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RELATIVITY OF VISUAL COMMUNICATION

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Communication is sharing and conveying information. In visual communication especially visual messages have to be formulated and interpreted. The interpretation is relative to a method of information presentation method which is human construction. This holds also in the case of visual languages. The notions of syntax and semantics for visual languages are not so well founded as they are for natural languages. Visual languages are both syntactically and semantically dense. The density is connected to the compositionality of the (pictorial) languages. In the paper Charles Sanders Peirce's theory of signs will be used in characterizing visual languages. This allows us to relate visual languages to natural languages. The foundation of information presentation methods for visual languages is the logic of perception, but only if perception is understood as propositional perception. This allows us to understand better the relativity of information presentation methods, and hence to evaluate the cultural relativity of visual communication.

Keywords: communication, compositionality, interpretation, language, pictorial language, relativity.

Introduction

The common truism says that one picture tells us more than thousand words. In philosophy we are not bound to common truisms but we do problematize the meaning of them. We do not doubt the basic message behind the truisms, but the very intention of the philosophical study is to clarify and explicate the notions and the topic under discussion.[1] The problem here is how pictures can convey information

[1] Aristotle in his *Topics* characterizes dialectical reasoning saying that "it reasons from opinions that are generally accepted" (Aristotle 1994–2009). The truism can be understood such a generally accepted opinion. Dialectical reasoning may not be confused to contentious or eristic reasoning in which winning plays central role. According to Aristotle dialectical reasoning is useful in teaching, in dialogues, and in philosophical inquiry.

and how we can all understand the pictorial message. Even though the notion of visuality is not restricted to a pictorial approach in the following, we will focus our attention on the generalized notion of picture. The reason for this is that it allows us to concentrate our attention on a few special – and I hope philosophically interesting – themes.

In philosophy there has been extensive discussion on pictures and about pictorial languages. Ludwig Wittgenstein, for example, developed his picture theory of language in *Tractatus Logico-Philosophicus*, and Otto Neurath was a leader of the International Foundation for Visual Education. The intention of the Foundation was to develop the international picture language which was called ISOTYPE (International System of Typographic Picture Education) (Neurath 1936: 7). The pictorial language had theoretical and practical foundations. The practical foundation refers to desires in business and science (Neurath 1936: 13) and the increasing number of pictorial messages that humans get on a daily basis (notice that Neurath wrote this already in 1936 (Neurath 1936: 22)). These were the practical reasons behind the development of the pictorial language.

Wittgenstein's picture theory of language is of central importance for us. The philosophical impact of Wittgensteinian philosophy of language is enormous. His ideas in *Tractatus* were developed by logical positivists. Later Wittgenstein developed his philosophical ideas into new directions which widened his influence into other philosophical schools. There is a close connection between the Wittgensteinian approach and Neurath's approach, because Neurath was one of the founders of the Vienna Circle, the leading group in 20th century positivism. In the Vienna Circle, Wittgenstein's *Tractatus* was read very carefully and Neurath based his picture language on the ideas that can be traced to *Tractatus*. However, *Tractatus* is a deep philosophical book and its interpretation is extremely difficult. Bertrand Russell's introduction to the English edition of *Tractatus* gave an interpretation which refreshed the philosophical thinking of that time.

Neurath's fundamental idea was to develop a clear and informative language which could act as a theoretical foundation to visual communication. Natural language is based on linguistic or symbolic information presentation. The pictorial language, in turn, is based on a pictorial presentation of information. The information presentation methods of the linguistics of pictorial languages differ strongly. The common truism referred to above is based on the assumption that pictorial information presentation is more direct than linguistic information presentation. In a sense, this is also assumed by Neurath (1936: 27): "At the first look you see the most important points, at the second, the less important points, at the third, the details, at the fourth, nothing more – if you see more, the teaching picture is bad".

The quotation shows us the intuitive ideas we have about pictorial information presentation. The idea that at a glance it is possible to attain knowledge is based on a positivistic assumption of the foundation of knowledge (Hintikka 2007). However, even if some of the ideas can be traced to positivism, they were not accepted only by positivists and, moreover, they did not vanish with the disappearance of positivism. A similar idea was formulated by the *Charlie Hebdo* artist Bernard Willem Holtrop during his visit in Helsinki in spring 2015, when he argued that pictures cannot be edited and that they convey information extremely quickly (for more precisely, see Helsingin yliopisto 2015).

