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# Propositional Contents: Historical and Methodological Considerations<sup>1</sup>

**Abstract:** The article discusses the concept of *proposition*. The history of the concept is discussed, general postulates are formulated, the fulfillment or non-fulfillment of which makes it possible to compare different theories of propositional contents. An outline of the history of inquiries into the notion of proposition is followed by a presentation of the two main contemporary ways of thinking about the notion: the possible world theory and the structural theory.

**Keywords:** proposition, propositional content, content, truth conditions, truth-bearers, propositional attitudes, possible world theories of propositions, structural theories of propositions

## 1. Introduction

The linguistic expressions we recognize as sentences are used to assert or deny that something has happened, is happening, or will happen; to ask questions, to give orders, to make promises and perform other kinds of speech acts. The basic idea behind the notion of a *proposition* can be explained only by referring to this seemingly trivial observation. Let us note, therefore, at the outset that nothing prevents us from considering the equivalence relation ‘states the same thing as (---),’ which will single out from the class of all sentences suitable for making statements those that state the same thing. We can do the same in the case of other speech acts – by separating sets of sentences that can be used to ask the same question, give the same command, make the same promise, etc. Then we can match up sentences that, while differing in terms of the type of speech act, in some pre-theoretical sense concern the same ways the world might be.<sup>2</sup> In this sense one can say that my assertion: ‘I will visit Jane tomorrow,’ your question (addressing me): ‘Will you visit Jane tomorrow?’ and my promise: ‘I

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1 The paper is a shortened and modified version of Ciecierski (2016), I would like to thank Jagoda Dolińska and Jakub Plewicky for translating the original Polish paper that has been used as a basis for preparing this article.

2 Let us keep in mind that not everything can be the subject of just any speech act – I cannot, for instance, *promise* that 2 plus 3 are 5.

promise to visit Jane tomorrow' concern the same way the world might be: the situation involving me, Jane, a particular day, and the relation of visiting. In each of these cases we can distinguish a common semantic component to which we refer by using phrases such as: '(the proposition) that Tadeusz visits Jane on the day d.' A proposition or propositional content is simply this common semantic component.<sup>3</sup>

The aim of this text is to acquaint the reader with the most important threads of the discussion regarding the concept of proposition and to situate the threads against a background of the very interesting history of the notion in question.

## 2. Basic Description

Let me begin with a list of postulates which keep occurring (individually or in groups) in various theories of proposition. We could in fact risk saying that philosophical disputes concerning the notion of proposition are usually closely related to the question whether – and if so, how – a particular theory of propositions fulfills individual postulates. The first one is the condition indicated above, stating that a proposition is that which connects a certain class of sentences:

(W1) A proposition is the content shared by a certain class of sentences that have different illocutionary force.<sup>4</sup>

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3 As C.I. Lewis stated once: 'The proposition is the assertable content; and this same content, signifying the same state of affairs, can also be questioned, denied, or merely supposed, and can be entertained in other moods as well.' (Lewis 1943: 242). Let me stress that some philosophers deny this Lewisian intuition either by delimiting the class of speech acts that may differ only with respect to their illocutionary force (that is, presupposing that some changes are changes involving propositional content) or by building into the propositional content the illocutionary content itself (cf. Hanks 2007, 2015, 2017).

4 This can be defined via abstraction: proposition is a class of abstraction from the relation of having the same content given on a class of sentences. In such case of course – as long as we take this definition literally and not as an explication – we take propositions to be sets of sentences, which might prove problematic for some. This case can also be treated as an example of reduction by elimination of the notion of *proposition*. I would like to remain neutral on this matter – which is why I shall not formulate this condition in this way. The condition [W1] is naturally a very weak one: however, this is not a problem as it is exclusively a necessary condition.

This condition does not in effect need to be commented upon further. Interestingly, however, some writers (e.g. Frege, Meinong, Hanks) refuse to accept it.

The second condition states that a proposition is a truth-bearer:

(W2) Propositions are truth and falsehood bearers – they are extensions of predicates: ‘is true,’ ‘is false.’

Let us briefly explain the sense of the postulate (W2): it is usually remarked that predicates such as ‘true’ and ‘false’ are literally predicated of on objects of very different kinds: sentence types, sentence tokens (concrete physical objects – e.g. sequences of sounds), occurrences (ordered pairs composed of a sentence type and a pragmatic context), utterances and thoughts (beliefs). Postulate (W2) states that to the extent to which the uses of the aforementioned predicates are correct, this happens because these predicates are also used with reference to the *content* of sentence types, the *content* of sentence tokens, the *content* of utterances, and the *content* of thoughts.

This condition needs to be commented upon briefly. In the history of the notion of proposition, two interpretations of it as a truth-bearer are discussed surprisingly frequently. According to the first one, propositions, unlike sentences, have value regardless of the circumstances – thus, they correspond roughly to the content of sentences referred to as *eternal sentences*, i.e. utterances having no indexical component.<sup>5</sup> In the other, propositions are *occasionally* prone to a change of circumstances and resemble (in such cases) rather the meanings of sentential functions than of eternal sentences.<sup>6</sup> What is interesting, some contemporary authors defend the view according to which in the theory of language and thought both these notions of *content* are needed.<sup>7</sup>

According to the third condition:

(W3) The proposition expressed via sentence S is that which is not understood by a person unaware of the meaning of the sentence S or – in the case of indexical sentences – the context in which the sentence S is produced.

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- 5 E.g. produced when the sentence: ‘Socrates is sitting’ is replaced with the sentence: ‘Socrates is sitting on October 5<sup>th</sup>, 410 BCE at 2 PM.’
  - 6 The proposition expressed via the sentence ‘Socrates is sitting,’ in light of this theory, would be a content which can be abstracted from an utterance such as ‘Socrates is sitting in the time  $t_i$ ’ in which we entertain the subsequent concrete values of the variable  $t$ .
  - 7 An excellent account of these disputes can be found in Recanati (2007).

Hence, what we assume here is for instance that the proposition expressed via the sentence ‘I am hungry’ is unknown to a person who does not understand the words in it, or to a person who does not know who the speaker or producer of this sentence is. This condition – which represents, as we shall see, the historically probably most ancient intuition underpinning the notion of *proposition* – associates propositions with the understanding of sentences.

The subsequent condition is as follows:

(W4) Propositions are the *referents* of nominal phrases such as: ‘that *p*’, ‘the proposition that *p*.’

At the same time, we can consider the condition (W2) to be simply a result of (W4) and of the observation according to which, apart from psychological and modal sentences, the indicated structures are a complement of sentences such as: ‘It is true that *p*’, ‘It is false that *p*.’ Should we accept this condition, then we can not only omit the condition (W2) and claims that *propositions are bearers of modal properties and objects which are connected via diverse psychological relations with subjects of states such as beliefs*. Even though this can be done, I will formulate both indicated conditions as separate and independent postulates:

(W5) Propositions are bearers of modal properties – they are extensions of predicates: ‘it is possible’, ‘it is necessary’ (given a certain interpretation of these predicates).

(W6) Propositions are objects of propositional attitudes – they are among the arguments of psychological relations such as believing.

In accordance with the last postulate:

(W7) Propositions are semantic values of the sentences (or: sentences-in-context).

Whilst the condition of *being a semantic value of sentences* can be reduced to: (a) taking sentences having the same semantic value to be inter-exchangeable so that the semantic value of the whole expression in any context available in the language *L* is preserved, (b) assuming that sentences with different truth values are sentences with different semantic values.<sup>8</sup>

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8 As in Omyła (1994); we could refer to this condition as (b) the ‘principle of subordination to fundamental division.’ The reader might identify the first condition as one of the possible formulations of the principle of compositionality; a particular case of the second condition is the well-known principle determining extension by intension.

