ATLAS.ti
QUALITATIVE DATA ANALYSIS

2. LECTURE

SEMIOTICS: SIGN AND MEANING

Ladies and Gentlemen,
Today's lecture is about the study of signs, or semiotics (from the Greek sema/semeion = sign).

1. INTERPRETING SIGNS

Umberto Eco (1932 – 2016) was a bestselling Italian author, polymath, polemic columnist and essayist, media and cultural theorist, bibliomaniac and one of the most important semioticians.

FIg. 2.01: Umberto Eco (1932 – 2016) [1]

Working from the ancient metaphor „the world is a book whose text is given to us to read", *Eco* gives us an illustrative introduction to the art of interpreting signs in the first few pages of his novel *The Name of the Rose* which I would like to quotation from to start this lecture:

The first-person narrator, the novice *Adson of Melk*, tells of how, in his youth, he and his master, *William of Baskerville*, climb the steep path to an abbey where the novel takes place. *William* lingers for a moment at a tree-lined bend in the road to carefully examine a track in the snow and a few bent branches. Then, when a group of agitated monks appears, he explains to their leader that „Brunellus, the favored horse of the abbot" has run off and describes what the horse looks like and where to find it. Once the monks have run along, the following dialog unfolds between student and master:

'And now tell me how did you manage to know?'

'My good Adson, during our whole journey I have been teaching you to recognize the evidence through which the world speaks to us like a great book. I am almost embarrassed to repeat to you what you should know. At the crossroads, on the still-fresh snow, a horse's hoofprints stood out very neatly, heading for the path to our left. Neatly spaced, those marks said that the hoof was small and round, and the gallop quite regular—and so I deduced the nature of the horse, and the fact that it was not running wildly like a crazed animal. At the point where the pines formed a natural roof, some twigs had been freshly broken off at a height of five feet. One of the blackberry bushes where the animal must have turned to take the path to his right, proudly switching his handsome tail, still held some long black horsehairs in its brambles. ...

'Yes,' I said, 'but what about the small head, the sharp ears, the big eyes ...?'

[1] „File: Italiaanse schrijver Umberto Eco, portret.jpg" by Bogaerts, Rob / Anefo is marked with CC0 1.0

> 'I am not sure he has those features, but no doubt the monks firmly believe he does. As Isidore of Seville said, the beauty of a horse requires 'that the head be small, .. short and pointed ears, big eyes, flaring nostrils, erect neck, thick mane and tail..'
>
> 'All right,' I said, 'but why Brunellus?'
>
> 'May the Holy Ghost sharpen your mind, son!' my master exclaimed. 'What other name could he possibly have? Why, even the great Buridan, who is about to become rector in Paris, when he wants to use a horse in one of his logical examples, always calls it Brunellus.' *(Eco 1983, pp.26-27)*.

Eco illustrates here the different contexts, in which signs can appear, be it in the form of natural signs (bent branches as an indication of the size of the horse) or as artificial signs which are created by humans, e.g. in order to express a certain idea (the name of the horse which is intended to indicate its noble nature).

In his book *Il Segno (The Sign) (1973), Eco* defines signs as *„something that stands for something different for someone"*, i.e. something that has a *meaning* for the receiver of the sign. In the following overview, he proposes a differentiated classification into natural and artificial signs.

