

POSSIBLE-WORLDS SEMANTICS, FICTION, AND CREATIVITY

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Received: 14 December 2013

In the paper we will study the notions of possible-worlds semantics, fiction, and creativity. The intention is to show how the notion of possible-worlds semantics allows us to generate a fresh interpretation of the notions of fiction and creativity. To do this, we have to consider the philosophy of logic. Possible-worlds semantics can be used in interpreting modal notions. The intention is to interpret the notions of fiction and creativity as modal notions. However, the analysis shows that the notions of fiction and creativity are multimodal notions.

Key words: *possible-world semantics, fiction, creativity, philosophy of logic*

Introduction

The notions of possible-worlds semantics, fiction, and creativity are all of great importance. The notions operate in different areas; it may be hard to see the interconnection between the notions. The notion of the possible world is connected to logic and science, and the notions of fiction and creativity are connected to art. Therefore, there is a large gap between the areas of applications of the notions. We are not saying that the notions have a necessary interconnection, but that the notions can be interconnected in a fruitful way. In particular, we will show how the notion of possible-worlds semantics allows us to generate a fresh interpretation of the notions of fiction and creativity.

The notion of possible-worlds semantics is a logical notion that has a long and deep history in philosophy and in logic. This makes the inter-

pretation of the notion very hard to apply. It is well known that Leibniz used the notion of the possible world in his philosophy. The notion refers to the possibilities God had when he was creating the world: God picked the best of all possible worlds. The possible-worlds semantics for modal logic are based on this idea. First strict logical formulations for the possible-worlds semantics were formulated in the late 1950s and early 1960s by Kanger, Montague, Hintikka, and Kripke (among others) (Hintikka, 1989; Copeland, 2002).

Possible-worlds semantics was used in interpreting modal notions, like necessity and possibility (alethic modalities), knowledge and belief (epistemic modalities), and obligatory and permitted (deontic modalities). The Aristotelian interpretation of (aletic) modalities was the so-called temporal interpretation. That is, something is possible if it takes place at some moment in time, and something is necessary if it takes place all the time (Hintikka, 1974). Possible worlds allow us to give an atemporal interpretation of the modal notions, as Leibniz's example demonstrates. Something is possible if there is a possible world in which it is true, and something is necessary if it is true in every possible world. Possible worlds are formulated in the same logical space, and hence, in a logical sense, they are realised in the same time. The possible world interpretation may seem quite easy to accept: of course, it is possible that I could be in some other place than I factually am right now. The temporal interpretation is not natural in these kinds of cases: the fact that something is, right now, such and such excludes the possibility that things could be otherwise in the same time and place – such possibilities never take place. How can we make such a non-temporal interpretation precise? Let p be a sentence. We say that it is possible that p if we can construct or imagine a state of affairs in which p is true. This does not give a full answer to the problem. However, it helps us to locate the problem more precisely. We have to consider the methods of construction or imagination and the character of the states of affairs (Lewis, 1973).

The notions of fact and fiction need to be specified. How are they or, rather, how could they be interrelated? To answer questions like this, we have to specify what kinds of things are called fact and fiction. For example, "It is a fact that p " seems to mean something like " p is true", where ' p ' is a descriptive sentence. So, facts are something that is pictured by true descriptive sentences. Facts are not linguistic, but factual

entities. Fiction is something non-factual: so, fiction can be characterised as something that can be characterised by false sentences. This is connected to the separation between fact and fiction in literary theory, which says that fiction is just “the child of my brain” (Davis, 1983, 14). The separation is difficult to make precise, since Defoe says that his novel is based “in truth of fact: and so the work is not a story, but a history” (Davis, 1983, 15). How can a novel be non-fictive? The idea is that “fact” and “fiction” are “not defining two distinct and unimpeachable categories” (Davis, 1983, 9).

The notion of creativity is, if possible, a messier notion than the notion of fiction. Is creativity something characterising humanity? It is obvious – by definition – that a human being can be creative, but it is problematic whether a computer or an animal can be. The specific meaning of the notion remains unclear. Maybe the reason is that such a notion escapes, by definition, all the exact characterisations. The notion belongs to the class of notions that Hodges (2001) calls *scaling adjectives*. These kinds of notions are neither true nor false, but they are more or less adequate.

