

What is thinking with images? [draft]

1. Introduction

The goal of the chapter is to introduce main definitions, as well as to describe the main problem of the book, that is, what are epistemological function and the content of images.

1.1. Definitions

Thinking with images is here understood broadly as mental capability (traditionally ascribed to imagination) of thinking in or with images that includes external, most commonly visual representations (e.g., diagrams, paintings, maps, drawings, visual models) and/or internal visual imagery (mental images); often the two are used in combination, as when we are required in mathematics to visually imagine a certain spatial transformation of an object represented by a diagram on paper or on a screen. It is also the case that imagistic thinking is used in conjunction with non-imagistic thinking, for example, symbolic representations, too.

Images will be here understood as broadly as possible as structure-preserving representations, that include pictures, non-pictorial images like MRI scans, and merely homo- or isomorphic representations, and mental images – as experiences that mirror the experience of perceiving an object when this object is not actually present, but is imagined (Kulvicki 2014). It should be noted, that with this provisional definition I do not determine the format of mental images. I do not limit the scope of my investigations to pictures and visual images, as well, however, visual images serve the best examples of thinking with images. My investigations should apply to auditory, literary, scientific images etc. too, that is, if I argue for the possibility of thinking with or in images, then I argue that it is possible to think with music, literature, or scientific models. However, due to the simplicity of the argument, I will restrict myself mostly to the analysis of visual examples as the most common and intuitive ones.

Although they differ in many aspects, I suggest treating jointly internal and external images, for two reasons. First, if one wants, as I am, to argue that images could be a medium of thought, then when it comes to the content of thought there is no relevant difference between the former and the latter. Geometry serves a good analogy. If one could think with geometrical figures, then there is no relevant difference between a geometrical figure as a mental entity and the geometrical figure as an image drawn on a paper – in both cases important is the act of thinking that includes operations on mathematical (external or internal) representations. Second, a

common strategy in the contemporary linguistically orientated philosophy of mind is to study the nature of thinking by means of studying lingual expressions of thought. It is held that studying external representations of thought could bring us closer to the proper understanding of the nature of thought. Thus, it is at least heuristically plausible, that conjoining internal and external images could teach us something about the former by means of the latter.

1.2. Why is it important?

Thinking with (mental) images is one of recognized forms of non-verbal thought in contemporary cognitive psychology. It is also widely held that imagistic thinking is essential for art practice. The thoughts of composers may sometimes consist entirely of auditory images, as they manipulate images of melodies and chord patterns, trying out different possibilities until hitting upon something which satisfies them. The thoughts of an engineer may consist entirely of visual images of arrangements of objects. One could also argue that the referring to images is basis of a common practical reasoning such as: “If I make a move like that [image], then I shall be able to do like that [image]”. The importance of thinking with images in our cognitive systems is not news. Yet a time-honoured view, still prevalent, is that the utility of images is only instrumental. It is argued, for example, that the function of images is to decrease information costs or quicken a process of decision. Images can be also effective means of communication or reasoning tools. Images may, for example, illustrate cases of a definition; they may help us understand the description of a situation or the steps in some reasoning; they may suggest an idea for investigation etc. Thus images have a facilitating role. But that is all, on the prevalent view (Giaquinto 2007).

Prima facie, it is nothing wrong with this picture. However, I claim, that if we agree upon that images have only inferior heuristic function, then there is no good reason why images should not be replaced by a superior and more effective tool of reasoning and communication. After all, we possess better, for example, more precise, tools, such as logic tools, to make decisions or to assess a situation. Thus, it is not enough to claim, that images could be a bearer of some information. One of the profound challenges in contemporary epistemology – and one which has by no means been satisfactorily answered – is to convincingly demonstrate that images and only images convey semantical justifiable information, that is not possible to obtain without images. To put it in other words, the goal is to prove that thinking with images is a genuine, autonomous, and internally cognitive form of thought and knowledge. Such a demonstration must not be confused with the dominant view that visualization is a merely secondary, inferior, illustrative and intuitive presentation of cognitive process and arguments, which have, for their

own part, a source that is completely independent of such visualization (Botterill, Carruthers 1999).