### 3. The Way We Have Come: The Stoics through Reinach<sup>9</sup>

Discussions of the notion of *proposition* date back to antiquity – more precisely, to the Hellenistic period. In Stoic logic, the notion of *lekton* was given a key role. As a term, ‘lekton’ – if limited only to linguistic signs<sup>10</sup> – can be translated as ‘that which one means,’ ‘that which is said,’ or (in a slightly anachronistic manner) ‘the content of an expression.’ What is interesting here is the negative characteristic of the notion proposed by the Stoics: the *lekton* of an expression in a certain language is that which is not understood by a person who does not know that language. This characteristic corresponds roughly to our condition (W3). In their most common understanding, *lekta* were not of linguistic nature, they also existed independently of language and its users. In the Stoic view, all contents can be divided into complete and incomplete, a division drawn on psychological grounds – the receiver of the utterance, when hearing an expression of incomplete content, tends to ask for it to be completed. This property is what complete *lekta* lack, as they are the content of different speech acts. As it is sometimes noted, the Stoics clearly distinguished three aspects of any utterance, the first two of which correspond to the locutionary aspect of every speech act, while the last one corresponds to the illocutionary aspect thereof: the fact that certain words were pronounced, the fact that certain content was expressed, and the fact that pronouncing words with a certain content served the purpose of taking some action (e.g. giving an order or making a promise). In Stoic theory, propositions (the Stoics would use the term of *axiomata*) were a *subset* of the set of all complete contents of expressions – namely those that could become objects of an assertion (Cf. Mates (1953: 27–28)).<sup>11</sup> This definition might at first seem to exclude the condition (W1) and the characteristic of proposition as content which can be shared by different speech, however, a factual inconsistency would take place only in the case where certain contents could not be subject of assertions (in a sense analogous to that in which the proposition saying that 2 plus 3 add up to yield 5, cannot be subject of a promise, for instance), which seems to be a questionable assumption, to say the least.<sup>12</sup> The characteristic described above was followed by

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9 The best studies devoted to the ancient and medieval history of the concept of propositions are: Nuchelmans (1973), and Nuchelmans (1980).

10 This notion is equally applied to signs of any kind – not only linguistic signs.

11 The most widely known Stoic definition of proposition is the following: it is a ‘complete *Lekton*, assertoric by itself.’

12 William Kneale and Martha Kneale rightly point to the fact that the assumption that propositions are expressed by acts of speech of different types, allows for a fine explanation of the evident observation that logic relations between sentences are not limited

another, which the Stoics however did not consider to *define* the proposition: according to this characteristic all propositions are true or false (which implies our condition; W2). Some Stoics (like Chrysippus) also agreed that propositions are also bearers of modal properties (W5).

Two properties ascribed to propositions within Stoic theory may seem interesting and ‘out of the box’ from today’s perspective (Mates 1953: 153–154). First, the Stoics assumed that propositions can contain a grammatical tense form and so they can change the truth value in time. Second, they allowed the possibility that propositions of a certain type (though not all propositions in general) cease to exist in a specific time. This possibility was reserved for the propositions expressed via indexical atomic sentences (called ‘definite’ propositions, *orismenon*, e.g. the proposition expressed by the sentence: ‘He is sitting’), as opposed to indefinite (generalized ones, e.g. the proposition expressed by the sentence: ‘Someone is sitting’) and intermediate ones (containing a proper name, e.g. the proposition expressed by the sentence: ‘Dion is sitting’). Why these theses were defended is not fully clear – they most probably stemmed from the belief that certain propositions can be expressed only once as they are strongly linked to the fact of phrasing as a concrete token of an expression, used in that precise context. It is assumed in this view not only that certain indexical utterances have content that is inexpressible by any non-indexical sentence, but also that certain indexical utterances have content that is inexpressible in any other utterance. Note that a similar thesis is argued in favor of by some contemporary theoreticians of propositions, however, this is due to other reasons strictly related to the structural theory of propositions. Those theoreticians simply argue that since individuals are components of propositions, the existence of propositions depends on the existence of individuals, and individuals can, at a certain moment in time, cease to exist.

When looking at both ancient and recent history of the notion of *proposition*, two theoretical tendencies can be easily noted. On the one hand, there is a willingness to consider propositions to be either linguistic entities or at least entities which take their structure after the structure of sentences. On the other hand, the tendency to consider them to be more or less complex mental processes or states<sup>13</sup> – usually states experienced by a competent user of a given language,

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to logical relations between non-performatively used declarative sentences. Kneale and Kneale (1963: 62).

13 Although they cannot be considered contents of such states. Should propositions be identified with contents of psychological acts, then the question of the nature of contents remains open. Contents of psychological acts most certainly cannot be

when we can truthfully say that they understand a particular sentence. That these tendencies have emerged – tendencies which can be referred to as the *linguistic* and the *psychological* theory, respectively, is by no means surprising: propositions are either objects which one knows due to one's understanding of the sentence, or knowing them is simply the same thing as understanding the sentence.

The Latin terms corresponding to the Stoic *axioma* are, for instance, *pronuntiatum* or *enuntiatio* (both introduced by Cicero), *dictum*, *dictum propositionis*, *enuntiabile* (used by various medieval thinkers), and *significatum*, *significabile* (Gregory of Rimini) or *dicibile*.<sup>14</sup> These should of course be used with caution and the meaning of each term should be defined in consideration of the text and the context of the theory in which it functions.

The volume of this chapter does not allow a detailed description of medieval theories of propositions – we can, however, give a brief overview of some of the recurrent ideas. It should be noted at the outset that these discussions usually had their point of departure in the formula proposed by Boethius: that of a sentence being an utterance signifying a true or false thing (*oratio verum falsum significans*) – in which a clear distinction is made between the utterance and the thing signified by it, or the actual subject of truth or falsehood: a proposition.

Peter Abelard<sup>15</sup> draws a clear distinction between propositions or contents (*dicta*) and sentences (*propositiones*) that express them (or, to use a semantically neutral terminology as suggested above: sentences which *signify* contents). Abelard claims that the relation between the sentence and the proposition is analogous to the relation between the name and the thing named, albeit devoting an ample amount of space to a defense of the claim stating that *dicta* are not objects at all. The two views might apparently seem conflicting; what close analysis seems to indicate, however, is that they are indeed reconcilable to Abelard. To understand what Abelard could have meant, we have to strongly differentiate the fact that a certain expression has meaning from the fact that it has a reference. In the case of a proper name the fact of having sense (and the meaning) can be

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identified with psychological acts. They can, however, be identified with *z* linguistic expressions (probably the expressions of some language of thought), which is of course a variation of the linguistic standpoint.

- 14 The anonymous reviewer of this text pointed out that another frequently used term is that of *judicium*, clearly pointing to the *operation of judging*, was interpreted in the Thomist tradition as the operation of connecting or separating the substance and attribute.
- 15 This reconstruction of Abelard's views is based on: M. M. Tweedale (1976), *Abailard on Universals*, chapter 5.

reduced to having a reference (which sometimes quite unfortunately takes the form of a claim that meaning is the reference). In the case of other expressions, however, this might not necessarily be the case: having meaning is not equivalent to the fact that an expression designates anything. This is exactly the case with declarative sentences – they are meaningful expressions that state something, while we cannot say that they designate anything other than denotation of their components, which *cannot be, however, in any way identified with a proposition*. These components (and combinations thereof) are not propositions; otherwise there would be no difference between a sentence and a name – whereas the essence of a declarative sentence and its signification is an ineliminable assertive element which is given no name (in the case of the sentences used to perform speech acts other than statements, we also encounter an illocutionary element that is given no name).

Another characteristic and interesting view on propositions which we owe to Abelard is the claim stating that *dicta* are the semantic value of some occurrences of the nominal phrases<sup>16</sup> of the form ‘that p. ‘This claim – being the first explicit phrasing of our thesis (W4) – is informed by one of the definitions of a declarative sentence as an utterance whose general form should be analyzed as stating that: ‘It is true/false that,’ and introducing a general category of the so-called *impersonal sentences* like: ‘It is necessary/possible that,’ ‘It’s good/bad that,’ and ‘It is allowed/prohibited that’ (Jacobi 2004: 145). This fact makes the *dicta* – if we follow Boethius’ definition – bearers of truth and falsehood (W2).

As I have mentioned, another interesting aspect of the medieval theory of propositions – especially the later versions – is a theory of *language of thought* which originated in the frameworks developed by Augustine and Boethius. This theory stems primarily from the belief that the words of an overt language are conventional signs which would have no meaning, were they not in some way associated with human cognitive acts. Expressions of the language of thought were interpreted as *acts* necessary in order to understand an expression of a given type. In the case of categorematic terms that are not sentences, such acts should be referred to as *notions*, in the case of categorematic terms which are sentences – as *mental sentences*. In the latter case, the complexity of respective acts was well acknowledged – it was usually assumed that in a mental sentence, the act (as we would say today) of combining mental expressions syntactically

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16 Not in all such contexts – certainly e.g. psychological contexts have to be ruled out. Abelard cannot therefore be considered the first theoretician of propositions as objects being both contents of the acts of speech and propositional attitudes.

is accompanied by an act of judging whether such combination is produced in reality. It is precisely here that a certain ambiguity arises in theories of language of thought – according to the first possible interpretation, mental sentences are a combination of the two acts just mentioned; according to the other, they are *per se* the specific act of syntactic combination of categorematic notions. Should we follow the second interpretation and realize that in lieu of the act of judgment, other acts can be considered (e.g. those of assuming or doubting), we will see that the theory in question leads to the following consequence: mental states (understood as combinations of mental expressions) are objects of states such as assuming or considering, which makes them – were we to use today's terms – objects of *propositional attitudes*.