About logic

As a field of science, logic is of a very special kind. It can be seen as a branch of mathematics or of philosophy. As a branch of mathematics, it is sometimes understood as the mechanical manipulation of symbols – just as the whole of mathematics has been understood – just as a mere game. As a branch of philosophy, one may understand it as a logico-conceptual analysis of philosophical topics (Hintikka, 1973). However, logic as a branch of mathematics does not mean that it is just the manipulation of symbols; moreover as a philosophical logic, it does not mean a philosophical reflection of “the eternal themes”. Logic is both the manipulation of symbols and thinking deep, philosophical questions. The manipulation of symbols is not a goal of logic but a means of logic. If logic is understood mainly as the manipulation of symbols, this is a great misunderstanding. When Russell said that “Logic is hell!” he did not mean that it is difficult, or boring, to manipulate the symbols, but it is extremely difficult to keep in mind the subtle logical topics. It is easy just to manipulate symbols, but extremely difficult to keep in mind the foundational logical subject matter.

For example, Boole wrote a book called *An Investigation of the Laws of Thought* in which he sets out to “investigate the fundamental laws of those operations of the mind by which reasoning is performed” (Boole, 2005, 1). This shows the deep philosophical importance of logic. In the present day mathematical logic, the deep content may be difficult to grasp, but surely the intention is not the mere manipulation of symbols. The intention is not, as was the intention of Boole, to find out laws of thought in a metaphysical or psychological sense. In the metaphysical sense, “the laws of thought” could be understood as something on the fundamental reality of mental being. In the same sense, “the laws of nature” can be understood as a metaphysical fundament of nature (Rakshit, 1999, 7). In a psychological sense, “the laws of thought” mean empirical facts about how humans actually work. Mathematics as a formal science is neither a metaphysical nor empirical analysis. However, still there are several opportunities open to meaningful mathematical and logical study.

The logical study can be divided into two different but closely connected areas: proof theory and model theory. To understand the idea of proof theory, let us consider the following quote from Nagel and Newman (1989):

“The formalization proceeds in four steps. First, a complete catalogue is prepared of the signs to be used in the calculus. These are its vocabulary. Second, the ‘Formation Rules’ are laid down. They declare which of the combinations of the signs in the vocabulary are acceptable as ‘formulas’ (in effect, as sentences). The rules may be viewed as constituting the grammar of the system. Third, the ‘Transformation Rules’ are stated. They describe the precise structure of formulas which other formulas of given structure are derivable. These rules are, in effect, the rules of inference. Finally, certain formulas are selected as axioms (or as ‘primitive formulas’). They serve as a foundation for the entire system. We shall use the phrase ‘theorem of the system’ to denote any formula that can be derived from the axioms by successively applying the Transformation Rules. By a formal ‘proof’ (or ‘demonstration’) we shall mean a finite sequence of formulas, each of which either is an axiom or can be derived from preceding formulas in the sequence by the Transformation Rules.” (Nagel, Newman, 1989, 45–46)

The quotation explicates very clearly what the formalization of a language is: it means explication of the whole language, its symbols, grammar, and rules of inference, and moreover, the explication of the sentences that are assumed as axioms. From the axioms, one can use

the inference rules to infer new sentences, called theorems. If the set of axioms is recursive, we say that the corresponding set of theorems is axiomatizable. As a special case, the set of axioms may be an empty set: then the set of theorems is just the set of logical truths. In fact, there are infinite numbers of proofs (Hodges, 2001). The very idea is that logical – and also mathematical – proofs are demonstrations of (logical or mathematical) truths. The notion of demonstration refers to the constructivity of logic and mathematics: proofs are built up step by step from the explicated starting point to the end state. However, the demonstration is possible only if the whole system is explicated, that is, only if it is formalized. The fundamental idea behind the constructivity is the finitary nature of the proofs (Neumann, 1989). In empirical science, such a demonstration is not possible: the formalization supposes that there would be metaphysical natural laws and that our scientific laws are adequately formulated (Rakshit, 1999). Aristotelian science assumes that axioms are “obvious truths”; hence the results of science are certain truths (Hintikka, Halonen, Mutanen, 2002, 295–337).

