Motivated sign formation in Hieroglyphic Egyptian and German Sign Language (DGS)

Towards a typology of iconic signs in visual linguistic systems[*]

Eliese-Sophia Lincke & Silvia Kutscher, Berlin

Abstract

In Spoken Egyptian, the form of a linguistic sign is restricted by rules of root structure and consonant compatibility as well as word-formation patterns. Hieroglyphic Egyptian, however, displays additional principles of sign formation. Iconicity is one of the crucial features of a part of its sign inventory. In this article, hieroglyphic iconicity will be investigated by means of a preliminary comparative typology originally developed for German Sign Language (Kutscher 2010). We argue that patterns found in Egyptian hieroglyphic sign formation are systematically comparable to patterns of German Sign Language (DGS). These patterns determine what types of lexical meaning can be inferred from iconic linguistic signs.

Introduction

Since de Saussure's seminal work on the nature of language, his maxim of the arbitrariness of the linguistic sign has led most linguists to rate iconicity in language as a rather marginal phenomenon irrelevant for linguistic theorising. Within the functional-cognitive linguistic paradigm, however, opinions have changed due to influential studies by Haiman (1980, 1983) and others (e.g. authors in Haiman 1985). Ever since, it has turned out that iconic, i.e. motivated form-meaning relationships, are less exceptional than one might expect and can be found not only in syntactic structures,

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but also systematically on the phonological level, e.g. in phonestemes, ideophones or in vowel qualities as associated with semantic contrast (Hinton *et al.* 1994; Voeltz & Kilian-Hatz 2001; Fischer 1999: 126-129). In Egyptian, we can presume that iconicity is even more prominent in written forms, namely in iconic hieroglyphs, than in their spoken counterparts. The large number of iconic hieroglyphs and the semiotic strategies that they represent therefore deserve our attention.

Until its decipherment, hieroglyphic Egyptian was believed to have a purely iconic-logographic, or even extra-linguistic, nature. The seemingly solely iconic character of Egyptian hieroglyphs has fooled scholars across centuries and maybe prevented successful reading. This erroneous paradigm was finally proven wrong by Champollion's groundbreaking description of the principles of the hieroglyphic writing system. Interestingly, however, since Champollion's exhaustive treatise of iconic hieroglyphs as part of his *Grammaire égyptienne* (1836), the systematic description of the semiotic principles governing iconic hieroglyphs has not raised any particular interest for the next 150 years, with the exception of the individual hieroglyphic inventories of the Graeco-Roman temples. Nevertheless, the iconic nature of numerous hieroglyphs has often been utilised indirectly in particular cases when it helps the modern scholar to fill gaps in lexical knowledge. If so, they are either employed to infer lexical meaning by means of its hieroglyphic form and to confirm meaning developed by other means of lexical semantic research or to identify actual referents in discourse.[1] The differences in the translations of Pyr. 435a (PT 293) by Sethe and Allen illustrate how information provided by an iconic hieroglyph, in this case used as a classifier, leads to different interpretations of a text and, as a consequence, to diverging translations (italics are our own).

Pyr. 435a		Pyr. 435b		
	'Gefallen ist (einst) in den Nil eine heilige Person als der zur Neunheit gehörende *Pelikan. Fliehe*, *fliehe*!		(Untier, leg dich nieder.)'	(Sethe 1962, vol. 2: 209)
	'The *Sunshine's* Servant has fallen in the inundation, *turned away*, *turned away*:		(monster, lie down!)'	(Allen 2005: 54, W199!)

We infer from these translations the following glosses[2] for the three attestations of this paragraph in the pyramids of Wanjash[3] (a), Taataj (b) and Pijaapij I (c) (upper lines after Sethe, lower lines after Allen):

1a)

			psD-t-(y)-				
xr-	Hm	m-	(y)-	m-	Hp-	jfn-	jfn-
fall.PFV-CLF	majesty	in-	Ennead-F-(ADZ)-CLF	in-	Nile-CLF	flee.IMP-CLF	flee.IMP-CLF

xr-	Hm-psD-t-		m-	Hp-	jfn-	jfn-
fall.PFV-CLF	servant-sunshine-F-CLF		in-	inundation-CLF	turn_away.STAT-CLF	turn_away.STAT-CLF

(Pyr. 435a[W], after Sethe 1960)

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1   For *referent classification*, cf. Lincke & Kammerzell (this volume).
2   Glossing follows the suggestions made by Di Biase-Dyson, Kammerzell & Werning (2009).
3   The reconstruction of pharaonic names is taken from Lincke & Kammerzell (this volume).

b)

				psD-t-				
xr-	Hm	m-	(y)-		m-	Hp-	jfn-	jfn-
fall.PFV-CLF	majesty	in-	Ennead-F-(ADZ)-CLF		in-	Nile-CLF	flee.IMP-CLF	flee.IMP-CLF
Xr-	*Hm-psD-t-*				m-	Hp-	jfn-	jfn-
fall.PFV-CLF	servant-sunshine-F-CLF				in-	inundation-CLF	turn_away.STAT-CLF	turn_away.STAT-CLF

(Pyr. 435a[T], after Sethe 1960)

c)

				psD-t-				
xr	Hm	m-	(y)-		m-	Hp-	jfn-	jfn-
fall.PFV	majesty	in-	Ennead-F-(ADZ)-CLF		in-	Nile-CLF	flee.IMP-CLF	flee.IMP-CLF
xr	Hm-psD-t-				m-	Hp-	jfn-	jfn-
fall.PFV	servant-sunshine-F-CLF				in-	inundation-CLF	turn_away.STAT-CLF	turn_away.STAT-CLF

(Pyr. 435a[P], P/A/E 28, after Pierre-Croisiau 2001)

It is evident from these translations that Sethe and Allen utilised the classifiers of the rarely attested *Hm-psD-t* and *jfn* in order to render their translation more precisely. Sethe oriented himself to Wanjash's version (Ex. 1a) with the respective classifiers and. He rendered the pelican as the referent of *Hm-psD-t* and attributed to *jfn* a meaning that highlights the speed of the manner-of-motion. Allen, by contrast, adapts his interpretation to the classifiers, ignoring the pelican of Wanjash's version, and, hinting at a motion event that is oriented backwards. Both classifiers are attested in the versions from Taataj's and Pijaapij's pyramids (Ex. 1b-c). In spite of this, Allen's translation of this passage is listed under Wanjash's Pyramid Texts.

Iconic hieroglyphs in Egyptian function either as classifiers (like in Ex. 1) or as logograms. In this paper, we will focus on iconic logograms,[4] as well as unique and repeater-like classifiers.[5] Both mentioned sign function classes are subsumed under the term *semogram* (Schenkel 2005: 42-51). Semograms fulfil the condition [+meaningful] (Kammerzell 2004; cf. Lincke & Kammerzell, this volume, Table 1) in contrast to phonograms in the wider sense that are [–meaningful].

The question arises as to how meaning is encoded in an iconic hieroglyph. Which semiotic principles can be detected in meaning-encoding and what degree of specificity can be reached? What are regular form-meaning-referent relationships and where are the limits of the hieroglyphic system? In other words: What are the potentials and constraints of iconic hieroglyphs? In this article, we aim to demonstrate the principles of iconic sign formation in Egyptian, i.e. the types of semiotic relationships between hieroglyph and referent that are based on iconicity and that help us infer (lexical)

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4   There is, of course, also a rather limited number of non-iconic logograms that will not be considered.