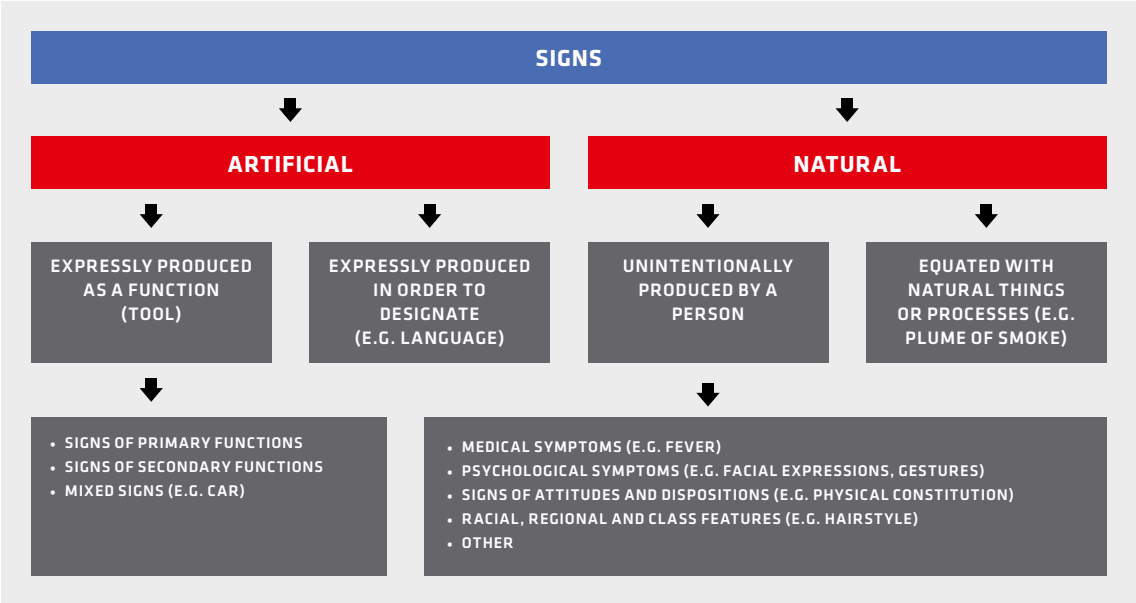

Fig. 2.02: Classification of signs (modified after Eco 1973, p. 44)

Particularly significant for human communication, and thus also for qualitative data analysis are signs that are produced expressly for the purpose of designation, that is for indicating something such as written and spoken language, images, artistic representations. A second group are signs like facial expressions and vocal quality that are produced by humans unintentionally. A third group are tools, in the broadest sense, and also the built environment, including architecture. Tools possess not only their utilitarian function as a tool (hammering with a hammer, entering through a door, living in a house) but also a sign function. Thus, the *primary sign function* of the door is to show me where the entrance to the house is; its decoration as a majestic portal constitutes its *secondary sign function*, whereby it indicates the social status of the owner or the significance of a public building.

2. SERENDIPITY AND THE MORELLI METHOD

In 1983, Italian historian and cultural theorist *Carlo Ginzburg (*1939)* wrote a witty cultural and scientific history of the use of signs that reads like a crime novel under the title *Clues: Roots of an Evidential Paradigm (Ginzburg 1988)*.

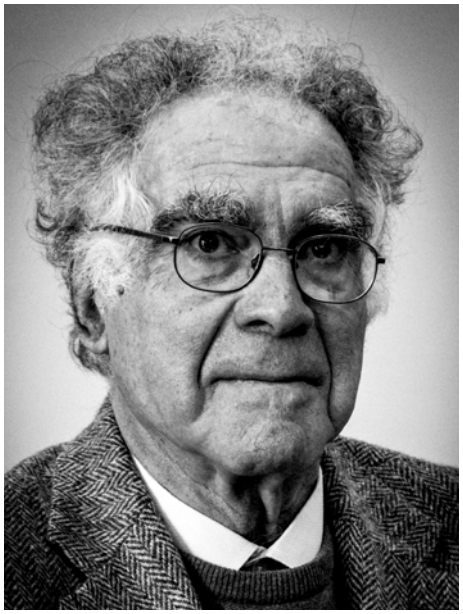

Fig. 2.03: Carlo Ginzburg (b. 1939) [2]

In this paper, he contrasts the quantitative understanding of science that goes back to *Galileo* and *Descartes* with the much older search for knowledge based on clues, traces, indicators or signs. He sees the beginnings of this in „the hunter crouched in the mud, searching for traces of his prey". *Ginzburg* shows that - unlike the experimental method that is based on reproducibility - the *indicator paradigm* produces knowledge of the individual and the unique.

Fundamental here is the conclusion of the underlying cause (fire) from an effect (smoke) and of the whole from often seemingly insignificant details. In *lecture 5* I will return to this method of conclusion called *abduction* - the only logical conclusion which leads to *new* findings.

Ginzburg shows us that *Umberto Eco's* story of Brunellus the horse appears as an ancient motif in a fairy tale that is widespread among Kyrgyz people, Tatars, Hebrews and Turks, in which three brothers are able to describe a stolen camel - or a horse, in another version - to a court based on a multitude of traces as accurately as if they had seen it themselves.

This story was further expanded in a collection of novella in Persia and first appeared in Italian in the 16th century under the title *The Three Princes of Serendip*. English writer *Horace Walpole (1717 - 1779)*, inventor of the Gothic novel, took up the story and coined the neologism *Serendipity* for „discoveries made by accidents and sagacity". Today, serendipity is a common source of discovery in sociology and data retrieval. Serendipity is also one of Thomas Muhr's favorite concepts and played a role in the development of ATLAS.ti.

Of particular interest for *Ginzburg* is the so-called *Morelli method* which can be traced back to the Italian physician and art historian *Giovanni Morelli (1816 – 1891)*. In the 1880s, under the pseudonym *Ivan Lermolieff*, *Morelli* introduced a startling innovation to the differentiation between originals and copies within art history.