The proof theory as a syntactical and finitary approach may be the kind of mathematical reasoning one has in mind when speaking about the mere manipulation of symbols. However, in school (and also in university) mathematics, one central topic is called *calculus*, which is very technical – the manipulation of symbols – but at the same applied mathematics. In general, the notion of *calculus* refers to the manipulation of symbols, which can be interpreted and reinterpreted. Hence calculus operates between proof theory and model theory.

According to *The Cambridge Dictionary of Philosophy*, model theory is “a branch of mathematical logic that deals with the connection between a language and its interpretations or structures” (Audi, 1995, 502). The characterisation emphasises that, in model theory, the intention is to study the interpretations of the language. In proof theory, the idea is to study the formal syntactical properties of language, that is, to study uninterpreted language. Hence, the aim of model theory is, in a sense, opposite to the aim of proof theory. The interpretation can be given in very general terms, as different kinds of interpretations of whole mathematical theories: “Model theory is the study of the construction and classification of structures within specified classes of structures” (Hodges, 1993, ix). Models are non-linguistic entities, but they are defined relative to a language.

In model theory, the models are entities that may be called complete models. That is, models fix all the facts. The construction of models is an infinite task even if the construction can start from a finite number of entities (Hodges, 1993; Mutanen, 2004). This means, for example, that any given sentence is either true or false in a given model. So, each sentence divides the class of all models (of the corresponding language) into two classes: the class of models in which the sentence is true, and the class of models in which the sentence is false. The possibilities for linguistic description of models are very restricted. *Lindenbaum's lemma* says that any consistent set of sentences can be extended into a maximally consistent set of sentences. The proof of the lemma shows how several logical and mathematical proofs are in fact *limit* proofs (Mutanen, 2004). A set of sentences is a maximally consistent set if no proper superset of it is consistent. However, such a maximally consistent set does not give a full description, up to isomorphism, of a model, but only a linguistically complete description up to elementary equivalence.

In model theory, the models are infinite entities. The cardinality of the model, that is, the number of entities in the domain, is often infinite. Moreover, the number of sentences that are true in a given model is infinite. In model theory, finitary methods have been developed that enable us to develop a philosophically and practically more realistic approach. Let us mention model sets, urn models, distributive normal forms, and methods for model construction. Model sets are not strictly model theoretical entities, but sets of sentences. Model sets operate between proof theory and model theory. In model theory, for example, Henkin models have a similar role. For us, these are of central importance.

Lindenbaum's lemma shows that each such consistent set of sentences can be extended to a maximally consistent set. This means that all such finitary characterisations are incomplete – but some of them are more genius than others. These finitary methods are recipes for constructing complete models (Hintikka, 1962; Hintikka, 1987). A logical fact is that the less information there is, the easier it is to construct a consistent story from it. However, the creativity is to generate a finitary story that gives a recipe for constructing deeply moving stories.

The soundness and the completeness of the first-order logic say that the proof theoretical and model theoretical approaches are very closely related: a sentence is provable if and only if it is valid. However,

the proof theoretical and model theoretical approaches are based on different theoretical foundations.

“After the work of Gödel and Tarski, it simply is impossible to maintain that the meaning of propositions is constituted via their inferential relations to other propositions. Meaning is a matter of semantics, and the overwhelming impact of the work that began with Tarski and Gödel is to make it clear that the semantical relationship cannot be reduced to syntactical ones.” (Hintikka, 2007, 109)

Feferman (2006) underlines the interconnection as follows:

“To a first approximation there are two main kinds of pursuit in logic. The first is the traditional one going back two millennia, concerned with characterizing the logically valid inferences. The second is the one that emerged most systematically only in the twentieth century, concerned with the semantics of logical operations. In the view of modern, model-theoretical eyes, the first requires the second, but not vice versa.” (Feferman, 2006, 453)

The difference between the proof theoretical and model theoretical approaches reflects a deeper philosophical difference, as was explicated in van Heijenoort (1967). He calls the approaches “logic as language” and “logic as calculus”. The idea is that the first group thinks of logic as a single language, more precisely, a language with a fixed interpretation. Then a natural approach is just proof theoretical: one has to use the language one has. On the contrary, the idea behind the approach called “logic as calculus” is that logic can be re-interpreted: one may give new interpretations to the language quite freely (Heijenoort, 1967). Hintikka generalises the distinction so that it can be applied to more general philosophical approaches: the one language assumption and the model theoretical approach. Hintikka argues that the distinction reflects deeper philosophical presuppositions behind different kinds of philosophical approaches. For example, the famous Wittgensteinian attitude that we are prisoners of our language becomes understandable if we recognise that the presupposition of this attitude is the one language assumption. According to Hintikka, other members of the group are philosophers like young Carnap and Russell. For example, Derrida’s interpretation of the writing (Derrida, 1982, 12–14) or Heidegger’s notion of truth as “a fundamental *existentiale*” (Heidegger, 1988, 343) can be understood if we recognise that these are based on the presupposition that we are bound to our language.

