Bybee 2010) and a tendency for related meanings to converge in form and vice-versa. Nevertheless, it has been shown that phonesthemes play a role in processing (Bergen 2004) and neologism creation (Schmidtke, Conrad, and Jacobs 2014). Fatani (2005) argues in a similar fashion for aesthetic and sensory connotations of certain phonemes and clusters of phonemes in Arabic which are used in the Qur'anic text. Urban (2011) in his cross-linguistic study found that languages use nasal consonants in words for nose with above chance probability. Similar tendencies were also found for lip-words and bilabials, and tooth-words and dentals.

Ideophones, called alternatively expressives, mimetics in Japanese, or eventives in Lithuanian lal (Andersen 2009) constitute a typologically interesting category. Ideophones are word

7 The cross-linguistic distribution of phonesthemes remains to be determined, the bulk of research has been done on English data so far.

8 Introspectively, the clusters *mň-* or *hň-* could be possible phonestheme candidates.

classes which are typically highly marked in their phonetic makeup, exploiting phonotactic, stress or intonation patterns that are otherwise constrained in the given language. They can function either independently as holistic expressions, or as verbal or clausal modificators. These expressions are in both cases used in communication for the depiction of a scene by being mapped onto various perceptual qualities. Ideophones thus serve as vocal images of sensory perceptions of the environment and the body. Their discourse functions are related to expressiveness and subjectivization. Their performative nature is seen in narratives which are enhanced by their vivid imagery, providing a more intense experience for the audience (Childs 1988). Dingemanse (2012) finds three non-exclusive types of iconicity in ideophones: a) imagic iconicity - sound mimics sound, b) gestalt iconicity (or diagrammatic iconicity) - word structure depicts event structure, and c) relative iconicity - related forms map onto related meanings. Notice that this categorization is readily applicable to the classification of sound symbolic phenomena in general.

2.3 Structural iconicity and the Iconicity-of-distance hypothesis

In a number of writings in 1980s J. Haiman (1980; 1983; 1985a; 1985b) (re-)introduced the concept of iconicity into the study of grammatical structure, hence the term structural iconicity.[9] Drawing on previous research, Haiman systematized and enriched the field with some valuable insights and observation. By setting the notion of iconicity in grammar within the context of functional typology and by relating his work to the then recently discovered Greenbergian universals, he introduced a new way of thinking about language structure. The concept has been established as a valuable explanatory principle in typology and has been widely used in typological literature. In this section I will first give an account of the different types of structural iconicity, then I will present Haiman's Iconicity-of-distance hypothesis, finally I will discuss some challenging views made from functionalist positions.

In contrast to sound symbolism, structural iconicity is not concerned with the actual 'shape' of the sounds and strings of sounds, and the ways in which these labels relate to reality, but rather with the way these strings of sounds are organized with respect to one another and the structure of reality. It follows from the nature of the phenomena in question that the iconicity

9 By grammar I understand such linguistic phenomena that relate strings of sounds of a language to one another, from word order to ablauts. It is worth remarking though that iconicity is most typically found in the domain of syntax, less so in bound morphemes.

involved is necessarily of the diagrammatic kind, i.e. relations between symbolic parts of a diagram reflect the inner relations of a concept, in other words their topologies are comparable. The words of a language are thus in their majority arbitrary labels for real world entities, whereas the structure of language can be understood to a certain extent as a diagram of physical world relations, or rather of the conceptualization thereof.

Two types of structural iconicity are identified in Haiman (1983; 1985a)'s model, i.e. isomorphism and motivation. Isomorphism describes the general tendency for a one-to-one relation between form and function in language. While the opposite is not excluded, isomorphism makes languages more efficient in communication. Whenever two expressions are mapped onto the same referent, speakers tend to find differences between their meanings proactively. These differentiations can surface in grammar, lexis, or pragmatics. Total synonymy is therefore rejected in this line of thinking. Motivation is defined as "a correspondence between our perception of the world and our [linguistic] representation of this perception" (Haiman 1985a, 15). Motivation essentially mirrors definitions of iconicity in general. In fact, the distinction between isomorphism and motivation can be disregarded under the assumption that total synonymy in real world is also nonexistent. This is suggested by some authors (e.g. Givón (1985). I will use Haiman's model for the sake of clarity.

Motivation can be further split into four categories which I for lack of better terminology call *ordering iconicity*, *quantity iconicity*, *symmetry iconicity*, and *tightness iconicity*. As mentioned earlier, these subtypes are all necessarily diagrammatic in nature and exploit the temporal or spatial linearity of the language code in order to transform the structure of multi-dimensional reality into the language medium.

Ordering iconicity, as the term suggests, denotes the reflection of the order of things in reality on various linguistic levels. Haiman (1985a)'s term "tense iconicity" suggests the main point of this principle, i.e. the temporal order of events can be and by default will be reflected in the linguistic structure. So that in the oft cited example *Veni, vidi, vici*, it is quite natural to expect that the coming preceded the conquering.

(1) a. Vdala se a otěhotněla. [10]

10 I generally follow the Leipzig Glossing Rules throughout the examples. However, I made a few exceptions. Unless essential for the argument made by the example, I leave some of the Czech examples unsegmented. The abbreviations used in the examples: A agens, AB absential, ABS absolute state, ACC accusative, AL alienable, ART article, AUX auxiliary, DAT dative, DEF definite, DU dual, FI final desinence, F feminine, GEN genitive, INAL inalienable, IND independent pronoun, INDEF indefinite, INST instrumental, LOC locative, LV linking vowel, M masculine, ME medial desinence, N neuter, NOM nominative, NTR neutral, PERS personal

marry.PST.PRT.F REFL and get.pregnant.PST.PRT.F

She got married and she got pregnant.

b. Otěhotněla a vdala se.

get.pregnant.PST.PRT.F and marry.PST.PRT.F REFL

She got pregnant and she got married.

Similarly, the two sentences in examples (1a) and (b) contrast exactly for the reason that isomorphism is at work here and we expect them to differ semantically. The intuitive interpretation is indeed the tense-iconic one. One thus knows what preceded and what followed.[11] One could alternatively analyze (1) in such manner that *a* 'and' does not have the expected additive or simultaneous meaning, but rather an extended, derived meaning '(and) then.' However, this extension may well be derived from the tense-iconic structuring of the discourse. It should be noted that reverse, counter-iconic sentences are indeed possible. Such secondary variants are expected to be coded as more complex and bulkier, because the temporal relations need to be marked explicitly as in example (2).

(2) Než otěhotněla, vdala se.

before get.pregnant.PST.PRT.F wed.PST.PRT.F REFL

Before she became pregnant, she got married.

Although labeled tense iconicity by Haiman, this principle can be extended to causal relations, i.e. the iconic order cause > effect. Such reading is also possible in (1) and, given the sociocultural context, would be present for many speakers of Czech.

Haiman (1980) himself gives two other examples of ordering iconicity which are not strictly tense-iconic. They concern the tendency for protasis to precede apodosis in conditionals and the cross-linguistically prefered SO word order pattern. These phenomena are also treated in Itkonen (1994)'s classification of iconicity subtypes. Both temporal and causal iconicity are subsumed under the dimension of order. Drawing on Haiman, Itkonen interprets the frequent

pronoun, PL plural, POSS possessive adjective, PRES present, PRT participle, PST past, REFL reflexive, SG singular.

11 It could be expected that even speakers unfamiliar with the given language would interpret the situation tense-iconically provided they were hinted with the general formula V1 V2 vs. V2 V1. This follows from the assumption that iconicity is a general language-independent cognitive process.

SO order as a diagram of event transition from agent to patient. A slightly different, discourse-level oriented classification is given in Givón (1995) under the two "sequential order principles." Givón aims to cover the phenomena concerning the interaction of information structure and word order. While the "semantic principle of linear order" basically mirrors Haiman's notion of tense iconicity, the "pragmatic principle of linear order" states that "more important or more urgent information tends to be placed first in the string" or that "less accessible or less predictable information tends to be placed first in the string" (ibid. 54-55). These two principles are potentially contradictory, the latter being itself motivated by Givón's cognitive principle "Attend first the most urgent task." However, conflicting or competing motivations or iconicities do not pose a problem from this point of view.

The notion of ordering iconicity becomes highly prominent in isolating languages which rely heavily on word order, e.g. the languages of Southeast Asia. In these languages there is virtually no inflection and only a weak distinction between lexical and functional words. Tai (1985)'s analysis of temporality and word order in Chinese shows that diagrammaticality might be the most important mechanism for the expression of grammatical relations in the language, cf. (3). Similarly, Kwan (2010) shows that the placement of locative PPs in Cantonese Chinese relative to the verb is governed by iconicity considerations which may go contrary to the cross-linguistically frequent pattern. Diessel shows in a similar fashion in a corpus-based analysis that temporal adverbial clauses in English follow tense iconicity. Although the general tendency is for adverbial clauses to follow the main clause in English, clauses expressing preceding events frequently precede the main clause.

(3) Mandarin Chinese (Sino-Tibetan, China)

a. ta hen\/ gaoxing\ de wanr/

he very happy DE play

He is playing very happily.

b. ta wanr/ de hen\/ gaoxing\

he play DE very happy

He is very happy from playing.

Bybee (1985) shows the role of iconicity in the development of verbal inflection in her well known analysis of verbal morphology. Bybee analyzes the ordering of TAM and agreement

markers relative to the verbal stem and the degree of fusion with the stem. The results show that semantic relevance of the elements to the verb plays a major role. More relevant markers are closer to the stem and show a higher degree of morpho-phonological fusion. To paraphrase the famous quote, the analysis goes on to say that today's markers are reflexes of yesterday's words which in turn had been ordered iconically according to their relevance to the verb. This analysis shows the role iconicity can play in diachronic perspective and grammaticalization. As for the relevance driven ordering, it may be seen as a transition between ordering and tightness iconicity.

Quantity iconicity does not receive much attention in Haiman's papers, but other authors treat it as a subtype of structural iconicity. The idea of quantity iconicity is, roughly speaking, that chunks of reality that are somehow bulkier will be coded with more linguistic material. The observation that plurals are generally longer than singulars and that this might be a linguistic reflection of the natural order of things was among the first in the iconicity-oriented literature (cf. Jakobson (1966), but also Haspelmath (2008b) and the discussion in section 2.5). Itkonen (1994) uses the dimensions "number" and "quantitative properties" in her classification of iconic motivations. Number iconicity refers roughly to the tendency that the number of conceptual pieces of reality be reflected in the number of pieces of a sentence. The one example she gives is the agent-action-patient breakdown of an event and the corresponding sentence structure of agent NP, VP and patient NP. Quantitative properties concern the asymmetries such as singular vs. plural which are motivated by the ontological distinction *less* vs. *more* according to Itkonen (2004). Two other phenomena are in fact easily connected to quantity iconicity, i.e. complexity iconicity, and markedness iconicity. More complex or marked entities are reflected by a higher degree of complexity or markedness in the linguistic structure. Differential object marking is frequently quoted as an instance of markedness iconicity (e.g. Aissen (2003), or Kievit and Kievit (2009),but cf. the discussion in (Lee 2010)).[12]

Givon (1995, 49) formulates the quantity principle, again oriented on the discourse-pragmatic level: "A larger chunk of information will be given a larger chunk of code; less predictable information will be given more coding material. More important information will be given more coding material."[13] An example of this principle is the reference scale (full NPs > independent

12 Differential object marking describes a situation where different classes of objects get different marking, typically depending on animacy.

13 This principle is given in Givón (1985, 197) as follows. "The more *mental effort* is expended in processing a topic-NP (i.e. in establishing its referential identity in discourse), the more *coding material* is used to represent it in language."

pronouns > unstressed pronouns > zero anaphora) as seen in discourse organization. This tendency is corroborated by Ji (2007)'s quantitative data. Ji finds that full NP referents are most frequently found in the beginnings of episodes and sub-episodes in narrative discourse. This principle might be in my opinion also applied to Hopper & Thompson (1985)'s analysis of categoriality. Drawing on their previous 1984 research, they claim that lexical category membership is emergent from discourse roles and that discreteness and specificity of a discourse participant is reflected by the number of "trappings," or morphosyntactic features and thus high categoriality. The beer in the first, somewhat idiomatic sentence in (4) is less nouny, it cannot take modifiers and is, semantically, a component of the predicate, whereas the beer in the second sentence is more nouny, it allows modifier and is more independent from the predicate.

(4) Jdeme na pivo. vs. Tohle malé černé pivo není pro mě.

We're going for a beer. vs. This small dark beer is not for me.

An interesting example of quantity iconicity is found in the Arabic derivational pattern in (5). While not fully productive, it may be used with some agentives to express the degree of intensity or frequency of the action described by the corresponding verb. Notice that the intensity is reflected by more linguistic material.

(5) Arabic (Semitic, North Africa and Middle East)

a. ka:ðib liar (active participle)

b. kaðða:b someone who lies frequently (intensifying pattern)

c. kaðða:ba one-of-a-kind liar (intensifying pattern + feminine gender)

Reduplication is a cross-linguistically frequent example of quantity iconicity. The process by which partial or full reduplication of a word modifies its meaning is in my opinion quite straightforwardly iconic: Again, more reality is reflected by more form. Common meanings conveyed by reduplication include plurality, repetition, intensity, continuation, habituality, or diminution (Conradie 2003). For example, partial stem reduplication is used in Turkish to form intensified adjectives (*pekiştirme sıfatları*, lit. 'strengthened adjectives'), e.g. *beyaz* 'white' > *bem-beyaz* 'snow white.' The one example of possible systematic reduplication in Czech are habitual imperfectives (Danaher 1996), e.g. *býval* > *bývával* 'he used to be.' Interestingly, instances with the reduplicated -va- usually express the event's taking place further

back in time. Reduplication is also commonly found in onomatopoeia (e.g. 'cuckoo') and ideophones (see e.g. Andersen (2009) for examples).