By no means can mental sentences, however, be considered to have performed the role of propositions in *any* theory of language of thought, and therefore, no such theory can be considered a variation of a hybrid (linguistic-psychological) theory of content. The matter is made evident once we compare the kind of language of thought proposed by Ockham with the framework of language of thought proposed by Buridan – despite some significant similarities, in Ockham's approach the sentences of public language *do not signify* sentences of the language of thought (his terministic analyses apply equally to both these languages). It is therefore impossible to say that in Ockham's framework, sentences of the language of thought are propositions expressed via sentences of public language (Kretzmann 1970: 780). To Buridan, things take a slightly different turn: he argues in favor of a theory according to which mental sentences are signified by sentences of public language, whilst having no function of signification. Were we to adopt a theory like Buridan's and agree to interpret the notion of *mental sentence* as an operation of combining (without the additional element of the operation of judging), we immediately obtain the currently immensely popular theory of the proposition as content of sentences and propositional attitudes,<sup>17</sup> that is, clearly formulated thesis (W6).<sup>18</sup>

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17 It is independently noted that in theological discussions, *dicta* were discussed as a subject of knowledge and faith (Nuchelmans 1983: 201–203). The theory of propositions as contents and propositional attitudes seems therefore to have been motivated in at least two independent ways.

18 In his interesting review work, Norman Kretzmann (1970: 777–779) divided medieval theories of propositions into four groups: theories considering propositions to be (i) linguistic entities, (ii) mental entities, (iii) extralinguistic entities belonging to one of the known categories, (iv) entities which require the introduction of a new ontological category specifically for them. It is indeed interesting, philosophically, to see what standpoints lie behind the labels (i)-(iv). Among others, theories were studied

In the mainstream modern thought up until the nineteenth century, innovative theories on the notion of proposition are scarce.<sup>19</sup> The first theory that has this innovative status is that of Bernard Bolzano.<sup>20</sup> Bolzano draws a fundamental division into *sentences which are said* (German: *Sätze*), *sentences which are thought* (*Urteile*) and *sentences in themselves* (*Sätze an sich*). The former concerns true or false utterances understood as particular speech acts, the latter – acts of nurturing a certain thought (acts of judgment), which can also be pronounced true or false. In the case of sentences in themselves (a subclass of which are truths in themselves – German *Wahrheiten an sich*) neither linguistic nor psychological entities are concerned, but something which – to Bolzano – is the matter (*Stoff*) or sense (*Sinn*) of an utterance or of psychological acts of judgment.

This characteristic is followed by another:

I understand by a sentence in itself any statement that something is or is not, indifferently whether this statement is true or false, whether or not anyone has put it into words, whether or not it has even been thought.<sup>21</sup>

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which had the proposition be sentential expressions as such (group (I): such theories can be referred to as ‘theories of identity’); theories that considered propositions to be the result of operations of combining notions, and those that considered propositions to be acts of judging such combinations, theories that considered propositions to be objects denoted by constituent sentences, properties of these objects, or ways in which these objects can be combined (group (iii): this is where we could perhaps find predecessors of the theory considering propositions to be some kind of states of affairs; theories considering them to be some kind of abstract objects (group (iv)). Even this concise overview should be enough to show how numerous points in contemporary discussions of the notion of proposition overlap with problems of propositions discussed in the Middle Ages. I believe that whenever medieval theories are treated solely as antiquarian curiosities, injustice is done to their authors, and we may perhaps succumb to the illusion that there are some clearly formulated criteria of progress in philosophy. When discussing theories in groups (iii) and (iv), Kretzmann adopts his principle of division as the distinction between ‘extramental entities’ and ‘entities *sui generis*.’ Since the author does not explain the difference between the two, I took one of the acceptable interpretations, according to which the latter means entities that do not fall into any known category such as substance, property, relation, etc.

- 19 It should be noted that interesting discussions were held outside of the mainstream, for instance regarding the question whether mental sentences (interpreted as contents) can change their truth value – cf. Nuchelmans (1994: 69–84).
- 20 Bolzano’s theory of propositions is discussed in Rojszczak (2005: 112–115), among others.
- 21 ‘*unter einem Satze an sich* verstehe ich nur irgend eine Aussage, das etwas ist oder nicht ist; gleichviel, ob diese Aussage wahr oder falsch ist; ob sie von *irgend* Jemand in Worte

As to sentences in themselves – apart from the fact that they have value of truth or falsehood (W2) – Bolzano claims that:

- i. They are built of ideas (or representations) in themselves (*Vorstellungen an sich*) and the copula *has*, which expresses the relation between the property and its bearer, in a way similar to the way sentences are built out of words.
- ii. They have the characteristics of truth or falsehood irrespective of: (a) thinking subjects, (b) time, and (c) circumstances.
- iii. They do not exist in real terms – which means, among others, that they do not exist in time and space.
- iv. Their constituents (or ideas in themselves) are universals.

Thesis (iv) is especially interesting here – it can be seen as the first clear formulation of the *thesis of homogeneity of proposition*, which considers propositions to consist solely of notions and to be unable to contain (as its constituents) objects other than notions.

It is in the Brentano school and its successors that we may find reflections of significance for the study of propositions. Thinkers such as Brentano, Meinong, Twardowski, Marty, Husserl, and Reinach were interested above all in the problems of objects and contents of intentional acts – transposing their reflections onto linguistic expressions. We could therefore perhaps assume that they would consider either the postulate (W6) or some other thesis close to this postulate, to be a characteristic vital for the notion of proposition. Again, we shall not enter a detailed discussion of theories discussed within this tradition<sup>22</sup> – we should however mention several recurrent threads.

Firstly, within the tradition in question, theorists have long struggled with the problem of separating types of intentional acts of propositional character. The first thinker to do that in an explicit manner was probably Meinong: he distinguished between representations and acts of thinking, dividing the latter into acts of supposing and judging. In Meinong's framework, the two types of intentional acts (i.e. acts of representing and thinking) are directed onto objects of a different kind – in particular the acts of thinking concern objects of a higher order called *objectives*, which are structures made of ordinary objects. To Meinong, objectives are bearers of truth and falsehood (W2), correlates of that-phrases (W4), and meanings of declarative sentences; in his view, objectives were not

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nicht gefast, ja auch *im Geiste* nur gedacht oder nicht gedacht worden ist' (Bolzano 1837: 77, par. 19; the original available online: <[http://dml.cz/bitstream/handle/10338.dmlcz/400472/Bolzano\\_26-1837-1\\_11.pdf](http://dml.cz/bitstream/handle/10338.dmlcz/400472/Bolzano_26-1837-1_11.pdf)>, accessed 30 Jul 2015).

22 The reader can be referred to an exhaustive historical study by Artur Rojczczak (2005).

meanings of utterances of other kinds as well, or correlates of intentional states such as desires or feelings which have their specific objects. In the case of the latter thesis, serious doubt arises as to the legitimacy of interpreting the notion of *objective* as an equivalent of the notion of *proposition*. A decisive view in this matter is difficult to form.

Secondly, it is precisely within this tradition that the idea of the state of affairs (German: *Sachverhalt*) was originally clearly formed, understood as a semantic correlate of a sentence or an act of judging. This idea can be thought to originate in Meinong's notion of the *objectiv*. It is Reinach to whom we owe the observation that the content of propositional states (and sentences) should not be confused with states of affairs to which the intentional states point. Regrettably, this observation is occasionally disregarded even today – and the error which Reinach imputed to Austrian philosophy (Schuhmann, Smith 1987) has since become international.