The philosophical difference between the two approaches is not whether language has interpretation or not, but whether one can vary

the interpretation. If there is no possibility to vary the interpretation, we are speaking about the reality we have. There is no philosophical reason to study model theory. So, proof theory becomes a natural branch of logic. Hence logic is a study of language of fixed interpretation, which is, in the ideal case, *lingua characterica* or, even, *lingua universalis*. As Wittgenstein says in *Tractatus*, logic does not need experience, but “logic precedes every experience” (Wittgenstein, 1922, 5.552). Logic provides a formal structure in which all experience takes place. So, in logic, we cannot say that such and such things are in the world (Wittgenstein, 1922, 5.61). For Wittgenstein, the philosophy of logic is part and parcel of his philosophy of language. So, Wittgenstein’s philosophy of logic also characterises his philosophy of language more generally. The model theoretical approach views logic as a freely interpretable calculus. In this sense, logic is like *calculus ratiocinator*. More generally, natural language can be thought of as freely interpretable. That is, our language is not bound to a single reality but can be connected to different realities. The philosophical problem is what these different realities are (Lewis, 1973).

The interconnection of logic – or language – to a reality is not easy to build up. The Wittgensteinian answer is that there is no philosophically justifiable ways to do this. According to *Tractatus*, “the proposition shows its sense” (Wittgenstein, 1922, 4.022). The meaning of a language cannot be stated (in the language). In this sense, we are bound into the language: “the limits of my language are the limits of my world” (Wittgenstein, 1922, 5.6). However, the Wittgensteinian approach is not enough for all philosophers. There is a proper need to formulate explicit semantics of logic and language (Niiniluoto, 1999; Hintikka, 2007). Tarski formulated a logically strict method for the study of semantics.

Tarski, in his papers of 1933 and 1944, formulated a notion of truth. His primary aim was to explicate the notion of truth formulated by Aristotle in *Metaphysics* as follows:

“To say of what is that it is not, or of what is not that it is, is false, while to say of what is that it is, or of what is not that it is not, is true.” (Tarski, 2001, 70)

Tarski was looking at the formal definition for this intuitive or pre-theoretical notion. To do the job, Tarski developed an explicit method, which is known as model theory. Tarski, in his formulation of the Aristotelian notion, formulated a notion of truth within a single interpretation, which can be called the *truth in a model* – not in all models, as

general model theoretical notion does (Hodges, 1986, 135–151). The notion of truth in a model is very practical; it is the notion we have in mind when we speak about truth: truth is just truth in reality. Tarski's formulation included several important model theoretical notions that are needed in interpreting language.

Fiction

Above, we characterised the notion of fiction as something not-true. The distinction between truth and not-true has to be specified more closely. Tarski's notion of truth can also be applied in the analysis of an everyday notion of truth. In general, narratives are not truth telling but storytelling, and storytelling obeys more complex logic than a true-false distinction presupposes.

Dorrit Cohn (2006) characterises fiction as non-referential use of language. The characterisation can be understood by using the model theoretical notion of truth given by Tarski. The referential use of language means that the notions of the factual use of language refer to reality. So, fictive texts are things that are not searching for truth in a proper sense – namely, in the sense of truth in reality. That allows fictive writing to be proper “verbal artistry”, the skill needed in generating creative works of literature (Cohn, 2006). The interpretation Cohn gives is one expression of one world interpretation. The referential use of words means that a given word has a real referent, meaning that it denotes an existing entity in reality – in the only (existing) world. The one world interpretation is not unusual in philosophy or in literary theory (Dolezel, 1988).