Holtrop seems to assume that pictorial information is deeply different from linguistic information. It is obvious that there is some difference, but how the difference is specified is not obvious. Besides the difference, is there something that interconnects the two? Natural languages are of different kinds: Chinese, for example, is a kind of pictorial language. Each symbol is ambiguous but it includes hints for interpretation. Ambiguity is present in all pictorial and symbolic languages.

About interpretation

There are several different kinds of information coding methods. Similarity is only one possibility and, unfortunately, it is not a unique reaction. There are different kinds of similarities and degrees of similarities. It is interesting to note that Holtrop seems to assume that pictorial information can be grasped "intuitively" by just taking a look at the picture. The assumption seems to be that we have a kind of "natural" pictorial information presentation method. This assumption also seems to be behind Neurath's pictorial language.

The interpretation of a given (natural) language is not a simple task to do. In logic, formal languages have inductively defined interpretation. Model theory is the study of different kinds of interpretations. As evidenced by model theory, there are several problems with the interpretation of formally characterized languages which shows the complexity of interpretation, such as the problem of compositionality or the interpretation of anaphoric expressions.

Communication is a process which includes participants in the communication and a topic of the communication: Participants are conveying information about something. Proper communication means that the participants construct a common understanding about the topic together. The participants may be of different kinds: individuals or groups of individuals. A basic situation is communication between two individuals. Both of the participants have their own understanding of the topic. To achieve proper communication between the two, there has to be something that interconnects the participants, something they share. The notion of sharing here is rather more metaphorical than a proper (philosophical) notion. Hence it cannot take a methodologically central role in this paper, but it can still refer to the essential problems to be closely studied. The philosophy of communication is a kind of meta-analysis which gives neither an empirical nor practical description but a logico-conceptual characterization of the topic.

All meaningful language use presupposes that language is not merely manipulable symbols but also interpreted symbols conveying information about something[2]. To convey information, the information presentation method has to be specified in one way or another. Semantics is a systematic study of the information presentation methods of languages. In positivism, there was a strong supposition that language was in a sense directly connected to reality, which can be seen from the following quotation from Wittgenstein's *Tractatus*: "The meaning of primitive signs can be explained by means of elucidations. Elucidations are propositions that contain the primitive signs. So they can be understood if the meanings of those signs are already known" (2010: 3.263).

In *Tractatus*, Wittgenstein developed the picture theory of language in which "the force of the term 'picture' is that of 'isomorphic representation'" (Hintikka 1973: 28). The notion of isomorphic is not a "natural" kind but is based on some method of representation. The method can be of any kind but to be reasonable it has to be manageable, i.e., it should allow one to formulate meaningful expressions and to interpret expressions. This is not a very restrictive constraint. The positivistic idea of the structure of languages was based on certain "protocol sentences", whose interpretation and truth value was certain. This is what Jaakko Hintikka (2007) calls the *atomistic assumption*. However, pictorial languages seem to be based on such an assumption which can be seen in Wittgensteinian picture theory (in *Tractatus*), Neurath's pictorial language, and also in Holtrop's statement referred to above.

[2] In fact Russell (1993: 169) argues that logic is a kind of natural language speaking about natural objects. That is, Russell assumed that the language of (symbolic) logic is interpreted and it has a natural interpretation.

Pictures and signs

As model theory demonstrates, for any given language there are several different possible interpretations. Still, the interpretations given to natural languages are richer than those given to formal languages. Moreover, the interpretations of natural languages are very context-sensitive, as the multitude of Wittgensteinian language games show. Pictorial information presentation methods remind one of poetry rather than scientific languages with exact semantical rules. However, they can still convey meaningful and even truthful information, as the following statement by Pablo Picasso shows: "I do not paint things the way they look, but the way I know they are" (Hintikka 1975: 229). The distinction between what something looks like and what it really is, is of central importance: the notion of picture is connected to appearance, and not to essence. Or, is it so?

The everyday sense of a picture which is based on similarity comprehends only the simplest of pictures. In this sense of pictures, Neurath (1936: 29) speaks about "fact-pictures" and Wittgenstein (1988: 164) refers to pictures as portraits. Picturing is a rich and manifold class of different methods of information presentation. Obvious pictures are informational "fast food". However, there is a need for richer pictorial methods of information presentation, as the Picasso example demonstrates. To understand this better, we have to consider how it is possible to present information and how we can achieve information by observation – how we see something as something.