Haiman's conceptual symmetry can be seen as a transition between ordering iconicity and tightness iconicity. In a way this phenomenon makes use of both word order motivated by ordering iconicity and other grammatical devices. Symmetry is according to Haiman (1985a, 72) "one of the most easily and generally diagrammable ideas in language." According to the above mentioned ordering principles what comes first either happened earlier, is a cause or is more important (as in *Premiér a ministři* 'The prime minister and the ministers'). The speech medium is inherently asymmetric, and symmetry or simultaneity cannot be directly expressed in language. This inherent asymmetry can be reinforced or overridden by morphological or prosodic diacritics, i.e. additional marking (ibid.). Conceptual symmetry is in this way reflected by morphological symmetry. Haiman gives word order parallelism, clausal fusion, and differences in sentence-final desinences as coding strategies for establishing morphological symmetry. Word order parallelism is characteristic of morphologically impoverished languages and formulaic expressions (Haiman 1985b), e.g. *Koho země, toho víra.* 'He who owns the land decides on the confession.' *Koho chleba jíš, toho píseň zpívej.* 'He who pays the piper calls the tune,' lit 'Whose bread you eat that one's song sing.' Clausal fusion, typical for reciprocals, denotes the situation whereby two parallel events are depicted in a single clause's VP. Thus, instead of the biclausal *Tomáš zamával Petrovi a Petr zamával Tomášovi '*Tom waved Peter and Peter waved Tom,' which would be intuitively interpreted as two separate events, the second following the first, the reciprocal construction *Tomáš s Petrem si zamávali* 'Tom and Peter waved eachother' is used, which implies the simultaneity of the wavings. The third possibility for which Haiman uses the term *homoioptoton*, borrowed from classical rhetoric, is connected to switch reference, a feature typical for Papuan languages. In a number of these verb-final languages whenever two sentences are conjoined, temporal and causal relations are expressed via medial and final verb desinences. The normal situation is that of asymmetry: S1x S2y, where x and y are the desinences expressing different subjects, sequentiality, or causality. In Haiman (1980, 531)'s words "one of the most aesthetically pleasing examples of iconic motivation", example (6) from Hua illustrates this situation (ibid. 532):

(6) Joe Harry ebgi-ga-na Harry Joe ebgi-e

Joe Harry hit-ME.3SG-A.3SG Harry Joe hit-FI.3SG

Joe hit Harry (and/then/so) Harry hit Joe.

Here, the symmetrical (or reciprocal) reading is impossible, the second clause marked with a final desinence followed the first clause. Now, to express reciprocity in Hua, two identical medial clauses are conjoined with an auxiliary final sentence as indicated in (7a). (7b) shows a similar situation with bare verb stems and the symmetrical conjunction *-ro*.

(7) a. Joe Harry ebgi-ga-na Harry Joe ebgi-ga-na ha-2e

Joe Harry hit-ME.3SG-A.3SG Harry Joe hit-ME.3SG-A.3SG do-FI.2/3.DU

Joe and Harry hit eachother.

b. d-go-ro k-go-ro hu2e

me-see-RO you-see-RO we.DU.do

We saw each other

The conceptual symmetry is in both cases expressed by the sameness of the two parallel (symmetrical) sentences which are framed by the auxiliary, the literal translation of (7b) is 'We two do/did seeing you and seeing me.' For a detailed discussion of conceptual symmetry see Haiman (1985a; 1985b).

The last subtype of iconicity recurring in the literature is tightness iconicity. Tightness iconicity describes the idea that the degree of conceptual relevance, closeness, or affectedness may be reflected by linguistic ties between the corresponding coding material. Itkonen (1994; 2004) formulates two dimensions of iconicity with relevance to tightness iconicity, "cohesion" and "distance." Cohesion is explained by ontological wholes being reflected in linguistic structure or, in a more trivial way, in the form of the slogan "What belongs together, goes together." Distance iconicity seems to derive directly from Haiman's formulations. Givón (1995, 51)'s account of tightness iconicity is subsumed under the "proximity principle:"

> "Entities that are closer together functionally, conceptually, or cognitively will be placed closer together at the code level, i.e. temporally or spatially. Functional operators will be placed closest, temporally or spatially at the code level, to the conceptual unit to which they are most relevant."

This can be illustrated by paraphrasing Givón's example.

(8) a. Mluvila s Marií, potom s Karlem a pak se Štěpánkou.

She talked to Marie, then to Karel, and then to Štěpánka.

b. Mluvila s Marií, Karlem a Štěpánkou.

She talked to Marie, Karel, and Štěpánka.

The intruding linguistic material in the (a) sentence marks greater (temporo-spatial) distance between the events, or their distinctness, while the second variant with the talkees separated only minimally by additional coding material indicates that there was most probably only one talking. In fact, (8) marks a transition from iconicity to syntacticity and a decrease in iconicity through diacritics motivated by economy considerations. The truly iconic solution would be to repeat the proposition three times with the respective referents in order to truly reflect the situation in real world where three separate talkings took place.

The Iconicity-of-distance hypothesis was first articulated in Haiman (1983) and elaborated in Haiman (1985a). The hypothesis forms together with his work on symmetry Haiman's main contribution to the study of iconicity in language. It is formulated as a hypothesis about a general tendency in language, which is accompanied by a few more specific sub-hypotheses in the form of cross-linguistic generalizations or near-universals. The hypothesis thus predicts what linguistic structures should be attested, or prefered. The hypothesis rests on the assumption that conceptual distance can be and is diagrammatically reflected as linguistic distance. The hypothesis focuses on near-synonymous grammatical constructions and is based on the collaborative work of isomorphism and motivation. We have seen that total synonymy is non-existent according to the isomorphism principle. Whenever there are two seemingly synonymous constructions XY and XY' in a language, their meanings tend to specialize in order to avoid total synonymy.[14] Motivation, then, governs the meaning division between the two constructions. If they differ in form, "[t]his difference [...] will correspond in some way to the difference in meaning. The greater the formal distance between X and Y, the greater the conceptual distance between the notions they represent." (Haiman 1985a, 105). What is formal (or linguistic) distance? The most straightforward answer could be the actual physical distance between linguistic units, which is actually true of some cases. Bolinger and Gerstman (1957) found that English NPs with compounds of the type *lighthouse keeper* vs. *light housekeeper* differ not only in terms of stress patterns but also in terms of relative temporal distances between the three components of the phrase in question. However this is not the only

14 Since my work is set in the functional typological framework, it goes without saying that these changes are indeed interpretive acts of the speakers who exploit the different forms at hand to express contrasts perceived as important.

possibility, as Haiman (1985a, 105) puts it:

> "The iconic representation of conceptual distance can also exploit the fact that language is hierarchically structured. The linguistic distance between expressions is reflected not only in the number of milliseconds that elapse between them, but also in the nature and number of the morphemes that lie between them."

The linguistic distance between two (presumably lexical) morphemes X and Y diminishes with points a) through f) on the following scale:

(9) The scale of linguistic distance (ibid.):

a) X#A#B#Y

b) X#A#Y

c) X+A#Y

d) X#Y

e) X+Y

f) Z

The scale deserves further comment. 'A' and 'B' stand for intruding (presumably grammatical) morphemes, '#' is word boundary and '+' is morpheme boundary. I will illustrate the respective points with examples from Czech. In a) the two words are separated by multiple free functional elements, e.g. *šaty, co patří matce* 'the dress that belongs to mother,' in b) there is only one functional element, e.g. *noha od stolu* 'table leg', lit. 'leg from a table,' in c) the functional element is a bound morpheme, e.g. *ps-ova miska* 'dog's bowl,' d) is a juxtaposition of two words, e.g. *šaty matky* 'mother's dress,' e) is a compound of the two words or agglutination, e.g. *konkurence-schopnost* 'competitive ability,' Z in f) is a fusion of the two words, a portmanteau word which can be X-like, Y-like or completely different in form, e.g. *Václavské náměstí* > *Václav-ák* 'Wenceslas Square > Wency's.'[15] One could also hypothesize the existence of at least one more point, X+A+Y as illustrated by Czech compounding. Czech compounds are frequently formed with a linking element, -o- between the stems, e.g. *prost-o-vlasý* 'hairless.' It is not entirely clear but this case should be probably placed between d) and e) on the scale. Since this is not of major concern in my work, I leave the problem unresolved.

15 Almost all the Czech examples conform actually only partially to the canonical instances of the points due to its highly inflectional character.

Let us turn back to the hypothesis. There are two synonymous constructions XY and XY' in a given language, one of which is higher on the distance scale. The isomorphism principle causes a split in meaning and specialization of the constructions. The Iconicity-of-distance hypothesis then predicts that the construction with less linguistic distance between X and Y will be associated with those chunks of reality that are perceived as conceptually closer. Having said that, one thing remains to be explained, viz. conceptual distance. Although Haiman gives a definition of conceptual distance, this notion and its vagueness is one of the drawbacks of his approach. Quoting Haiman (1985a, 107), the notion is, I believe, best considered in its naive, intuitive reading.

> "Two ideas are conceptually close to the extent that they:
>
> a. share semantic features, properties or parts
>
> b. affect each other
>
> c. are factually inseparable
>
> d. are perceived as a unit, whether factually inseparable or not
>
> whereas c. and d. may, for linguistic purposes, be treated as identical, since what determines linguistic fact is not objective reality, but the way in which this reality is perceived and conceptualized."

Haiman (1983, 782–83) further summarizes his predictions about various levels of language structure in the following claims:

> (10) "Distance iconicity in language
>
> a. The linguistic distance between expressions corresponds to the conceptual distance between them.
>
> b. The linguistic separateness of an expression corresponds to the conceptual independence of the object or event which it represents.
>
> c. The social distance between interlocutors corresponds to the length of the message, referential content being equal."

Haiman gives multiple examples from different areas of grammar and a variety of languages. I will go through these examples in the remainder of this section. The following text is a synthesis of Haiman (1980; 1983; 1985a; 1985b), unless indicated otherwise.

Causatives

Where a formal difference in terms of linguistic distance exists in a language in the expression of causation, the proximal construction will be used for a more direct causation.[16] A general example would be the formal difference between synthetic direct causatives and analytic "manipulatives." The oft cited example of *kill* vs. *cause to die* (Z vs. X#A#Y) shows such a contrast.

(11) Zvednul jsem hrnek k puse. vs. Nechal jsem hrnek zvednout se k puse.

I raised the mug to my lips. vs. I let the mug rise to my lips.

Haiman notes that indirect causation implies involvement of some kind of supernatural powers on the part of the causer in case the causee is inanimate, as illustrated in (11). Huang and Su (2005) present a particularly interesting analysis of causation in Saisiyat (Formosan), where they find that the causation strategy is determined by an interplay of tightness and ordering iconicity. The authors also claim that different speakers may choose different coding strategies for a particular situation depending on their conceptualization thereof. This may be seen as evidence for speakers' active exploitation of iconicity in communication.

Asymmetrical coordination

If there is semantic contrast between two types of coordinated sentences of the kind S1 and S2 vs. S1 S2, the former marks a greater conceptual distance or separateness of the events. This can be illustrated by the Daga (Trans-New Guinea, Papua New Guinea) example (12a), where the absence of conjunction indicates sameness of subjects (Haiman 1983, 788–89). Similarly, non-finite clauses in Czech do not allow different subjects. This shows that the non-finite participial predication is too tightly connected to the main event to allow two independent interpretations, as shown in (12b) and (c).

(12) a. onam-on-e … vs. onam-on-e amba …

come-3SG-PST vs. come-3SG-PST and

He came and (then) he… vs. He came and (then) another…

b. Pan starosta jda po návsi vesele si hvízdal.

16 A proximal construction is such a construction whose elements X and Y are closer to each other in terms of linguistic distance, a construction expressing greater distance will be call distal. While the distinction proximal vs. distal construction is not very elegant, I will use it for the lack of more suitable terminology.

mister mayor go.PRT across square happily REFL whistle.PST.PRT.M

Walking across the village square, mister mayor was whistling happily.

c. *Pan starosta jda po návsi kopla ho husa.

mister mayor go.PRT acrsoss square kick.PST.PRT.F 3SG.ACC goose

A goose kicked mister mayor walking across the village square.

Transitivity

The case of transitivity is, as evidenced by the data and Haiman's generalization, closer to quantity iconicity rather than tightness iconicity. The conceptual distance here is basically understood as the degree of object affectedness. As Haiman (1983, 792) puts it: "In no language will the phonological expression of a direct case be bulkier than that of the corresponding indirect case."

Haiman (ibid., 790) quotes an example from Spanish, where the transitive member of the pair has the meaning of "really doing."

(13) Spanish (Indo-European, Romance, Spain):

contestar la pregunta vs. contestar a la pregunta

(correctly) answer the question vs. contribute a response to the question

Possession

In languages with grammaticalized alienability distinction the proximal construction will be reserved for inalienable possession. In Haiman (ibid. 793)'s words: "In no language will the linguistic distance between X and Y be greater in signaling inalienable possession, in expressions like 'X's Y', than it is in signaling alienable possession."

This is exemplified in (14). Inalienable possession is marked by a cross-referential suffix (X+Y) in Maltese. Alienable possession is expressed in a PP (X#A+Y). Tightness iconicity in possession marking, being central to my work, is treated in more detail in section 3.

(14) Maltese (Semitic, Malta)[17]

il-karozza tagħ-na vs. ħu-na

17 All the examples from Maltese, Arabic, and Turkish are my own.

DEF-car	of-1PL	vs.	brother-1PL
our car		vs.	our brother

Individuation

The Iconicity-of-distance hypothesis predicts that less individuated discourse entities will be expressed in a proximal construction. What Haiman means by individuation, is separateness, specificity, or independence of a discourse element, be it an object or an event. The degree of individuation can be illustrated by incorporation. Independent object NPs are indeed more prominent in incorporating languages, while incorporated nouns are backgrounded. In much the same vein, it is possible for some reflexives in Turkish to take either the reflexive suffix or the independent reflexive pronoun. The change in form again marks a slight change in meaning. While the analytical *kendini döv-* means 'to beat oneself,' the synthetic form *dövün-* has a more restricted meaning 'to beat oneself's breast in grievance, to grieve.'

Social distance

It is suggested in (10c) above that certain pragmatic phenomena might be also interpreted as diagrams of reality, again located somewhere between distance and quantity iconicity. Social distance is conceptualized metaphorically as physical distance. Greater social distance and politeness generally results in indirectness and an increase in linguistic material used to convey the message. To quote Haiman (1983, 801): "The verbosity or prolixity of formal registers may [...] be a verbal icon of an envelope around the speaker's actual message."

2.4 Critique

Iconicity-based research and especially the Iconicity-of-distance hypothesis have been recently challenged in a series of writings by Haspelmath which were followed by a discussion in Cognitive Linguistics in 2008 between the two parties. Haspelmath's approach is to the best of my knowledge the most elaborate critique of iconicity thinking which presents an alternative robust model, while being grounded in the same framework, functional typology. I will summarize the 2008 Cognitive Linguistics discussion in the following and present the model proposed by Haspelmath.