The referentiality is not good enough to do the job intended. Fictive literature operates in so many fields that we need more subtle conceptual tools. The tools we need have to be capable of being edificative in a strong sense (Davis, 1983, 15). In literature, the stories characterise linguistically some courses of events. As the characterisation above shows, models are non-linguistic entities that give static descriptions of states of affairs. So, it seems that model theory has not so much to do with literature.

In literature, stories are usually multidimensional complexes in which different kinds of factors build the whole. The factors can be of different kinds, like historically different versions of the same stories;

different, but interconnecting courses of events; different interconnecting modalities. One dimension in evaluating literature is to evaluate the multidimensionality and the cleverness of interconnecting the different kinds of factors to play together. For example, the story of Doctor Faustus has several different versions, including old folk stories. The version written by Goethe includes several different dimensions so that the whole story pictures and, at the same, problematizes the whole lifestyle of the western world (von Wright, 1989).

The interconnection of different kinds of factors, the multidimensionality, is obviously present in high-quality literature. However, it is not easy to characterise what it precisely means, and how to evaluate it. The different factors we have referred to may operate in different areas, like factual, epistemic, deontic, and ethical. Philosophically, this means that the language must be modal – and the underlying logic must also be modal, or more precisely, the language must be multimodal. The multimodality means that, in the text, different modalities play together so that changes in one modality area may cause changes in the field of another modality: for example, new knowledge may cause changes in ethical responsibility. Dolezel (1988) speaks about semantical unhomogeneity in this sense (Dolezel, 1988, 234). The way these interconnections are built up can be seen as an indicator of creativity.

To consider modalities, we have to use modal language, which means that we have to consider possible worlds (Hintikka, 1969; Hintikka, 2007; Lewis, 1973). For example, knowledge is not just to own information, but something which excludes uncertainty (Hintikka, 2002, 52). So, knowledge that p makes it possible for the knower to identify reliably states of affairs in which p holds. That is, knowledge divides relevant worlds into two classes: knowledge worlds and non-knowledge worlds. Because of the truth condition, the actual reality has to be in the class of knowledge worlds. The character of modal logic is identified by the relationship between the possible worlds, then assessability relation: for example, if reflexivity, transitivity, and symmetry hold between the worlds, we have the modal system S5. The method of identifying individuals in different worlds, cross-world identification, is central to developing quantified modal logics. In particular, cross-world identification is a key notion in characterising the identity of individuals. The notion of identifiability is both theoretically and practically important (Hintikka, 2007).

Possible worlds are not necessarily model theoretical complete worlds. They may be more practical or more concrete entities. However, the model theoretical complete model is the fundamental notion in model theory. To get an idea of what the notion of a possible world may mean in some practical applications, let us use Hintikka's remark:

“They have been misled by the term ‘possible world’. They have taken it as its face value. This is an abject mistake. It used to be said that the Holy Roman Empire was not holy, nor Roman, nor much of an empire, either. A possible world need not be possible in the traditional sense, as is shown by Rantala's urn models.” (Hintikka, 1987, 24)

Moreover, we may add to the remark that a possible world need not be a (complete) world either.

In philosophical applications, we need a flexible notion of a model or of a possible world. According to the model theoretical approach – and in a sense also the proof theoretical approach – the fundamental idea is to characterise a reality by using the linguistic tools we have. To make the idea systematic, we get a notion of a model set that “is a set of formulas that intuitively speaking can be interpreted as a partial description of a model in which all its formulas are true” (Hintikka, 1987, 11). The model set approach is of extreme value. It is extremely simple and intuitively clear.

The model set approach seems to be very fruitful in analysing literature. In literature, the characterisation is merely linguistic. The author writes a story in which they picture the multimodal reality. Such a characterisation is always incomplete. However, some stories are explicit enough to allow us to see the intended reality, that is, to see the essential aspects of the reality. Similarly to the case of the model set, these characterisations allow us to generate complete characterisations. However, there are several different complete models that can be generated from a given model set. Especially if a given model set is contradictory, the model construction becomes frustrated. This shows that it is easy to construct a story if one knows only a few things; in fact, if fewer known things are given, slighter restrictions are imposed on the model construction (Kahneman, 2011). In high-quality literature, the characterisation is rich, but the richness opens deep lines of thoughts.

The model set we generate need not be correlated with the actual reality, and hence sentences true in a model set need not be true in a proper sense. So, the notion of a referent can be used within a model set.