According to Peirce (1955), there are three different kinds of signs, namely index, icon, and symbol. These use different methods to present information. For example, dark clouds "tell" us that rain is coming or cat hair "tells" us about a cat. These are examples of signs that Peirce calls "index". That is, the power of denotation comes via real connection between the sign and the denoted object. The ordinary pictures, like photographs and drawings, are "similar" to the thing they are picturing. In logic, a symbolic notation like aRb shows the relation that R holds between the entities a and b – you really can see it. According to Wittgenstein, such a picture is "a logical portrayal of" the thing pictured (1961: note 27.9.1914, p. 6e). Similarly, mathematical equations are pictures of the relations in reality. Such signs are called icons by Peirce. The last type of signs includes signs which refer to the object by a conventional rule. The example of such is our ordinary language; the semantical rules are only "arbitrary conventions" that the language community keeps in power just by using the language. Such signs Peirce calls symbols.

It sounds natural to say that we see from a photograph what it expresses. However, it is a proper question to ask what we see when we are seeing it. The question of whether we are seeing the external world or something else, like sense data, is, of course, a proper question, as the argument of illusion (Hintikka 1969: 162–164) shows. The content of our perception is not so obviously given as phrases such as "we clearly see that […]" indicate (Brogaard 2014). The notion of seeing or perceiving needs to be more closely analyzed. The notion of perception we have here is the propositional perception "a perceives that p", which Brogaard (2014) calls "content view". Such a notion is related to notions like propositional knowledge "a knows that p" or propositional belief "a believes that p". Such notions are understood as modal notions (Hintikka 1962). That is, the perceiver gets some information via perception. So, according to Hintikka (1969: 155), the sentence "a perceives that p" is analyzed as "in all possible states of affairs compatible with what a perceives is the case that p", and the sentence "a does not perceive that p" is analyzed as "there is a possible state of affairs compatible with everything a perceives in which not-p is true". The model theoretical analysis given by Hintikka shows how our perception has the informational content similarly to our knowledge that something is the case. The notion of "perceiving that" is not the only

possible notion of perception but for us it is, of course, of central importance.

The model theoretical analysis shows how the informativeness of perception is built up. The very idea is that we can divide the perceptual framework into scenarios which show us what we perceive and what we do not perceive. The scenarios are divided into two groups: those that are compatible what we perceive and those that are incompatible what we perceive. In the case of propositional knowledge, such an analysis is natural; the propositional knowledge can be expressed by a language. In the case of perception, the situation is not so simple. However, Edmund Husserl thought that (in principle) our perceptions can be expressed linguistically but is this justifiable opinion is a proper question. It seems to be that even in the case of propositional knowledge, it is not possible to give a complete linguistic characterization of knowledge. The perceptual information is more complex to characterize: "Perceiving as" is not all we perceive informationally. Our linguistic methods of analysis give the impression that linguistic analysis provides all the information that is possible to get out. Model theoretical analysis shows the restrictions of such a complete view. Model theoretical analysis is not merely a set theoretical approach; models can also be formulated behavioristically (Hintikka 1975: 93–95). There are no theoretical restrictions to developing other kinds of model theoretical tools. It is also possible to develop pictorial models that can be seen as a special case of more general visual models.

Pictorial models could be understood as ordinary models of (natural) language, as Wittgenstein does. In this sense, pictorial models are concrete models which show the content of the sentences modeled as far as we can "understand" pictures. In this sense, pictures can be translated linguistically (Hintikka 1973: 37–40). In this sense, a single sentence may be modeled using several different pictures, just as one sentence has several different (set theoretical) models. The difference is that in general pictures do not have such a well-specified syntactical structure as set theoretical models.

However, pictorial models can also be understood as kind of Henkin models (Webb 2006: 258), which are understood as models of pictorial language. The idea of this extension is to take the notion of pictorial language more seriously. In fact, Neurath (1936) intended to generate a proper pictorial language. The basic idea behind Neurath's pictorial language was to "translate" ordinary language into a pictorial language. Neurath developed his pictorial language step by step, intending to develop it into something more and more powerful (Neurath 1936). One can see this approach as being somewhat naïve. However, there is no reason to disregard Neurath's ideas: the philosophical idea behind his picture language is very deep.

The reason why Neurath's idea behind his pictorial language may seem naïve could be the explicitness of the approach. The explicitness reveals the philosophical and language theoretical suppositions behind the approach. Of course Neurath, as a member of Vienna Circle, explicates his positivistic assumptions. Let us mention the "inductive character" of the language, which means that the language is built up of simple symbols whose meaning is clear cut. The more complex expressions are built up from these simple symbols using explicit syntactical rules, and the meaning is generated inductively, just as the syntax is. The Wittgensteinian picture theory of language was used by members of the Vienna Circle when they developed their philosophy of language. In his picture theory Wittgenstein "wanted to view all sentences as logical pictures (isomorphic representations) of such states of affairs as would make them true" (Hintikka 1973: 16). According to Wittgenstein, sentences show their structural properties.