Alongside the discussion on epistemologically inferior and non-autonomous character of imagistic thinking and whether and to what extent images contribute to knowledge, there is also a disagreement among contemporary philosophers of mind, neuroscientists, and psychologists regarding the issue of images as medium of thought. Historically speaking, there is at least one good reason to believe that images play a crucial role in thinking. It was believed that images could give us an answer to the question on concept formation and the issue how abstract concepts could relate to sensory data. The so-called image theory of meaning and cognition was prevalent in modern philosophy at least since Locke to Russell. However, due to certain Kantian, Wittgensteinian and post-Wittgensteinian arguments, it is held that images cannot be representationally basic and the phenomenon of imagistic thinking has been largely regarded as epiphenomenal and peripheral in cognition. On the one hand, it is argued that images cannot fix the content of thought (intentions, rules); on the other, the central processes of thought require a propositional representation system, a language of thought, universal and modeled on the machine languages of computers. The language of thought is compositional, systematic, and productive. Images lack all of these essential qualities and so are hopeless as key players in thinking. On the other hand, even if image theory of meaning gives a wrong answer to the question on the relation between what is mental and what is experienced, it does not mean that the question is wrong. Just in the opposite. It seems that it is still addressed in a conceptual/nonconceptual content debate, or in a discussion on nativism about concepts.

It is also a case that even strong opponents of the imagistic theory of thought do not argue against the view that our thoughts could consist only of (mental) images as for example in art or in practical reasoning. It is also pointed out (Rollins 1989) that purely symbolic processes are ill-suited to capture perceptual categorization, they cannot capture what is particularly visual, and they are unable the insight and creativity characteristic of most human problem-solving. As a result, it is widely accepted by contemporary scholars that thinking with images is possible. It is also claimed that the debate on the thinking with images issue is important since it seems to challenge the contemporary understanding of the nature of thinking. However, it is still not clear what do we mean by the imagistic theory of thought. The main issue that has to be settled is whether images are not only epiphenomena of more abstract and more basic language of thought.

I claim, that a full-blooded explanation of the nature of thinking with images has to address two problems: (A) epistemological problem, i.e. whether and how thinking with images contributes to knowledge?; (B) conceptual problem, i.e. whether and how images could play a role of medium of thought, where thinking is understood, among other things, as capability to operate with concepts. There is a reason to conjoin these two questions, since answering the second question gives us a clue how to answer the first, but not conversely.

2. Two Problems of Thinking with Images

The goal of the chapter is to clarify the claim and to introduce two problems of thinking of images that have to be addressed by a comprehensive image theory of meaning and cognition.

2.1. The Epistemological Problem

The epistemological problem could be framed in a question: whether, how and why images and thinking with images can play a genuine role in our cognition, and to what extent we can ascribe epistemological values to images and thinking in or with images? This general question contains at least four issues:

- (a) Can a visual way of acquiring a belief justify our believing it?
- (b) Can a visually acquired belief be knowledge in the absence of independent nonvisual grounds?
- (c) If, as I shall argue, thinking with images is a form of knowledge, then how and to what extent it differs from non-imagistic forms of knowledge?
- (d) If and how imagistic knowledge can contribute to scientific knowledge?

However, if one, as I do, wants to defend a positive answer to these questions, one has to address following objections (Carroll 1998):

- (K) The Knowledge Challenge: images and visual thinking cannot provide propositional knowledge, since they lack propositional content.

Objection K could be described in two ways. First, it is claimed, that images differ from propositional attitudes, such as beliefs, since the former do not possess truth conditions. One argues that images' content could be defined by intensional context, for example, as the way something appears in our phenomenal consciousness, but that is all (Crane 2009; Haugeland 1998; Peacocke 1987, 1992). Second, it is claimed, that if images had propositional content, then they should be able to express such logical relations as negation. Another word, if a

proposition “if P , then Q ” is true, then a proposition “it is not true, that if P , then Q ” is false. However, this operations cannot be applied to images, since it is not possible to reformulate images into a negation of itself (Crane 2009; Sainsbury 2005).