It is clear that a word may have a referent in a given model set without us assuming that the word has a referent in reality. For example, Sherlock Holmes has a referent in Holmes stories, but he is not a real person. Model sets are something we may call small worlds, and hence they can be handled easily. Model sets say in logical terms the same as Dolezel when he says that “fictional worlds are sets of possible states of affairs” (Dolezel, 1988, 230). Fictional worlds are just partial descriptions of states of affairs. As the notion of the model set shows, such a description is not a complete description of the world; the full description supposes an (uncountable) infinite number of sentences.¹

The fact that the descriptions are incomplete means that there are questions that cannot be answered: for example, the question of whether Sherlock Holmes has a birthmark on his back (Hintikka, 2007; Dolezel, 1988, 223). The descriptions in the books do not give the information needed to answer the question and there are no other sources of information that could be used. In the case of real-world problems, we can make observations, or even experiments, to get further information. However, to identify individuals and events, one has to put the individuals or events on the map, to locate them (Hintikka, 2007). The author does this by using different methods of identification. A central part of the creativity is how the author does the identification.

The descriptions can be formulated in different books or short stories, as in the case of Sherlock Holmes, or only in a single book. Moreover, the stories can be developed from an oral tradition into sophisticated poetry, which may have at the same time a counterpart in reality, like the story of Doctor Faustus. Such descriptions may contain several different kinds of stories, and hence the wholeness may be incompatible. Moreover, a single story may be internally inconsistent.

A possible world is a model set, and the class of possible worlds is hence just a class of model sets. However, we have the following situation. Each sentence and each (consistent) set of sentences generates a class of possible worlds. This is an obvious mathematical fact. This implies that each sentence (and set of sentences) is vague in the sense that it allows such different interpretations. What does it mean for a sentence to be true? It means that the actual world is included in the set of models that make the sentence true.

¹ In special cases possible worlds can be finite; see Hintikka, 1984.

The notion of the model set can be used in analysing modal notions like possibility or knowledge. To speak about the possibility or impossibility of something, or about what somebody knows or does not know, we have to speak about several different possibilities. The analysis of the semantics of modal notions cannot be done without using a notion of a possible world or the like. For example, to say that p is possible in model set X means that there is a model set X' acceptable from X , so that p is true in X' . Similarly, 'a knows that p ' is true in model set X if p is true in every model set X' accessible from X (Hintikka, 1962). Here we see that possibility operates like an existential and a knowledge operator like a universal operator. By giving some properties to the accessibility relation, we get different modal logical systems.

The idea behind multimodality is that we get a complete analysis of epistemic notions by "mixing alethic, tense and epistemic logic" (Hendricks, 2007, 130). Cohn (2006) defined fiction as a non-referential mode of language that does not characterise fiction clearly enough. The story about Sherlock Holmes is according to Cohn's interpretation of fiction, because the name *Sherlock Holmes* does not refer to any actual person. However, it is reasonable to discuss Sherlock Holmes within the story world – it is reasonable to ask about the education Holmes has or the methods Holmes uses, just as in the case of a real person. The only difference is that the final decisions are based on the books, and in the case of a real person on reality.

The story can use different modalities in the characterisation. The characterisation may use factual, epistemic, ethical, or behavioural modalities. The idea is to interconnect different kinds of modalities in a way that forces us to evaluate our fundamental values. For example, Quentin Tarantino's movies show brute violence without any reason. In fact, the movies exclude the question about reason; the acting horizon is depleted of rationality. Hannah Arendt speaks about the banality of violence in which the violence becomes in a sense meaningless: what happens to our fundamental ethical values? They seem to disappear – we have to re-evaluate all the values.

Creativity

The notion of creativity is one central notion that characterises humanity. However, by definition, it is something very difficult to define.

Plato characterises a poet's creativity as madness. However, creativity as madness is not unknown for present-day thinkers. The link between creativity and madness is not very fruitful. If creativity is just something mad or something strange, how can it be so valuable? Dawis (1973) defines possible worlds as a nested class so that the actual world is in the centre of the nested system. The relation of similarity is defined as a distance relation between the models in the nested system of models. One interpretation of creativity as madness could be that creativity refers to the long distance from the centre of the nested system. Another interpretation could be that the world is chosen randomly. However, the interpretations are not reasonable; maybe they do not do justice to the madness theory. We are more interested in having a rational analysis of what happens in creative activity. This, in an obvious sense, excludes the madness theory.