Neurath's fundamental assumption was that pictures fix the reality directly: there is a direct one-to-one relationship between the picture and reality. A similar assumption was behind

the Wittgensteinian picture theory of language, even though the picture theory was a characterization of semantics of ordinary language rather than a proper (pictorial) language, as was the case in Neurath's pictorial language. Such an assumption was generally assumed by positivists which is closely connected to the atomistic assumption (Hintikka *et al.* 2002: 307). The postulate restricts sense information to information which can be expressed by atomic sentences, or protocol sentences, as Neurath and other positivists called them. The atomic sentences express the foundation of all the knowledge we have or can have. Neurath also accepted the assumption in his pictorial language. The assumption has its plausibility and it has been assumed quite generally, even though sometimes one does not recognize that one has assumed it. For example, the statement given by Holtrop above includes some aspects that refer to the assumption.

As Peirce's theory of signs show, pictures can function as signs in several different ways. A mental image about a picture leans on picturing via similarity. However, the mental image does not state very clearly what the "similarity" comprehends. As the examples above show, the similarity is rather more symbolic than concrete; maybe the notion of "similarity" has the most concrete meaning in the case of a scale model. In most cases, the similarity is something more abstract and is conveyed via some interpretational key, which gives the "logic of isomorphism", i.e., the method of "pictorial representation" (Hintikka 1975: 223).

Pictorial language

The scale model is – or seems to be – "similar" to the thing that is being modeled. In a scale model, not every single detail is expressed, nor is every detail that is expressed uniquely expressed. That is, the similarity is not one-to-one. Hence, the "natural" interpretation code which gives the "natural" isomorphism between the model and the thing being modeled is not properly natural but conventional. Hintikka (1975) considers methods of representations in early cubism. He emphasizes that "[t]he key idea of this whole development can be taken to be just the idea of freely varying the representational relationship between language and reality" (Hintikka 1975: 239). The varying methods of representation do not imply any kind of relativism but the possibility to represent reality in different ways. Linguistic or representationalistic tools make it possible to vary the semantics of the language voluntarily. Philosophically, this is an extremely deep observation. Wittgenstein assumed that the semantics of the language can be seen (2010: 4.022), but also "[w]hat can be shown cannot be said" (2010: 4.1212). This means that the semantics of a language cannot be expressed (within the language), i.e., there cannot be an explicit theory of semantics. According to Wittgenstein, this semantical inexpressibility also applies to pictures: "The picture, however, cannot represent its form of representation; it shows it forth" (2010: 2.172). So, the name "picture theory" is not correctly formulated. "In the jargon of the *Tractatus*, we might say that picturing in the proper Wittgensteinian sense is a relation between a *true* sentence and a *subsistent* (*bestehend*) state of affairs. Strictly speaking, it is therefore a solecism to speak of a picture theory of *language* in *Tractatus*. What we might find there is a picture theory of *truth*" (Hintikka, M. B., Hintikka, J. 1986: 121).

The Wittgensteinian attitude that semantics is inexpressible even if it has a great supporter is not the only possibility. It is possible to systematically study the semantics of a given language, which has been demonstrated to be true by doing actual semantical study and developing semantical theories in practice. This has been done in the model theory. This does not need to be restricted only to languages but can be generalized to other representationalistic approaches, especially to pictorial representations. Hintikka (1975: 239) says that

"For the most important feature of the cubist revolution consisted precisely in the giving up of one preferred method of pictorial representation, viz. the naturalistic and illusionistic one. This is analogous to the step from 'logic as language' to 'logic as calculus' which also involved giving up idea of one preferred and indeed inescapable mode of representation".

Neurath developed his pictorial language as a proper communicative language. Even if Neurath leans on the natural language while developing his pictorial language, the idea is not to get one-to-one correspondence between natural language and pictorial language. The flexibility of the pictorial language connects the language to the "calculistic position" (Pietarinen 2011). The calculistic position is sometimes connected to the compositionality of languages. However, compositionality is not directly connected to the calculistic position but, rather, to an inductive definition of language. Tarski-type semantics are defined by a step-by-step procedure which starts from the minor elements of the language or sentence. This imposes semantical compositionality or semantical context-independence (Hintikka, Kulas 1985: 4). This is an extremely important property: the meaning of the whole sentence (or text) is dependent on the elementary elements of the sentence (or text). Moreover, the meaning of a given sentence (or text) is not dependent on the context in which the sentence (or text) occurs. However, in general, there is no reason to assume that natural languages are compositional. Moreover, in logic there are methods for managing noncompositional languages (Hintikka, Kulas 1985). In pictorial languages, the noncompositionality is more obvious than in the case of natural languages. This was also recognized by Neurath (1936: 18): "The units of the picture language have different senses when they are in different positions".