(T) The Triviality Challenge: even if images and imagistic thinking can provide propositional knowledge (i.e. even if (K) is false), any knowledge so provided is cognitively trivial.

Even if images could be a source of a propositional knowledge, they should also convey such knowledge, that is not trivial (Carroll 2002). It seems, however, that imagistic knowledge does not withstand the comparison with science. Differently speaking, knowledge, we get from images, seems trivial in comparison with the knowledge we get from sociology, psychology, biology, or physics. That claim is based on the belief that images, as specific non-abstract representations, cannot convey information on abstract concepts, that are the core of scientific cognition. This belief is strong especially among post-Wittgensteinian thinkers, such as Bennett and Hacker (2003), or Goodman (1968), but in fact it refers to a compelling intuition that images unsupplemented by much prior knowledge (and hence thought), are confined to representations of appearance. This gives rise to an immediate problem for the imagist theory of thought, since many of our words and concepts do not stand for the kinds of thing which have an appearance; for example logical concepts like *and*, or, *not*; temporal concepts like *tomorrow*, *yesterday*, *year*; concepts for abstract properties like *inflation* (of money), *prime* (of numbers); and number-terms like *sixteen*, or *sixty-four*. In none of these cases is there any mental image which seems even remotely appropriate to express what we mean.

(P) The Proficiency Challenge: even if images and imagistic thinking can provide non-trivial propositional knowledge (i.e. even if both (K) and (T) are false), it do so via means which are cognitively or epistemically inferior.

P challenge is pragmatic by nature. Even if images possess nontrivial propositional content, it does not mean that images are an effective tool of reasoning. It is claimed that, even if images play a role in our cognitive systems, they lack precision, unequivocalness, and generality, that one can ascribe scientific language. In mathematics, for example, we could learn how to count with fingers to express the equation $2+2=4$, but only by possessing abstract concepts expressed, for example, in symbolic language enable us to count the number of fingers, apples and almost everything else as well. Due to the vagueness of pictorial representations, images, in comparison to the precision of scientific language, seems cognitively inferior.

(R) The Replaceability Challenge: even if (K), (T), (P) are all false, information available through images could be obtained from different sources.

The common basis of aforementioned challenges is a belief, that even if one proves the claim, that thinking with images possesses cognitive value, it does not follow that it is a competitive form of cognition. It could be argued, for example, that images play a function that could be compared to function daily press plays in society – they convey information in simpler and more comprehensive manner, but it does not mean that they are a competitive form of cognition and could be replaced by other media. Thus, in the case of the epistemological nature of thinking with images, one can defend a weak cognitivism claim, that images possess informative function, and reject a strong cognitivism claim, that could be described as a conjunction of claims that thinking with images is an autonomous form of cognition in the face of possessing features that could be ascribed only to images. The challenge for cognitivism in the case of thinking with images is in fact not a possibility to ascribe images informative functions. The core of the problem that has to be addressed is to prove that the information is genuinely different and this information is possible to obtain only by imagistic means. Strictly speaking one has to defend the conjunction of claims, that:

(Strong cognitivism): 1) thinking with images is a source of nontrivial knowledge; and 2) thinking with images and only thinking with images possess such a feature, that enables an access to the information, that could be obtained only by images.

Conjoining (K) through (R) presents us with a strongly non-cognitivist position – a rejection of the view that thinking with images is the kind of thing that can have genuinely cognitive value (Stokes 2007). Yet I will argue that the skeptical position can and should be rejected. I claim that imagistic thinking provides us with non-trivial knowledge. The challenge lays in investigations what kind of knowledge could it be.

2.2. The Conceptual Problem

I claim, that conceptual problem of thinking with images contains two minor problems. I call it simple and hard problem conceptual problem. The simple problem of thinking with images refers to syntactical and semantical conditions of a hypothetical language of thought, that as it seems, images lack. It is claimed, that thought could be described by productivity, that is an ability of a finite cognitive system to produce an infinite number of thoughts. The productivity of thought is possible, as it is claimed, only thanks to the feature of compositionality and systematicity of thought. Compositionality means that it is possible to connect some thoughts

in a whole and to take some wholes apart. Systematicity means that it is possible to transform a specific thought with a specific structure into different thoughts with the specific structure, for example, understanding proposition “John loves Marry” means that one understands the proposition “Marry does nor love John”, etc.