5   All classifiers in Egyptian are more or less iconic but we will restrain ourselves to these most striking types.

meaning. By doing so, we hope to contribute to a better understanding of the possible contribution of studies on hieroglyphic iconicity to lexical semantic research and translation.

We chose to exemplify the features and sub-types of iconicity of the Egyptian hieroglyphic inventory by demonstrating that the formative principles for a hieroglyphic icon are in no way unique. For this purpose, we will compare the principles of iconicity in two different linguistic systems: (1) hieroglyphic Egyptian and (2) German Sign Language (Deutsche Gebärdensprache, DGS). Both systems share the visual modality but constitute different modes, *writing* on the one hand and *signing* on the other hand.

We will demonstrate firstly that the form of the signs in these two linguistic systems makes use of the same underlying principles of iconicity. Secondly, it will be shown that the systems are determined by affordances which differ due to the modes (cf. Section 2.5) in which both are used: 2-dimensional space and static depiction with script and 3-dimensional space and dynamicity in signing, respectively. We will discuss to what extent a shared modality, on the one hand, and divergent modes, on the other hand, result in common sign formation principles and to what extent they differ.

Our approach in this paper is not corpus-based. Therefore, we are dealing with types, not with tokens or the sign inventories of particular periods, regions, text genres, or even scribal schools. Also, allographs (graphic variants of a hieroglyphic type) are not our concern here. We only investigate the affordances of a system that have been utilised in order to create a hieroglyphic form at one point in time or another, whether they are attested on a regular basis or just once.

1 Are Egyptian hieroglyphs and German Sign Language comparable?

1.1 Motivations for a comparison

There are two reasons why we suggest a shared typology of two different linguistic systems. (1) The first steps made towards exploring iconic signs in both systems gave the impression that iconicity in signing and writing is comparable. The similarities suggested that a joint typology would be fruitful. The aim of such a typology is to work out the systematic analogies and divergences in the iconicity of both systems. We base this investigation on a typology of DGS signs recently proposed by Kutscher (2010). (2) It is our declared aim to avoid idiosyncrasies. In order to do so, it is very helpful to include different systems so that shared characteristics will be placed at the centre of the typology while particular properties of individual systems are described as differences and not falsely considered as universal semiotic key points. To compare systems of different modes in the same modality, i.e. writing and signing, seems particularly promising in this respect. In one of the next steps, the typology is going to be tested on other visual systems in order to find out whether they also exemplify these shared principles. Thus, the typology has been developed with further extension as its aim. It is preliminary and open for expansion in order to include other communication systems of the visual modality (diverse systems of writing, signing, and co-speech gesturing).

Furthermore, the history of research of both German Sign Language (DGS) and Hieroglyphic Egyptian shows some communalities that have hindered studies on their iconic character, at least partially. When DGS and sign languages in general fought for their acceptance as fully functional languages, most researchers chose to downplay their iconic features because of the paradigm of the symbolic nature of language coined by de Saussure (e.g. Frishberg 1975). Similarly, the iconic factor in classic hieroglyphic Egyptian — although apparent to every learner of that language — was not treated systematically after Champollion. Champollion himself discussed at length the iconic relationships of logogram and lexeme that he subdivided into "caractères mimiques ou figuratifs" and "caractères tropiques ou symboliques" (1836: 22). He was also concerned with the relationship between classifier (that he called "déterminatif") and host in several chapters (1836: chapters III-V). However, his discovery of phonograms, i.e. non-iconic hieroglyphs, which correspond to consonants of Spoken Language, put an end to the interest in Egyptian hieroglyphic iconicity. The latter lost its role as the key to understanding hieroglyphic inscriptions. The phonetic reading of Egyptian led to a scientific examination of the pre-Coptic chronolects, while the study of iconicity and of the semiotic form-meaning relationships of hieroglyphs was neglected with the exception of some smaller contributions, e.g. by Henry G. Fischer (esp. 1976). As for Ptolemaic hieroglyphic writing, several scholars pursued the question of the individual motivation and choice of hieroglyphs in particular temples (e.g., Cauville 2002, Derchain 1991, Fairman 1945, Junker 1903, Sauneron 1982).[6] But — with the exception of Derchain (1991) — a systematic matching or comparison of the principles applied in these texts with semiotic models in a typological framework has not been the aim of these contributions.[7] Sign formation in the Greco-Roman Period seems to have been an intellectual game based on a thorough knowledge of religious and esoteric concepts that were probably only accessible to a priestly elite and not to all members of the broader culture. Therefore, we will leave this period aside in this pilot typology. Furthermore, cryptography has raised some interest but remains a small subpart of the writing system within well-defined contexts.[8] Since Goldwasser (1995), however, the preoccupation with semiotic bases of Egyptian writing systems and iconicity in pre-Ptolemaic Egyptian has been slowly re-entering Egyptology. This newly developing interest has engendered a more careful evaluation of the properties of these systems as well as of their ancient and historic explorations (starting with Goldwasser 1995 and 2002, Allon 2010, von Lieven 2010, Lincke 2011).

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6   We are indebted to Jean Winand for raising the question of Ptolemaic and for pointing out some references on Ptolemaic hieroglyphic writing.

7   Derchain (1991: 245-246) presents a semiotic model which does not match our concept of the relationship of Spoken and Written Language and of Percean Semiotics. We will briefly come back to this in Section 2.1.

8   For a discussion of literature on and the principles of Egyptian hieroglyphic cryptography, see Werning (2008).

1.2 Some basic information on German Sign Language

Sign languages are natural human languages that have emerged over the course of decades (e.g. Nicaraguan Sign Language), or even centuries (e.g. French Sign Language) as communicative systems among communities of deaf people. Sign languages are produced in the visual-gestural modality and transmitted over multiple channels: not only manual gestures, but also mimics, head and torso movements, eye gaze as well as configurations of the lips (mouth gestures) are used as part of the linguistic system of sign languages. While the most important channel for providing lexical and morphosyntactic information is the manual one, the mimics of the upper part of the face and the movements of head and body give information comparable to prosodic means in oral languages, eye gaze is comparable to morphological agreement in oral languages, and mouth gestures are comparable to oral language manner adverbials.[9] In fighting for the acknowledgment of sign languages as fully developed linguistic systems comparable in complexity to spoken languages, linguistic research on sign languages started in the middle of the 20th century by focusing on the investigation of commonalities in linguistic structure between signed and spoken languages (for an overview on the history of sign language research, see Liddell 2002). Indeed, spoken and signed languages have been found to share fundamental linguistic properties on all levels of the language system, including not only morphosyntax and semantics but also phonology and prosody (for an overview, see Sandler & Lillo-Martin 2006). Recent research, however, also discusses decisive differences of signed languages that contrast them to all spoken language systems, such as simultaneity in syntax and the pervasiveness of imagistic iconicity on the lexical level (e.g. Taub 2001; van der Kooij 2002; Meier et al., eds. 2002; Pizzuto et al., eds. 2007).[10]

The sign language investigated in this paper, German Sign Language (Deutsche Gebärdensprache, DGS), is the visual-gestural language used by the majority of deaf and by some hard of hearing persons in Germany. Note that German Sign Language and German are genetically and typologically unrelated languages. The designation as German is due to fact that it is the sign language of deaf Germans. The number of persons in Germany for whom DGS is the preferred means of communication is estimated at approximately 80,000 signers. The vast majority of deaf children (approx. 90%) are born into families in which they are the only deaf member. In addition, one aim of the educational institutions for the deaf is to teach the oral language and the writing system of German. As a consequence, DGS is in close contact to German and is influenced by German, especially at the lexical level. In the following, we restrict ourselves to giving some basic information about the phonological structure of DGS

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9   Since these so-called non-manual components of sign languages are of no relevance for the focus of this paper, we will not go into details, but see e.g. Wilbur & Patschke (1998), Sandler (1999), Wilbur (2000), Brentari & Crossley (2002), Kutscher (2007).