Neurath (1936) was looking for some simple pictorial characters to act as the foundation of his pictorial language. The "logic" of the pictorial language is in accordance with our "logic" of observation: "Reading a picture language is like making observations with the eye in everyday experience: what we may say about a language picture is very like what we may say about other things seen by the eye" (Neurath 1936: 20). Here, Neurath has in mind a kind of informative notion of perception,[3] which means that our perceptions provide information about the thing or world that is perceived. The notion of information here has its usual information theoretic meaning, in which the measure of information is relative to the (relative) number of excluded possibilities. In this sense, perception does not give information "directly" but only relative to the class of possibilities in which the observation can be embedded. Hintikka (1975: 61) clarifies this:

"What follows is that to specify what someone, say a, perceives is to describe what the world is like according to his perceptions (whether they be veridical or not). Since these perceptions do not fix the world uniquely, this description is logically speaking not unlike a disjunction of several different alternatives concerning the world. The most systematic way of spelling out these several alternatives is to make each one of them as full a description of the world as we can give by means of the resources we are using".

Neurath developed his pictorial language as a proper language which takes care of itself. "It is unnecessary to say in words what we are able to make clear by pictures" (Neurath 1936: 26). So, a pictorial language is thought to be a proper language in which it is possible to formulate proper statements, and it allows a proper dialogue, otherwise it could not be used in teaching, which was one of the main targets of the language.

[3] Perception need not be understood as informative. Regarding the discussion about interpretations of perception, see Brogaard (2014). For us, the analysis of informative perception is sufficient.

Neurath had a strong belief that an effective pictorial language could be developed. He (1936: 27) says that "[at] the first look you see the most important points, at the second, the less important points, at the third, the details, at the fourth, nothing more" which shows the strength of his belief. To make sure that the effectivity is really meant, Neurath adds to the quotation that "if you see more, the teaching picture is bad". The effectivity has been accepted more generally; it is not merely the assumption made by positivists, even if the assumption is based on some fundamental positivistic assumptions. The set of assumptions may vary, but the fundamental ideas assume that pictures are immediate tools for conveying information. This can be seen, for example, from common truisms, Holtrop's statement, and Neurath's (1936: 30) statement in which he says that even if we do not know the rules of the pictorial language, we "get the effect of the pictures". Peirce's theory of signs shows that the pictoriality is not a direct and obvious relationship between a picture and the thing being pictured. In a similar way to how natural language presupposes an interpretation code, pictorial languages presuppose some interpretational code. There is no such a direct access to the meaning of the pictures.

The benefit of Neurath's picture language is that it allows us to generate statements and even instructions (Neurath 1936: 56). Such properties interconnect the pictorial language to natural language. The use of a pictorial language is not very easy. The pictorial representation, even if Neurath looked at extremely simple forms, is not very simple. In a picture there is an enormous amount of detail that may be understood as meaningful. For example, in Chinese language signs there are interpretational hints which direct the interpretation of the symbols. In pictorial languages, the situation is more complex. For example, take a look at early cubists' works and "see" their realism from the pictures (for further information, see, for example, Hintikka 1975: ch. 11).

About noncompositionality

Pictures function as basic symbols of the pictorial language. Neurath was looking at very fundamental and simple pictures that could be used as foundational symbols. This approach has some important benefits. One philosophically important aspect of this pictorial language project is that it broadens our notions of language and its expressive power. The expressive power has been studied in model theory, which allows models to be of any kind of structure, even factual or behavioral ones (Hintikka 1969). Wittgenstein's picture theory can be seen as a model theoretical approach. However, the syntactical approach has been more "conservative", even if there are examples of "pictorial" languages, like Chinese and hieroglyphics (Neurath 2010).

Neurath was developing a proper picture language which could be used as a natural language. Neurath formulated in his pictorial language examples from proper statements. In this sense, the approach was extremely important and still worth further study. Neurath had in mind a kind of inductively definable structure for his pictorial language. The idea is closely connected to the philosophical and logical ideas of the early 20th century. However, as said, the approach is very important and partly developable independently of Neurath's philosophical presuppositions (Pietarinen 2011).