I call it a simple problem of thinking with images, since it seems, that it is possible to include in a description of images its productivity, compositionality, and systematicity. A noncontroversial example is map (Braddon-Mitchell, Jackson 1996). It is possible to decompose it into parts, such as dots as cities, lines as rivers etc, that could be transformed into an infinite number of configurations. Systematicity is not a problem as well, since if a map represents city A that lays on the left from city B, then it shows also that B is on the right from A. The same in the case of “common” images. If one can picture a house with the sunny sky in the background, and a cloudy sky, then one is able to picture a house with a cloudy sky in the background. Similarly in the case of diagrams. If one is able to interpret one Venn diagram, then one is able to understand another, etc.

It does not mean, however, that there is no difference between imagistic representations and lingual representations. It is claimed, for example, that the feature of images, among other things, is their informative richness. It seems also that when imagistic representations refer to a temporal and spatial structure of represented object, the lingual representations refer to logical relations, and are insensible to spatial and temporal relations. The difference is also in the composition principle (Fodor 2009). However, to argue that images possess different features than lingual representations does not mean that they do not possess features responsible for process of thinking.

A hard problem of thinking with images could be framed in two ways. In both cases, the problem refers to the relation between images and concepts. First, the argument is based on the assumptions regarding the nature of thought and concepts, and its conclusion is a claim, that images cannot be a form of thought.

- (1) Thoughts are made of concepts;
- (2) Concepts are general non-spatial and non-temporal entities;
- (3) Images are individual representations that have temporal and spatial features;

- (4) Thoughts are not made of images.

The first articulation of the hard problem of thinking with images refers to the issue, how to understand the conceptual nature of images (Dennett 1968/81; Pylyshyn 2007). Strictly speaking, the compelling explanation of thinking in images has to include such understanding of concepts and images, that would enable connecting both, and at the same time does not reduce images to epiphenomena of propositional states.

The second articulation of the hard problem of thinking with images is Wittgensteinian by nature and connects doubts regarding the nature of resemblance that assumingly characterizes images' semantics, as well as so-called paradox of rule-following. Representation of a linden could serve as an example. If one possess a representation of a linden, then it is isomorphic with the representation of Berlin, at least with its important part. If so, then it is a problem, how do we know, what concept ascribe to specific representation, and as a consequence, how do we know, that we think about a linden and not about Berlin. Generally speaking, how do know, that we think, what we think. An image in itself does not give us a clue to determine its content. Thus, images cannot be an autonomous form of thinking, since it is not possible to differentiate phenomenologically indifferent, but different when it comes to content, representations.

3. Theory of images

In this chapter I claim that the lack of clarity on what is thinking with images and what role does it play in cognitive systems, especially, whether and how does it contribute to knowledge, is due to the lack of comprehensive explanation of what is an image, especially, what is the content of (mental) images. I claim that, if investigating semantics and nature of language could bring us closer to the explanation of nature of thinking, then the same work could be done in the case of the theory of depiction. Thus I look closer to the contemporary theory of depiction in analytic aesthetics and assess its prospects.

We know that, generally speaking, images are made to present things, but main question is what is the imagistic way of representing. There are three issues that have to be addressed: (1) what makes images to represent things, or what are images' satisfaction conditions; (2) what are images' criteria of correctness; (3) what differs images and thinking with images from other forms of representation and thought, especially from language.

I critically examine possible accounts of what fixes images' content and what differs images from other forms of representation. There are at least three different approaches to answer the question: (a) images and only images have certain syntactic properties (Goodman 1968,

Kulvicki 2006); (b) images and only images have certain semantic properties (most importantly, resemblance to the depicted scene) (Peacocke 1987, Budd 1995, Abell 2009); and (c) images and only images are the things that trigger certain perceptual (or quasi-perceptual) state in suitable observers (Wollheim 1974, 1987, 2001, Walton 1990, 2002, Hopkins 1998, Lopes 1996, 2005, Maynard 1994, Gombrich 1960, Nanay 2004, 2005, 2010, Matthen 2005, Levinson 1998, Feagin 1998).