The creativity of Tarantino's movies or Goethe's *Faustus* is not the madness, but the deep-going questioning that problematises our way of life (or some other fundamental question). The problematisation is multimodal. *Doctor Faustus* is a paradigmatic example of a Western scientist. However, Goethe interconnects the inquiry to the ethical question in a way that forces us to rethink the fundament of our knowledge-seeking and, more generally, the fundament of the Western lifestyle. The modalities that are under problematisation are epistemic and ethic, but these are interconnected to practical lifestyle. Similarly, Tarantino's movies underline the banality of violence; they force us to problematise the mere being of human.² So, the other way to characterise the notion of creativity is connected to the different kinds of modalities. The basic idea is to characterise something as creative if it forces us to re-evaluate our basic modalities. Violence becomes normal behaviour – are we still humans? The more famous example is the story of Oedipus. Oedipus is a well-educated, cultivated, and strongly moral person. According to standards of antiquity, he is a good person. He is trying to do well – he is brave, wise, and proud. He seeks knowledge and behaves on the basis of his best knowledge. How deep is our responsibility? What is good for a human being? The story of Oedipus forces us to re-ask questions like these. In fact, the responsibility is still an open problem, as present-day life shows. Ethical understanding has been under continuous change

² Similar problematisation can be seen in Sartre's plays, such as *Huis clos* (1944), or his novel *La nausée* (1938).

– partly because of stories like Oedipus. In fact, Plato was one who problematised the ethical thinking of his time (Hintikka, 1962).

Closing words

Creativity is a fundamental property of human beings. It is not easy to characterise the notion of creativity. Maybe creativity defies precise characterisation. Fiction can be seen as an inspirer of our imagination. This is done by creating new horizons that problematise the fundamental values of human life. This can be done by evaluating different modalities by characterising practical life from some general point of view. This can help us to have a more fruitful life, but also to make us more creative. Unfortunately, the notions of creativity and fiction seem to escape our analysis. However, in science and in philosophy, we have to ask impossible questions. This may help us to become more creative and to exercise our fictive thinking.

References

- Robert Audi (ed.) (1995), *The Cambridge Dictionary of Philosophy*, Cambridge: Cambridge University Press.
- George Boole (2005), *An Investigation of the Laws of Thought*, Project Gutenberg. Available at: <http://www.gutenberg.org/files/15114/15114-pdf.pdf>.
- Dorrit Cohn (2006), *Fiktio Mieli*, Helsinki: Gaudeamus.
- Jack B. Copeland (2002), “The Genesis of Possible Worlds Semantics”, *Journal of Philosophical Logic*, Vol. 31, No. 2, pp. 99–137.
- Leonard J. Davis (1983), *Factual Fictions. The Origins of the English Novel*, New York: Columbia University Press.
- Jacques Derrida (1982), *Positions*, Chicago: University of Chicago Press.
- Lubomir Dolezel (1988), “Possible Worlds and Literary Fictions”, in: Sture Allen (ed.), *Possible Worlds in Humanities, Arts and Sciences. Proceedings of Nobel Symposium 65*, Berlin: Walter de Gruyter.
- Solomon Feferman (2006), “What Kind of Logic Is ‘Independence Friendly’ Logic?”, in: Randall E. Auxier, Lewis Edwin Hahn (eds.), *The Philosophy of Jaakko Hintikka*, Open Court Publishing Company.
- Martin Heidegger (1988), *Being and Time*, Oxford: Basil Blackwell.
- Vincent Fella Hendricks (2007), *Mainstream and Formal Epistemology*, Cambridge: Cambridge University Press.