In epistemology, the fundamental problem has been to study what is termed propositional knowledge, i.e., knowledge which can be expressed linguistically. Sometimes this has been interpreted such that knowledge is somehow restricted to the linguistic domain. For example, Nelson Goodman and Catherine Elgin (1988: 3–4) say that

"Epistemology once sought certainty through derivation from incontrovertible basic statements. Whatever could be so derived, and nothing else, qualified as knowledge. […] Since only sentences are subject to derivation, none of the insight, information, or understanding

imparted by nonverbal symbols, and music could serve the process only as auxiliary aids with no more than incidental epistemological interest".

The philosophy of language and logic has also played a very important role in epistemology. The development of logic has been extremely strong, which has several implications for philosophy. In logic, the use of inductive definitions has been very fruitful. Inductive definitions have been used to define both syntax and semantics.

Inductive definitions generate well-behaving structures into languages. For example, the formulas of a given logical language can be defined as a set which includes given atomic formulas and which is closed under sentence formation rules. This generates a well-behaving syntactical structure of formulas and subformulas. In the case of sentences, the situation changes a little bit but it still remains clear enough. All these are compositional in a clear-cut sense. Tarski-type semantics is defined inductively in a similar way. This generates extensional semantics, which means that the truth value of a given sentence is determined by the truth values of its parts. However, as intensional logic shows, this has only limited scope. Tarski-type semantics can be applied to intensional logic. In natural languages, the situation becomes much more complex, as demonstrated by anaphora (Hintikka, Kulas 1985).

Even if inductive definitions in logic made it possible to "mechanically" generate new sentences, theorems and even models, machine-like mechanistic procedures do not explain logic or logical reasoning: logical reasoning is properly creative. This creativity can be seen in both proof theory and model theory. The creativity is needed because of the richness of the languages. The formalism does not exclude human creativity: The rules of inference are only mechanical in some specific sense. The actual inference steps and proofs suppose ingenuity.

The richness of logical languages can be seen, for example, from the Löwenheim-Skolem theorems (*downward* and *upward*) which show the multiplicity of the models of a given theory (Keisler 1977: 63–65). Such logical results demonstrate that completeness is not a simple notion which is either valid or fails to be valid. According to Hintikka (1988), the completeness can be either deductive or semantic. Kurt Gödel (1999) proved that first-order logic is not deductively complete. However, Gödel proved in his completeness theorem that a given sentence is provable if and only if it is valid, which shows a kind of semantical completeness of first-order logic with a certain kind of semantical completeness. However, the results of model theory prove that it is not possible to characterize just the intended class of models, which shows that a certain kind of semantical completeness fails to be valid. Hintikka (1988: 165–166) calls this the descriptive incompleteness of the first-order logic.

The inductive definition of the syntax of first-order logic shows that syntax is discrete. Natural languages are syntactically more complex than (first-order) logic. However, natural languages can be approximated by logic. The semantics is not so simple case: the model theoretical results shows that semantical structure of a simple set of sentences is extremely complex one. Using Goodman's terminology this can be expressed that first-order logic is semantically dense. The pictorial language is more complex than logic or natural languages, so the semantical density also holds for pictorial languages. However, pictures are not inductively generated entities. There are no simple characters from which all the pictures are generated using some rules of picture formation. As Goodman says, pictures are also syntactically dense.

"That is, given any two marks, no matter how small the difference between them, they could be instantiating two different characters, and given any two characters, no matter how small the difference between them, they may have different referents […] any difference in a mark may correspond to a different character,

and any difference in the character may stand for a different correlation to the field of reference" (Giovannelli 2010).

Such density crushes Neurath's approach: there cannot be such a well-behaving pictorial language that Neurath was looking for. However, this does not mean that Neurath's idea should be rejected: it should be further developed.

In the philosophy of language, the game theoretical approach has proved to be very fruitful. For example, the game theoretical approach is very flexible. It offers us a philosophically deep and practically applicable general framework in which the problems characterized above can be handled. In this approach, the notion of strategy plays a central theoretical role. The notion allows us to handle several problems, like the problem of (semantical) density (Hintikka, Sandu 1997). So, the pictorial language developed by Neurath is a very important step but certainly not the final stage. The approach has a very promising future (Pietarinen 2011).

In his *Notebooks, 1914–1916* Wittgenstein says that (1961: 29.9.1914)

"If the right-hand figure in this picture represents the man A, and the left-hand one stands for the man B, then the whole might assert, e.g.: 'A is fencing with B'. The proposition in picture-writing can be true and false. It has a sense independent of its truth or falsehood".