[2] Photo by Claude Truong-Ngoc / Wikimedia Commons - cc-by-sa-3.0 (claude.truong.ngoc@gmail.com)

According to this innovation, when it comes to attributing a painting to an artist, those parts of an image that have been carefully executed, such as faces, are far less instructive than its apparent trivialities such as the form of fingernails and toenails, or earlobes.

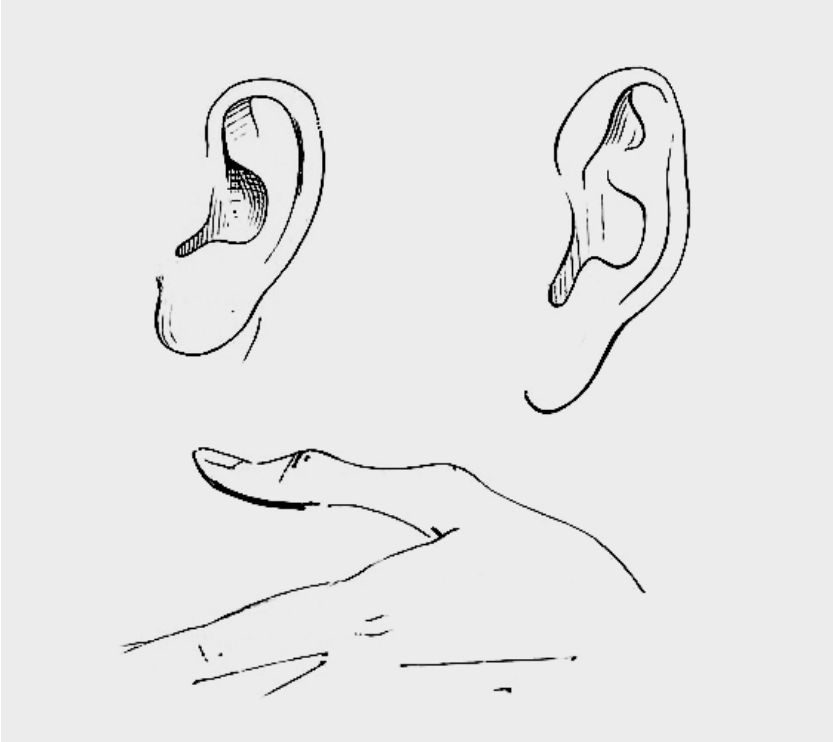

Fig. 2.04: Details on attributing paintings (from: Ivan Lermolieff 1880) [3]

In the Old Masters Picture Gallery in Dresden alone, 46 paintings had to be re-attributed to different painters after *Morelli's* publications. The most famous example is *Sleeping Venus*, one of the few original works by Renaissance painter *Giorgione* which it had previously been thought was a copy of a work by *Titian*.

Fig. 2.05: Giorgione (1478 – 1510) „Sleeping Venus" (Old Masters Picture Gallery, Dresden) [4]

[3] https://digi.ub.uni-heidelberg.de/diglit/morelli1880/0001 (p. 104)
[4] https://commons.wikimedia.org/wiki/File:Giorgione_-_Sleeping_Venus_-_Google_Art_Project_2.jpg

Observing the smallest, seemingly unimportant details is also important in criminal investigations and in Morelli's time was being used as a tool of suspense in the crime novels of *Edgar Allan Poe* and Arthur *Conan Doyle*, with Conan Doyle's master detective *Sherlock Holmes* also taking an interest in the shape of earlobes to solve a case of murder.

Fig. 2.06: Sigmund Freud's Couch – in the background, his art collection [5]

I would like to take a famous piece of writing from *Sigmund Freud (1856 – 1939)* to give you an insight into interpreting a work of art. Freud initially took an interest in the *Morelli method* as a collector of art. In his study *The Moses of Michelangelo (1969, p. 207)*, published in 1914, he writes:

> „It seems to me that [Morelli's] method of enquiry is closely related to the technique of psychoanalysis. It, too, is accustomed to divine secret and concealed things from despised or unnoticed features, from the rubbish heap, as it were, of our observations."

Freud uses the *Morelli method* to explore the psychological condition expressed by *Michelangelo* in his *sculpture of Moses*. In a meticulous description of the left hand of *Moses* that is reaching into the thick strands of his beard, he writes:

> „[The] fact remains that the pressure of the *right* index finger affects mainly the strands of hair from the *left* side; and that this oblique hold prevents the beard from accompanying the turn of the head and eyes to the left. Now we may be allowed to ask what this arrangement means and to what motives it owes its existence" *(Freud 1969, p. 209)*.