10 A note of caution is in order here. Typological research within the group of sign languages is only at the beginning. Most of the sign languages studied to some detail are languages from Western industrial countries. Recent work on sign languages from other parts of the world shows that the heretofore assumed structural uniformity in sign languages may have to be qualified (Nyst 2007, Schwager & Zeshan 2008).

and its sign formation processes, since other levels of the language system are irrelevant for the purpose of this paper.

On the phonological level, DGS, like other sign languages, has language-specific sets of minimal meaningless units, combinations of which produce meaningful units, namely manual gestures called *signs* in sign language linguistics. As this paper concerns itself with semiotics, which means that the term *sign* would lie ambiguously between the semiotic sense and the sign language linguistic sense, in the following we will call a sign language sign a *DGS sign* and restrict the term *sign* to the semiotic reading.

The phonological features which are found in sign languages are based on differences in the shape of the hand (*handshape*), its orientation towards the body of the signer (*hand orientation*), movements of the fingers or the wrist of the hand (*internal movement*), and the place of the hand in the space in front of the signer or on the signer's body or second hand (*place of articulation*).[11] Example (2) gives a minimal pair differing in handshape (⟨⟩ vs. ⟨⟩) but similar in hand orientation (palm towards face), internal movement (touching the face twice) and place of articulation (the cheek), to illustrate how the four parameters interact in forming meaningful DGS signs.[12]

2   a)   b)

BAUER   WOHNUNG
'farmer'   'appartment'

As mentioned above, DGS is in close contact to German. As a consequence, one can find some interesting effects with respect to the expansion of the lexicon. Apart from DGS internal rules for sign formation processes, DGS has three methods to coin new DGS signs by accessing the German lexicon. The first method is to spell the German word with a special set of DGS signs called the finger alphabet. Here, a DGS sign

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11 In contrast to oral languages, sign language phonology can only be described adequately in terms of a non-linear phonological model (e.g. Liddell & Johnson 1989, Sandler 1989, Brentari 1998). In sign languages, a combination of phonological features directly results in a meaningful sign, i.e. there are no units comparable to phonemes (i.e. combinations of articulatory features) in oral languages. Since the specificity of sign language phonology is of minor importance for this paper, we will restrict the description of the phonological level to the descriptive analysis first established by Stokoe (1960).

12 In sign language linguistics, it is an established convention to note names for sign language signs in capital letters, e.g. BAUER in Example (2a). Those names are conventionalised explications and hence make it possible to refer to sign language signs without giving pictures. The names are based on translation equivalents of the oral language of the state in which the respective sign language is spoken, e.g. German names for DGS signs. With the exception of Example (4b) BAUM and Example (11) GRÜN (made by ourselves), the source of figures depicting DGS signs is the „Allgemeine Gebärdenwörterbuch" of the department for German Sign Language and Communication of the Deaf at Hamburg University. It can be accessed electronically at:
http://www.sign-lang.uni-hamburg.de/ALex/Start.htm.

represents a letter of the German orthography. The second method is to combine a finger alphabet sign with a lexical DGS sign (cf. Ex. 12a in Section 3.4). The third method is to combine a lexical DGS sign with a lip pattern called mouthing (German: *Mundbild*) which represents a word-form of German (cf. Ex. 13a in Section 3.4). The last two methods are of special interest for the purpose of this paper and are elaborated on in Section 3.4.

A major difference between oral and signed languages is the frequency of imagistic iconicity in lexical signs (e.g. Friedman 1977, Mandel 1977, DeMatteo 1977, Brennan 1990, Engberg-Petersen 1993, Wilcox 2000, Taub 2001, van der Kooij 2002, Becker 2003, Demey 2006, Kutscher 2010) and of diagrammatic iconicity in syntax (e.g. Perniss 2007). The former plays a major role for the formation of lexical signs. In Kutscher (2010) it is argued that the theory of signs as established by Charles S. Peirce is particularly fruitful with respect to the description and classification of iconic signs in the visual-gestural modality, but also needs to be expanded regarding the nature of the relation between sign vehicle and reference object. Kutscher (2010) shows that iconic lexical signs in DGS are more complex, with respect to iconicity, than has been discussed in contemporary research and supplies a new typology of linguistic signs with reference to the visual-gestural modality. These results are taken as the starting point for the following investigation on the commonalities and differences between Egyptian hieroglyphs and lexical signs in sign languages.

2 Core concepts for a typology of signs in visual systems

2.1 On the notion of *sign*

In semiotics there are diverse models on the nature of a sign and of semiotic processes (for an overview, see e.g. Nöth 2000). A widespread approach is the triadic model, of which the most influential in linguistic circles is the seminal work by Ogden & Richards (1923). The more illuminating triadic model for our purpose, however, is to be found in the works of Charles S. Peirce and his followers.[13] It defines signification as consisting of relations between three relata, a *sense* (*interpretant*), a *sign vehicle* (*representamen*) and a *referent* (*object*) (Fig. 1).[14] Hence, in the triadic model of

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13 The semiotic theory of Charles S. Peirce is distributed over numerous articles written over a period of several decades. Therefore, it is impossible to adduce a decisive publication. Our explication of the Peircean semiotics is based on explanations by Pharies (1985), Nöth (2000) and Short (2007). References made to Peirce's works refer to the collected papers adduced in the bibliography of this article. Latin numerals refer to the volume, Arabic numerals to the paragraphs of the volume.

14 Terminology in brackets gives the original terms used by Peirce. In our paper we decided to use the clearer and more memorable terms *sense*, *sign vehicle* and *referent*, following Nöth (2000: 141). While the correspondence between *representamen* and *sign vehicle* as well as *reference object* and *referent* is unproblematic with respect to the purpose of our paper, the seeming correspondance between *interpretant* and *sense* is a rather superficial one. Generally spoken, for Peirce the *interpretant* of a sign is the effect which the sign has on the mind of its perceiver, i.e. it evokes an interpretation. In this respect, the terms *sense* and *interpretant* correspond. Grounding in a pragmatic-based theory towards meaning, however, Peirce states that this interpretation is in a sense unique for every use of a sign (*dynamic interpretant*), since interpretation also depends on the concrete situation of the utterance and is subjected to individual differences in the mental or-

Peirce the interpretant is an essential component of the signification. The term *sense* (interpretant) relates to the mental representation of the referent, while the term *sign vehicle* (representamen) relates to the material component in which the semiotic unit manifests itself, e.g. a sequence of phones, a gesture, a sequence of letters, a token of a logogram, etc. The term *referent* (object) relates to something in the world[15] to which the sign refers. In other words, the term not only relates to entities, but also includes state(s)-of-affairs and properties. In the Peircean framework, the sign vehicle (representamen) mediates between the sense (interpretant) and the referent (object), and the sense (interpretant) mediates between the sign vehicle (sign) and the referent (object).
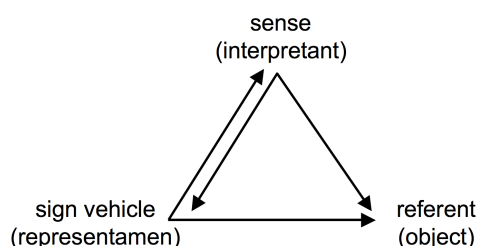
Figure 1. Components of the signification process as represented in a semiotic triangle (Peirce's terminology in parentheses)