Haspelmath (2008b)'s critique is aimed at quantity iconicity, complexity iconicity, and cohesion iconicity (i.e. tightness iconicity). While he finds iconicity involved in isomorphism, se-

quence, contiguity, and repetition as an acceptable hypothesis, Haspelmath claims that there is no role of iconicity in the phenomena associated with quantity and tightness iconicity. These phenomena are argued to be caused solely by frequency effects and since frequency is by far the most prominent parameter in this line of thinking, I will refer to this approach as frequentist. Possession, causation, and coordination are discussed in turn and several counterexamples to the predictions of the Iconicity-of-distance hypothesis are quoted. Many structures following the general pattern A#X#Y are given as counterevidence to tightness iconicity in possession. Frequency-driven explanations are also provided for the phenomena in question. While the frequentist model will be discussed in detail further on, Haspelmath's basic argument is that the differences in coding can be explained by different frequency distributions. Croft (2008) in his reaction accepts Haspelmath's counterexamples and offers a revised version of the sub-hypothesis for possessives relating it closely to quantity iconicity: What is conceptually closer gets less coding. Croft also takes issue with Haspelmath's treatment of frequency. While it is standard practice to assume that absolute frequency causes changes in linguistic structures, Haspelmath argues that relative (categorial) frequency is the most important factor here (see below). Croft also shows that distance iconicity is no different from contiguity iconicity which is accepted as real by Haspelmath. Haiman (2008) argues that more data are needed to resolve the question. On the other hand, he argues in favor of iconicity. Haiman claims that iconicity is broader in scope and provides explanation even in cases where frequency is not involved. He quotes honorific agreement in possessive constructions in Korean and Japanese as an example of differential marking which cannot be explained by frequency. Haiman also shows that some of Haspelmath's counterexamples are, after closer inspection, no counterexamples at all. The A#X#Y pattern is diachronically a stylistic variant of the iconic word order Y#A#X. Another argument in favor of iconicity is in Haiman's view its involvement in novel form production. The debate thus remains unsettled.

Haspelmath's frequentist model is grounded in usage based theory and tries to bring this line of thinking to the cross-linguistic level. While typology tried in past decades to explain the observed cross-linguistic patterns in terms of cognitive constraints and biases and processing needs, it has been noted by different authors (e.g. Evans and Levinson (2009), or Bybee (2010)) that these top-down processes proved far from being non-problematic. Some linguists have turned from this framework and try to find explanation for typological data in bottom-up processes. This usage-based framework argues that both cross- and intra-linguistic regularities can be explained as cummulations of micro-level interactions of agents (speakers) who try to

fulfill their communicative goals (cf. Larsen-Freeman (1997), or Beckner et al. (2009)). This top-down vs. bottom-up argument is however to a certain degree problematic, at least in this case. Although it may seem to be more basic than having to resort to some putative abstract constraints, it should be kept in mind that Greenbergian typology is grounded functionally and cognitively. In my opinion, the bottom-up argument therefore loses strength because in the end both the frequentist and the iconicist accounts rest on the same set of domain-general cognitive mechanisms, categorization and probabilistic computations based on previous experience in the former case, and analogy and similarity perception in the latter.

As already noted, frequency plays a crucial role in this view. Haspelmath (2008a) argues that any "coding asymmetries" are caused by frequency asymmetries. This would also include the near-synonymous constructions in Haiman's hypothesis. Haspelmath further argues that languages are code efficient. Code efficiency arises through the interplay of two general features of language, i.e. paradigmatic organization, and frequency asymmetry. Paradigmatic organization of language enables that only one member of a binary opposition needs to be coded if coding is obligatory. Frequency asymmetry contributes to code efficiency with more frequent expressions' being shorter than rarer expressions with which they contrast. Such frequency asymmetries emerge diachronically through frequency effects which operate in language (Bybee 2006; 2010). There are four generally recognized frequency effects, all of which rest on the assumption that predictable information needs less overt coding to be interpreted correctly:

a) The conserving effect: High frequency strengthens memory representations of linguistic units and makes them more accessible. Frequent irregular forms resist analogical change, frequent forms form the basis of analogical change, and frequent forms resist innovative constructions.

b) The reducing effect: High-frequency items undergo reductive sound changes more quickly and to a greater extent (e.g. should have > shoulda).

c) The autonomy effect: Frequent forms gain autonomy and lose connections to other related forms (e.g. gonna vs. going).

d) The productivity effect of type frequency: A pattern with high type frequency is likely to be extendable to other types (e.g. plural forms of novel words, syntax of novel verbs).

Haspelmath elaborates on these notions and argues that the typological observations of cross-linguistically recurrent coding asymmetries are caused by cross-linguistically systematic frequency asymmetries. He claims that if similar constructions are marked in a similar way across languages, similar frequency distributions of items and classes of items will be found across languages. He supports this argument with corpus data from different languages. However, only few languages like English, or Spanish are used. More data from a wider range of languages are desirable.

I will now try to illustrate both the frequentist and the iconicist approach on the example of the above mentioned Maltese possessive classification, since iconicity in possession was tested in my experiment. As the example (13) repeated here as (15) shows, there are two ways to express adnominal possession in Maltese.

(15) Maltese (Semitic, Malta)

il-karozza	tagħ-na	vs.	ħu-na
DEF-car	of-1PL	vs.	brother-1PL
our car		vs.	our brother

The older affixal form was inherited from Classical Arabic where it is the only way to express pronominal attributive possession. The newer adpositional construction is an innovation shared with the colloquial Arabics of the North African area. While the frequentist model does not predict emergence of an innovation, the subsequent scenario is quite clear. Haspelmath's model argues that there is a cross-linguistically comparable group of items that are more frequently coded for possession.[18] In other words, the class of possessa usually labeled as inalienable is made up of nominals that are as a group more frequently coded for possession than other nominals, hence the importance of relative frequency. Notice that the model does not predict the distribution of concepts between the two classes, it only predicts that such frequency asymmetry will be found in many languages.[19] So, in the Maltese situation there would be a group of words that were possessed in communication more often than the rest of the vocabulary even in the old unitary system. Now, for whatever reason the new construction was invented by the speakers, it gradually had to acquire a certain level of popularity or inter-

18 This particular situation possibly reflects the broader tendency for dropping bound inflectional markers and replacing them with adpositional, free standing forms observed in colloquial Arabic. Some authors (Boumans 2006) suggest that language contact via substrate influences may be involved.

19 However, exceptions to this tendency are not ruled out. Cases like Czech, where inalienable possessa are frequently zero-marked for possession, are therefore not an issue.

speaker acceptance in order to become part of the grammar. One could further speculate that it may have been useful due to its distinctness and attention gaining potential, when expressing possession on items that were much less predictably possessed. Because the number of alienable items is much higher, the type frequency of the new construction would grow and so would its productivity, becoming the default way for expressing possession in the global perspective. Note that paradoxically it serves as a way to code *ab*normal possession. The resulting alienability split can be seen as different stages of grammaticalization. Alienable possessa are coded with the innovative, bulkier construction which facilitates interpretation of the message. Inalienable possessa resist the innovation as a result of the conserving effect of frequency. Items that are frequently possessed have stronger memory representations and may even be less compositional. The high within-class frequency is related to the predictability of the older construction's meaning with inalienable possessa. They are more readily interpreted as possessed and do not require more robust marking. This rather sketchy illustration shows how would the occurrence of possession split be explained by the frequentist model. While the model gives a detailed account of the 'how' of the process, it is not entirely clear if the 'why' can be explained as just a matter of counting, not content. I will revisit this topic in the next section.

Paradoxically, Haiman and the other iconicists do not dwell much on the diachronic facets of grammatical iconicity. While iconicity is used to explain the shapes and behavior of various linguistic constructions, the notion is frequently used as a descriptive label with no further analysis. Nevertheless, I will again try to illustrate this approach on the same example using Haiman's and Givon's remarks with regard to diachrony. Again, there are two alternative constructions for expressing possession. There are two potential readings of the hypothesis. The reasons for the emergence of a new construction are situation specific and reserved for further language particular analyses in the 'weaker' interpretation. The 'strong' reading suggests that a new construction (or way of expression) is used as a case of linguistic creativity, motivated by slight differences perceived between two chunks of reality which, for some reason, become important for speakers. In case of possession, a group of particular concepts is conceptualized differently with respect to possession. Recall, in this regard, Givón (1985)'s iconicity metaprinciple that claims that speakers make such distinctions in language that are important for their interactions with the environment. Whatever the motivations for an innovation, there would exist two near-synonymous expressions of possession. This is where isomorphism comes into play. Speakers would tend to differentiate the meaning of the constructions at hand

and use them for a more nuanced communication. The Iconicity-of-distance hypothesis predicts that motivation in the form of tightness iconicity would then cause a group of possessa which are conceptually closer to the possessor to be expressed by linguistic closeness. Inalienable possessa are conceptually close to the possessor in that they are, roughly speaking, literally or figuratively parts of the possessor. It would then be precisely on these grounds that class membership would be determined for each concept.

It is not quite clear from the frequentist model to what extent this mechanism is involved in online processing on the micro-level. The coding asymmetries arise diachronically, but it is not clear whether speakers access the categorial relative frequency counts in processing. We may assume that categories emerge as generalizations over clusters of construction exemplars resulting from the frequency-driven processes applied to individual items. This means that inalienables emerge as a grouping of frequent constructions. It is much less clear how the frequentist model would account for, say, category assignment to novel items. If a community of speakers of an alienability marking language discovered a new organ, how would this previously never possessed item be classified? Would it be marked as alienability because of its being low in construction frequency, or would it be categorized as inalienable? In the latter case it would be through the semantics-driven gravitational force, based on analogy and possibly iconicity in the conceptualization thereof. Much the same applies for language learning. Do speakers access their native frequency counts as a general hypothesis of classification or are perceptual similarities the cueing mechanism?

The exact nature of the processes involved is far from clear and both approaches raise many question that remain to be resolved. One of the main issues of the iconicist approach is in my opinion the fact that whether the predictions Haiman makes are supported by typological data or not, it does not provide direct evidence that the patterns are motivated and to be explained by iconicity and conceptual distance. To use the iconicist wording, it is far from clear whether the patterns in question reflect speakers' conceptualizations and interpretations of reality or whether they are a product of the analyst's post hoc secondary-iconic interpretations. Do speakers really *see* the similarity and make use of it in communication or does the linguist see the similarity because they *want* to see it? Ultimately, the same applies to the frequentist arguments, as suggested above. While we may see the 'how' at work in diachronic corpora and synchronic experimental research, it does not necessarily say anything about the 'why' of the range of phenomena in question. Taking this as my main research question, I hope to shed

some light on this problem.

It is quite common (not only) in linguistics that two parties in an argument hold their opinion as the solely correct one while denying wholly the opposing one. Although this is not entirely the case, both Haspelmath and Haiman accept the existence of iconicity and frequency effects respectively, it should be kept in mind that iconicity and frequency are not two mutually exclusive principles. As the above mentioned questions suggest, they are better seen as two mechanisms operating in language that are more or less exploited in different processing situations such as contact and learning situations, acquisition, language disorders, or normal native-to-native adult interaction. This applies to iconicity in general and to tightness iconicity in particular. Further research is indeed needed to show the precise nature and degree of involvement of all the processes involved.

3. Possessive classification: typological considerations and observations from Czech

3.1 Alienability: definitions and typological overview

We have seen in the previous chapter that differential possession marking is one of the more controversial topics in linguistic iconicity. I have taken this phenomenon to test possible involvement of iconicity in language processing. It is therefore important to review the major notions and some of the issues discussed in the literature. This section will proceed as follows. First, I will describe the difference between alienability and inalienability. I will then discuss possible motivations for the distinctions, and possible scenarios for the emergence of alienability splits. The remainder of this section will be dedicated to a discussion of possessives in Czech with focus on alienability effects.

The notion of alienability as a linguistic category goes back to Lévi-Bruhl (1916), who used the term alienabile possession to describe the peculiarities of possession coding in his research on Melanesian languages. The terminological opposition alienable vs. inalienable was then introduced by Uhlenbeck (1917). In his famous paper, Bally (1926) discussed the possible relevance of what he called personal sphere and solidarity in the syntax of Indo-European languages, taking issue with Lévy-Bruhl's claim that such a distinction is exotic and foreign to the Indo-European family. Alienability has become one of the central topics of research on the

expression of possession, drawing attention of both language specialists and typologists since these pioneering works. But what exactly is alienability? The term denotes a difference in categorization between two groups of linguistic items with regard to the conceptualization of possession. Inalienable items form a closed, oftentimes very small group of possessa that are conceptualized as inherently having a possessor or being hardly separable from one. On the other hand, alienable items may be labeled as 'other,' i.e. the items that are not conceived of by the speakers as necessarily having a possessor (PR). For instance, a hand differs in this respect from a table. A hand always implies a body, i.e. some PR, while a table can be bought, sold, or thrown away, and is not necessarily someone's.

This distinction is grammaticalized in many languages of the world and the two classes are treated differently in possession coding, hence the term differential possession marking. This distinction is usually observed on (though not necessarily restricted to) adnominal or attributive possession, i.e. both the possessor and the possessum (PM) are expressed in one NP headed by the possessum noun which is modified by a possessor NP, or a pronoun. I adopt in this work the account of alienability given in Chappell & McGregor (1989; 1996) who understand possession in a broader sense than just ownership, but rather in terms of establishing a relation of a some kind. They place the concepts on a three stage scale which continues with classification and which expresses the degree of referentiality of PM and the conceptual distance between PR and PM. Alienables or genitives code a semantic relation of non-inherent association between the referents. Such a relationship is established through the construction and not necessarily through any real world circumstances. Inalienables present a midpoint between alienables and classification. They express the idea of two entities being inextricably linked. Inalienable constructions are characterized by the fact that they do not "encode ownership nor establish any kind of voluntary or transitory association between the two nouns, but rather [express] a closely bound relationship" (Chappell and McGregor 1989, 28).

It should be further noted that differential possession marking covers two slightly different situations, obligatory possession, and possessive classification. The inalienable class is always marked for possession in obligatory possession. Bare inalienable nouns thus cannot stand as a free form. In case the possessor is to remain unexpressed, these languages make use of a special marker for unspecified PR or various derivational morphemes. A quick survey of the WALS data on obligatory possession shows that of the 244 sampled languages forty-three mark some nouns obligatorily for possession (Bickel and Nichols 2013a). Obligatory posses-

sion is exemplified in (16) (ibid.).