[5] Study with the couch, Freud Museum London, 18M0138.jpg – CC-BY-SA-4.0 (Self-published work)

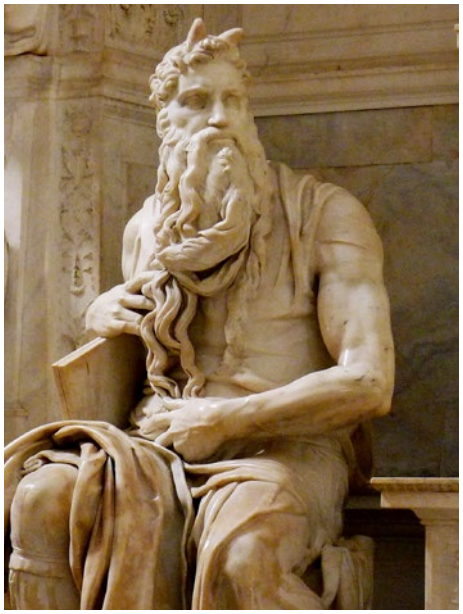

Fig. 2.07: The Moses of Michelangelo (1475 – 1564) [6]

From this and other *„Morellian"* signs, *Freud* explores the presumed sequences of movements that preceded the moment in time that has been frozen by *Michelangelo*: convulsed by the clamor of the Israelites dancing around the Golden Calf, with an iron grasp plunged into his beard, at the same time he reverts the impulse of convulsion and hastily withdraws his hand in order to save the Tables which threaten to slip from his hand. Thus, for *Freud*, the *Moses of Michelangelo* - unlike the Biblical Moses - becomes

> „a concrete expression of the highest mental achievement that is possible in a man, that of struggling successfully against an inward passion for the sake of a cause, to which he has devoted himself" *(Freud 1969, p. 217)*.

In his monumental work *Michelangelo*, published in 2021, the Berlin-based art historian and pictorial theorist *Horst Bredekamp (b. 1947)* rejects the reason for *Moses´ inner* agitation that was assumed by *Freud* and his contemporaries: The discovery of the worshiping of the Golden Calf is incompatible with the seated position of *Moses*. (*Moses* broke the first tablets after this discovery). The horns of Moses - actually rays of light that were mistranslated as „horns" - clearly refer to the time after he received the tablets for the second time, the tunic on *Moses'* right knee serving to conceal the rays that are so formidable for the people. *Bredekamp* assumes that *Michelangelo* is depicting the moment when *Moses* learns from God that he himself will no longer be able to enter the Promised Land in front of him as he will die before then. *Bredekamp* summarizes his interpretation:

> „[*Moses'*] rage is not about the downfall of the Israelites, it is about the shock of this moment when his death is proclaimed. This marble figure, that was seen as the ultimate image of power, wrath and the patriarchy, is rather the negation of everything that the 19th and 20th centuries saw in it." *(Bredekamp, p. 305)*

Despite the obvious misinterpretation, *Bredekamp* calls *Freud's* description of the movement of Moses' fingers and strands of hair „a pinnacle of the German language." Freud's „analysis of the psychological and physical inner movement of Moses has ineluctably shaped the image of this marble figure". *(Bredekamp 2021, pp. 300 and 302*). What we are dealing with here is a lesson on the possibilities of error in the interpretation of signs when interpreting the inner experience. *Freud* seemingly interpreted the presumed inner experience of *Moses* in an ingenious manner by carefully analyzing his outward display - and yet he made a grave error because he misjudged the context. However, *Freud* and *Bredekamp* do agree in their interpretation that *Moses* is expressing not wrath but self-control or devotion to God's will.

I would like to conclude this brief excursion into art criticism by looking to modern art. In the 60s, *Umberto Eco* coined the term *Open Work (Eco 1973)*, a concept which had a huge influence on art. In doing so, he gave the interpretation of art a *dialogical perspective*, according to

[6] Moses by Michelangelo JBU140.jpg. Creative Commons (CC BY 3.0)

which the work of art is only completed by the interpretant. For Eco, each work of art is multi-layered and ambiguous and thus exhibits a certain openness. Moreover, in *Modern Art*, artists *consciously* strive for openness:

> „In other words, the [artist] offers the interpreter [...] a work *to be completed*. He does not know the exact fashion in which his work will be concluded, but he is aware once completed the work in question will still be his *own*. It will not be a different work, and, at the end of the interpretative dialogue, a form which is *his* form will have been organized, even though it may have been assembled [...] in a particular way that he could not have foreseen." *(Eco 1973, p. 55)*.

I find it important to take the concept of the *Open Work* into account in qualitative data analysis too, any time we are dealing not with a depiction of factual circumstances, but with modern works of art, with art always also including trivial art, advertising and mass media in the view of the theorist *Eco*. Such a consideration requires different types of reading performed by the most diverse of interpretants to be juxtaposed as equals in the interpretation of texts and multimedia.