As a consequence of defining the sign vehicle as the mediator, in Peircean semiotics there is a direct relation between the sign vehicle and the referent. The nature of the relation can be symbolic, iconic or indexical.[16] A relation is symbolic if it is habitual

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ganization of the sign users. Nevertheless, the interpretation of a linguistic sign is also driven by law or habit, and therefore ideally a consensus of the meaning of a sign should be possible (*final interpretant*). Another aspect of the *interpretant* is that — since it is a mental equivalent of the representation of an object in the mind — it always stands as the *representamen* of a new sign, and, consequently, the process of semiosis is an infinite one, i.e. a succession of interpretants in the mind of a sign user *ad infinitum* (Peirce II: § 303, II: § 92; cf. also Nöth 2000: 64).

15 *World* in this paper is to be understood in the sense that it includes possible worlds and fantastic entities only existent in the human mind, like for example the famous unicorn.

16 This is the point in which our approach differs fundamentally from that of Derchain (1991): He not only follows a model of language that places Written Language as a secondary representation (i.e. a vehicle) of Spoken Language, speaking of the hieroglyph as the *signifiant* (sign vehicle) of the (Spoken Language) phoneme (*signifié*, i.e. sense). In order to integrate visual iconicity, Derchain has to consider the hieroglyph to be in a double function: (1) — as just mentioned — as a sign vehicle of a Spoken Language element and (2) as a sign vehicle of an image: « ... le hiéroglyphe signifie simultanément une image, celle de l´objet qu´il représente, et un ou plusieurs phonèmes, exclusivement des consonnes » (Derchain 1991: 245). We reject this non-autonomous model in concord with Lincke & Kammerzell (this volume, Section 1.2). We incline to an autonomous model of Written Language in close overlap with Spoken Language. Therefore, we interpret a written sign as a sign vehicle of a sense (without a detour of being a sign vehicle of the sign vehicle, i.e. phoneme, of Spoken Language). And we follow Peirce when we cosider signs to have a symbolic, iconic or indexical nature if the relationship between sign vehicle and referent is symbolic (i.e. habitual), iconic (i.e. based on similarity) or indexical (i.e. contiguous) and not – as Derchain argues – if the sense (in his terms *signifié*) is a symbol, icon or index (Derchain 1991: 245-246 with Figure). Furthermore, what Derchain calls "index" is in fact a conventionalized sign, i.e. a symbol (!) in Peirce's sense: « … je désigne comme « index » des signes qui renvoient directement par une métaphore usuelle que les Égyptiens ne ressentaient plus comme telle à un

or regular (Peirce IV: § 447). In other words, in contrast to de Saussure, the criterion of conventionality, of habitual application of a sign, is at the centre of defining a symbol. The criterion of arbitrariness which is preferred by de Saussure is rather irrelevant for Peirce. A relation is iconic if there is some kind of similarity, i.e. some shared features, forms or properties, between the sign vehicle (representamen) and the referent (object). Iconicity is not a given feature of a sign but is evaluated by the sign user on either side of the communication process. A relation is indexical when there is some kind of contiguity relation between the representamen (sign vehicle) and the referent (object), e.g. a causal relation like the one between smoke and fire.

The evaluation of a sign as iconic is subject to cultural and conceptual conditions and restrictions and therefore cannot be determined objectively. Iconicity in a linguistic sign is thus dependent on the mental conceptualisations of the sign user (see also Taub 2001: 20) and to conventions of the linguistic community. Most importantly, in a linguistic sign, the relation between sign vehicle and referent may exhibit all three kinds of relation simultaneously. Depending on which kind of relation is foregrounded in the sign, a classification of signs into symbol, icon and index is established (Peirce IV: § 448). From the viewpoint of language systems, linguistic signs are primarily to be classified as symbols, since every linguistic sign is conventionalised within the language community which uses it. Consequently, an iconic linguistic sign is by its nature also a symbol. From the perspective of language use, the iconic and indexical relation may predominate. For our purpose, we consider the classification or evaluation of a sign as depending on the perspective and on the weighting of the contemplator, i.e. the producer of an iconic sign but also the scholar (cf. also Ransdell 1986: 57, Nöth 2000: 186).

The semiotic theory of Peirce, especially the aforementioned classification of signs, has found its way into linguistics via its reception by Roman Jakobson (1971) and has been widely accepted in linguistic theorising ever since. Our paper is also based on these Peircean ideas.

In concord with Peircean semiotics and in contrast to classifier-referent relationships in discourse as described by Lincke & Kammerzell (this volume), we do not consider the actual or "real world" referent of a sign in this article. Instead, we speak of the referent that the sign producer had in mind when he chose to form the sign (*immediate oject*).

The term *sign* is also frequently used to refer to the sign vehicle alone, e.g. when a hieroglyph is called a *sign*. In order to avoid this terminological confusion, we will call the form-component (sign vehicle) of a sign a *hieroglyph*, when dealing with hieroglyphic Egyptian, and a *DGS sign vehicle*, when speaking of German Sign Language.

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signifié qui peut être, dans le cas le plus simple, une qualité d'un être ou d'un objet, soit évidente, soi qu´on lui attribue traditionellement » (Derchain 1991: 245).

2.2 Iconicity in semiotics

In Peirce's definition of an iconic sign *(hypoicon)*, the sign vehicle (representamen) shares a quality (or property) with the referent (object). Peirce (II: § 277) distinguishes three types of hypoicons:

(1) The first one, called imagistic hypoicon, shares sonic or visual characteristics with its object, sonic in the case of onomatopoeia, visual in the case of imagery.

(2) In the second type, called the diagrammatic hypoicon, there is a structural similarity between sign vehicle and referent (object), like in the case of an electrocardiogram (ECG).

(3) The third type consists of metaphors.

This paper is concerned with the visual subtype of (1).

The definition of *iconicity* as the property of a sign vehicle in a similarity- or quality-based relation to its referent has raised some discussion in semiotics about what similarity actually means. We cannot go into detail here but would like to stress that similarity is a problematic quality because it can hardly be systematised and is not able to be measured. Instead, as stated above, it depends on the user and contemplator of a sign. However, we assume that human beings with the same cultural background generally have a common sense of what is to be considered similar in terms of their culture.

2.3 Sign formation, prototypes and the referent

While the above explications of semiotic theory centre around established linguistic signs, the focus of this paper is not the use of a sign once it has entered the speakers' community (i.e. the sign inventory of this community). Instead, we will explicate the communalities and differences of iconic signs in DGS and Hieroglyphic Egyptian from the perspective of their creation, i.e. as a process of sign formation. In this process, the iconic relationship is established between the sign vehicle and the referent according to Peirce. This relationship does not necessarily have to be analysed from the interpreter's perspective. For our purpose, we describe it from the producer's perspective.