We may add to this that pictures can be understood as proper statements, but at the same time we have to assume some method of interpretation, as Wittgenstein's example shows. This implies that pictures lose the power to convey information directly and immediately, even if this means that a picture language cannot be universal, but is relative to some community which shares the interpretational code. However, the pictorial interpretation is not restricted to a lingustic community, which allows us to enlargen the community and, hence, to reduce the relativity of the communication.

Conclusions, or closing words

In visualization, the idea is to make thinking visible or to make thought visible (Ritchhart *et al.* 2011). As we have seen, visualization in ordinary language and in pictorial language is relative to some method of visualization. Without such a method, one cannot formulate statements and we cannot "see" the pictorial statement as intended. The method is not – and cannot be – universal, but is it restricted to the "linguistic community". As Neurath (1936) emphasized, pictorial languages do not have as much cultural and educational presuppositions as ordinary or scientific languages have. Still, a certain relativity to a linguistic – or pictorial – code remains: in understanding pictorial language one has to "see as", not merely to "observe". So, our notion of "propositional observation" is the proper notion of observation in our analysis.

According to Wittgenstein, we are bounded into our language. This can be seen when Wittgenstein (1988: 40) says that "But if you say: 'How am I to know what he means, when I see nothing but the signs he gives?' then I say: 'How is *he* to know what he means, when he has nothing but the signs either?'". The same holds true as much for pictorial languages. However, there is no need to assume such a strong philosophical attitude as Wittgenstein. We can see that by using different languages – both natural, formal, and pictorial – we can break through the wall of misunderstanding and hence release us gradually from the relativity of communication.

References

Aristotle. 1994–2009. Topics, *The Internet Classics Archive* [online], [cited 24 August 2015]. Available from Internet: http://classics.mit.edu/Aristotle/topics.1.i.html

Brogaard, B. (Ed.). 2014. *Does Perception Have Content?* New York: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780199756018.001.0001

Giovannelli, A. 2010. Goodman's Aesthetics, *Stanford Encyclopedia of Philosophy* [online], [cited 15 July 2015]. Available from Internet: http://plato.stanford.edu/archives/sum2010/entries/goodman-aesthetics/

Goodman, N.; Elgin, C. Z. 1988. *Reconceptions in Philosophy & Other Arts & Sciences*. London: Hackett Publishing.

Gödel, K. 1999. Some Metamathematical Results on Completeness and Consistency, On Formally Undecidable Propositions of "Principia mathematica" and Related Systems I, and On Completeness and Consistency, in Heijenoort, van J. (Ed.). *From Frege to Gödel: A Source Book in Mathematical Logic, 1879–1931*. San Jose: iUniverse, 592–617.

Helsingin yliopisto. 2015. *Charlie Hebdo – piirtäjä vieraili yliopistolla* [online], [cited 1 July 2015]. Available from Internet: https://www.helsinki.fi/fi/uutiset/charlie-hebdo-piirtaja-vieraili-yliopistolla

Hintikka, J. 1962. *Knowledge and Belief: An Introduction to the Logic of the Two Notions*. Ithaca: Cornell University.

Hintikka, J. 1973. *Logic, Language-Games, and Information: Kantian Themes in the Philosophy of Logic*. Oxford: Clarendon Press.

Hintikka, J. 1969. *Models for Modalities*. Dordrecht: D. Reidel Publishing Company.

Hintikka, J. 1988. Onko totuus saavuttamaton?, in Kusch, M.; Hintikka, J. *Kieli ja maailma*. Oulu: Pohjoinen, 143–169.

Hintikka, J. 2007. *Socratic Epistemology: Explorations of Knowledge-Seeking by Questioning*. New York: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511619298

Hintikka, J. 1975. *The Intentions of Intentionality and Other New Models for Modalities*. Dordrecht: D. Reidel Publishing Company. http://dx.doi.org/10.1007/978-94-010-1865-4

Hintikka, J.; Halonen, I.; Mutanen, A. 2002. Interrogative Logic as a General Theory of Reasoning, in Gabbay, D. M.; Siekmann, J.; Benthem, van J.; Woods, J. (Eds.). *Handbook of the Logic of Argument and Inference: The Turn Towards the Practical*. Series: Studies in Logic and Practical Reasoning. Gabbay, D. M.; Johnson, R. H.; Ohlbach, H. J.; Woods, J. (Eds.), Vol. 1. Amsterdam: Elsevier/New Holland, 295–338.

Hintikka, M. B.; Hintikka, J. 1986. *Investigating Wittgenstein*. Oxford: Basil Blackwell.