- Jaakko Hintikka (1962), *Knowledge and Belief*, New York: Cornell University Press.
- Jaakko Hintikka (1969), *Models for Modalities*, Dordrecht: D. Reidel Publishing Company.
- Jaakko Hintikka (1973), *Logic, Language-Games and Information: Kantian Themes in the Philosophy of Logic*, Oxford: Clarendon Press.
- Jaakko Hintikka (1974), *Knowledge and the Known: Historical Perspectives in Epistemology*, Dordrecht: D. Reidel.
- Jaakko Hintikka (1984), “The Logic of Science as Model-Oriented Logic”, in: P. Asquith, P. Kitcher (eds.), *PSA*, East-Lansing: Philosophy of Science Association, Vol. 1, pp. 177–185.
- Jaakko Hintikka (1987), “Self-Profile”, in: Radu, J. Bogdan (ed.), *Jaakko Hintikka*, Dordrecht: D. Reidel Publishing Company.
- Jaakko Hintikka (1989), “Exploring Possible Worlds”, in: Allen, Sture (ed.), *Possible Worlds in Humanities, Arts and Sciences. Proceedings of Nobel Symposium 65*, Berlin: Walter de Gruyter.
- Jaakko Hintikka (2007), *Socratic Epistemology: Explorations of Knowledge-Seeking by Questioning*, Cambridge: Cambridge University Press.
- Jaakko Hintikka, Ilpo Halonen, Arto Mutanen (2002), “Interrogative Logic as a General Theory of Reasoning”, in: R. H. Johnson, J. Woods (eds.), *Handbook of Practical Reasoning*, Dordrecht: Kluwer Academic Publishers, pp. 295–337.
- Wilfrid Hodges (1986), “Truth in a Structure”, in: *Proceedings of the Aristotelian Society*, New Series, Vol. 86, pp. 135–151.
- Wilfrid Hodges (1993), *Model Theory*, Cambridge: Cambridge University Press.
- Wilfrid Hodges (2001), *Logic: An Introduction to Elementary Logic*, Harmondsworth: Penguin Books.
- Daniel Kahneman (2011), *Thinking, Fast and Slow*, New York: Farrar, Straus and Giroux.
- David Lewis (1973), *Counterfactuals*, Cambridge (MA): Harvard University Press.
- Arto Mutanen (2004), *From Computation to Truth via Learning*, Helsinki: Helsinki University Printing House.
- Ernst Nagel, James Newman (1989), *Gödel’s Proof*, Routledge.
- Ilkka Niiniluoto (1999), *Critical Scientific Realism*, Oxford: Oxford University Press.
- Tommi T. Rakshit (1999), *Can There Be Special Science Natural Laws?*, dissertation, Helsinki.

- Alfred Tarski (2001), “The Semantic Conception of Truth and the Foundations of Semantics”, in: A. P. Martinich (ed.), *The Philosophy of Language*, New York: Oxford University Press, pp. 69–91. (The paper was originally published in *Philosophy and Phenomenal Research*, Vol. 4, No. 3 (1944), pp. 341–376.)
- Jean van Heijenoort (1967), “Logic as Calculus and Logic as Language”, *Boston Studies in the Philosophy of Science*, Vol. 3, pp. 440–446.
- Johann von Neumann (1989), “The Formalist Foundation of Mathematics”, in: Paul Benacerraf, Hilary Putnam (eds.), *Philosophy of Mathematics*, Cambridge: Cambridge University Press.
- Georg Henrik von Wright (1989), *Ajatus ja julistus*, Juva: WSOY.
- Ludwig Wittgenstein (1922), *Tractatus Logico-Philosophicus*, New York: Kegan Paul. Available at: Project Gutenberg’s *Tractatus Logico-Philosophicus*, Release Date: 22 October 2010 [EBook #5740], <http://www.gutenberg.org/files/5740/5740-pdf.pdf> (accessed: 9 October 2013).

SEMANTIKA MOGUĆIH SVJETOVA, FIKCIJA I KREATIVNOST

Arto Mutanen

U tekstu razmatramo pojmove semantike mogućih svjetova, fikciju i kreativnost. Nakana nam je pokazati kako semantika mogućih svjetova omogućuje generiranje nove interpretacije pojmova fikcije i kreativnosti. Kako bismo to učinili, moramo razmotriti filozofiju logike. Semantika mogućih svjetova može se koristiti u interpretiranju modalnih pojmova. U tekstu interpretiramo pojmove fikcije i kreativnosti kao modalne pojmove. Međutim, naša analiza pokazuje da su pojmovi fikcije i kreativnosti multimodalni pojmovi.

Ključne riječi: *semantika mogućih svjetova, fikcija, kreativnost, filozofija logike*