As mentioned above, Peirce defines iconicity as a relation between sign vehicle and referent. They are in a similarity-based relationship. For visual iconic signs, this means that the sign vehicle depicts visible properties of the object, e.g. its shape or colour. When a particular object serves as a model for a sign vehicle, abstraction and categorisation are involved. By abstraction we mean that due to affordances of the respective visual communication systems, not all properties of the object can be depicted. A simplification[17] — subtracting individual features and details — takes place, e.g. the non-representation of leaves in the DGS sign vehicle BAUM 'tree' (Ex. 4). Properties that cannot be imitated in the respective systems (e.g. material, colour, actual size) are also disregarded. Categorisation is met, for instance, when a particular object — like a broadleaf tree — is chosen as a representative of a more general sense — e.g., *tree* in general —, i.e. a broadleaf tree is categorised as a member of the category of *tree* (e.g., in Ex. 3). Therefore, it can be used to represent the category as

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17 Cf. also *schematiziation* (Taub 2001) and *transformation* (Polis 2008: 31-32).

a whole. This categorisation is also attested in Egyptian and has been described by means of prototype theory (Goldwasser 2002). In categorisation, prototypes play an important role. The object chosen for the representation of a more general sense is usually a prototype and not just any member of the category. Prototypes are bound to cultural concepts and stereotypes (see the next section).
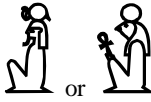
2.4 Sign interpretation, conventionalisation and arbitrariness

The motivation of a sign may not be transparent to the interpreter of the respective sign for a number of reasons: (1) The part or characteristic of an object which is imitated by a sign vehicle depends on cultural concepts, e.g. in the DGS sign vehicle for grandmother (Ex. 3a), the bun that used to be worn stereotypically by elderly women is chosen while other culturally relevant characteristics of elderly women (e.g. a cane) are ignored. (2) It is probably principally unpredictable which culturally relevant characteristic is chosen as a basis for the formation of the sign vehicle. From the interpreter's point of view, the iconicity of a sign vehicle only becomes evident when the associated sense or the respective referent as well as the underlying cultural concept is revealed or known. Thus, iconicity is only transparent if the sense of a sign is given to the receiver or if it can be easily deduced from the context by an interpreter who is familiar with the respective culture (cf. Sonesson's term 'secondary iconicity', cf. Sonesson, without year: lecture 3, page 25f.). (3) In the case of iconic signs, opacity also comes along with conventionalisation. When a sign enters the sign inventory of a speaker community it gets conventionalised, i.e. sign vehicle and sense become a fixed association. This, of course, implies an attenuation of the iconic character because the sign vehicle does not depict the actual referent in discourse. Furthermore, the sign vehicle is often not adapted to changes in sense, which imply referents with which the unmodified sign vehicle is not in a similarity-based relationship.[18] Also, essential visual characteristics, like the shape or functional parts of a referent, might undergo a change in the course of time. (4) The defining cultural concepts may be opaque to a foreign interpreter and sometimes — despite a possible original transparency — also to contemporary members of the respective culture. In either case, they are not universal.

Example (3a) shows that a salient and distinguishing, i.e. prototypical, characteristic of an old woman, according to German Sign Language at the time of sign formation, was her bun. As a consequence, 'grandma' is signed by depicting an imaginary bun. This is culturally specific because it implies that elderly women in Germany wore a particular hair-do, namely a bun, what they might not do in other parts of the world. It is conventionalised because the bun is chosen to represent the referent although this

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18 For instance, *oH#wtj* in its meaning 'male, man' (*Wb.* I, 217.11-12, cf. also Coptic •••••
    'male, hsuband') takes the logogram [⌂]. It is derived from the root *oH#* 'fight' which is in a meto-
    nymic or schematic relationship (cf. Section 3.3) with [⌂]. The depicted weapons, however, are
    not in an iconic relationship with expressions of male sex *per se* and with maleness outside the
    context of fighting. (While the logogram remains unchanged, classifiers can be adapted. Given that
    ⇨ and 𓀀 are iconic hieroglyphs used as classifiers for designations of men and terms of male-
    ness, it is unsupising that the former is used as a classifier for *oH#wtj* 'man, male', cf. *Wb.* I,
    217.12.)

hair-do is no longer widespread. Despite its anachronism, the sign's form is still in use and is unlikely to be modified. In hieroglyphic Egyptian, representations follow, roughly speaking,[19] the principles of representation and the cultural concepts conveyed in Egyptian art. An old person, by comparison with DGS, is depicted as leaning on a stick (Ex. 3b).[20] This seems familiar to us because it is a shared concept of old age in the Egyptian and both ancient[21] and modern European cultures. But the identification of a seated person — wearing a wig and a sun-disk, sporting a beard or even the face of a falcon (Ex. 3c) — as a god is impossible without prior knowledge of the Egyptian conventions of divine representations and the respective divine attributes.

3	a)	b)	c)
sign vehicle			
depicted property / cultural concept	bun (usually worn by elderly women)	man hunched over with age leans on a stick	seated person with long cloth, wig and sun-disk on head
gloss[22] and translation	OMA 'grandma'	*jꜣw* 'be(come) old'	*Rꜥ* 'sun god'

2.5 Modality, mode, and medium

We claim that modality, mode and medium in which a sign is transmitted determine its iconic character. The term modality refers to the sensory system in which the sign is perceived. The term mode refers to the signalling system that conveys the information to be communicated, and the term medium refers to the actual vehicles of transmitting the information, e.g. papyrus, stone, body.[23] For the purpose of this paper, we will concentrate on the visual modality and two modes, namely writing and signing.

Table 1 lists three types of modalities in which language (and other communication) is transmitted, visual — perceived by the eyes, aural — perceived by the ears — and tactile — sensed by the skin. Different modes are used to convey the communicational information of each modality to the respective organ of perception. In the case of the visual modality — which we are concerned with here — these modes are signing, writing and co-speech gesture.

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19 To our knowledge, more substantial studies on that question have not yet been undertaken.

20 There are several attestations of the female form of this hieroglyph when the subject of the respective text is a woman, e.g. tomb of Ti (Steindorff 1913: plate 47), tomb of queen Mersyankh III (Dunham & Simpson 1974: plate XXb); cf. Fischer (1976: 15, footnote 54).

21 Cf. the riddle of the sphinx, solved by Oedipus.

22 To gloss hieroglyphs, we use the citation form of the respective lexeme in Egyptological transcription. The glossing conventions of DGS signs are explained in footnote 12.

23 In contemporary theorising, the terms mode and modality usually are used interchangeably, (Forceville & Urios-Aparisi 2009: 4). However, we find it more useful to differentiate between sense-related aspects and signaling systems of communication channels. Hence the terminological differentiation between mode and modality as explicated above.

modality		visual		aural	tactile	
mode	signing	writing	co-speech gesture	speech	braille	tactile signing

Table 1. Modalities and modes of human communication

Table 2 presents some characteristics of signing and hieroglyphic writing which are necessary to compare both systems. As already said, both systems are visual. But while German Sign Language uses several channels simultaneously to form signs (the hands, non-manuals like mimics amongst others, and sometimes mouthings), the hieroglyphic system writes or draws a sign on a surface or carves it into a surface and therefore uses only one channel to transmit a sign per communication act. Furthermore, sign languages can use a three-dimensional space, whereas hieroglyphs are flat, conveying information in two dimensions, irrespective of its execution as a drawing or a relief. And while a sign language can reproduce the dynamics of an action due to its kinetic nature, hieroglyphs remain static.[24] But the dynamic quality of sign languages makes a sign token also short-lived, existing only in the moment of its formation, while written signs can be preserved over millennia as demonstrated by the existence to this day of Egyptian documents. With respect to the grade of similarity, the potential of iconic DGS sign vehicles to imitate some quality of the referent is relatively low, while hieroglyphs potentially can imitate visual qualities of the referent with a high grade of detail.