(16) Acoma (Keresan, USA)

possessed: *záça* 'his horn' (e.g. a stag's own horn)

derived free noun: *háçani* 'horn, a horn'

possessed free noun: *k'aháçani* 'his horn (e.g. a horn belonging to a person)'

The latter situation, possessive classification, is, as frequency data suggest, far more common. It denotes differences in the way possession is expressed on possessa. Inalienable possessa are typically marked for possession by simple juxtaposition with the possessor or by a bound morpheme cross-referencing the possessor. Schematically, PM PR or PM-PR PR. Alienable possessa are marked more robustly, typically by a (conceptual) genitive on the possessor, schematically PM PR-GEN, or PM GEN PR. Notice that this situation is predicted by the Iconicity-of-distance hypothesis. A look at the WALS data on possessive classification reveals that 118 languages of the 243 language sample have a grammaticalized category of possessive classification (Bickel and Nichols 2013b). Of these 118 languages, twenty-four have more than two possessive classes.[20] The binary opposition situation forms the canonical alienability split, i.e. the situation where the two classes behave differently in morphosyntactic terms, as in (17) (from Bickel and Nichols 2013b).

(17) Mesa Grande Diegueño (Cochimí Yuman, Mexico)

2-ətal^{y} vs. 2ə-n^{y}-ewa

1SG-mother vs. 1SG-AL-house

my mother vs. my house

While the examples used so far may give a general idea, it still remains to be cleared what items belong to the respective classes. The answer is not straightforward. The two most typical groups that are always fully or partially categorized as inalienable are body parts and kinship terms. There are also other lexical items that may be treated as inalienable and the exact delimitation of the category is language specific. Other classes of items typically categorized as inalienable (cross-linguistically) are summarized in (18) from (Chappell and McGregor 1989, 27) Notice that all these types can be said to be (or to have been at some point) a part of

20 More than two possessive classes are typical for e.g. Oceanic languages where inalienables are typically marked by a bound pronoun and alienables are marked with two or more possessive classifiers. Such classifiers commonly mark the distinction alimentary vs. other. See Palmer (2007) for examples.

the possessor, either literally, or metaphorically. This is easily related to Haiman's definition of conceptual closeness. Two concepts are close if they are "factually inseparable," or are "perceived as a unit."

(18) Common types of inalienable possessa

- body parts - kinship terms
- exuviae (blood, sweat, tears)
- aspects of personality including emotions
- forms of personal representation (terms for soul, reputation and name)
- concepts involving images of the person (footprints, shadow, photograph, story, song)
- important cultural concepts and objects of value

Typological data show that the exact paradigmatic makeup of the category varies widely (and wildly) across languages. Inalienable notions whose common denominator is hard to find are often encountered. There are also many different idiosyncrasies observed even among the 'core' group of body parts and kinship terms. These facts have been a source of discussions about the nature of inalienability. While some linguists see inalienability as a purely structural phenomenon, others maintain the position that it can be defined in semantic terms. The former view can be illustrated by Nichols (1988; 1992)'s analysis. In her broad cross-linguistic surveys, Nichols approaches alienability splits with her 'locus-of-marking' typology. This approach classifies languages and structures of languages in four types according to the placement (*locus*) of the marking of a relation between two linguistic elements. Structures can be head-marked, dependent-marked, double-marked, or zero-marked.[21] She finds that an emergence of alienability split is with one exception restricted to languages with head-marked possession in her sample, i.e. possession marked on the PM noun, e.g. the Maltese pattern *id-i* 'my hand.' In split situations, head-marking is reserved for inalienable nouns and alienables are dependent-marked as genitives, e.g. the Maltese *il-knisja tagħ-na* 'our church.' It follows from the examples above that inalienables can be also zero-marked, i.e. simply juxtaposed, e.g. *id Marija* 'Marija's hand.' Nichols analyzes the nouns marked as inalienable in the languages in her sample and finds that it is virtually impossible to characterize the class in se-

21 This typology can be illustrated schematically on the expression of possession. Possessum is the head and possessor is the dependent constituent in possessive constructions. Head-marking was already seen in Maltese, e.g. *bint-i* 'my daughter,' double-marking is found in Turkish, e.g. *perde-nin reng-i* 'curtain's color,' dependent-marking in English, e.g. *curtain's color*, zero-marking in Arabic, e.g. *law7 sattar* 'curtain's color'

mantic terms, and argues that alienability is best analyzed as a purely structural phenomenon. The inalienable class is, then, a class of lexical items that "[happen] to take inalienable possession marking in a given language." That is to say, it is a bundle of diverse words that behave alike not because of their conceptual similarity. The inalienable category rather emerges as a grouping of words that are most often possessed in conversation. She concludes that:

> "The semantics of the possessive relation follows automatically from the semantics of the nouns in the 'inalienable' class, but membership in the 'inalienable' class cannot be predicted from the semantics of the possessive relation, since there are lexical exceptions. […] 'Alienability', then, is basically not a semantic matter. Of all grammatical phenomena it is most like valence in that some nouns require particular kinds of dependents (bound nouns require possessors) and some nouns dictate the form to be taken by their dependents ('alienable' nouns … require one form of dependent, and 'inalienables' require another). Like valence, it lends itself to semantic generalizations over the lexical membership of form classes, but is not a piece of meaning that the speaker chooses to communicate."
>
> (Nichols 1988, 575–76)

Nichols tries to generalize over this lexical variation and offers an implicational hierarchy based on the types that are found among inalienables cross-linguistically. The hierarchy predicts that if a language codes one class as inalienable, it will do so in all the other groups that lie above (or left in the case of (18)) from it.

> (18) alienability hierarchy (Nichols 1988, 572)
>
> body parts and/or kinship terms > part-whole > spatial relations[22] > culturally basic possessed items > other

The opposing position claims that the alienability distinction arises from semantics or rather perceived proximities and similarities in the conceptual domain. This position is represented by Velazquez-Castillo (1996) in her study of alienability split in Guaraní. She argues that when a subjectivist view of meaning is taken, it is possible to define inalienables as a semantically based prototype category which is based on the following set of interrelated notions :

i. "conceptual dependence of the PM on the PR

ii. inherency of the relation

22 Spatial relations or directionals did not appear in previous discussion. However, this class of nouns that express spatial relationality, e.g. the Turkish forms like arka 'back,' yan 'side,' etc.

iii. inseparability between the PR and the PM

iv. permanency of the relation"

(Velázquez-Castillo 1996, 33:32)

All these notions are based not on objective real world relations, but on subjective conceptualizations of reality. Take, for instance, a hand. Being part of the PR's body, it is dependent on the PR and inherently related to the body. The inherency derives from the fact that such a (possessive) relation is given rather than established through some thoughtprocess. Although body parts are objectively separable from a body, the normal, most frequently encountered situation is attachment, and this norm surfaces as the conceptual inseparability of body parts from bodies. This, in turn, is related to the permanency of the relation: Hands are related to bodies in the same manner from (before) birth to death (and some time after). The notion of inherent relationality is discussed as a possible core feature of inalienables. As Dahl and Koptjevskaja-Tamm (1998) note, both body parts and kinship terms as well as directionals are both 'relational' and 'uni-relational,' while all alienables are 'non-relational' and 'multi-relational.' This at first sight confusing terminology deserves some explanation. Relationality (as opposed to non-relationality) is characterized by a high degree of conceptual dependency. Relational nouns are conceptually dependent in the sense that they must be understood in relation to something else (e.g. a body part to a body). Non-relational nouns are in this respect independent in that they are not conceptualized as necessarily related to another object or entity. Uni- and multi-relationality denotes the fact that uni-relational inalienable nouns establish a predictable (oftentimes the only possible) relation when conjoined with the PR. *Moje ruka* 'my hand' is, in almost the totality of cases, the hand that is attached to my arm at the wrist and is part of my body. On the other hand, alienables are multi-relational because the relation established by a possessive construction is open to interpretation. *Moje letadlo* 'my plane' can thus mean the plane I own, designed, have to catch, fly of all the pilots the most etc. In many cases, the ownership interpretation might not even be the most frequent one, as this example suggests. Recall also the definition of alienability given in Chappelle & McGregor (1989) already discussed.

The notion of conceptual autonomy and dependency is also interestingly treated in Lichtenberk (2005), who in his analyses of possessive classification in Oceanic languages argues that it is possessum *individuation* that underlies the usage of different types of possessive constructions. Individuation denotes in this context autonomy of a discourse element, i.e. the en-

tity is recognized as a distinct individual in the discourse. As Hopper and Thompson (1985) note, body parts are typically not autonomous entities and are physically undifferentiated from the PR. "Something which happens to or by means of a body part is normally done to or by the body part's possessor" (ibid. 167). This may be applied to other inalienables as well. An individuated PM is thus interpreted as an independent discourse participant in its own right. Lichtenberk claimes that alienable possessa are always conceptually individuated and inalienables are not. His argument is built around examples from languages represented here by Toqabaqita. Toqabaqita codes possessives for alienability in line with the frequent pattern where inalienables are marked with personal suffix on the possessum, while alienables are marked by juxtaposed independent pronouns.[23] This is illustrated in (19) (Lichtenberk 2005):

(19) Toqabaqita

gwalusu-na	vs.	biqu	nau
nose-1SG.PERS	vs.	house	1SG.IND
my nose	vs.	my house	

There are two interesting phenomena in the language that have to do with the possibility to mark inalienables with the alienable marker. First, when an inalienable noun is used with an alienable meaning, it is marked accordingly. Fote 'shoulder blade' is normally marked as inalienable, but takes the alienable grammar when used metaphorically. Similarly, the alienable possessive tells the interlocutor that the head is not the speaker's body part in (20).

(20) a.

fote-ku	vs.	fote	nau
shoulder.blade-1SG.PERS	vs.	paddle	1SG.IND
my shoulder	vs.	my paddle	

b.

gwau-ku	vs.	gwau	nau
head-1SG.PERS	vs.	head	1SG.IND
my head (part of my body)	vs.	my (e.g. fish) head (for me to eat)	

The other situation is related to the fact that inalienables in Toqabaqita and several other (even non-related) languages are underspecified for number and cannot be directly modified while

23 Data on nominal possessors are not given in the referenced paper.

in the inalienable construction. They are thus low in categoriality, referentiality and discourse prominence. In order to specify an inalienable noun, the alienable construction must be used, as in (21):

(21) maa-ku vs. maa mauli nau; maa nau naqi

eye-1SG.PERS vs. eye be.left 1SG.IND; eye 1SG.IND this

my eye(s) vs. my left eye; this eye of mine

Whenever an inalienable noun enters discourse as a distinct entity and is thus more individuated and specified, the change in its status is reflected by its taking the alienable marking. Lichtenberk makes an important observation with regard to iconicity when he points to the fact (or rather the analytic possibility) that this individuation, or separateness of possessa in similar cases is reflected by the linguistic separateness (cf. Haiman's note on individuation effects in distance iconicity in section 2.4). It should also be noted that these examples run counter to Nichols (1988)'s claim that coding of alienability "is not a piece of meaning that the speaker chooses to communicate." It is precisely the expression of alienability that alters the meaning of the utterance.

One more example is worth mentioning in this context. Movima is a language isolate spoken by approximately 1,500 speakers in the Beni Department in Bolivia. Possessive constructions of the language exhibit some properties interesting from the iconicity point of view. 'Core' inalienables (i.e. body parts and kinship terms) are obligatorily marked for possession in Movima. However, there is also special inalienability marking which is used to mark relationships that "can involve parts of wholes, natural products, material, colours, and also inseparable more abstract concepts" (Haude 2006, 238) A relatively high number of nouns can appear in this construction. Inalienable possession is marked with partial stem reduplication. (22a) illustrates obligatory possession, (22b) alienable possession, and (22c) shows the reduplication pattern (ibid.).

(22) Movima (isolate, Bolivia)

a. i'nes a:kay-a=n vs. i'nes a:kay-wa-wankwa

ART.F older.sibling-LV=2 vs. ART.F older.sibling-?-INSTR.ABS

your older sister vs. the/an older sister

b. ro:ya vs. roya=n

	house		house=2	
	house	vs.	your house	
c.	charaye<lo->lo=is;	ba:-ra	as	balo<si->si=a
	honey<INAL->=PL.AB;	finish-be.ntr	ART.N	pink<INAL->=N
	their honey (of the bees);	its pink (color) has worn off		

These examples are particularly interesting from my work's point of view as they might pose a problem for both the Iconicity-of-distance hypothesis and Haspelmath's frequentist account, discussed in section 2.5. Notice that while possessive markers remain the same in obligatory possession, alienables and inalienables, the only thing that changes is the obligatoriness of marking or stem alternation. Inalienability coding is thus bulkier and more complex than alienable possession in this particular case. On the iconicity account it might be hypothesized that tightness iconicity is suppressed by a competing iconic phenomenon, the quantity iconicity of reduplication. Reduplication iconicity might be connected with the conceptualization of inalienability conceptualization via its intensity meaning. What is less separable is, intuitively, interconnected more intensively, and what is more intense gets more coding material. The frequentist account would have to investigate the constructional frequencies of these ambiguous nouns. It might be found that the alienable readings are more frequent in the pair, and the reduplication in inalienability marking is one of the coding strategies for marking a secondary, less predictable meaning. This, interestingly, would not rule out the iconic interpretation. We may thus see that both approaches could find solutions to such counterexamples and that the two mechanisms are not mutually exclusive.

I have already touched upon possible scenarios for the emergence of alienability splits in previous section when discussing the diachronic aspects of the iconicist and the frequentist models. This issue has been, quite naturally, addressed by other authors in other contexts as well. Dahl & Koptjevskaja-Tamm (1998) and Koptjevskaja-Tamm (1996) show a possible scenario for the emergence of alienability split on the example of Maltese, which descends from classical Arabic. There was a uniform way of marking possession in classical Arabic: Pronominal possession was head-marked with a personal suffix and nominal possession was dependent-marked with a case ending. Spoken varieties of Arabic gradually lost case morphology and attributive possession with nominal possessors was expressed by a simple juxtaposition of PM and PR. This development is exemplified in (23).