3. TECHNICAL AND HUMAN COMMUNICATION

What is the relationship between a sign and its message? *Information theory* provides a simple answer: the *sign* (signal) is allocated to the *information* which it is meant to convey through its *coding*. The *coding* is a type of user manual for how to get from the sign to the message. In the context of telecommunications, we are also dealing with the *transfer of information* in human communication which passes from the *coding* through the *speaker* and the *channel of transmission* to the *hearer* and his or her *decoding* (see Fig. 02.08).

Linguistic communication, however, is far more complex. Due to the complexity of language and the differences in the socialization of speaker and hearer, the coding and decoding rules only ever overlap partially for the speaker and hearer. There also exist particularities in the conscious, as well as unconscious, non-linguistic elements of facial expressions and gestures, in the contextuality, i.e. the embedding of linguistic communication in the *speech situation*, in the *social context*, and in the dependence of language on *social norms*. A further particularity is the distinction between the *denotation* (the sign function) and *connotation* (the associated field of meaning) of linguistic expressions.

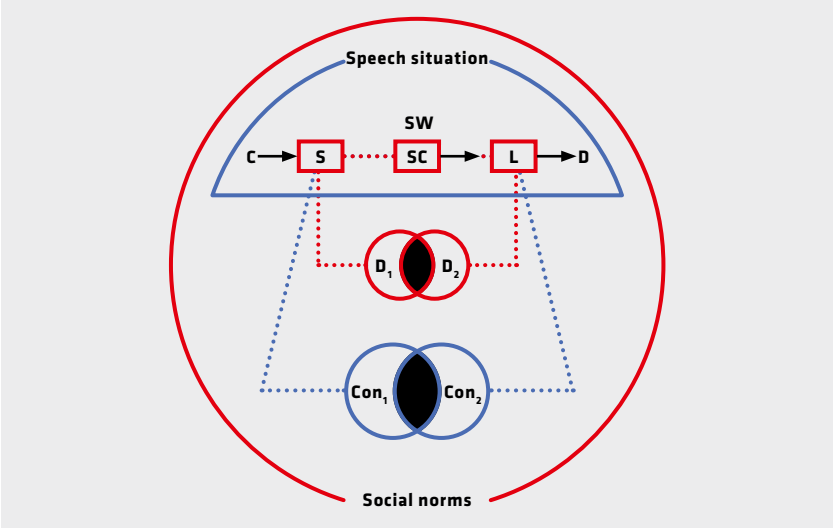

Fig. 2.08: Linguistic communication (modified after Herrlitz 1973).

C = Coding
SW = Sound wave
D = Decoding
S= Speaker
SC= Soundchain
H = Hearer
D_1 | D_2 = Denotation
Con_1 | Con_2 = Connotation

4. SEMIOSIS

The connection between sign and meaning, the subject of semantics, is just as central to semiotics and social sciences. How does a random physical object (e.g. a bent branch, a succession of sound waves, or printer ink on a piece of paper) become a sign?

Eco's answer we know already:

> *A physical object (e.g. a sound or letter) becomes a sign in that it stands for something else (the signified) for someone (the interpreter).*

Let us look more closely at the process of signifying *(semiosis)*. The very perception of a physical phenomenon as meaning „something" occurs on the basis of the interpreter's experiential knowledge of the life-world. (Example: A plume of smoke means in one instance „fire", e.g. a forest fire, but in another context signals the „papal election" - white or black). The interpretation of the sign as something „else" is a *creative act of finding meaning*, for which the context of the sign and the experiential knowledge of the interpreter are meaningful. Yet any interpretation is only ever temporary, and new points of view may necessitate its revision. The process of potentially never-ending interpretation is indicated by the term *hermeneutic circle* which we met in Lecture 1 (Fig. 01.12).

The quest for the connection between sign and signified conceals an epistemological problem. The view taken by *naive realism*, according to which the signs correspond to the objects they signify, is therefore untenable for the simple fact that there are many signs whose meaning does not refer to any object. As an example, let us say we want to look for the meaning of the word horse (the spoken sequence of sounds or the written sequence of letters /horse/). Do we mean a specific horse, e.g. Brunellus? Are we including all horses? What about photos or Stone Age drawings? And Pegasus, the winged horse of ancient legends? In what sense do we talk about the car as the „horse of the technical age"?