	Sign Languages	**Hieroglyphic Egyptian**
modality	visual	visual
mode	signing	writing
• channel(s) of transmission	hands, non-manuals, mouthings (3)	visual depiction (1)
• space	3-dimensional	2-dimensional
• time	yes (dynamic)	no (static)
• persistence	no (transitory)	yes (enduring)
• grade of detail	lower	higher

Table 2. Mode-specific properties of signing and writing

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24 As Jean Winand (p.c.) noted, the orientation of hieroglyphs according to their reference point (usually a representation of the person to whom the text passage is attributed) in a text-image composition complements the list of features of (hieroglyphic) writing. However, for the question of the iconic relationship between sign vehicle (hieroglyph) and referent which is at issue here, we can neglect this additional stratum.

3 Correlations in the iconicity of two different modes of the visual modality

3.1 Hypothesis

On the basis of the assumptions made in the previous sections, we would like to put the following hypothesis to a test:

> Modality, as well as mode, determine the possibilities of sign formation within one system and by doing so also affect the form of the sign. As a consequence, there have to be systematic correlations within the sign formation processes of Sign Languages and Hieroglyphic Writing because they belong to the same modality. Similarities are determined by the shared properties of the visual modality on the one hand and differences result from the different modes (as well as media, which is not the topic of this paper) of the two systems on the other hand.

3.2 Image-iconicity

As a start, we consider image-iconic examples, that means signs for which the sign vehicle and the referent share a quality. As we deal with systems of the visual modality, this representation must refer to a visible property of the reference object. This property is the referent's shape.[25] We can observe equivalent sign formation processes in DGS and in Hieroglyphic Egyptian. In both systems, it is possible that the shape of the sign vehicle represents the shape of the referent (SHAPE-FOR-SHAPE).[26]

Two sub-types can be distinguished from each other. In the first one, the shape of the referent is imitated in its entirety, for example in DGS 'mussel' and 'tree' and in Egyptian 'duck', 'cow' or 'lake'[27] (Ex. 4).

The second sub-type of the shape-for-shape class represents the referent meronymically. Only a part of the object is chosen to be signed or depicted (part-whole relationship). Examples from DGS are 'deer', where only the antlers are shown, and 'machine', where two cog-wheels are signed. In comparable Egyptian cases, only the head of a duck or a cow, or the blossom of a 'lotus flower' are depicted (Ex. 5).[28]

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25 Colour would be another visible property but is not relevant in either of the systems. On the one hand, it is not directly able to be depicted in DGS. On the other hand, hieroglyphs are sometimes coloured but colour does not convey linguistic information, i.e. it does not constitute a means of differentiating between the meanings of an otherwise identical hieroglyphic shape.

26 The terms "shape for shape" and "path for shape" are taken from Taub (2001).

27 The case of 'lake' is an example of Egyptian where bird's eye view is adopted so that we see the shape of the obviously artificial lake from above.

28 A coexistence of a complete and a meronymic representation of one and the same sign — like in the case of Egyptian #pd and jH (cf. Ex. 4 and 5) — is not attested in DGS.

SHAPE FOR SHAPE

| **German Sign Language** | | **Hieroglyphic Egyptian** | | |

4)   complete representation   complete representation

| MUSCHEL | BAUM | *#pd* | *iH* | *S* |
| 'mussel' | 'tree' | 'duck, bird' | 'cattle' | 'lake' |

5)   meronymic representation   meronymic representation

or
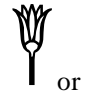
| HIRSCH | MASCHINE | *#pd* | *iH* | *zSn* |
| 'deer' | 'machine' | 'duck, bird' | 'cattle' | 'lotus flower' |

Typical for Egyptian is the representation of an activity by means of the depiction of several participants interacting with each other (Lincke 2011: 61-62). Following Kammerzell (2004) and Lincke (2011: 43-62), semantic role relations like *agent*, *undergoer* and *instrument* subsume the participants of several actions in the examples in (6). The number of participants that are depicted ranges from two — like in 'pull out', where the plant that is eradicated and the acting person are represented (Ex. 6b) — to the very complex and very rare cases of four or even five participants such as in 'bail out' (Ex. 6g). In that case the hieroglyph shows the *agent* which is a truncated male person only preserving head, shoulders and arms, a small bowl (*instrument*), a water jet (*undergoer*), a slightly simplified depiction of a boat (*source*), and maybe the *location* where the boat is situated, if the rectangle under the boat is to be interpreted as a lake.[29]

In fact, these hieroglyphs generally are as close to a naturalistic representation as static representations of dynamic events can get in Egyptian writing, despite the lack of immediate dynamics in the written mode. Instead of simply juxtaposing the participants, they are depicted as interacting with each other. This type is particularly common with human participants. This combinative, supplementary metonymic relation is called feature-activity (Goldwasser 2002: 34) and is a means to encode dynamics in hieroglyphs (Lincke 2011: 61).[30] This is why these hieroglyphs are listed under image-iconicity here. One could, however, also argue for a categorisation of these

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29   We thank Eitan Grossman for this suggestion.

30   Example (6h) shows that the representation of a dynamic event can also be restricted to a single, mostly human, participant as long as the feature-activity metonymy is met by the depiction of a typical gesture or stance of the respective activity or event.

hieroglyphs as schematic-iconic (cf. Section 3.3) because the dynamicity, which is an essential feature of an action, is only represented in the sign vehicle while the sign vehicle itself is not dynamic.[31]

German Sign Language	**Hieroglyphic Egyptian**

6a)   agent&undergoer&instrument

#zX   *qd*   *Hwj*
'harvest'   'form, build'   'beat'

b)   agent&undergoer

qd   *fdj*   *f#j*
'form, build'   'pull out'   'carry'

c)   agent&instrument

sqdj   *z#w*
'oar'   'guard, protect'

d)   agent&location

nbj   *sDr*
'swim'   'sleep, lie'

e)   agent&source

zwr
'drink'

f)   agent&undergoer&source   &goal

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31 We would like to thank Pamela Perniss for helpful discussions concerning this matter.

German Sign Language	**Hieroglyphic Egyptian**	
	wob	*z#T*
	'be(come) clean'	'pour out'

g)   agent&undergoer&instrument&source&
                            location

pnq
'bail out'

h)   agent / theme[32]

njs	*Xr*	*jb#*
'call'	'fall'	'dance'

To come back to Example (6g), this hieroglyph can serve to demonstrate the limits of iconicity of this type of hieroglyphic depiction. Firstly, the *agent* is oversized in comparison to the boat or the lake and secondly, he is floating in the air. The latter holds true for the vessels in (6f) too. Also, in Example (6c), a sailor is holding but not using the oar in the hieroglyph used for 'oar'. Thus, the iconic potential is not exhaustively used. The reasons for this have to be further investigated.