I argue that for different reasons all of these accounts are misguided. Yet, they offer conceptual tools to set up desiderata for comprehensive explanation of what makes images images. I claim that we can distinguish at least six desiderata for further research:

(GD) The Generality Desideratum: A comprehensive explanation of what is an image ought to be framed in general terms, non-reducible to specific domain or explananda, that is, it should be able to be applied to depiction, mental objects, as well as to scientific graphs, etc.

(OCD) Open Concept Desideratum: The comprehensive explanation should include diversity of historical forms of images, and be open to changes of images' form in the future.

(MD) Multimodality Desideratum: The comprehensive explanation should include multimodal character of images, that is, it should include visual, auditory, or merely structural representations, etc.

(CD) Correctness Desideratum: Theory of Images should include a possibility of standard of correctness for images.

(DD) Difference Desideratum: Theory of Images should explain how imagistic representations differ from other forms of representation, especially from language.

(AD) Arbitrariness Desideratum: Theory of Images should include both conventional and non-arbitrary character of images.

4. Ways of seeing and standard of correctness

In this and two the next chapters I propose an answer to aforementioned questions including desiderata described in the chapter 3. This chapter is devoted to the questions what are the standard of correctness for images and what differs images from other kinds of representation (desiderata CD, and DD). I defend two claims. First, I argue that standard of correctness cannot be reduced to external models or mere descriptions. Instead, I propose to make a shift to

perceptual account on standards of correctness based on the view that respective standards of correctness for images are ways of seeing things aright. It means that subject's attitude to the object of representation consists in a repertoire of capacities or dispositions for seeing patterns or similarities, yet these are not reducible to lists of properties or criteria in virtue of which one thing is similar to another. Learning seeing things aright requires experience and training but the point of the training is to get you to see the correct use of our concepts and techniques.

Second, I claim that what differs images from other kinds of representations is non-discursivity of standards of correctness, that is images' standards of correctness cannot be decomposed into analytical parts. Although training of seeing things aright cannot be conceived as simply acquiring a set of responses – causal dispositions to respond to such and such stimuli, it is also not something modeled in terms of the mechanical application of techniques or procedures that could be articulated in explicit rules. It means that when the learner acquires the perceptual knowledge he or she does not acquire a body of theory, but he or she acquires an ability to face things with the right perceptual attitude, the attitude that enables them to judge that such and such is a correct move. Only then one could say about explicit rules and correctness standards. As a consequence images are not a matter what is perceived but how to perceive.

5. What makes an image?

In this chapter I focus on the question concerning nature of images and try to fix such a view on images that could include their role as a medium of thought and desiderata GD, OCD, and MD, described in the chapter 3.

I defend two claims. First, I show that, instead of picture-like view, it is possible to think about images in terms of operations that like mathematical entities are abstract by nature. Strictly speaking, I show that we can describe images as an abstract operation of constructing representations or a way of seeing, that is, the way some objects or events could be seen, constructed, or thought about. In this case image is an expression of abstract operation, i.e. construction, like in the case of mathematics a number is an expression of some algebraic function. I argue that, as in the case of mathematics, the fruitless way of trying to understand mathematical entities is a description of specific entities like numbers or geometric shapes, in the case of images, the fruitless way is a description or classification of specific images. To put it differently, one cannot understand what is a triangle basing on observations of specific triangles. The crucial issue is to understand specific operations, that is, the way a triangle is constructed. The same is in the case of images. One cannot understand what is image basing

merely on observations, classification and description of images as such, for example, on classification of contemporary and non-contemporary works of art. The key thing is to understand what kind of operation these images express. Therefore, I claim, one has to reformulate the respective ontology of images from the ontology of objects into ontology of operations.