(23) Arabic (Semitic, North Africa, Middle East)

a.	da:r-u	l-3umd-at-i;	ba:b-u	da:r-i-n
	house.SG-NOM	DEF-mayor-F.SG-GEN;	door.SG-NOM	house.SG-GEN-INDEF
b.	da:r	al-3umd-a;	ba:b	da:r
	house	DEF-mayor-F.SG;	door.SG	house.SG
	mayor's house;		a door of a house	

While this was not a problem for uni-relational nouns, multi-relationals are open to a range of interpretations. There was a "need for a more pronounced expression" of the relation between multi-relational possessa and possessors. A new analytic construction was introduced at this stage where PR was marked by a participle with the meaning 'belonging,' which grammaticalized into an of-preposition. This marking started as a strategy to mark possession explicitly using a word with a literal meaning related to ownership: *da:r bita:3a 3umda* 'house in mayor's possession.' While these processes were at work in the nominal PR constructions, the innovation started to attract also pronominal possessors by means of analogy. The archaic construction was retained in the inalienable group, because inherently relational, uni-relational nouns were unambiguous in the old possessive construction. Koptjevskaja-Tamm concludes that the relationality of inalienables worked together with frequency considerations in Maltese. That is, inalienables are more readily interpreted as possessed and are at the same time frequently marked for possession in discourse, which can result in chunks like PM-zero, or PM-PR. This scenario is proposed to be valid for alienability splits in general.

A very similar explanation is found in Heine (1997) who claims that possessive markers are eroded to zero in the initial stage and only juxtaposition of the PR and the PM is found. A renewal of marking follows which typically uses a locative, ablative or comitative marker. The new construction is not employed with inalienables because their being related to a possessor is the norm and need not be explicitly marked. However, this general pattern does not account for the frequently encountered head-marked inalienables. A similar analysis is found also in Nichols (1988; 1992) with the exception that she refuses semantics altogether and argues on purely structural terms that the older marking is retained only on those items that are talked about as possessed the most. She concludes:

> "A single diachronic process appears to motivate all of the attested patterns involving

> ‘alienability’: tighter bonding of possessive affixes, fusion of possessive affixes to nouns, and earlier lexicalization of possession, take place with those nouns which are most often possessed -- kin terms, body parts, and (in languages where they are lexicalized as nouns) inherently relational notions such as parts of wholes. In [obligatory possession], possessive morphemes are so constantly associated with certain nouns that they are lexicalized together and the nouns cannot be used without possessive affixes. In [alienability splits] the possessive affixes used on the closed (‘inalienable’) set of nouns are typically shorter, involve fewer morphemes than the open class, and in general look etymologically older [...].”
>
> (Nichols 1988, 579)

Let us now return to Haiman and the Iconicity-of-distance hypothesis. I repeat here under (24) the sub-hypothesis for alienability in its ‘strong’ version, which is corroborated by much, but not all the typological data, and its revised version from Croft (2008), which accounts also for Haspelmath (2008b)’s counterexamples.

> (24) a. “In no language will the linguistic distance between X and Y be greater in signaling inalienable possession, in expressions like ‘X’s Y’, than it is in signaling alienable possession.”
>
> b. “[A] conceptually more distant relation is encoded by a linguistically bulkier expression. This formulation changes the iconic mapping from distance between X and Y tolengthof the linguistic form used to code the relation between X and Y.”
>
> (Croft 2008, 54)

When we bring together the points made throughout this chapter, a very interesting picture emerges, especially if one relates Velazquez-Castillos’s conceptual (in)separability and Lichtenberk’s degree of possessum individuation to distance iconicity. Although the actual distribution of lexemes along alienability lines varies among languages, it is possible to find a core cluster of semantic features that derive from real world relations as conceptualized by the speakers. It may be argued that it is the difference in conceptualization that, in a way, drives alienability splits. Some concepts are perceived as naturally belonging to someone (or something), or, in other words, the conceptual distance between these referents and their possessors is perceived as relatively small, or even nonexistent. This in turn may work together with frequency effects and set into motion the process whereby two constructions arise with the ‘linguistically proximal’ one being reserved for inalienables precisely because they are conceptu-

alized in a different manner, i.e. as naturally belonging, attached and inseparable in their own right. The potential possession of the naturally independent pieces of reality needs to be stressed, marked more explicitly because of their being conceptualized as separate, or distant from their prospective possessors. It is also important to note that the predictions of the Iconicity-of-distance hypothesis do not tell us anything about what nouns in particular will be treated as inalienable. As Givón's meta-iconicity principle predicts, the categorization will be such as suits the needs of the language's speakers. And these may indeed vary with their habitat and consequent socio-cultural practices. This suggests that iconicity might be involved on the diachronic level in much the same way as Bybee's analysis shows for marker ordering in verbal inflection (section 2.4). Lichtenberk's analysis also suggests that speakers may manipulate linguistic material synchronically, exploiting iconicity (both language internal and external) as a communicative strategy to resolve pragmatically non-standard situations. This is in line with Haiman (2008)'s claim that iconicity is involved in the creation of novel ways of expression.

3.2 Possession in Czech and the role of alienability

Before I proceed to the test of the Iconicity-of-distance hypothesis, it is important to discuss the expression of possession in Czech. In order to investigate potential iconicity effects in alienability splits, I used speakers of Czech which is a language without differential possession marking.

Czech possession system generally fits the 'Standard Average European' pattern, i.e. alienability is not grammaticalized. Exceptions to this potential areal feature can be found on the edges of the European area. Similarly to Maltese already mentioned several times, alienability marking is found in Icelandic and Faroese, and in Scots Gaelic (Stolz et al. 2008; Stolz and Gorsemann 2001). On the other hand, Bally's 1926 paper demonstrated that even Indo-European languages show certain grammatical idiosyncrasies that can be explained by alienability effects, or concepts pertaining to the 'personal domain,' as Bally called the (oftentimes heterogenous) group of items including, as one would rightly guess, body parts and kinship terms. Unlike the phenomena discussed in the previous section, these alienability effects are not found on the phrasal level, but rather they operate on the clausal level, especially in form of external possession, also called possessor ascension. This is the case for the Czech possessive system as well. Before I proceed to the discussion of external possession and alienability

in Czech, it is worthwhile to briefly review adnominal possession in Czech.

Czech possessive system as a whole is treated in detail first in Zimek (1960)'s contrastive study of possession in Czech and Russian and later in Piťha (1992)'s monograph that covers all the possibilities of the expression of possession in Czech and offers a strictly structurally oriented analysis of the possession grammar. Adnominal possession in Czech fits the definition of alienable possession given in Chappell & McGregor (1989). It serves to express not only possession in the narrow sense (i.e. ownership), but to establish a relation in general, as evidenced by the examples in (25), none of which codes possession in the narrow sense.[24] The Dutchman in (a) is a professional racer, who was driving the car. The genitives in (b) and (c) code the patient, or the agent of a nominalized predicate (see also below).

(25) a. vůz Holanďana udělal několik kotrmelců

the Dutchman's car made a few somersaults

b. koalice, jíž by obžaloba Jiřího Čunka pořádně zkomplikovala život

the coalition who could be severly troubled by the prosecution of J. Č.

c. Tento minerál je nezbytný pro tvorbu kostí

This mineral is essentially for ossification

Attributive possession is always dependent-marked in Czech, both with nominal and pronominal possessors. There are three ways of possession marking in Czech: i) possessive pronouns with pronominal possessors, ii) 'possessive adjectives' with certain kinds of nominal possessors, and iii) the more general genitive case which may in principle be employed with all nominal possessors. These are exemplified in (26) and will be treated in further detail. Beside these patterns, Zimek (1960) and Piťha (1992) give also other coding strategies that establish either a relation of a kind or possession in the narrow sense. That includes several prepositions with locative or directional meanings, such as *noha od stolu* 'table leg,' or and two classes of relational adjectives, e.g. *psí štěkot* 'dog bark,' and *dárcovský materiál* 'donor material.' Although these constructions fit the pattern of alienable possession as defined above, I only mention them here without further discussion, since I am concerned only with such constructions that have the potential to express possession in the narrow sense.

24 The Czech examples used throughout this section come from the Czech National Corpus (syn2010), unless indicated otherwise.

(26) Different ways of expressing possession (b. and c. were contructed after a.)

a. possessive pronoun: *její vztah s Bibbim* ‘her relationship with Bibbi’

b. possessive adjective: *Mariin vztah s Bibbim* ‘Marie's relationship with Bibbi’

c. genitive: *vztah naší sousedky s Bibbim* ‘our neighbor's relationship with Bibbi’

There is a set of eight possessive pronouns in Czech. All the pronouns are with one exception marked for person and number, only 3. person singular is also marked for gender with the feminine pronoun *její* ‘her’ vs. the unified masculine/neuter form *jeho* ‘his/its.’ There is also a special reflexive-possessive pronoun *svůj* ‘self’s’ which is used in contexts where pronominal possessor in a possessive NP is identical with the subject of the sentence. According to Čmejrková (2003), there is a strong tendency to use the person-marked pronouns instead to reduce ambiguity. Possessive pronouns are placed before nouns and generally agree with the head in case, number, and gender and behave thus like adjectival modifiers in NPs, as evidenced in (27).

(27) Bál se patrně mého hlas-u.

fear-PST.PRT.M REFL apparently my.GEN.SG.M voice-GEN.SG.M

He was apparently scared by my voice.

‘Possessive adjectives’ form a special class of adjectives. These adjectives are formed with the derivational morphemes *-ův/-in* and only certain nouns are allowed in this construction (Prouzová 1964; Piťha 1991a; 1991b). Their formation is restricted to morphological nouns, i.e. cases such as the adjectival noun *hajný* ‘gamekeeper’ are excluded. A noun must also be declinable, and only persons and certain person-like beings in the singular are allowed in possessive adjectives. The *-ův* type is formed with animate masculines, *-in* with feminines. The possessor must be a bare NP, modification or relative clauses are not possible, as indicated by (28), in (b) the PR noun *matka* ‘mother’ is modified by a possessive pronoun *naše* ‘our,’ in (c) by a relative sentence.

(28) a. slova napodobovala tón

word.NOM.PL.N mimic.PST.PRT.PL.N tone

matčina hlasu

mother.POSS.F.GEN.SG.M voice.gen.sg.m

the words were mimicking the tone of mother's voice

b. *slova napodobovala tón naše matčina hlasu.

c. *slova napodobovala tón matčina, která nedávno zemřela, hlasu.

In cases where all these conditions hold, a possessive adjective is the default choice. Like possessive pronouns, possessive adjectives are pre-nominal and agree with the head in case, number and gender. Piťha (1991b) comments on the semantics of this construction. Possessive adjectives code the agent or patient when used with deverbative nominals, e.g. *Husovo upálení* 'the burning of Hus,' or *Karlův příchod* 'Karel's coming.' Otherwise, the meanings range from inalienability, alienable ownership, and authorship, to a general relation which is specified through the possessum's relationality and lexical semantics and the context. Postnominal genitive is then used in all the other cases of nominal possession and is generally synonymous with the possessive adjective construction, although there may be certain nuanced differences with regard to definiteness and individuation (see Prouzova (1964) and Piťha (1992) for a detailed discussion).

As noted earlier, external possession is a topic that generally calls for considerations of alienability not only in Czech. External possession, also called possessor ascension is a syntactic phenomenon whereby the PR is expressed not within the possessive NP but as an independent constituent. Payne and Barshi give a description:

> "We take core instances of *external possession* (EP) to be constructions in which a semantic possessor-possessum relation is expressed by coding the possessor (PR) as a core grammatical relation of the verb and in a constituent separate from that which contains the possessum (PM). ... [T]he PR is expressed like a direct, governed, argument of one of the three universally attested basic predicate types (intransitive, transitive, or ditransitive). … [T]he possessor-possessum relationship cannot reside in a possessive lexical predicate such as *have*, *own* or *be located at* and the lexical verb root does not in any other way have a PR within its core argument frame. Thus, despite being coded as a core argument, the PR is not licensed by the argument frame of the verb root itself - and herein resides the intrinsic fascination of EP constructions."
>
> (Payne and Barshi 1999, 39:3)

An interesting comment is also found in Hopper & Thomson (1985)'s paper. They claim that body parts are typically not individuated in discourse (cf. Lichtenberk's analysis above). They

argue that they are low in categoriality because of their discourse status and that possessor ascension is motivated by their low categoriality. Possessors are kept outside the possessum NP because NP modifiers present one of the trappings of the category noun.

External possessors are expressed as datives in Czech and are used with both nominal and pronominal possessors. This construction is analyzed by some authors (see Křivan (2007) for a detailed review) as an instance and subtype of 'free dative' (*volný dativ*), i.e. a dative object which is not required by the predicate verb's valence and represents a facultative element in the sentence structure. On the other hand, Macháčková (1992) in her paper argues contrary to previous views that external possessor dative should be treated as obligatory in argument structure. Piťha (1971; 1992) argues that no such category as possessive dative should be defined for Czech. External possession (a term not used by the author), he further claims, is just a special context-dependent reading of the 'dative of interest' with a broader scope of meanings which are united by the affectedness of the dative referent by the event denoted by the verb. To use Dahl and Koptjevskaja-Tamm (1998)'s terminology, he claims that relational and uni-relational nouns favor the possessive reading to such a degree that all the other interpretations are virtually excluded. This does not, says Piťha, give a reason to establish possessive dative as a distinct category of Czech.

While Piťha's view may be justified from a strictly structuralist form-oriented point of view taken in his analysis, when one takes a less restricted position, a distinct dative possessive construction may be found in Czech that is quite productive and probably frequent as well. More recently, Fried (1999; 2009) provides a detailed analysis of external possession in Czech from the perspective of Construction Grammar (cf. e.g. Fried and Ostman (2004)). Fried provides ample evidence for a specific possessive dative construction that is differentiated from adnominal possession both morphosyntactically, and semantically.

(29) Difference between external possession and genitives (from Fried (1999))

a. Zryl už jsi matce zahradu?

dig.up.PST.PRT.SG.M already AUX.2SG mother.DAT.SG.F garden.ACC.SG.F

Have you dug up mother's yard for her?

b. Zryl už jsi matčinu zahradu?

dig.up.PST.PRT.SG.M already AUX.2SG mother.POSS.ACC.SG.F garden.ACC.SG.F

Have you dug up mother's yard?

c. Zvoní ti budík.

ring.PRES.3SG 2SG.DAT alarm.clock.NOM.SG.M

Your alarm clock is ringing

d. Spadlo mu do oka smítko.

fall.PST.PRT.SG.N 3SG.M.DAT in eye.GEN.SG.N dust.NOM.SG.N

A speck of dust got into his eye.