The other major sign type of image-iconicity is attested only in DGS because the stasis of hieroglyphs does not allow for this kind of representation. It consists of an air-drawing with the path traced by the signer's hands depicting the respective shape of the referent (PATH-FOR-SHAPE). This type of sign vehicle comes as a complete depiction of the referent's shape — like in 'fir tree' (Ex. 7) — or, as a meronymic representation of a salient part of the referent — as, for example, in 'elephant' (Ex. 8).

PATH FOR SHAPE

German Sign Language	**Hieroglyphic Egyptian**

7)   complete representation

TANNENBAUM

'fir tree'

8) meronymic representation

ELEFANT
'elephant'

3.3 Schematic iconicity

Besides image-iconicity, there is also schematic iconicity — which plays an important role in both modes. The term *schematic* is borrowed from research on artificial intelligence and has not been part of Peirce's sign typology.[33] Kutscher (2010) argues that it has to be introduced to take full account of the possible iconic principles in sign languages and that it is necessary for the sign typology of linguistic systems in the visual modality in general. In Kutscher (2010: 96) as well as in our approach, the term *schema* and *semantic frame* (Fillmore 2006 [1982]) are equated, referring both to the network of knowledge that is needed to understand the meaning of a concept or lexical unit. This schema or frame includes for example taxonomic sub- and superordinate concepts and — if the schema or frame belongs to an event and action — the participants that are involved.

   The sub-types of schematic iconicity in our typology are based on different types of *metonymies*, a term that Champollion (1836: 23) already used for the Egyptian material. In the first sub-type, an object is represented by a DGS sign vehicle or Egyptian hieroglyph depicting an object from the respective semantic frame (OBJECT-OBJECT). This is the case of DGS signs for 'library' where an arrangement of books represents their depository (the library) and also for 'oil' where the container, an oil can, is signed (Ex. 9). The same relation type is also attested in Egyptian. The container-for-liquid metonymy has been described by Goldwasser (2002: 35) for Egyptian classifiers. A milk vessel representing the liquid 'milk' or a wine jar for the respective beverage can serve as examples here. Also the depiction of the grape-vine plant and its cultivation construction can serve as a basis for the classifier of 'wine' in Egyptian (Ex. 9). Metonymic hieroglyph-referent relations can be found mainly in classifier-host relations in Egyptian. They are also attested for logograms, but only if the reference object cannot be depicted according to the rules of Egyptian art (like in the case of certain liquids and of non-visible physical effects like wind with its hieroglyphic logogram ⦿). Champollion (1836: 24) gives some other examples, for instance for expressions of time.

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33 Peirce's subdivision of the hypoicon is threefold (imagistic, diagrammatic and metaphorical, cf. Section 2.2). However, in none of these, he considered metonymic relations. This is why a new subtype of imagistic iconicity which we call *schematic iconicity* has to be added to his typology.

OBJECT FOR OBJECT (metonymic representation)

German Sign Language		**Hieroglyphic Egyptian**		
9)				
BIBLIOTHEK	ÖL	*jrT-t*	*jrp*	
'library'	'oil'	'milk'	'wine'	
(rows of books)	(can with oil)	(milk vessel in net)	(wine jars in net)	(vine on props)

As for the second type of schematic iconicity, ACTION-OBJECT, there is no equivalence between our two systems. Instead, the realisation of the metonymy action-object is generally uni-directional. The direction to be found in DGS is action-for-object, in Egyptian hieroglyphs, it is object-for-action (Ex. 10). In DGS, the imitation of an action can be used to represent an object involved in said action. This is the case for 'tea' where the dipping of a tea bag into a mug is gestured or for 'baby' where the act of cradling a baby is imitated (Ex. 10a). In Egyptian, by contrast, objects as participants of actions are used to represent the action in which they are relevant. Their relation to lexical meaning can be described by means of semantic role relations (Kammerzell 2004, Lincke 2011: 43-59). Some examples of these metonymic relations have already been given by Goldwasser (1995: 68-70). The prototypical case of these relations are *instruments* (including organs) like a drill for 'drill', a cow's ear for 'hear' and legs for 'come' (Ex. 10a). Less frequent is the choice of a hieroglyph depicting the *location* of an action, like a tomb (Cervelló-Autuori 2006: 6-7) in the case of 'bury' or a bed in the case of 'sleep' (Ex. 10b).

The reason for the described inverse direction lies in the differences between the modes of both linguistic systems. Signing necessarily takes place in 3-dimensional space and time. In addition, it is a phonological principle that syllable-internal motions correspond to the vowels and sonorants that form syllable nuclei in oral languages. Hence, taking the depiction of actions as the basis for schematic sign formation is an economic, "natural" choice. A written sign, by contrast, is predominately static (disregarding the time-span taken to write down or incise the hieroglyph). Consequently, taking the depiction of an object as the basis for schematic sign formation seems to be the more "natural" choice.

| ACTION FOR OBJECT | OBJECT FOR ACTION |
| German Sign Language | Hieroglyphic Egyptian |

10a)   instrument

| TEE | BABY | *wb#* | *sDm* | *jwj* |
| 'tea' | 'baby' | 'drill' | 'hear' | 'come' |

b)   location / goal

| *qrs* | *sDr* |
| 'bury' | 'sleep, lie' |

Rare are hieroglyphs like ⊠ in *grg* 'found' and ⵠ in *stj* 'shoot', which depict several participants (instrument&undergoer) in a configuration that can be considered as a deptiction of the action but without the agent. We consider them to be schematic (metonymic) because their image-iconicity is weakened by the lack of a relevant participant (agent) and — in the case of ⵠ — by the interplay with a second metonymy.[34]

A third case of metonymy is the representation of an object or living being typically exhibiting a certain property (Goldwasser 1995: 69-70). In Egyptian, most properties are encoded by means of verbs. There is only a small number of genuine adjectives. Therefore, the OBJECT-PROPERTY metonymy can be described as a participant-verb relation (Ex. 11). The respective semantic role is called *zero*.[35] In DGS, examples are very rare but nevertheless exist, e.g. the DGS sign GRAS/GRÜN, which either refers to grass or to the colour green. In this DGS sign, the hands imitate blades of grass sprouting form the ground.

OBJECT FOR PROPERTY

German Sign Language   **Hieroglyphic Egyptian**

11)   zero

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34 The hide&tail hieroglyph is a representation of an animal in a *component-integral object* metonymy, cf. Goldwasser (2002: chapter 2.3.1).

35 The role *zero* is defined by Langacker (2000 [1999]: 29-30) as "an entity that merely occurs in some location or exhibits a certain property". For its application to Egyptian classifiers cf. Lincke (2011: 49-50).

German Sign Language	**Hieroglyphic Egyptian**		
GRÜN	*dSr*	*j#w*	*nDs*
'green'	'be(come) red'	'be(come) old'	'be(come) small'

With classifiers, there are still more of these simple metonymic relations that can be labelled by means of semantic roles (cf. Lincke 2011: 43-59).

3.4 Oral language indicators

Beside image-iconicity and schematic iconicity, there is a third type of sign formation, the *Oral Language Indicator* (Kutscher 2010). It is characterised by the integration of a non-iconic element and an iconic element. The non-iconic element represents a part of Spoken Language (in Egyptian and DGS) or of Written Language (DGS only). In the case of Egyptian, these non-iconic elements are phonograms or logograms. In German Sign Language, they are either the finger alphabet signs representing graphemes (of Written German) or DGS mouthings of German spoken word-forms.