Second, I claim that images, as perceptual objects, for example pictures, can be described as spatiotemporal expression and instantiation of construction rules, that is, images, such as pictures, are final effect of operations of following certain construction rules, where the object of operation are specific spatiotemporal relations. I argue that operation of construing images can be seen as a rule-governed cognitive disposition and a perceptual competence and skill we acquire during a training. The crucial issue is to learn how to perceive or construct objects, that is to learn how to see things aright. Images, as final effect of such operation, are merely a representation of the way of seeing. What follows, on the one hand, I claim that temporal and spatial relations constitute the meaning of corresponding images. Geometry serves a good example, for manipulating the spatial relations determines whether, for example, we deal with squares or rhombs. The same applies in the case of art, where spatial and temporal composition of a work of art (music or painting etc.) determines the meaning of the work of art. Therefore, I claim that a change in spatial and temporal characteristic of the image fixes a semantics of images. On the other hand, I argue that spatio-temporal and individual images are epistemologically indistinguishable with general and abstract rules, where the latter should be understood as rules for constructing mental representations. I understand by that the claim that pointing at images is phenomenologically inseparable from the construction rules that are instantiated by the images.

6. Logic and Images

The last chapter is devoted to the epistemological question of thinking with images. My general methodological claim is that in the case of theory of images one can juxtapose aesthetics, viewed as a branch of philosophy of perception (Nanay 2010), and logic. On the one hand, it seems that nothing offer so little intellectual promise as a comparison between logic and aesthetics; on the other hand, the comparison between logic and aesthetics is historically the first methodological principle of aesthetics. It seems reasonable to think that also in the field of logic we can point out elements that are close to aesthetics. It is held, for example, that some proofs are more beautiful than others; one propositions are more elegant than others etc. It

seems that the idea of the relationship between logic and aesthetics should excite the attention of philosophers. Yet, as remarked Alfred Whitehead (1938): “the analogy between aesthetics and logic is one of the undeveloped topics of philosophy”.

Following Whitehead, I claim that in the case of theory of images it would be fruitful to investigate relations and similarities between logic and aesthetics. Basing on that juxtaposition, I am trying to give an answer to the epistemological question of thinking with images. The general answer is that the main feature of images’ semantics is its formal character. I understand by that a conjunction of two claims:

- (1) Thinking with images enables knowledge of or about epistemic possibilities.
- (2) Thinking with images does not refer directly to facts but presents formal ways of perceiving reality, or constructing representations, and thus refers to facts indirectly.

I will argue that we can understand the formal character of thinking with images in an analogy to the formal character of logic, where the latter enables knowledge of or about epistemic possibilities of thinking with propositions, and the former enables knowledge of or about epistemic possibilities of perceiving. Strictly speaking, I shall argue that one can understand images in terms of operations that provide rules of constructing representations and the role of an image is not to resemble the reality but to present the formal way an image could be constructed. In other words, I argue that one can ascribe images formal nature and on this ground one can give non-trivial answer to the question concerning epistemological function of images. To put it shortly, the truth of images is closer to the truth of logical propositions than material truth of empirical judgments.

The main argument for this claim will involve three steps. First, I will try to present the way one could think about formality of logic and formality of images. I argue that formal character of logic could be seen in three ways: (1) as normative function of rules of logic; (2) as general character of rules of logic; (3) as abstracting from semantic content of variables.

Second, I claim that all three understanding of formality could be analogically ascribed to images. I show how and to what extent this analogy helps us understand the epistemological function of thinking with or in images. I argue that images, as instantiations of rules of constructing external or internal representations, play the same role as “rules of meaning” in case of logic (Butts 1981; Sellars 1968, 1997). Thus, the primary function of images is not to represent things, but to enable the very possibility of representing something, that is, the role of

an image is not to resemble the reality but to present a formal way an image could be constructed. Images give us a non-trivial information how perceptual objects can be seen pointing at relevant features and relations of an object, fixing the possibility of possessing content.

Third, I claim that a comprehensive explanation of images' content should include both non-arbitrary and conventional nature of images (desideratum AD). I argue that although images' rules of construction are conventional by nature, images should also be connected causally with the world. Thus, the world puts constraints on how we think. In other words, we can imagine everything, but not everything we imagine makes sense.