Hintikka, J.; Kulas, J. 1985. *Anaphora and Definite Descriptions: Two Applications of Game-Theoretical Semantics*. Series: Synthese Language Library: Texts and Studies in Linguistics and Philosophy, Vol. 26. Dordrecht, Boston, Lancaster: D. Reidel Publishing Company.

Hintikka, J.; Sandu, G. 1997. Game-Theoretical Semantics, in Benthem, van J.; Meulen, ter A. (Eds.). *Handbook of Logic and Language*. Amsterdam: Elsevier, 361–410.

Keisler, J. H. 1977. Fundamentals of Model Theory, in Barwise, J. (Ed.). *Handbook of Mathematical Logic*. Series: Studies in Logic and the Foundations in Mathematics. Keisler, H. J.; Mostowski, A.; Robinson, A.; Suppes, P.; Troelstra, A. S. (Eds.), Vol. 90. Amsterdam, London, New York, Tokyo: North-Holland, 47–104.

Neurath, O. 2010. *From Hieroglyphics to Isotype: A Visual Autobiography*. London: Hyphen Press.

Neurath, O. 1936. *International Picture Language: The First Rules of Isotype*. London: Kegan Paul, Trench, Trubner & Co., Ltd.

Peirce, Ch. S. 1955. Logic as Semiotic: The Theory of Signs, in Buchler, J. (Ed.). *Philosophical Writings of Peirce*. New York: Dover Publications, Inc., 98–119.

Pietarinen, A.-V. 2011. Principles and Practices of Neurath's Picture Language, in Symons, J.; Pombo, O.; Torres, J. M. (Eds.). *Otto Neurath and the Unity of Science: Logic, Epistemology, and the Unity of Science*, Vol. 18. Springer, 71–82. http://dx.doi.org/10.1007/978-94-007-0143-4_6

Ritchhart, R.; Church, M.; Morrison, K. 2011. *Making Thinking Visible: How to Promote Engagement, Understanding, and Independence for All Learners*. San Francisco: Jossey-Bass.

Russell, B. 1993. *Introduction to Mathematical Philosophy*. New York: Dover Publications.

Webb, J. C. 2006. Hintikka on Aristotelean Constructions, Kantian Intuitions, and Peircean Theorems, in Auxier, R. E.; Hahn, L. E. (Eds.). *The Philosophy of Jaakko Hintikka*. Series: The Library of Living Philosophers, Vol. 30. Chicago: Open Court, 195–301.

Wittgenstein, L. 1961. *Notebooks, 1914–1916*. Wright, von G. H.; Anscombe, G. E. M. (Eds.). New York: Harper Torchbooks.

Wittgenstein, L. 1988. *Philosophical Grammar*. Rhees, R. (Ed.). Oxford: Basil Blackwell.

Wittgenstein, L. 2010. *Tractatus Logico-Philosophicus*. Ogden, C. K. (General Ed.). Series: International Library of Psychology, Philosophy and Scientific Method. EBook #5740: 23–90 [online], [cited 15 July 2015]. Available from Internet: http://www.gutenberg.org/files/5740/5740-pdf.pdf

VIZUALINĖS KOMUNIKACIJOS RELIATYVUMAS

Arto MUTANEN

Komunikacija – tai dalijimasis informacija ir jos perdavimas. Vizualinėje komunikacijoje visų pirma turi būti formuluojami ir interpretuojami vizualiniai pranešimai. Interpretacija yra susijusi su informacijos teikimo metodu, o šis konstruojamas žmogaus. Tai taip pat galioja vizualinių kalbų atveju. Sintaksės ir semantikos sąvokos vizualinėse kalbose nėra taip gerai pagrįstos kaip natūraliosiose kalbose. Vizualinės kalbos yra sudėtingos tiek sintaksiškai, tiek semantiškai. Sudėtingumas yra susijęs su (vaizdinių) kalbų kompozicionalumu. Straipsnyje, charakterizuodami vizualines kalbas, pasitelksime Charleso Sanderso Pierce'o ženklų teoriją. Šioji leidžia mums susieti vizualines kalbas su natūraliosiomis. Informacijos teikimo metodų vizualinėmis kalbomis pagrindą sudaro suvokimo logika, tačiau tik tuo atveju, jei suvokimas suprantamas kaip propozicinis. Tai leidžia mums geriau suprasti informacijos teikimo metodų reliatyvumą, taigi ir įvertinti vizualinės komunikacijos kultūrinį reliatyvumą.

Reikšminiai žodžiai: komunikacija, kompozicionalumas, interpretacija, kalba, vaizdinė kalba, reliatyvumas.