#### 4. The Path We Have Entered: The Birth of Current Problems of Propositions (Frege, Russell)

Some striking similarities can be seen between Frege's notions of *sense* and *thought* and Bolzano's *Vorstellungen an sich* and *Sätze an sich*. There is, however, no evidence to support the claim that Frege was inspired by Bolzano's works Sundholm (2000: 164–174). This is why Frege's semantic theory should be treated as an original theory of semantic value of expressions, that is, a theory of propositions as well. Let us briefly recall the most important threads within this framework – passing over, as we have to, some controversial questions of interpretation. To Frege, any expression has two basic semantic properties: it *refers* to a certain object (let us refer to it as 'nominatum,' as in Carnap 1964) and expresses a certain *sense*. In the case of names (this class includes definite descriptions like: 'the fattest weasel in the Sherwood Forest') the nominatum is a concrete object (a particular animal) and the sense is that which – as Frege puts it – indicates the way in which the object is given or presented<sup>23</sup> (in our case: a concrete weasel exemplifying the set of properties indicated by the description; in the case of proper names, sense as a category proves slightly enigmatic). In

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23 Frege notes elsewhere that the sense is *comprised* in the way in which an object is given. Nowhere does he state (as it is sometimes interpreted) that the sense of an expression is the way in which the nominatum of the expression is given. It would be perhaps most accurate to say that the sense presents a nominatum in a certain way without eliminating its performing other functions.

the case of sentences – which, as it is sometimes emphasized, are interpreted by Frege as names of a particular kind – the nominatum is the truth value of truth or falsehood, which Frege considers to be objects of a particular kind, therefore taking it that all sentences having the same truth value have same nominatum.<sup>24</sup> Frege refers to the sense of the sentence as thought (*Gedanke*) – were we to consistently apply to this notion the category of *the way an object is presented*, we would have to say that true sentences indicate different manners in which an object called ‘truth’ is presented, and false sentences indicate different manners in which an object called ‘falsehood’ is presented. Moreover, to Frege thought is an objective content of a sentence available to many, and as such should by no means be confused with the act of thinking or representation in psychological sense. Since Frege considers the sense of a name to be graspable by anyone who knows the use of symbols or the language of which the name is part (to which we can add: and the context in which it is used<sup>25</sup>), then – keeping in mind that sentences are, within his theory, names of a particular type – we can assume that Frege adopts the positive part of the condition (W3\*). Frege would not, however, agree to accept the condition (W1), at least when considering speech acts other than questions and assertions (Carl 1994: 94–96).

The most seminal feature, perhaps, of Frege’s semantic theory are his discussions of the principle of interchangeability of expressions with the same nominata. Let us recall that the principle states that mutual substitution of expressions with the same nominata does not affect the nominatum of the expression within which the substitution was performed. Interestingly, Frege does not formulate a similar principle *explicitly* for the senses of expressions – nowhere does he claim that the sense of the entire expression is to be a function of the senses of its constituents. However, as shown by Carnap (1964: 121), he adopts this principle *implicitly* – he seems to need it in order to justify the belief that a nominatum of a sentence is truth value, and the sense thereof is a thought (a proposition). Should we additionally assume that Frege would agree that the difference in the nominatum of expressions implies a difference in their sense, then we can consequently say that senses, and senses of sentences in particular, make semantic value of sentences or sentences in context (principle (W7)).

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24 It is worth noting here that in some passages of his influential article, Frege considers truth value to be the *circumstance* that the sentence is true or false (Frege 1892: 34).

25 For the sake of simplicity, I abstract here from Frege’s idea of hybrid names (and hybrid expressions). For a discussion of the idea, see Künne (1992, 2010); Textor (2007, 2015); Kripke (2011b); Penco (2013); Ciecierski (2019).

Moreover, in Frege one can find clues regarding yet another principle, according to which the substitution of an expression having a certain sense with a different expression that has a different sense, always leads to a change in the sense of the entire structure. This principle, unlike the former, has no equivalent in the domain of *nominata* (in the expression ‘the son of Sophroniscus,’ replacing the name of ‘Sophroniscus’ with the name of ‘Phaenarete’ does not affect the change of the *nominatum* of the entire expression – it is still Socrates). Should Frege be willing to adopt this principle, then it is possible to show (without referring to psychological contexts) that within his theory, the criterion of sense identity is stronger than necessarily equivalence. The argument here is the following. Let us consider any particularization of a law of logic, for instance, a sentence like: ‘Warsaw lies on the river Vistula or Warsaw does not lie on the river Vistula.’ Let us replace the sentence ‘Warsaw lies on the river Vistula’ with some other sentence which has a completely different sense, for example, ‘ $2 + 3 = 5$ .’ As a result, we shall obtain a sentence composed of ‘ $2 + 3 = 5$  or  $2 + 3 \neq 5$ ,’ having a *different sense* than the original sentence and necessarily equivalent to the preceding sentence. In the case of sentences, the conclusion drawn from the argument presented above is consistent with the so-called *intuitive criterion of sense difference* (Evans 1982: 18–19), according to which two sentences have different sense if it is possible for the person who understands them to take a different attitude regarding each of them. It is also compatible with Frege’s influential theory of belief sentences, on the grounds of which interchangeable belief sentences are considered to include sentences with identical senses. The latter theory should be clearly separated from the thesis (W6) – we have no reason to believe that Frege would consider the sense of sentences to be arguments of psychological relations such as beliefs. There is no evident and clean shift from the semantic principle advocated by Frege, to the ontological thesis regarding the structure of propositional attitudes. Of course, as it was noted earlier in this text, Frege’s theory leaves unanswered a very important question: we do not know the exact criterion of sense identity (we only know when the senses are not identical). We do, however, have the advantage in that Frege’s successors, like Alonzo Church for instance, have come forward, all within the so-called logic of sense and denotation, with several formal theories that are possible explications to Frege’s approach (Cf. e.g. Church 1973/74, 1993).

In several fragments of his work the possibility that objects be constituents of propositions is strongly ruled out. This view will be later repeated by Frege in his well-known correspondence with Russell (Frege 1980: 163). Russell’s responds to these features’ arguments, which he deems to support his own theory of propositions laid out in *Principles of Mathematics*; according to this theory: ‘a

proposition, unless it happens to be linguistic, does not itself contain words: it contains the entities indicated by words.' (Russell 1903: 51).

Within this theory, Russell uses a notion of the *term* with reference to any possible component of the proposition – not without ontological nonchalance: among terms, he says, we may find many objects which do not exist (e.g. characters in works of fiction). All terms are indicated either by proper names or words which are not proper names. Russell gives terms of the first type the name of *things*, and terms of the other type – that of *concepts*. In the light of his theory, propositions are composed of concepts or things.

Russell's early theory of propositions was never developed in a precise and comprehensive manner – he never answered the question of what makes the content of nominal expressions such as 'Caesar's death' different from the content of sentences such as 'Caesar died.' Neither did he put forward any syntactically inspired version of his theory – in this regard, he cannot be seen to have pioneered the idea later developed by C. I. Lewis, Carnap, or Ajdukiewicz. Last but not least: should the reader be interested in the possible form of the part of Russell's framework which concerns the notion of identity of *propositions*, a good reference might be Alonzo Church who provides the axiomatic framework of this theory and its use in resolving the so-called Russell-Myhill paradox (Church 1984: 513–522).<sup>26</sup>

## 5. The Way We Are Heading: Present-Day Discussions

We shall discuss two *kinds* of theories of propositions that occur in the literature: the *functional theory* (or possible world theory) and the *structural theory*.

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26 The Russell-Myhill paradox can be informally represented in the following way: for any set of propositions, we can consider a proposition stating (truthfully or falsely) that all propositions which are part of this set are true. Such a proposition is or is not part of the class of which it states all elements to be true. Let us now consider the set of all propositions of the type mentioned which do not belong to corresponding classes (let this set be called P). Class P corresponds to the proposition *p* which asserts that all elements of P are true. Is proposition *p* part of class P? If it is, then it is one of the propositions which do not belong to corresponding classes. If it is not, then *in turn* – as a proposition which does not belong to the corresponding class – it has to be an element of P.