The example (29a) and (29b) shows semantic differences between external and internal possession. The externally possessed variant implies involvement of the possessor in the event and consequently a tighter relation to the possessum. Only the (a) variant implies that mother is the current owner of the garden. The (a), (c), and (d) examples show that transitive objects, intransitive subjects and certain oblique objects may be possessed externally.

Drawing on her previous research, Fried (2009) proceeds in her corpus based study by closely examining the cluster of properties that underlie the differences between external possession and adnominal possession, i.e. the semantic and pragmatic features of the possessor and the possessum, the involvement of the PR in the event expressed by the clause, verb semantics, and information flow. Two important factors are shown to play a role in external possession in Czech, i.e. alienability and possessor affectedness. Body parts overwhelmingly prefer external possession and so do, to a lesser extent, kinship terms. There are also other possessa that occur frequently with external possessors and that are conditioned culturally and are "inherently relevant to human beings and the routines of their daily existence" (ibid. 235). These possessa are divided into 7 groups based on their semantics:

a) "things that are part or features of self (body parts; name, title; speech; life; doubt, memory, intention, self-confidence, right to decide, etc.)

b) members of 'family', understood broadly as a culturally established unit of shared domestic life (kinship relations, pets and other domestic animals)

c) garments and their parts

d) environment perceived as essential to our existence, including dwellings and their parts (world; house, door, plumbing, bathroom; prison cell; backyard)

e) objects useful in an individual's daily life (cars, toys, flashlights, money, tickets, guitar strings)

f) common activities and established rituals (journey, wedding, funeral, graduation, education, vacation, holidays)

g) social and/or political organization (state/country, constitution, reform)"

(Fried 2009, 225)

The other important factor influencing the distribution of this pattern is possessor affectedness, or the degree of possessor involvement in the depicted events. This feature is shared by other dative-marked roles such as experiencer, recipient, beneficiary, and especially by the dative of interest which is closely related to the possessive dative (Fried 1999). This is also evidenced by the relevance of verb semantics in external possession. While the genitives are independent of verb semantics, external possession is allowed only with verbs whose semantics is compatible with affectedness.[25] Affectedness is shown to be a key feature that helps to explain the prevalence of inalienable possessa in this construction:[26]

> "[External possession] casts the possession relation as something that is relevant to the PR in a particular way, as something in his sphere of interest beyond just the fact of being owned. [External possession] signals that the PR is being affected (positively or negatively) by something that affects the PM. [...] The tighter the possessive relationship, the greater the chance that manipulating the PM will directly affect the PR." (Fried 2009, 220–21)

We may briefly summarize that the notion of alienability is to a certain extent relevant to Czech and suggest that speakers categorize possessa for alienability. It appears that this very general semantic distinction is at work even in languages that do not explicitly code it. The possessor affectedness reading of the external possessive construction is also closely related to the conceptual dependence or relationality. Inherently dependent, i.e. inalienable possessa are conceptualized as parts of wholes, i.e. parts of possessors. Such direct link between PM and PR implies a high possibility that the PR is affected through the PM, or has an interest on the outcome of the predicated event. As I will argue further, speakers of Czech therefore provide

25 Such verbs include "contact" predicates like *spravit* 'fix,' *umýt* 'wash,' "verbs of removing", e.g. *vzít* 'take away,' *ukrást* 'steal,' *ustřihnout* 'cut off,' and intransitives expressing "spontaneous processes without any identifiable instigator", such as *zemřít* 'die,' *padat* 'fall,' *smrdět* 'stink' (Fried 2009).

26 This phenomenon is not uncommon in world's languages. See e.g. Mithun (2001)'s analysis of noun incorporation in North American languages for a similar conclusion about the relationship between affectedness and alienability.

ideal subjects for a study of iconicity effects in alienability splits.

4 Artificial language learning as a possible extension of linguistic typology

As in other branches of (not only) social sciences, there are basically two possible sources of data that can serve as evidence for verifying or falsifying hypotheses of theoretical approaches: a) observation of a given phenomenon in its natural environment, or b) experimental research conducted in controlled (laboratory) environment. Both approaches have their advantages and issues resulting from their specifics and are best used together in a complementary fashion, whenever possible. The Artificial language learning (ALL) paradigm, frequently also called artificial grammar learning is a well established experimental paradigm used in psycholinguistics since the 1960s, when Reber (1967) published the pioneering study on rule extraction and generalization.[27] ALL is used as a methodology to collect behavioral language data in laboratory environment. While it is extremely complicated, if not impossible, to single out different variables that partake in language acquisition and learning, ALL offers an alternative to the observation of 'natural' acquisition situations (Culbertson 2012).

In a typical ALL experiment, a miniature artificial language is generated from a defined inventory of sounds and syllabic structures. The structure and complexity as well as the lexicon and 'morphemicon' size depend on the particular research question and varies from units of words and single-word stimuli to dozens of words and complex sentence stimuli (Tily and Jaeger 2011). While there are numerous experimental procedures, the basic principle remains the same. Two or more varieties of an artificial language are created that differ with respect to the condition under investigation. These different varieties are then taught to individual test subjects or groups of subjects whose task is to learn the stimulus grammar. There are, in principle, two general paradigms: the between-participant design and the mixture shift paradigm. In the between-participant (or alternatively between-group) design, each subject is randomly assigned to one of the artificial language variants and differences in test performance between the two (or more) groups are observed. The mixture shift paradigm was introduced recently specifically with regard to the typology oriented ALL research (see below) (Culbertson 2010; Culbertson et al. 2010; Culbertson and Smolensky 2012; Culbertson et al. 2013). In the mix-

27 Some authors distinguish between the two. Artificial grammar learning is, then, understood as a subtype of ALL focused on syntax (Folia et al. 2010).

ture shift paradigm, subjects are exposed to a mixed artificial grammar with two (or possibly more) ways of coding a grammatical relation (e.g. AN and NA word order). Subjects are expected to regularize to one of the variants and these regularization patterns are observed and analyzed.

Different testing procedures are employed to measure subjects' performance rates in order to compare relative learnability of the respective varieties in relation to the test condition. ALL experiments may be conducted in a single session or in several sessions over multiple day periods, again, depending on the research question and the particular design. Test tasks commonly draw on tasks typically used in natural language psycholinguistic experiments. Competence-based tasks commonly rely on grammaticality or forced-choice judgements in which subjects distinguish patterns which correspond to the training language from those that do not. When production performance is tested, subjects are trained on a subset of data and tested on their ability to generalize to held-out data. (Culbertson 2012) The nature of the stimuli also varies. Audio stimuli, i.e. syllables or words in ALL experiments are recorded by human speakers or synthesized using specialized software. Experiments targeting phonology usually do not include any semantic mapping and only strings of sounds are presented, while experiments focused on grammar have lexicons that depict objects (real-world or randomly generated shapes), persons, and events presented by pictorial or video stimuli. Sophisticated software using video game-like interface has also been used (Tily, Frank, and Jaeger 2011).

ALL has been used to study a range of topics concerned with acquisition mechanisms both in child and adult subjects, the most typical being parsing studies, i.e. learners' ability to segment out words and syllables from strings of sounds. Other common topics are acquisition of sequence regularities, generalization of syntactic relations, and acquisition of syntactic categories. (for a detailed review see Folia (2010), or Pothos (2007)) A novel paradigm has been proposed recently by some authors that suggests the application of ALL methods in typological research following recent studies that, from different positions, criticize standard approaches to the explanation of cross-linguistically frequent, systematically recurrent patterns in linguistic typology, be it the Greenbergian, or Chomskyan line of thinking.[28] Several au-

28 These two general frameworks in typology are sometimes named after their respective founding figures. Chomskyan typology is grounded in the Generative theory. Linguistic diversity is studied from the viewpoint of Universal Grammar and universals of language are interpreted as a set of domain specific, arbitrary constraints that form the basis of the human faculty of language. J. Greenberg is the founder of functional typology. Language structure is claimed to be shaped by the functions of language, i.e. language structure is adapted to the needs of language users. The cognitive processes involved are instances of domain general processing mechanisms and constraints.

thors (Evans and Levinson 2009; Bybee 2010; Dunn et al. 2011) have suggested that typology may have overestimated the role of cognitive factors (top-down processes). Contrary to previous views, these authors claim that attested typological patterns should be explained by cognition-external factors such as deep time genetic relations, language contact, historical and geographic factors, or, in some usage-based models, linguistic factors that are mapped not to some cognitive constraints and processing biases, but rather to interactional and communicative principles (bottom up processes, cf. section 2.5). In a reaction to Dunn et al. (2011)'s paper Tily and Jaeger (2011b) suggest that conventional quantitative typological research should be complemented by behavioral data from ALL experiments.

The proponents of typological applications of ALL argue that this methodology can be used as an auxiliary method in quantitative typological studies that can help to show whether cognition-internal explanations of observed cross-linguistically frequent patterns are justified. They suggest that if the behavioral data collected during ALL experiments are in line with a particular typological generalization, an explanation (albeit possibly a partial one) in terms of processing biases is strongly supported, since all the other factors are ruled out in laboratory conditions. These processing biases surface in ALL experiments as "learning biases," i.e. factors that favor acquisition of some forms over others. Culbertson et al. (2012) characterize such "substantive biases" with a rule: "acquire grammars that do not incorporate particular disfavored structures." While some authors propose robust mathematical models of learning (e.g. Culbertson et al. (2013), or Culbertson and Smolensky (2012)), the logic behind this suggestion is rather straightforward. If learners' preferences conform to proposed cognitive preferences, it is possible that these are real and play a role in the way language structure is shaped. This is, then, tied directly to one of the possible issues of this method, i.e. influences of subjects' previous language experiences.

It is generally accepted that the processes involved in ALL type of acquisition situation are essentially the same as in natural language acquisition. Data collected from child and adult subjects also suggest that learning mechanisms in both types of subjects are to a great extent comparable (Folia et al. 2010). On the other hand, Goldberg (2013) in her comment on Culbertson et al. (2012)'s paper that reports on ALL data concerning one of Greenberg's word order correlations suggests that other less strong explanations might be possible that concern subjects' native language influences and their experience with structures from other languages. To avoid, or rather minimize such effects, monolingual speakers are commonly re-

cruited as subjects and such structures are chosen that differ from the native language of the participants used in the particular experiment.[29]

Closely related to typologically oriented ALL research are studies that use ALL in addressing questions related to language emergence and evolution. These studies understand language evolution in terms of cultural evolution and transmission and generational transmission is argued to be the major mechanism of language change. However, this claim is far from unproblematic because it marginalizes intra-speaker language change and horizontal transmission. Some studies suggest that speakers' idiolects change significantly even after complete acquisition was reached and that horizontal transmission is at least as important as vertical transmission. It may well be the case that adult speakers are even much more significant agents of change than children (see Bybee (2010) for a discussion). The vertical transmission hypothesis is investigated using the Iterated artificial language learning paradigm (IALL) (Smith et al. 2003; Kirby 2007; Kirby et al. 2008). The transmission model in its simplified, single-speaker version assumes that the first generational speaker *s* has a certain hypothesis about the language's grammar which surfaces in their linguistic behavior. This linguistic behavior of speaker *s* serves in turn as a source of hypotheses created by speaker *s+1*, which will be reflected in their linguistic behavior and so forth. In IALL experiments, the first generation of speakers is trained on an artificial grammar and their knowledge is then presented to the second generation and so forth. Notice, however, that the speaker *s+1* would to some extent simultaneously affect speaker s in real-life conditions. Such influences are disregarded in standard IALL experiments. Changes from the original artificial language to the language of the n-th generation of speakers are observed and analyzed. Tily and Jaeger (2011) suggest that this paradigm can also be used in linguistic typology on the assumption that inter-generational changes might lead to the emergence of cross-linguistically frequent patterns.

It is worth mentioning that most of the proponents of ALL application in typology have background in generative theories, particularly in Optimality Theory and optimality theoretic typology. ALL is thus frequently used to argue for the existence of the language faculty and domain-specific sets of arbitrary (as opposed to functional) rules and constraints. There is, however, no reason to exclude this interesting method solely on these grounds. I believe that the opposite is true and that the ALL paradigm is readily transferable to functionally oriented research as a promising framework-free experimental method. This is already evidenced in M.

29 The participants are by and large native speakers of English, since the bulk of typologically oriented ALL research is done in English speaking countries.

H. Christiansen's work (Ellefson and Christiansen 2000; Christiansen and Chater 2008) whose research is grounded in functional theory and who uses ALL experiments to argue that domain-general processing and learning principles influence and shape linguistic structures, together with other, cognition-external factors.

5 The experiment

5.1 The hypothesis

At this point, I would like to summarize very briefly the topics touched upon in the previous sections, and bring them together in the form of a hypothesis that underlies the experiment presented in this chapter. The Iconicity-of-distance hypothesis formulated by Haiman is a general hypothesis about a principle that motivates, and can therefore explain some of the cross-linguistically recurring patterns. When applied to specific cases, it is formulated as a typological generalization and seeks to explain the shape of certain linguistic structures, such as differential coding of possession. Iconicity of distance as a subtype of iconicity in language is a communicative strategy and a cognitive mechanism that can be linked to general perceptual mechanisms and conceptualization of reality. These have to do with similarity perception and analogy. Iconicity of distance may be thus conceived of as a cross-modal analogy, i.e. the structure of language tends to be in harmony with the structure of reality. I believe that it is clear that this principle is cognitively grounded and is independent of cognition-external factors. It is possible to say that the Iconicity-of-distance hypothesis is a hypothesis about a cognitive bias that influences the structure of language. We have seen that typologically oriented ALL research assumes that cognitive biases play a role in acquisition in the form of corresponding learning biases. If we adopt this view, which is, in principle, in line with functional typological theory, we may assume that languages which conform to tightness iconicity (in this particular case) present an advantage in processing, and, consequently, in learning as well, and will be prefered over a language whose grammar is structured counter-iconically. This is also suggested by Givon's iconicity meta-principles that claim that iconcic language is easier to process. Indeed, this would hold only upon the assumption that iconicity plays a role in online processing. Recall also the claim that iconicity effects are more pronounced in abnormal processing situations, such as acquisition. Therefore, ALL appears to be especially suitable for testing if iconicity partakes on language processing.