The *semiotic triangle* (or triangle of reference) illustrates the complex relationship between sign and signified:

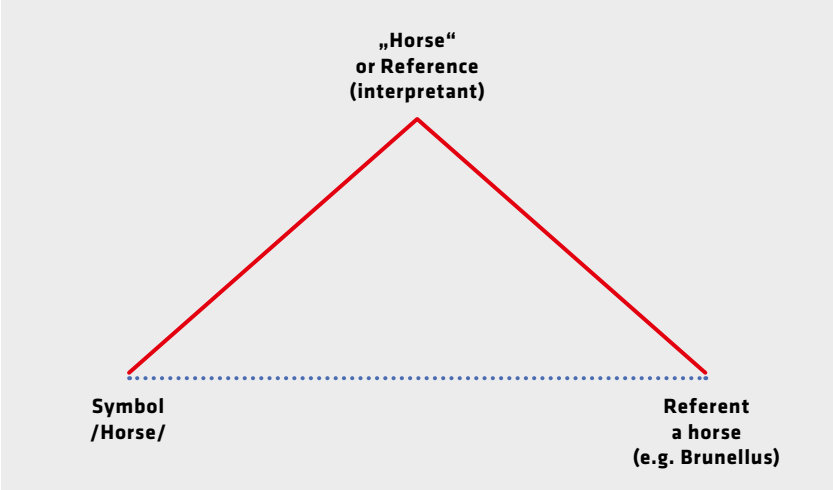

Fig. 2.09: Semiotic triangle (modified after Eco 1977).

The *symbol (or sign)* /horse/ does not just stand for an object or *referent*, i.e. for a specific horse (e.g. Brunellus). The legendary horse Pegasus, for example, never existed as an object. Rather, the sign /horse/ allocates the reference *(thought or idea)* of the „horse being" to an open class of different *referents*: living, dead, drawn, photographed, imagined horses, indeed even people („A Man Called Horse").

While *sign* and *referent* (object) are clearly defined unambiguously in the semiotic triangle, the status of the *reference* is still a matter of debate in philosophy and the social sciences today:

- According to the view taken by *behaviorism*, a reference corresponds to a tendency to react to a class of referents (objects) with the sign allocated to them. (An example of the „horse" class triggers the sign /horse/).
- According to the view taken by *mentalism* (from Latin mens = mind), the reference is an unobservable concept or idea (the „ideal horse" or the idea of the horse) in the consciousness of people.

Umberto Eco rejects both views. For him, the reference „horse" is itself another sign! The function of this sign is to *interpret* both the sign /horse/ and diverse referents, meaning concrete and metaphorical horses that could also be called /horse/. The reference is therefore also called *interpretant*. The *interpretant* of a sign has the characteristic of translating the sign into another „expression-substance".

Thus, the image of a horse may serve as an *interpretant* of the linguistic sign /horse/, or conversely the word or caption /horse/ may function as an *interpretant* for an image (such as in an art exhibition). Whether the *interpretant* is realized as a concept in the mind or as a perceptible physical sign does not play any fundamental role in the process of signifying. Each interpretant interprets a sign and also allows itself to be interpreted by another sign. References are not predetermined „ideas", rather they are interwoven with other references, through which they can be interpreted in a theoretically unending process *(unlimited semiosis)*. They are nodes in a network of signs that define one another. *Eco* calls this network a *system of sign systems* - his definition of *culture*.

This view of culture is shared by ethnologist *Clifford Geertz (1926 - 2006)*. The blurb of the German version of his volume on *Thick Description (1987)* summarizes:

> "I espouse a semiotic concept of culture. Culture is a system of common symbols, with which the individual can impose form and meaning on his experience. Its discourse is both social and public, which takes place in the house yard, the marketplace, and the town square. Through observable social actions of people, cultural forms find articulation: thus they provide information not just about themselves, they also point to more fundamental cultural meanings. Through their ‚thick description', they open up the possibility of understanding culture. Unlike the ‚thin description' which is restricted to collecting data, ‚thick description' means working out the complex conceptual structures, many of them superimposed upon or knotted into one another, thereby gaining access to the conceptual world in which our research subjects live, so that we can, in some extended sense of the term, converse with them."

For qualitative data analysis with ATLAS.ti, the *semiotic triangle* is meaningful when it comes to *coding* quotations in texts or multimedia. *Coding* is a key step in qualitative data analysis. The interpreter (or, in the case of automatic coding, the program) assigns a *code* or keyword to a passage of text or piece of multimedia. The meaning of the code in question can be additionally defined or described in the corresponding *code comment*.

The *code* (an ambiguous term which is defined differently here during coding to how it is defined in information theory) corresponds in the semiotic triangle to the *sign (symbol)*, the coded quotation (passage in the text or unit of meaning in multimedia) to the referent or *meaning*. The *reference* or the *sense* is also a sign (or a chain of signs) which can be equated with the *code comment* since it defines or describes the sense of the code (see Fig. 02.10).