## 5.1. Functional Theory

### 5.1.1. History

As mentioned before, the first clear formulations of the functional theory were authored by C. I. Lewis (1943) and R. Carnap (1964 (1st edition – 1947)). Lewis starts from an observation that propositions do in some way signify the state of affairs. To him, the notion of *signification* is a broadening of an analogous notion employed for nominal expressions and their content. We will therefore say that a name (or its content, the notion) signifies a set of characteristics, and having these characteristics is a sufficient condition for the object to be denoted by the name. Now, what is meant by *denotation* of the proposition is a real world which contains the signified state of affairs (if the proposition is true), or it is stated that the denotation is empty (should the proposition be false). In the last step, the proposition proves to comprise ‘any consistently thinkable world which would incorporate the state of affairs it signifies; a classification of Leibnizian possible worlds’ (Lewis 1943: 243). A consequent broadening of the notion of *signification* of a name/notion indicates that Lewis would assume that sentences and propositions signify a characteristic which would be a sufficient condition for the possible world to be a denotation of the sentence: this characteristic is to entail a certain state of affairs. Carnap gave Lewis’ definition a more concrete dimension, introducing the notion of *state description* – a maximal and consistent set of sentences of a given language, which can be considered a linguistic representation of a possible world. This term, in turn, serves to define the notion of *intension* of the sentence as a set of state descriptions to which the sentence belongs. Intensions of sentences were equated with propositions expressed by sentences. Driven by earlier suggestions made by Leibniz, Carnap points to the fact that this approach allows for a precise formulation of semantics for languages with modalities. On the grounds of both approaches, the criterion defining whether two sentences express the same proposition, is logical equivalence.

Lewis’ and Carnap’s ideas were taken up by logicians interested in intensional logic, to turn, in the 1950s and 60s, into a full-fledged formal theory currently known by the name of *possible world semantics*. Its use in natural language semantics and generalization within the framework of the so called index semantics (with notable contributions by Richard Montague, Arthur Prior, Hans Kamp, David Lewis, David Kaplan, and Robert Stalnaker) made it possible for the functional theory to take its present form in the early 1970s.

### 5.1.2. *Formulation and example*

The definition of the proposition posited by functional theory is the following: the proposition expressed by sentence  $S$  (or the sentence  $S$  in context  $c$ ) is a function mapping the set of possible worlds into the set of truth values; assigning truth to those among the possible worlds in which sentence  $S$  is true, and falsehood to the possible worlds where it is false. This definition is sometimes phrased differently: a proposition is a certain set of possible worlds, namely those in which a given sentence is true. An alternative formulation is possible as a result of the following fact: from all functions in the form of  $X \rightarrow \{0,1\}$  (referred to as characteristic functions of the set  $X$ ) we can choose a function which will assign 1 to the elements that belong to (arbitrarily chosen)  $A \subseteq X$ , and a 0 to the elements that do not belong to  $A \subseteq X$ . Similarly, we can find a definite function of the same form for each such set. Therefore, we can establish one-to-one mapping between the respective functions and the subsets of the set  $X$ .

This definition might be illustrated by the following example. Let  $L_1$  be a simple language system composed of: logical connectives (including modal operators), quantifiers, individual variables, brackets, individual constants '1', '2', '3' and two predicate symbols 'T' i 'H' interpreted as analytically exclusive (i.e.  $\neg T = H$ ). The atomic sentences of  $L_1$  are the following expressions: 'T(1)', 'T(2)', 'T(3)', 'H(1)', 'H(2)', 'H(3)'. Let  $I$  be a set of 'small' possible worlds in which we speculate about a certain process composed of three events, e.g. a coin is flipped three times. We assume first that each constant in  $L_1$  is assigned a function which assigns to each possible world an element of the domain of discourse of the language  $L_1$  (we shall additionally assume that this function is constant). We shall then posit that each predicate is assigned a function which assigns to every possible world a set of objects being an extension of this predicate (understood traditionally, i.e. as a set of objects which satisfy this predicate). Based on these two notions, we characterize the proposition expressed via an atomic sentence as a function which assigns to each possible world the truth value of this atomic sentence. This truth value is, in turn, unequivocally determined by whether the individual being a reference of the constant in a given possible world belongs to the extension of predicate in this possible world. In this framework, the atomic sentence 'H(1)' expresses a proposition which assigns a truth to each possible world, as long as the individual marked as '1' in a given world belongs to the extension 'H' in this world, etc. In the system  $L_1$ , eight possible worlds are distinguished. We can mark as  $i_1, i_2, i_3, i_4$  the worlds in which the designatum of the constant '1' belongs to the extension of 'H', and as  $i_2, i_4, i_6, i_8$  – those worlds in which the designatum

'2' belongs to the extension 'T'. In such case, the atomic sentence 'H(1)' expresses the proposition PH(1) of the form:

$$\{ \langle i1, 1 \rangle, \langle i2, 1 \rangle, \langle i3, 1 \rangle, \langle i4, 1 \rangle, \langle i5, 0 \rangle, \langle i6, 0 \rangle, \langle i7, 0 \rangle, \langle i8, 0 \rangle \},$$

and the atomic sentence 'T(2)' expresses the proposition PT(2) of the form:

$$\{ \langle i1, 0 \rangle, \langle i2, 1 \rangle, \langle i3, 0 \rangle, \langle i4, 1 \rangle, \langle i5, 0 \rangle, \langle i6, 1 \rangle, \langle i7, 0 \rangle, \langle i8, 1 \rangle \}.$$

Since PH(1) and PT(2) describe certain characteristic functions of the set of possible worlds distinguished by  $L_1$ , they can be equated with the following subsets of I, respectively:

$$P^*(H(1)) = \{i1, i2, i3, i4\}$$

$$P^*(T(2)) = \{i2, i4, i6, i8\}$$

(in what follows,  $P(A)$  will be used to mark a function being a proposition expressed as sentence A, and  $P^*(A)$  is used to mark a subset of the set of possible worlds which corresponds to this function). Propositions expressed via compound sentences are defined as characteristic functions determined by subsets of the set I of all possible worlds that are produced when standard set-theoretic operations are performed on subsets of I:

$$P^*(\neg A) = -P^*(A) \text{ [or: } I - P^*(A)\text{]}$$

$$P^*(A \wedge B) = P^*(A) \cap P^*(B)$$

Therefore, if A = 'H(1)' and B = 'T(2)', then:

$$P(\neg A) = \{ \langle i1, 0 \rangle, \langle i2, 0 \rangle, \langle i3, 0 \rangle, \langle i4, 0 \rangle, \langle i5, 1 \rangle, \langle i6, 1 \rangle, \langle i7, 1 \rangle, \langle i8, 1 \rangle \}$$

$$P(A \wedge B) = \{ \langle i1, 0 \rangle, \langle i2, 1 \rangle, \langle i3, 0 \rangle, \langle i4, 1 \rangle, \langle i5, 0 \rangle, \langle i6, 0 \rangle, \langle i7, 0 \rangle, \langle i8, 0 \rangle \}.$$

Sentences with quantifiers may be interpreted as follows: ( $i \in I, v \in \{0, 1\}$ , Ext is the extension of the predicate in a given possible world<sup>27</sup>):

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27 We assume the constant domain across possible worlds.

$$P(\forall x A) = \{ \langle i, v \rangle : v = 1, \text{ if } \text{Ext}(A, i) = U, v = 0 \text{ otherwise} \},$$

$$P(\exists x A) = \{ \langle i, v \rangle : v = 1, \text{ if } \text{Ext}(A, i) \neq \emptyset, v = 0 \text{ otherwise} \}.$$

Should therefore  $i_8$  be the only world in which all individuals have property of T, sentences ' $\forall x T(x)$ ' and ' $\exists x H(x)$ ' express the following propositions, respectively:

$$P(\forall x T(x)) = \{ \langle i_1, 0 \rangle, \langle i_2, 0 \rangle, \langle i_3, 0 \rangle, \langle i_4, 0 \rangle, \langle i_5, 0 \rangle, \langle i_6, 0 \rangle, \langle i_7, 0 \rangle, \langle i_8, 1 \rangle \},$$

$$P(\exists x H(x)) = \{ \langle i_1, 1 \rangle, \langle i_2, 1 \rangle, \langle i_3, 1 \rangle, \langle i_4, 1 \rangle, \langle i_5, 1 \rangle, \langle i_6, 1 \rangle, \langle i_7, 1 \rangle, \langle i_8, 0 \rangle \}.$$

Propositions expressed with modal sentences (assuming that the accessibility relation is universal – otherwise we would have to introduce relativization into the possible world) can be defined as follows:

$$P^*(\Box A) = I, \text{ if } P^*(A) = I, \emptyset \text{ otherwise.}$$

$$P^*(\Diamond A) = I, \text{ if } P^*(A) \neq \emptyset, \emptyset \text{ otherwise.}$$