I have chosen differential possession marking for the experiment because I believe that this phenomenon makes a perfect candidate for an ALL experiment. It is suggested by several authors (see especially the experimental research in Lichtenberk xy, recall also the WALS data) that alienability is a universal notion that plays a role in categorization and is directly linked to the conceptualization of reality. On the other hand, there are many languages that do not reflect this distinction explicitly in their structure. It is possible to say with this in mind that the problem of L1 influences, and influences of previous linguistic experience in general, in ALL is ruled out, because all languages do to some extent deal with this distinction. I expect that participants will recognize alienability (or conceptual dependence) as the factor governing the distribution of the respective constructions and that they will categorize the lexical items in the artificial grammar for alienability. On the other hand, they will not be familiar with the grammatical pattern coding the distinction. The issue of using adult participants raised by some authors using the ALL paradigm (see section 4) is also not relevant for this work, since I subscribe to the usage based models that acknowledge the role of adult speakers as agents of language change. What could be more problematic is the nature of the structure under investigation. We have seen that ALL experiments are typically concerned with formal morphosyntactic phenomena such as word order and branching, or affixation. Possessive classification and iconicity effects, although expressed formally by different morphosyntactic devices, are linked more directly to the conceptual domain. It is therefore my aim to apply ALL on this phenomenon and to investigate the potentials and limits of the method in this pilot study. The structures in questions are also technically suitable for the method, since they are easily transformed into ALL stimuli.

To test possible iconicity effects in differential marking of possession, an ALL experiment was designed using the between-participants paradigm.[30] A working hypothesis concerning possible influences of iconicity on language learnability was formulated:

H_w: Languages that exhibit iconically structured grammar are easier to process and cognitively prefered. If the possession marking in a language with alienability split conforms to the Iconicity-of-distance hypothesis, it will be easier to process. If two languages differ only in iconicity, the iconic grammar will be easier to learn than its counter-iconic counterpart.

The null hypothesis H_0 predicts that iconicity has no influence on language learnability:

30 A within-participant design would not be particularly suitable due to the nature of the phenomenon under investigation.

H_0: If two languages differ only in iconicity, no differences in learnability will be observed.

In the remainder of this section, the experimental design will be described first, and the results of the experiment will be discussed.

5.2 The participants

As already noted in the section on possession in Czech, I decided to use only those participants who are native speakers of Czech. There are several reasons for this decision. It was demonstrated above that alienability plays a role in the organization of the possessive system in Czech, albeit a minor one. This creates an ideal ground for the present test of the Iconicity-of-distance hypothesis. It is possible to assume that the differences in the conceptualization of possession based on alienability are psychologically real universally, i.e. even in speakers of languages that do not make overt coding distinctions. This is also suggested by the results of Lichtenberk's psycholinguistic experiments which show that speakers of English reflected alienability differences in the experimental conditions. This assumption was further strengthened by the results of my experiment as I hope to demonstrate in this section. On the other hand, the fact that Czech does not have a differential coding of possession in adnominal possessive phrases makes its speakers ideal participants because L1 influences are excluded, as already noted above. The results of the experiment may therefore be considered as resulting from general, language non-specific preferences. It should be noted that full 'linguistic profiles' of the participants were not obtained and this is, of course, an issue. On the other hand, it is reasonable to expect that the majority of participants had no previous experience with a language with differential possession coding, judging from the programs they attend. In the feedback questionnaires collected after the experiment, only one participant, a student of general linguistics, used a terminology that suggested previous knowledge of the phenomenon.

Forty participants were recruited for the experiment. The sample size was decided based on previous studies of comparable scope (e.g. Culbertson and Legendre (2010)) and consulted with Filip Smolík, the director of the Laboratory of Behavioral and Linguistic Studies (Labels). Considering that this is a pilot study, the size of the sample is certainly acceptable. All the participants were undergraduate students of different specializations at Charles University in Prague and were all recruited via the Labels registration system (available at http://experimenty-labels.cz/public). The sample may be characterized as a random sample drawn from the pool of students required to take part in a Labels experiment by their respective depart-

ments. Most of the subjects participated to fulfill a partial requirement for course credit. Each participant was additionally payed Czk 200 after the second session in order to ensure that all the participants were recruited in a short time period. This was a matter of project schedule rather than a methodologically motivated decision. Because the experiment followed a between-subjects design, the participants were randomly divided into two groups of twenty. The i-group was trained on the iconic grammar, and the c-group was trained on the non-, or counter-iconic grammar. The demographic profiles of the participants are given in table 1.

	i-group	c-group
female	15	15
male	5	5
age	21.7; 21	21; 21
philology	10	11
other	10	9

table 1: demographic profiles of the test groups, age is given as 'mean; median'

Although the groups were generated randomly, it can be seen that both groups are comparable with respect to all the demographic variables. The participants' specialization deserves further comment, since it might be assumed that it could influence the results of the experiment. The fact that many participants have a background in philology has two possible consequences. First, it may be assumed that they have a deeper awareness of linguistic diversity and metalinguistic proficiency than the general population, and second, they may be expected to be better language-learners. While both these facts make extrapolation to the whole population of the speakers of Czech problematic, their being better learners may partially exclude learning skills as an important factor that could influence the results. Additionally, the use of such participants is all the more justified considering this is a pilot study. If the null hypothesis was statistically more correct in the population of 'language-sensitive speakers,' there would be no reason to carry on the research on an extended sample including 'standard,' i.e. linguistically less aware speakers.

5.3 The stimuli

The miniature artificial language (AL, named 'Nuka Nuka' in the experiment) used in the experiment was created with several considerations. The AL was created to be as distinct from

Czech as possible, and to be simple to comprehend, and acquire at the same time. It was also desirable to keep the AL 'typologically probable,' i.e. to devise such sound inventory and grammatical structures that could, in principle, be found in natural languages of the world. First, an inventory of sounds was created. The size of the inventory was created in such a way to enable the generation of enough mutually dissimilar syllables and words. The sounds of AL were selected to represent cross-linguistically frequent phonemes that could be easily pronounced by speakers of Czech. The sound inventory is given in table 2.

vowel	stop	sonorant	obstruent
a	p	m	f
e	t	n	s
i	k	l	x
u		r	h

table 2: the sounds of AL

Vocalic qualities do not differ from their Czech counterparts, neither do most of the consonants. The only consonant that is not found in the Czech system is the voiceless laryngeal fricative /h/. This was also the only source of problems in the learning process. Because /h/ is voiced in Czech and /x/ is its voiceless counterpart and /h/ and /x/ may be expected to be acoustically similar for Czech speakers, a merger of /h/ and /x/ was observed in some participants, in either directions. Such cases were not counted as errors, and the merger is rendered as H in relevant cases (see below). /x/ was also realized as [ks] in a few tokens, resulting from orthographic conventions in Czech, where the grapheme 'x' represents the sound string [ks], while the phoneme /x/ is written with the digraph 'ch.' Another difference from Czech is the chosen stress pattern. To make the words of AL sound distinct from Czech, word-final stress was employed. The most simple and cross-linguistically frequent syllabic structure was used, i.e. CV.

In the second step, the words of AL were generated. Twenty words were used in the experiment, following the general pattern CVCV. (fn. All the sequences as well as all the other randomizations were generated with the use of the services at www.random.org.) In order to keep the words dissimilar and easier to learn, the lexicon was controlled for phonological similarity (for more information see e.g. Austin et al. (2007)). However, no words were altered. The whole lexicon is summarized in table 3. A quick inspection of the lexemes shows that only

kafi ‘ear’ and *kefe* ‘chair’ share two consonants and differ only in the vowels.

AL alienable	translation	AL inalienable	translation
matu	table	mexa	glasses
tite	clock	sixi	nose
xuki	lamp	xisa	hand
kefe	chair	kafi	ear
nuli	picture	nima	baby
famu	book	napa	shoe
laxe	flower	luka	mouth
pifa	doctor	pena	hat
lehi	mug	hiku	eye
xehe	kite	seta	dog

table 3: the lexicon of AL, sorted by alienability class

The conceptual poles of the words are also given in table 3. They were selected with two points in mind. First, a half of the lexical items (i.e. ten words) had to be inalienable, the other half alienable. The inalienables were selected with respect to the general, cross-linguistic tendencies (body parts, kinship terms), and to the classes defined in Fried (2009) (garments, pets). Second, the concepts had to be easy to depict with regard to the nature of the visual stimuli (see below).

A few additional items were created for the grammar learning part. A name for the possessor depicted in the visual stimuli was chosen. The name, ‘Petiru’ (Peter), was derived from European languages to help the speakers identify the word. In the beginning of the second session (see further below), a simple presentational sentence appeared, introducing Petiru the possessor: Titi Petiru ‘This (be) Petiru.’ In the remainder of the session, a single grammatical construction with two variants was used. The constructions expressed adnominal possession with pronominal possessor, schematically *his possessum*. The possessor was expressed either with a bound morpheme attached to the possessum, or with a prepositional phrase. The construction thus mirrored the ‘canonical’ instance of distance iconicity as seen in Maltese, as seen in (30). In the iconic variant, inalienable possessa were head-marked with a cross-referential suffix *-s*, and alienables were dependent-marked with a prepositional phrase *ta-ha*. The markers

were switched in the counter-iconic grammar, so that the proximal construction marked alienability, and the distal construction inalienability.

(30) a. il-karozza tiegħ-u > nuli ta-ha
DEF-car of-3SG > picture of-3SG
his car > his picture

b. ras-u > xisa-s
head-3SG > hand-3SG
his head > his hand

Both audio and visual stimuli were used. The lexical items were recorded both in isolation and in the possessive construction by a male student of phonetics and general linguistics, a native speaker of Czech. Every item was recorded several times into a single audio file during one session. The recording was edited with Audacity (Andrews), removing background noise and enhancing volume, and chosen instances were extracted from the original file using Praat (Boersma 2001). The lexemes and the constructions were paired with a set of simple black and white pictures that I drew on the Asus eeeNote tablet. I decided to include both pictorial and textual stimuli to enhance the learnability of the lexicon and the grammar. The text was presented in the DmDX (Foster and Foster 2003) default format. All the phonemes were represented by a single grapheme using the standard ASCII character set, as noted above /x/ was represented with the IPA character 'x'. The pronominal suffix *-s* '-he' was written as a part of the possessum word, as would be expected, while the preposition and the pronoun were written as one graphic word in the prepositional phrase, i.e. *taha* 'of-he.'

5.4 The procedure

The experiment was conducted in two sessions on two consecutive days. The participants were trained on the lexicon during the first session. Grammar training followed in the second session. The experiment was designed and presented with DmDX, a free software for stimulus presentation in behavioral experiments. It was conducted in the Labels laboratory. The experiment scripts were run on the laboratory's hardware (two laptops, one desktop PC). The participants interacted directly with the computer program during the experiment and any assistance from the administrator (ML) was not necessary. This design enabled three sessions to be run

simultaneously. Each participant was alone in a separate room with the computer. Before the experiment was launched, the administrator briefed the participant about how the experiment proceeds and how to control it. The participants were wearing headphones with a microphone. The audio stimuli were presented through the headphones and the microphone was used in some tasks to record participants' responses. The experiment was controlled with a keyboard. The first session took on average twenty to thirty minutes, the second ten to twenty minutes. The times varied because overall pace of the experiment was set individually by each participant, save for the test tasks. The experiments were identical for both the i-group and the c-group. The only difference was the inverse distribution of the two possessive constructions.

The first session, the lexical training, consisted of three learning cycles, each followed by a test task. All twenty lexical items were presented in a random order in every learning cycle, and randomizations were performed by the software at the beginning of the experiment. For each item, a corresponding audio file was played and the written form of the word and a picture showing the meaning of the item appeared on the screen simultaneously. The participants were asked in the instructions that preceded the cycle to repeat the word in order to enhance the learning process. The participants were thus exposed to each word six times during the lexical training session. Three test tasks were performed during the first session following each learning cycle, and each task was slightly increased in difficulty. In the first task, an audio file was played and a corresponding word appeared on the screen in each test item. Simultaneously, two pictures appeared and the participants were asked to decide which picture depicted the stimulus word. Twenty test items were presented in random order. However, the particular picture pairings were the same for all the participants. There was a ten second time limit for all the test tasks and reaction times were recorded together with responses. In the second task, a word appeared on the screen and an audio file was played as in the first task. One picture was presented simultaneously and the participants were asked to decide whether the stimulus word matched the picture. Again, twenty test items were presented, ten with positive, and ten with negative answers. While the order of the items was random, the individual response mappings did not vary between subjects. After the third cycle, a naming task was employed. A picture depicting one of the words in the lexicon appeared on the screen for each test item and the participants were asked to name what they saw.

Participants learned the grammatical constructions of AL in the second session. The participants were told in the introductory instructions that they would learn a certain grammatical

pattern of the language during the session. It is important to note that the participants were not explicitly told the exact meaning or function of the construction. However, they were cued indirectly in the instructions. While the possessor Petiru was introduced, the participants were informed by the software that they would first meet Petiru and then see some of his belongings: Nejprve vam predstavime Petiru, ktery je mluvcim tohoto jazyka, pote vzdy neco, co mu patri. (First, we will introduce you to Petiru who is a speaker of this language [Nuka Nuka], then [we will present] at each time something that belongs to him.) In the ALL experiments discussed in section 4, the participants were not informed about the nature of the grammatical constructions presented during the experiment. Situations reflecting natural (as opposed to in-class) acquisition seem to be generally prefered in the ALL literature. My solution is a mid-way between the two possibilities. It was indeed important that the participants understood the grammar they were to learn. On the other hand, the situation was kept a little less formal in this way. It might be argued that the results could be influenced by this decision and rightly so. On the other hand, the feedback questionnaires collected after the experiment showed that the majority of participants did interpret the grammar as expressing possession (see Results and discussion). And even in case of the participants who did not reason out the precise meaning of the construction, it must be kept in mind that distance iconicity in possessive constructions is just one of the particular instances of a single general principle described by the Iconicity-of-distance hypothesis. Therefore, I would interpret such cases as still testing a general sensitivity to iconicity in grammar and relevant to iconicity effects in differential possession coding.

While the lexical training included all the lexical items, only a subset of these was used in the grammar training, so that the withheld items could be used for the generalization task. Fourteen items were included in the training part, and the remaining six items (three alienable and three inalienable) were used for generalization. Table # shows the two groups. The training proceeded in similar fashion as in the first session. However, the test tasks were not employed between the learning cycles, but thereafter. Four learning cycles were presented in the first part of the session. The constructions were presented with audio files and written words as in the lexical training session. The situation expressed by the construction was likewise depicted in pictorial stimuli. Petiru the possessor was shown together with his possession which was highlighted by a red circle.