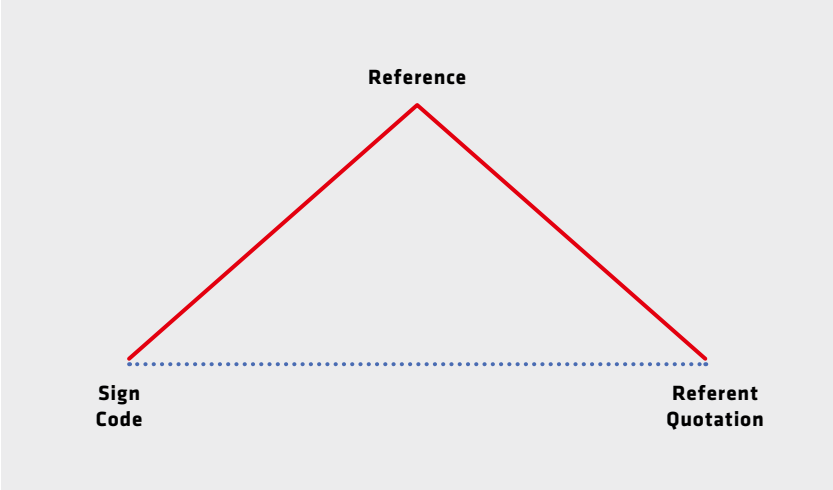

Fig. 2.10: Coding with ATLAS.ti

The possibility described above for the sign /horse/, that sign, referent and reference can signify one another in sequence, applies accordingly to the coding in qualitative data analysis: Each individual quotation which is assigned to a code is one of its possible referents and at the same time a complex sign which signifies this code. The reference of a code is identical with its meaning. In ATLAS.ti it should be outlined in its code note. The totality of all quotations assigned to a code most closely reflects the reference or meaning of the code: all quotations under a code exhibit a *familial similarity*. That is to say, *the meaning of the code is defined by the common meaning of all passages in the text, to which the code refers*. In other words: the quotations assigned to a code are *examples of its use*. This leads us to the use theory of meaning.

5. USE THEORY OF MEANING

The semiotic concept of language and culture at the same time gives us a clue as to the important question of how the meaning of a sign - a linguistic expression, a word, a term, a sentence or an image - can be ascertained or analyzed in the first place: ultimately by classifying it within the semantic network of structures of meaning which the sign is knotted into.

Clifford Geertz, however, shows that this is less about an abstract or theoretical analysis, than it is about at least virtual *participation in the conversation or discourse* of a language community. The connection between language and world becomes understandable only at this *pragmatic level*. So how can the meaning of a word, sentence or image be investigated? Austrian-British philosopher *Ludwig Wittgenstein (1889 – 1951)* developed a *use theory of meaning* for just this purpose.

It is worth taking a look at the life and scholarly journey of this genius. As well as his works, I also refer here to the descriptions in *Time of the Magicians (Eilenberger 2020)* which are as exciting as they are profound.

Fig. 2.11: Ludwig Wittgenstein (1889 – 1951) [7]

Wittgenstein was the son of one of the richest industrial families in Europe. After studying engineering at the *Technische Hochschule Charlottenburg* (later the *Technical University Berlin*), he studied philosophy in Cambridge under the great British philosopher *Bertrand Russel (1872-1970)*, co-author of *Principia Mathematica*. While volunteering on the front during the First World War, he finished his first major work, the *Tractatus logico-philosophicus (Wittgenstein 1921)* which he had first begun writing in 1912 and which, according to his foreword, he believes „the problems (of philosophy) have in essentials been finally solved", writing that „the truth of the thoughts communicated here seems to me unassailable and definitive".

The aim of his logical-philosophical analysis was to differentiate between significant, senseless and nonsense sentences. The *Tractatus* is comprised of sentences numbered in sequence. The first and last sentence have become the most famous: „The world is everything that is the case" and „Whereof one cannot speak, thereof one must be silent".

In his *Tractatus, Wittgenstein* starts from the *representation theory of language*. What the case is are atomic facts, i.e. the existence of circumstances, which are made up of connections of things. Propositions (sentences) consist of names for the things and their logical linking. In true propositions, the names of the things exhibit the same logical links as the things do in the circumstances assigned to them, otherwise they are false propositions. Significant propositions are statements about facts, such as propositions in the natural sciences. Senseless propositions are propositions that are always true regardless of the circumstances, they are tautologies. Nonsense propositions, on the other hand, are propositions whose names do not correspond to things, e.g. statements about good or bad - and all propositions in philosophy. This also applies to the propositions of the *Tractatus logico-philosophicus* which conclude with:

„My propositions are elucidatory in this way: he who understands me finally recognizes them as senseless, when he has climbed out through them, on them, over them." Shortly before this, however, he alludes to a sphere beyond the expressible: „There is indeed the inexpressible. This *shows* itself; it is the mystical."