### 5.1.3. *Why is this theory potentially attractive?*

Some philosophers share the view that the theory described above is an ill-conceived application of the technical definition discussed in formal semantics. I think that this is a misguided assessment – functional theory has its own (widely known) problems, but it is also supported by serious arguments. Some of such arguments were presented by the most prominent and consistent among the living advocates of the functional theory, Robert Stalnaker.<sup>28</sup> To put it in simplified terms: according to Stalnaker, the most important basic condition which should be met by propositions is postulate (W6). Adopting this assumption has its consequences: what we want to have, above all, is a theory of content which shall not impose on this notion any form related to generic or individual dispositions of cognitive systems that are capable of holding beliefs and other types of propositional attitudes. What we particularly want to avoid is a form related to the linguistic representation of content. On the positive side, we want contents to be described and classified inferentially and that the states 'equipped'

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28 His most comprehensive study is: Stalnaker (1984).

with them correlate in some way with the states of the world (or of the surroundings). The two characteristics are shared not only by intentional states, but also information states in general – we could say that content is type of information of a particular kind, and a belief state is a particular type of information state – i.e. a type in whose case, apart from the correlation with the states of the environment, states are causally linked to one another and to behaviors of a cognitive system. Stalnaker distinguishes clearly between the question of the content of a given state, which he identifies with causally determined information born by that state, and the question of that state's characteristic as a propositional attitude of a particular type. States have content due to causal relations, and they are propositional attitudes of a particular type because they are related in a certain way to actions. The notion of *content* postulated by this theory is thus separated from the notion of *belief* or *propositional attitude* and ascribed to the notion of a *state bearing information*. In this sense, it becomes a term of a very general character and scope. Theoretically, an attractive explication of this notion should reflect this general character in a way. Such possibility is not granted, let us repeat, by the linguistic theory which requires contents to have a linguistic structure. On the other hand, the theory which defines content as a subset of the set of possible worlds or of the situation remains neutral as to the way in which the information is represented – it allows that in the case of certain systems information is of linguistic character, while admitting that it absolutely does not have to be the case with other systems – the Eiffel tower (whose shadow correlates in a way with the position of the Sun), thermometers, animals, toddlers, etc. It is by no means claimed here – let us stress this once again – that each case of these systems has to do with belief states, since in order for this to happen we would need an adequate relation of the information state to action. We do, however, consider them to be information states.

Regardless of these motives one could ask how functional theory works in relation to the remaining postulates connected to the notion of proposition. Leaving the very general postulates (W1) and (W4) aside (there is no evident reason for them not to be fulfilled by the theory in question), let us note that we face no problems in fulfilling the postulates (W2) and (W5). It seems problematic, however, to meet the postulates (W3) and (W7), and we can also consider the postulate (W6) problematic to fulfill.

#### 5.1.4. *Major internal problems*

When discussing the theories of propositions reviewed here, it is sometimes pointed out that it is difficult to explain how particular cognitive systems can remain in

cognitive relations towards functions defined on a domain of possible worlds or towards sets of possible worlds. To put it briefly: the sense of the notion of *grasping the proposition* is highly mysterious (Cf. Putnam 1975: 183–188). The fundamental error related to this objection lies in the fact that within the functional theory, no relation of ‘grasping’ is postulated to occur between a cognitive system and a functionally defined proposition. Rather, a functional definition of proposition is to be an abstract mathematical representation of disposition to discern the possible states of the world or environment. Postulate (W3), correctly interpreted, when applied to functional theory can be reduced to stating that a person who does not understand the sentence does not have a certain disposition, a significant part of which is the ability to distinguish between certain possibilities (e.g. those which verify the utterance and those which falsify it).

The greatest challenge to the functional theory still lies in the fulfilling of the postulate (W7). As I mentioned before, within the framework we are discussing, logically equivalent propositions, i.e. true in the same possible worlds, are considered identical. This means that – as long as we want to consider propositions to be semantic values of sentences – logically equivalent sentences should be inter-exchangeable in any given context when the semantic value of the entire context is preserved. We know, however, that this is not the case. The sentence: ‘Aristotle claimed that every human being is an animal’ expresses a proposition that is different from the one expressed by the sentence: ‘Aristotle claimed that every human being is a chordate’ (the two sentences have different truth value in the real world), although the two sentences: ‘Every human being is an animal’ and ‘Every human being is a chordate’ are true in the same possible worlds. It seems therefore that the functionally defined propositions are not semantic value of sentences, if only we allow that language has psychological contexts. This reasoning is sometimes broadened onto thesis (W6): starting from observations on non-compositionality, an ontological thesis is drawn which states that functionally defined propositions cannot be contents of propositional attitudes.<sup>29</sup> However, it is in no way clear why we should accept such a shift from the semantic to the ontological level.

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29 Max Cresswell, for instance, writes: ‘If the meaning of a sentence is just the set of worlds in which the sentence is true, then any two sentences that are true in exactly the same set of worlds must have the same meaning, or in other words must express the same proposition. Therefore, if a person takes any attitude (for instance, belief) to the proposition expressed by one of those sentences, then that person must take the same attitude to the proposition expressed by the other’ (Cresswell 1985: 4).

We do have, however, a *different* reason to doubt whether the functional theory of propositions allows us to preserve the postulate (W6). Since propositional attitudes are identified here with states bearing information, and the latter are deductively closed (i.e. any state bearing information that  $p$  is a state bearing the information that  $q$ , as long as  $q$  is a logical consequence of  $p$ ), it seems that we are obliged to assume that a cognitive system holding a belief that  $p$  is in a state bearing the information that  $q$ , for any  $q$  entailed by  $p$ . To many philosophers, this seems an unacceptable consequence: they suggest that in such a situation we would have to accept a thesis saying that beliefs are closed under logical consequence, which in turn would mean that we hold many more beliefs than we would be able to sincerely admit. I believe this reasoning is flawed by the fallacy of equivocation: it is something altogether else to say that the fact of being in an information state entails the fact of being in another information state, than to say that being in a belief state entails being in (a certain) other belief state. The functional theory features (or should feature) the principle of being deductively closed only when applied to states bearing information. Even if one such state is a belief state (which requires it to remain in a specific network with other states and behaviors), it does not necessarily follow that another information state being a consequence of it, should also be a belief state. For example: if I hold a belief that the sun will rise tomorrow, I am in a state bearing the information that the sun will rise tomorrow or that the president of the USA in 2058 has already been born. This does not mean, however, that I hold a belief that the sun will rise tomorrow or that the president of the USA in 2058 has already been born. It seems therefore that the postulate (W6) can indeed be reconciled with the functional approach. In such case, the most serious challenge for the functional theory is still related to non-compositionality. Finally, let us briefly note that this problem is not successfully resolved by theories that attempt to substitute the notion of the *possible world* with the notion of *situation* – as shown by Max Cresswell, these theories make it is possible to demonstrate that at least some logically equivalent sentences (e.g. a sentence and its double negation) are interchangeable in belief contexts, which does not accord with a more evident observation: it is logically possible to be wrong and really consider that  $p$ , without necessarily considering that not-not- $p$  (Cresswell 1985: 168–174).<sup>30</sup>

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30 Cresswell himself puts forward a theory which requires a reference to structured meanings which are not propositions.

## 5.2. Structural Theory

### 5.2.1. History

The basic idea behind structural theories of propositions takes root in the same works that present the functional theory. However, none of those works formulate it as theory of propositions – it is used by Lewis to define the notion of *analytical meaning* (strictly speaking, that of *analytical equivalence of sentences*) (Lewis 1943: 246); Carnap uses it to explain the notion of *intentional isomorphism* which in turn serves to formulate the criterion of sentence interchangeability in belief contexts (Carnap 1964: 56–64). Kazimierz Ajdukiewicz was likely the first one to apply it as an essential element of the theory of propositions (Ajdukiewicz 1967a, 1967b). His theory had been presented publicly for the first time in 1958 during the International Congress of Philosophy in Venice (with transcript published in 1961); the idea was expanded during his lectures in the USA in 1959 (with consequential articles published posthumously in 1965). Outside of Poland, Ajdukiewicz's ideas were not given the amount of notice they deserved (though published in English). Contemporary discussions of structural theory essentially originate from two sources – on the one hand, they are inspired by the school of semantic thought represented by authors like David Lewis (1970) and Max Cresswell (1985)<sup>31</sup>; on the other, they are rooted in the language of thought hypothesis and the representational theory of mind (Fodor 2008). Now, it is worth noting that these two traditions approach the case differently: while the first one treats propositions as semantic structures, the other sees them as syntactic structures.