In Example (12a) from DGS, the finger alphabet representation of the (Written) German alphabet letter is used to represent the first letter of the respective written word in German.[36] This finger alphabet letter is either integrated into an iconic sign or precedes it in a sequence. In our example, the finger alphabet letter for German <w> is integrated with iconic STECHEN (INSEKT) 'stinging (insect)'[37] in order to create a sign WESPE 'wasp'.

In Egyptian (Ex. 12a-b), the non-iconic element is a grapheme, more precisely a phonogram, corresponding to one consonant of the root. It has to be integrated into the iconic element and cannot be depicted in a sequence with it. The phonogram adopts the role of one of the participants, as in 'carry' (Ex. 12a), where the first consonant of Egyptian 'carry', an <f>, represented in hieroglyphs by a horned viper, takes the place of the object that is carried (*undergoer*; cf. also <H> in *Hwj* 'beat' above, Ex. 6a). In contrast to DGS, it is not necessarily the first letter that has to be chosen to become integrated. In Example (12b) for *wob* 'purify', it is the phonogram for the last consonant, <b> that is used to replace the person that is purified. The same mechanism can be applied to bi-consonantal phonograms that may represent the full (consonantal) root. This is the case in *msj* 'give birth' (Ex. 13a). A phonogram <ms> is attested for this lexeme. It can replace the child in the iconic depiction of "giving birth". Due to the fact that Written Egyptian, unlike Spoken Egyptian, does not represent vowels, this is as complete an overlap as can exist between Spoken and Written Egyptian. Fischer (1977: 9-10 with fig. 4) attests a productive phase of this composite sign type during the Old Kingdom and gives some further examples.

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36 We emphasise again, however, that German and German Sign Language are typologically unrelated languages.

37 When this DGS sign is used without mouthing or initial finger alphabet sign to denote an insect it usually signifies BIENE 'bee'.

INTEGRATION OF A SECOND MODALITY (1)

German Sign Language	**Hieroglyphic Egyptian**

12a) finger alphabet (representing initial   phonogram (representing initial
      phoneme of German)   consonant of the root)

	STECHEN (INSEKT)		<f>	*f#j*	→	*f#j*
W	WESPE 'wasp'					'carry'

b)   phonogram (representing final
                                               consonant of the root)

	<b>	*wob*	→	*wob*
				'purify'

In contrast to some other sign languages, mouthings can serve to represent the pho-
netic information of a German spoken word in DGS (Ex. 13). The mouthing is per-
formed simultaneously with the articulation of the iconic DGS sign, as in BÜRO
'office' (Ex. 13a). Note that mouthings are not complete representations of a German
spoken word in the narrower sense. They only represent parts of the Spoken Lan-
guage, insofar as they generally imitate the parts that can be seen on the lips (but not
the sound).

　　In DGS, the iconic part can, in some instances, have a more general meaning
(e.g. MUSIK 'music' when it is used alone), on the basis of which several new lexical
items can be formed by integration of the respective mouthings (e.g. <lied> + MUSIK
→ LIED 'song' or <oper> + MUSIK → OPER 'opera'). This may be compared with
the integration of a non-iconic element with a rather unspecific iconic hieroglyph. The
latter are usually used as category classifiers and, therefore, have a more general
meaning (e.g. 𓂻, used as a logogram of *jwj* 'come' and as a classifier for verbs of
motion). They can integrate a non-iconic element, for instance 𓂽 — the logogram in
sSm 'guide, lead', a verb involving motion in the wider sense — to form an
alternative logogram (Ex. 13b). The hieroglyph 𓂽, when iconically-integrated, is
walking. There are numerous combinations of 𓂻 with non-iconic hieroglyphs (that
when being used alone serve as phonograms), e.g. 𓂼, 𓂻, 𓂾, 𓂿, 𓃀 (cf. Fischer
1977: 7).

INTEGRATION OF A SECOND MODALITY (2)

German Sign Language	**Hieroglyphic Egyptian**

13a)   mouthing (representing German word-form)   phonogram (representing consonantal skeleton of the root)

mouthing

<büro>   TASTATUR   <ms>   *msj*   →   *msj*
BÜRO 'office'   'give birth'

b)   mouthing (representing German word-form)   logogram (representing consonantal skeleton of the root)

mouthing

<lied>   MUSIK   <sSm>   CLF (motion)   →   *sSm*
LIED 'song'   'guide, lead'

In the cases of oral language indication in DGS, the iconic sign itself is not specific enough to give the same information as provided in combination with mouthing. Therefore, the integration of (parts of) oral language is a means of word formation on the basis of a more general iconic sign. In Egyptian by contrast, the integration of phonograms and logograms often results in alternative spellings only (Ex. 12-13a). However, hieroglyphic forms of lexemes that do not necessarily have an alternative written form are attested in the combinations of ⋀ with the phonograms mentioned above (Ex. 13b).

4 Conclusions

Linguistic systems in the visual modality can make use of their potential to form semantically transparent, motivated, and therefore iconic signs. These signs are iconic to any interpreter who is familiar with the sign's sense, the activated cultural concept upon which the sign vehicle is based and the underlying principles of iconic sign formation.

The principles of sign formation in DGS and Hieroglyphic Egyptian discussed in this paper are:

(1) the complete or partial (or meronymic) representation of the shape of the referent (SHAPE-FOR-SHAPE),

(2) the metonymic representation of objects from the semantic frame, i.e. OBJECT-OBJECT, ACTION-OBJECT (action-for-object in DGS and object-for-action in Egyptian), and OBJECT-PROPERTY and

(3) the integration of an element representing oral language (Oral Language Indicator) into an iconic element.

Systematic differences between iconic relationships attested in DGS and Hieroglyphic Egyptian respectively are subject to the specific affordances of the modes, i.e. signing and writing. These are illustrated by the regular distribution of blank columns in the tables throughout this paper. In image-iconicity, for instance, there is a systematic gap in the path-for-shape sign formation type in Hieroglyphic Egyptian due to the stasis imposed by writing. In schematic-iconic sign formation types, action-for-object is only found in DGS while object-for-action is predominantly attested in Egyptian. The reason for this lies in the divergent potentials for representing dynamics and object details in DGS and Egyptian respectively.

The analysis put forward in this paper illustrates the motivated relationships between hieroglyphic form and referent. Since referent and sense are interrelated, the results of this paper are relevant for lexical semantics and text translation. When modern scholars are confronted with an unknown word-form that bears an iconic hieroglyphic form, they find themselves in a situation that is comparable to that of language acquisition: Starting form individual instances of referent – word pairings, over time the language learner categorises individual referents into classes of objects denoted by the same lexical unit. This process of abstraction is based on repeated exposition to significations, where the language sign stays the same, while the referent varies. The Egyptologist too has to make conclusions about lexical meaning from the information that sign vehicle and context imply. The particular referent may be known but is sometimes also unknown (cf. Ex. 1). In order to reconnect sign vehicle and referent or to infer the related sense, it is helpful to the modern interpreter to become familiar with the principles of sign formation described above. They are a key to the understanding of iconic hieroglyphs and can be an effective tool to deduce lexical meaning, to facilitate the interpretation and to qualify the translation.

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Silvia Kutscher   Silvia.Kutscher@uni-koeln.de
Eliese-Sophia Lincke   eliese.lincke@nexgo.de

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postal address:
c/o Institut für Archäologie, Lehrbereich Ägyptologie, Humboldt-Universität zu Berlin, Unter den Linden 6, 10099 Berlin (Germany)