The horrors of the war had led *Wittgenstein* to mysticism and religion. After the war, he rid himself of his entire inheritance and spent several years working as a village school teacher, living under the most meager of conditions in the Austrian mountains.

At the end of his 20s, he returned to philosophy and became the founder of ordinary language philosophy. In a later work, *Philosophical Investigations (1945)*, which turns the *Tractatus logico-philosophicus* on its head, he developed his *use theory of meaning*, among other thoughts.

[7] By Clara Sjögren Public Domain, https://commons.wikimedia.org/w/index.php?curid=56059352

His thesis is: „The meaning of a word is its use in the language".
Wittgenstein explains this for human language by using the metaphor of a *language-game*:

> „But how many kinds of sentences are there? Say assertion, question, and command? - There are countless kinds: *countless* different kinds of use of what we call „symbols", „words", „sentences". And this multiplicity is not something fixed, given once for all; but new types of language, new language-games, as we may say, come into existence, and others become obsolete and get forgotten ...
>
> Here the term *„language-game"* is meant to bring into prominence the fact that the speaking of language is part of an activity, or of a form of life.
>
> Review the multiplicity of language-game in the following examples, and in others:
>
> - Giving orders, and obeying them –
> - Describing the appearance of an object, or giving its measurements –
> - Constructing an object from a description (a drawing) –
> - Reporting an event –
> - Speculating about an event –
> - Forming and testing a hypothesis –
> - Presenting the results of an experiment in tables and diagrams –
> - Making up a story; and reading it –
> - Play-acting –
> - Singing catches –
> - Guessing riddles –
> - Making a joke; telling it –
> - Solving a problem in practical arithmetic –
> - Translating from one language into another –
> - Asking, thanking, cursing, greeting, praying.
>
> It is interesting to compare the multiplicity of the tools in language and of the
>
> ways they are used, the multiplicity of kinds of word and sentence, with what logicians have said about the structure of language." *(Wittgenstein 1958, § 23)*

The use theory of meaning is of practical significance for qualitative data analysis because it highlights, on the one hand, the nature of linguistic terms, with their multitude of functions, as rules of conduct or rules of a game. Furthermore, we obtain an effective approach for determining the meaning of a term: We analyze its *use* in the context in which it occurs, which for qualitative data analysis means: in *textual examples*. Of critical importance here is a consideration of the respective language community and (sub)culture, in which the term is used.

In qualitative data analysis, this specifically means *not* assuming fixed or preconceived meanings of terms, but rather investigating empirically how terms - e.g. friendship, happiness, health and illness - are used in the texts to be analyzed or interpreted, and what their relationship is with related and differing terms.

This principle is also used by the „big language models" on which chatbots such as ChatGPT are based. Here, machine learning based on immense text corpora is used purely statistically to determine the meaning of human-made words or phrases. The chatbots' seemingly human-like responses have nothing to do with human text comprehension. Linguists therefore call these chatbots based on stochastic processes „stochastic parrots." Basically, the answers are plagiarism machines that work statistically.

As we have already seen above with the use of the semiotic triangle when coding in ATLAS.ti, the sense or *meaning of a code* in a corpus of text to be analyzed is ultimately also defined by its use, specifically by the familial similarity of all quotations which are connected to it. At the same time, this means that the meaning of the code can change every time a new quotation is found or an existing one is deleted.

The use of artificial intelligence in qualitative data analysis, which is gaining an ever more prominent role, also utilizes the use theory of meaning, even though the creators of the machine learning tool do not exactly invoke *Wittgenstein* at any point. To investigate the meaning of a linguistic expression, a suitable text corpus is combed for examples of the use of the sentence or phrase to be coded with the help of learning neural networks.

With ATLAS.ti, this can then be used as a basis for automatic *Sentiment Analysis* which investigates sentences, or alternatively phrases, in a text that is being analyzed exhibiting a positive, neutral, or negative emotional connotation. Automated searching for concepts should also be mentioned here. The identification of concepts is based on an analysis of similar nominal phrases.

6. PROMPTS FOR DISCUSSION

- What is a sign? To what extent is the use of signs - and thus the coding of a text - a twofold creative act?
- Discuss the classification of signs according to *Umberto Eco*.
- Discuss the relationship of *sign – referent or signified object - reference* using the semiotic triangle (triangle of reference). What does *Eco* understand by „unlimited semiosis“?
- Apply the semiotic triangle to coding in ATLAS.ti.
- *Umberto Eco* and *Clifford Geertz* talk of a *semiotic theory of culture*. What does this mean?
- Describe the game metaphor of language use according to *Wittgenstein* and the *use theory of meaning* which he derived from this. Practical applications?

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