David Bell once noted (cf. Bell 1987) that any adequate propositional theory should have something to say in terms of the following properties of propositions: their *subjectivity*, i.e. that a proposition can be an object of *one's* thought or a content of *one's* utterance, their *objectivity*, i.e. that propositions can be transmitted and that they can be the object of thought for many subjects, their *reflexivity*, i.e. that propositions can relate to propositions themselves and their components alike and their *rationality* (meaning that propositions can be arguments of logical relations and have components). Viewing propositions

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31 Cresswell, however, does not treat structured meanings as propositions – instead, he claims that the analysis of sentences describing propositional attitudes forces us to accept that those attitudes do not include entire sentences as their component, but only parts of sentences.

through a structural lens is an elegant way to frame certain aspects of reflexivity and rationality of propositions.

### 5.2.2. *Formulation and example*

In general terms, structural theories can be divided in the following way: the first type assumes that the structure of propositions is different than the structure of sentences that are used to express the propositions (let us call such an approach *non-linguistic*); the other one assumes that the structure of propositions is identical to the structure of sentences that express them (we shall name this a *linguistic* approach). There are also different variants of the linguistic approach – the *syntactic* and the *semantic*. The former recognizes propositions as expressions of a language of some sort (likely, the language of thought); the latter sees them as structures comprised of semantic interpretations of linguistic expressions. Somewhere in-between the two kinds of theories of propositions one can locate act-type based theories of propositions which equate propositions with types of cognitive acts (like the act of predication) (cf. Soames 2010, 2015; Bave forthcoming). In what follows, I will focus on the more popular of these approaches – the semantic approach. Its most prominent contemporary proponents are Edward Zalta (1988) and Jeffrey King (2007).<sup>32</sup>

The basic idea behind the linguistic and the semantic notion of the *proposition* is as follows. We assume that any (syntactically unambiguous) sentence has a certain syntactic structure which points to how it is constructed of basic (terminal) elements. Those terminal elements have certain interpretations (semantic values). We equate the proposition expressed by given sentence S with an isomorphic structure<sup>33</sup> that has a syntactic structure of sentence S in which we have substituted its terminal elements with semantic values. It is worth noting how broad this definition is – it does not settle what the semantic value of terminal elements is; nor does it adopt any specific syntactic theory. Specific versions of the linguistic theory can hence differ from one another for at least one of those reasons.

Again, let's take a simple example of the language  $L_1$  – sentences 'T(1)' and '¬H(1)' are true in exactly the same worlds, though they have different syntactic structures, with different terminal elements ('T' and '1' in the first sentence and

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32 These theories differ from each other in certain details – as briefly summarized in King, 'Structured Propositions.'

33 Hence, a structure that keeps the same relations and functions as those assigned to the initial structure.

‘ $\neg$ ’, ‘H’ and ‘1’ in the second). In the first case (if we adopt categorical notation and operator-argument syntax with ‘+’ representing syntactic composition) it is a string:  $s/n + n$ , in the second:  $s/s + (s/n + n)$ . Should we assume that the semantic values of expressions are their intensions, hence – in the case of predicates, they are the functions from a set of possible worlds to subsets of the set  $\{1, 2, 3\}$  (let us mark them as ‘ $f_1 \dots f_n$ ’, where  $f_1$  is an interpretation of ‘H’ and  $f_2$  of ‘T’); in the case of individual names, they are the (constant) functions from a set of possible worlds to the set  $\{1, 2, 3\}$  (let us mark them as ‘ $g \dots g_n$ ’ where  $g_1$  is an interpretation of ‘1’); in the case of connectives the functions assigning functions to functions, i.e. assigning propositions to propositions (let us mark them as ‘ $h \dots h_n$ ’ where  $h_1$  is an interpretation of a negation) – then the propositions expressed by both of those sentences will be two structures:

$$f_1 + g_1$$

and:

$$h_1 + (f_2 + g_1).$$

Should we, in turn, assume that extensions of expressions are semantic values (as proposed by Ajdukiewicz); that the following (different) structures are propositions (where  $i_1$  is the real world, we assume that we got heads when flipping a coin the third time, i.e. that  $T(3)$ ) and that Vr and Fl designate truth values:

$$\{1, 3\} + 1$$

and:

$$\{\langle \text{Vr}, \text{FL} \rangle, \langle \text{Fl}, \text{Vr} \rangle\} + (\{2\} + 1).$$

### 5.2.3. *Why is this theory potentially attractive?*

There are many reasons for choosing one version of the structural theory as the most attractive. Among them, the most important are the following<sup>34</sup>:

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34 Other reasons are described in the literature: for instance, Jeffrey King believes that adopting the structural theory allows us to: (i) prove the existence of the propositions (as they are facts of some type – relying on the existence of a certain language with expressions with specific semantic values which create a certain propositional

[a] *Some (but not all!) versions of structural theory let us preserve compositionality.*

The need to preserve compositionality was, as I mentioned, the main drive behind Carnap's idea of intensional isomorphism. Hence, it is no wonder that the structural explication of the notion of *proposition* can be viewed as a natural candidate for a theory of propositions meeting the condition (W7). Indeed, on the basis of that theory, sentences like ' $7 + 8 = 15$ ' and ' $15 = 15$ ' express various propositions, therefore we know why the following sentence can be true: 'George believes that  $15 = 15$ ;' and this can be false: 'George believes that  $7 + 8 = 15$ ' – hence, this substitution is not a counterexample for our principle. Nonetheless, some caution should be taken here and we need to pay attention to what kind of entities stand for semantic values of expressions that are terminal elements of sentences. Let us assume that, for instance, we decide that constant functions (those assigning one and the same object to every world) correspond to singular terms (excluding definite descriptions from this class) on the level of semantic value; or (virtually the same thing) that singular terms are destitute of anything but their reference. Let us consider two sentences of identical structure that contain two different individual expressions, albeit with the same reference (e.g. 'Plato' and 'Aristocles'). It may seem at first that for every such occurrence, it is possible that the belief sentence in which the first of those expressions ('George believes that Plato is a philosopher') serves as a complement is true; and the sentence in which the second sentence ('George believes that Aristocles is a philosopher') serves as a complement is false. In order to determine the case clearly, we can use an argument formulated many years ago by Benson Mates (see Church 1954). Consider these two sentences:

- (\*) Anyone who believes that Plato is a philosopher, believes that Plato is a philosopher.
- (\*\*) Anyone who believes that Plato is a philosopher, believes that Aristocles is a philosopher.

Note that the truth value of sentence (\*\*) can be doubted (whether for legitimate reasons does not matter in the context of Mates' argument). Let us express these doubts:

- (\*\*)' Someone doubts that anyone who believes that Plato is a philosopher, believes that Aristocles is a philosopher.

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structure), (ii) solve the problem of the 'unity of the proposition' – that is why certain structures can constitute propositions (e.g. a structure comprised of Socrates and the property of being a philosopher) and others cannot (e.g. a structure comprised of Socrates and the function of negation).

Simultaneously, it is unlikely that someone doubts the truthfulness of sentence:

(\*)' Someone doubts that anyone who believes that Plato is a philosopher, believes that Plato is a philosopher.

However, the sentences (\*)' and (\*\*)' express the same propositions.

There is a number of answers to the argument above. We can follow Alonzo Church's suggestion and argue that (\*)' and (\*\*)' have the same truth value. Church used a translation-based argument to persuade the reader to adopt this thesis: if we translate sentences such as (\*\*)' into a language in which there is only one term for Plato – then we will simply get the equivalent (direct translation) of the sentence (\*)'. Church suggests that this proves that if we are considering the falsehood of sentence (\*\*)', what we in fact we are thinking of is the falsehood of its metalinguistic equivalent (of the following type: 'Anyone who believes that the person named «Plato» is a philosopher, believes that the person named «Aristocles» is a philosopher'). Of course, another answer to the argument above might be to claim that any two different sentences never express the same proposition, but then we would throw the baby out with the bathwater – in particular we would get rid of the completely nontrivial notion of *sentence synonymy*. It seems then that a follower of the linguistic theory has no choice but to follow Church's suggestion (and supplement it with Church's idea of *synonymous isomorphism*).