Again, participants were asked to repeat the construction and move to the next item whenever

ready. The four learning cycles were followed by two very short test tasks with only the possessa used in training. In the first task, two variants of the construction appeared with the same possessum, which was also depicted in a picture. No audio was played in the task. Participants were asked to decide which of the two is the grammatical variant for the given lexeme. Four test items were presented in random order, while the possessa in the items remained the same. Response time was reduced to five seconds for all the test tasks in the second session and participants were notified in the instructions for each task. I decided to reduce the time in order to force the participants into the first, intuitive reaction. A grammaticality judgement task followed. A picture showing a possession situation for one of the lexical items appeared on the screen. A possessive construction appeared on the screen and the corresponding audio file was played. The participants were asked to decide whether the construction was grammatical or not. Four test items were again presented. These tasks were followed by familiarization of the words that were not included in the grammar training. The lexemes were presented in the same manner as in the first session, i.e. picture, sound, and text. Repetition of the words was not required this time, and transitions between items were automatic. Each word was shown for ten seconds. The familiarization was followed by the last task. A picture appeared on the screen and the participants were asked to describe the situation in the picture using the grammar they learned. Ten test items were presented in total, six withheld lexemes, and four words that were included in grammar training. The familiar data were distributed among the three task evenly, i.e. each item appeared only in one of the tasks. The experiment was over after the last test task was finished. The participants were then asked to fill in a short questionnaire. The questionnaire asked for basic demographic data, in this case age, gender, and specialization, and two question concerning the experiment. The participants were asked about the meaning of the grammar, and any rules and regularities in the distribution of the constructions.

5.5 Results and discussion

The data collected from each participant were scored and coded into a single dataset for further processing and analyses. The results for tasks 1 and 2 in both lexical (hereafter referred to as L1 and L2), and grammar training (hereafter G1 and G2) were extracted directly from the DmDX environment. Correct or incorrect responses, and reaction times in milliseconds (from stimulus onset to keystroke) were recorded by the software and directly exported. A correct

response was scored one point, an incorrect answer zero points, thus the maximum score in L1 and L2 was twenty points each, in G1 and G2 it was four points each.

The results for task 3 (hereafter L3, and G3 respectively) in lexical and grammar training needed to be further processed, because only audio files with recorded responses were obtained during the experiment. All the responses were transcribed for scoring. If the participant corrected themselves, the last variant was recorded as the final answer. A two point scale was used for the scoring. In L3 the response was scored two points if it matched the target word exactly. If the response word differed from the target word in only one sound, the response was scored one point. Otherwise, the items were scored zero points. Two remarks need to be done here. As was already noted above, the occasional merger of /h/ and /x/ was not counted as error, e.g. for the target word xehe (kite), both the exact match xehe, and any of the possible variants of HeHe were counted as correct and scored two points. This decision was based on the acoustic similarity of the two phonemes as well as the fact that there were no minimal pairs in the data. Second, there were several tokens which were counted as zeros but which were intuitively very similar to their respective target words, the most frequent case being vowel metathesis, e.g. *kifa* instead of the target word *kafi* 'nose.' On the other hand, a method more rigorous than feeling of similarity had to be employed. These mistakes were also distributed evenly enough to prevent any skewing of the results.

G3 was evaluated with the focus on the possession marking. Two points were scored when the response construction matched the target construction exactly, or if the possessum word was altered in one segment. One participant used a slightly altered variant of the dependent-marked construction, xatu instead of taha. These responses were counted as correct, if the construction was grammatical, because the marker was used systematically. If the construction was marked with correct grammar, but the possessum differed significantly, the response was scored one point. In the remaining cases (no marking, ungrammatical marking) the response was counted as incorrect (zero points). It follows from the nature of L3 and G3 responses that reaction times were not recorded directly, however, reaction times (response onset times) were extracted for G3 using Praat.

Before I proceed to the analysis of the results of the experiment, I would like to discuss how the participants reacted to the meaning of the grammar, i.e. alienability split. If we look at the questionnaires, in which the participants were asked to specify their hypotheses about the meaning of the grammar, we find that twenty-four participants (60%), 13 in the i-group and

11 in the c-group, identified the construction as expressing possession. The second most frequent answer (3+2) was related to verbal morphology. Participants stated that the grammar expressed that the stimulus word is being held, touched, or manipulated. The second related question asked about the system underlying the distribution of the constructions. Almost all the participants gave the answer by way of enumerating the items, or the semantic fields in the inalienable group (body parts, garments, animals, kid), while the alienable group was treated as the more general class reserved for all other items by the participants. However, some participants tried to find a more general pattern, or classificatory criterion. Twenty-seven responses of this kind were collected. The second most frequent answer (5+3) suggested that the classification is based on animacy, owing to the fact that many, though not all items in the group are, broadly speaking, animate (baby, dog, and, in a way, body parts). More interestingly, the highest number of participants (19) identified a classification based on characteristics which may be subsumed under inalienability and may be interpreted as a layman account thereof. It is worth mentioning that 'distance,' or 'direct relation' appeared multiple times in the questionnaires. It is possible to say that these impressions made by the participants over a set of unfamiliar linguistic data point to the universality of this categorial distinction and its semantic nature, derived from salient perceptual and conceptual differences, as argued for by some authors. The speakers of Czech readily recognize inalienability as a unifying principle behind the grouping of items in the data. It is also possible to take a step further and inspect the test items qualitatively. Table 4 shows mean scores for individual test items in the grammatical training (the two groups do not differ significantly).

target word	task	mean score
mouth	G1	0.95
picture	G1	0.96
mug	G1	0.8
flower	G1	0.95
nose	G2	0.93
lamp	G2	0.95
eye	G2	0.86
doctor	G2	0.85
table	G3	1.35
glasses	G3	1.46
baby	G3	1.88
shoe	G3	1.65
book*	G3	1.25
clock*	G3	1.43
kite*	G3	1.43
hat*	G3	1.05
ear*	G3	1.16
hand*	G3	0.85

table 4: mean scores for individual lexical items in grammar tests, maximum score for G1, and G2 is 1.0, maximum score for G3 is 2.0, words with asterisks were held out during the training cycles

The items in G1 and G2 have generally higher scores, which is probably caused by the fact that only stimuli from the training part were present, and the stimulus constructions were presented on the screen (and with an audio file in case of G2). 'Mug' in G1 and 'doctor' in G2 are the most problematic, although the differences are minimal. I have no explanation for the first case, but it is possible that 'doctor,' as alienable concept, collided with some participants' animacy hypothesis. In G3 the scores of the novel items are not generally lower, as could be expected, suggesting that classification was quite clear for the majority of participants (note that the scores are above 1.0). The most problematic items are 'hat,' 'ear,' and 'hand.' 'Hat' appears to be the most ambiguous in terms of categorizatioh, belonging to the same group as

shoes and glasses (garments). On the other hand, it is the most loosely attached piece of clothing ('wearable') in the group. I also suppose that the errors in 'hand' derive from the form of the possessum, since only nine participants produced the target possessum word 'xisa.'

Notice also that the two groups of participants do not differ markedly with respect to the interpretation of the grammar, with slightly more cases in the i-group. This points to the fact that subjects interpret the data under the iconic and counter-iconic condition in the same direction vis-a-vis the given data paired with meanings presented in the form of visual stimuli. This fact is in line with the claims of the typologically oriented ALL research. Dispreferred structures and languages are not impossible, but languages exhibiting such features are disfavored in the learning process. Haiman does not say anything about this question other than that iconicity is the norm and counter-iconic grammars are not expected to be typologically rare, if encountered at all.

We may now proceed to the test of the hypothesis described in 5.1, and the analysis of the results. In the first step, the results of lexical training were prepared for comparison. Overall scores (Lsum) of the test tasks in lexical training are given in table 5 with standard descriptives. The statistics in the analysis were performed in Deducer (Fellows 2012), a GUI build for R (R Development Core Team 2013), using R version 2.15.0.

Lsum	i-group	c-group
mean	56.7	57.2
median	56.5	57.5
SD	11.6	10.0

table 5: comparison of the the performance of the test groups in lexical training

We may see at first glance that both the i-group and the c-group are very similar in the test results from the first session. This is corroborated by further analysis which shows that the two groups do not differ significantly in Lsum scores ($t(38) < 1.0$, $p > 0.1$).[31] This finding shows that both groups performed comparably well in lexical training and there are no significantly better learners in any of the two groups. This in turn means that possible differences discovered in grammar learning are not caused by uneven distribution of learning skills among the groups. This allows us to move further in the analysis. In case the groups differed in learning skills, further analysis would be problematic since the cause of any additional differences

31 Similar results are obtained for the particular test tasks, as could be expected.

would not be clear.

Gsum	i-group	c-group
mean	21.2	20.5
median	22	21
SD	4.2	4.6

table 6: comparison of the the performance of the test groups in grammar learning

Table 6 shows overall results (Gsum) of the test tasks in grammar learning with standard descriptives. When we compare the results of the two groups, the findings are very similar to those obtained for lexical training tasks. Although the values are slightly higher in the i-group, the tests show that there are no statistically significant differences between the i-group and the c-group ($t(38) < 1\ .0$, $p > 0.1$). These results show that the i-group did not perform significantly better as would be predicted by the Hw hypothesis. This suggests that iconicity effects do not play a significant role in language processing and that iconically structured grammar does not enhance learning effectiveness.

However, before accepting that the iconicity hypothesis Hw has been disproved, it is worthwhile to further continue the analysis. It is possible that some differences might be found on a more subtle level, based on the claim that iconicity in grammar is consciously accessible only to a limited extent. On-line recorded and off-line extracted reaction times were taken as a source for analysis in the next step. I decided to use reaction times for correct answers only, because previous analysis showed that the two groups do not differ in test scores. When we compare reaction times of the two groups, the tests show that this time the difference between the groups is highly significant ($t(38) = 3.378$, $p < 0.002$) The overall reaction times of the i-group were better than those of the c-group. Since it was already demonstrated that the participants in both groups are equal learners, we might assume that the differences in reaction times are an effect of the way the two grammars are structured, i.e. (counter-)iconicity, and that iconicity does enhance processing. However, there is one more test that needs to be done before any version of Hw can be accepted. There is a possibility that the participants in the c-group generally behave differently in task types employed in this experiment, i.e. they react more slowly in all the tasks. To test this possibility reaction times recorded for L1 and L2 were compared between the two groups. The results show that the differences between i-group and c-group are significant ($t(38) = 2.049$, $p = 0.047$). It may be the case that the c-

group participants are slower problem solvers in general. On the other hand, the levels of significance for the two sessions differ markedly and the data suggest that the differences in grammar learning might to a certain extent be caused by iconicity. The evidence is thus not definitively conclusive. Iconic grammar reflecting the conceptualization of reality might be processed more easily and thus faster as predicted by the H_w hypothesis, suggesting that iconicity is involved in language processing and acquisition. Such result would point in two directions. It might be possible that distance iconicity operates on this less obvious, subtle level. This could be linked to the assumption that iconicity in grammar may not be consciously accessible by the speakers and operates on the subconscious level. It could also be the case that greater, or more direct influences of iconicity were not observed due to the design features of the experiment. The minimal differences observed in test performances might be caused by the size of the AL's lexicon, or the nature of test tasks, and the number of test items. On the other hand, there is a possibility that the differences found in the data were caused by external factors, i.e. the nature of the samples. Further research is needed to show if such (and other) modifications would yield different results.

6 Conclusion

I have addressed the problem of iconicity in language in this thesis and I have tried to test whether distance iconicity plays any role in language learning and processing with my experiment. The differential marking of possession was selected as an instantiation of distance iconicity for the test. Although the evidence is inconclusive potentially interesting results were obtained.

In chapter 2 I addressed the problem of linguistic iconicity from different perspectives. The historical overview demonstrated that the debates about the relationship between language and reality are a recurring topic in thinking about language. Going back to Ancient Greece, the issue predates scientific linguistics by centuries. The postulate of the arbitrariness of the linguistic sign was formulated by Saussure and accepted by most linguists for the greater part of the 20th century. This position was challenged in the 1980s by Haiman, Givón, and other functionalists.

In the second section of chapter 2, I discussed the semiotic foundations of iconicity. Iconicity is oftentimes used in the sense of non-arbitrariness in the literature. The notion of iconicity is

directly linked to the perception of similarity and arises as an interpretive act of speakers (interpreters of signs). Iconicity plays a major role in typological explanations and is implicated in language processing, learning, and development by some authors. I presented the Iconicity-of-distance hypothesis as a typological generalization that offers predictions and explanatory basis for a range of grammatical structures. This view is challenged by linguists who argue that frequency effects shape linguistic structures. I proposed that both frequency and iconicity are important factors in language change and processing, and that they can be seen as two forces that may work together, or against eachother in different situations.

I chapter 3, I discussed the differential marking of possession from a typological perspective and the role it plays in the expression of possession in Czech. Based on the literature, I suggested that possessive classification is based semantically. Conceptual distance and independence of the possessum are two general, mutually interrelated dimensions that play role in possessive classification. The distribution of external possessive constructions in Czech is also co-determined by these two factors.

I showed that the artificial language learning paradigm can be used as an auxiliary method in linguistic typology and I suggested that this experimental paradigm could be used as a framework-free methodology and that it is readily applicable in the functional typological research.

The experiment presented in chapter 5 was designed with all these facts in mind. I used the ALL methodology to test a hypothesis based on the Iconicity-of-distance hypothesis. I selected differential possession marking as the structure and used speakers of Czech as participants in the experiment. Although it is only a pilot study, interesting data were collected that encourage future research. The speakers of Czech, a language without an overt coding of inalienable possession, interpreted the grammar in the experiment as alienability and were able to categorize the lexical items in the tests with respect to alienability. This result supports the claim that alienability is an important, universal category that derives from the way speakers conceptualize reality.

The analysis of the test data showed that differences in test performance between the two groups of participants were not statistically significant with respect to iconicity. However, the evidence is in my view inconclusive. Although the differences were not significant, the data suggest that iconicity may to some extent influence the reaction times and could be involved in language processing. Further research will be needed to resolve this question. The results

suggest that ALL can be used in this field. Future research could use a larger, and more varied sample, and the experiment could be extended. A more complex artificial grammar is desirable with more items and test tasks to enable more data to be collected, since the limited scope of the tests in my experiment was one of the drawbacks of this research, together with the sample that included participants who are generally more sensitive to linguistic stimuli.

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