[b] *Accepting structural theory and postulate (W6) lets us explain the systematic character of our propositional attitudes.*

The argument based on systematic character of propositional attitudes relates to one of the most interesting features of our thinking – its non-atomic character. Generally speaking, the fact is that if we have a possibility of finding ourselves in a propositional mental state of a specific form, then we have a disposition to find ourselves in every achievable propositional state of an identical form. Hence, if my belief is that Warsaw is larger than Copenhagen, then I have the capability to form, or at least (in adequate circumstances) to entertain the false beliefs that Warsaw is larger than Warsaw, that Copenhagen is larger than Copenhagen, that Copenhagen is larger than Warsaw. Roughly speaking, if I hold a relational belief that  $aRb$ , then I have a disposition to hold beliefs that  $xYz$  – for every individual concept  $x, z$  and for every relational  $Y$  that I have a concept of (with an exception of categorial mistakes). Here, the linguistic analogy is evident. Therefore, if we assume that propositions have a linguistic structure and that they are the content of thought (W6), then we can explain the systematic character of propositional attitudes in an elegant way – it results from the grammatical properties of the

language of thought. Those grammatical properties of course have to be realized in dispositions to perform the appropriate syntactic operations.

[c] *The possibility to distinguish between rigid descriptions and directly referential expressions.*

David Kaplan pointed (1989: 493) to the noticeable difference between the two types of rigid designators: on the one hand, there are proper names and indexicals; on the other – *rigid* and definite descriptions. Although both types of expressions designate the same object in every possible world, only in the second case the object designated indirectly (so to speak) – that is, as one whose properties are indicated in the description. The structural theory of propositions which assumes (just like early Russell) that objects can be constituents of propositions, can describe that difference well. In case of sentences including expressions that are directly referential, we shall simply assume that the designated object (Mont Blanc with all its snow) is a constituent of a proposition, while in a sentence with rigid description, the proposition will be comprised not of the object but of a set of properties. Now, it is worth noting that – if we want to hold on to our distinction – *we do not have to* hold on to Russell's version of the theory of propositions. In turn, we can, for instance, assume that individual names have intensions (individual concepts), and keep the difference on the structural level by assuming that definite descriptions are not singular expressions but expressions that can be contextually eliminated. This is an important issue, since Kaplan's remarks are often (erroneously) interpreted as if he suggested that in order to adopt the distinction mentioned, we have to adopt Russell's version of structural theory.

#### 5.2.4. *Major internal problems*

In what follows, I will limit myself to the 'troubles' with linguistic theories. Hence, here I will focus on the issues that arise when a proposed relation between proposition and a sentence that expresses that proposition is just too close.

It is often noted that if propositions are to work as contents of propositional attitudes, then the linguistic framework is not credible as a theory to describe the contents of thoughts of subjects who do not have any linguistic competence. Some authors follow the suggestion of Frank Ramsey and go as far as to distinguish two senses of propositional constructions, such as 'thinks that,' 'believes that' etc. – and one of them is reserved strictly for organisms and cognitive systems capable of using a language. Should we agree with that, we would have to limit the postulate (W6) strictly to the propositional attitudes understood as mental states of the subjects of the latter type. I think this answer has few

benefits. If inferential models of learning and problem solving are in any way accurate, then, in relation to the fact that they adopt the notion of *propositional attitude*, there has to be a continuity between, for instance, a crow solving complex problems in order to obtain food and an adult *homo sapiens* resolving issues (that are sometimes similar). A good notion of the *propositional attitude content* should apply to both types of situations and not result in a demarcation line that's drawn *ad hoc*. It should be then proposed that a follower of the linguistic theory should completely abandon the postulate (W6) and preserve only the notion of the proposition understood as content of the sentence.

Independently from the difficulty to which we just pointed, one should observe that at least some versions the linguistic theory are inconsistent.<sup>35</sup> This may be illustrated by the following argument. Let us assume the existence of a set of all false propositions  $F = \{F_1, F_2, F_3, \dots\}$ . Let us mark the set of all its subsets in the standard way, as  $2^F$  (e.g.  $2^F = \{\emptyset, \{F_1\}, \{F_2\}, \{F_3\}, \dots\}$ ). We can assign a *false* sentence to each subset of set  $2^F$ , for instance in the following way:  $\emptyset \rightarrow 'F_1 \in \emptyset'$ ,  $\{F_1\} \rightarrow 'F_1 \notin \{F_1\}'$ ,  $\{F_2\} \rightarrow 'F_1 \in \{F_2\}'$  etc. (the main principle is as follows: to each set  $x$  belonging to  $2^F$  we assign a sentence claiming that  $F_n$  belongs to  $x$  as long as  $F_n$  does not belong to  $x$ , and a sentence claiming that  $F_n$  does not belong to  $x$ , as long as  $F_n$  belongs to  $x$ ). Of course, probably every structural theory of propositions has to assume that *the sentences we assigned to the subsets of set F express different propositions* – among other things, they *all* differ from each other with respect the second propositional constituent. This in turn means that there are at least as many false propositions as the number of elements of set  $2^F$  which is incompatible with Cantor's theorem: Hence, structural theory is *contradictory*. Note that the mentioned paradox is not the only one that can be formulated: the exact formalization of the Russell-Myhill antinomy requires premises characteristic for the structural theory of propositions (cf. e.g. Urquhart 2003). In order to leave that paradoxical situation behind, we can consider an old remedy: the branched theory of types (see, e.g., Kripke 2011a).<sup>36</sup> (interestingly, Russell was

35 The analysis is inspired by Patrick Grim's argument, which serves as a foundation of the construction described here – see Grim (1984). Cf. Ciecierski (2011). Only after its publication have I become acquainted with a previous review of King's book written by Harry Deutsch in which he formulates and assesses the situation similarly – see H. Deutsch, Review, from: J. King, *The Nature and Structure of Content*, 'Notre Dame Philosophical Reviews,' (2008), URL=<<http://ndpr.nd.edu/news/23524-the-nature-and-structure-of-content/>> [accessed 04 Aug 2015].

36 The basic idea of branched theory of types relies on expanding the object hierarchy (or, in our case, propositions) with a ban on impredicative definitions (that is defining

initially reluctant to accept that solution as he deemed it highly arbitrary when applied to propositions).

The final problem for the structural theories is connected to the postulate (W6). It is often noted that the conditions of equivalence of propositions assumed within structural theory imply the equivalence of contents of propositional attitudes when we encounter essential differences in behaviors, hence (as it is usually considered) differences in cognitive significance of equivalent contents. For instance, let us imagine that I am watching a situation on a monitor: a situation in which a pickpocket robs a certain person standing next to a monitor. If I am not aware of the fact that it is myself I am watching on the monitor, then I hold beliefs that have essentially different cognitive significance and different behavioral profile when I think that this person/he (I am pointing to the human viewed on the monitor) is being robbed, than when I believe that I am the one being robbed. Since there are reasons to claim that in the contexts indicated the *proposition stating that he is being robbed* and the *proposition that I am being robbed* are identical – then we either have to explain the difference in cognitive significance without referring to the notion of content, or we have to reject the postulate (W6) and accept the fact that arguments of propositional relations and contents of sentences are objects of different types.

## 6. Conclusion

Both theories discussed above can be interpreted in a procedural or operationalistic way. The idea of procedural or operationalistic theory of contents has been considered by philosophers at least since the 1960s and 1970s, when it was first expressed in works of Tichy (1988), Woods, Johnson-Laird (1977: 189-214), and Suppes (1980) (see Wilks 1994). In many cases, the procedural approach is an attempt to respond to the objections made from time to time against the notion of *intension of an expression*. Some authors (primarily Quine) demanded that every semantic notion have a pragmatic equivalent in linguistic theory – a notion referring to users of a given language and their behavior, which could be then used in adequately designed empirical tests. Simultaneously, they claimed that the notion of *intension (content)* of an expression, contrary to the notion of its extension, does not have such a pragmatic equivalent. One of the possible replies to that objection is to defend the view that intensions are essentially

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objects in terms of collections to which those objects belong). Hence, for instance, false sentences from our list will express sentences of the higher type than propositions belonging to the set F.

closely related to linguistically defined procedures of *identification* (in the case of nominal expressions), *categorization* (in the case of predicates) as well as to *verification*, or *identifying the state of affairs* (in the case of sentences), and that the understanding of a given expression is limited to mastering a certain procedure assigned to that expression by a given language. In turn, the mastering of a procedure is a disposition to behave in a certain manner in adequate circumstances, for example confirming or denying the sentence in the face of certain information, solving problems which require understanding the sense of the sentence, etc. Of course, we have to emphasize here that the procedural approach is not a sentence content theory but rather a theory of understanding sentences. Indeed, when thinking of postulate (W3), we are willing to acknowledge that if we do not understand the sentence, then we have no way of verifying its truth value. However, this is a *result* of not knowing the sentence's content (as pointed out by Ingarden decades ago: in order to know the method of verifying the sentence, first we have to know what the content of the sentence is).

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