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Directival theory of meaning as a theory of narrow content

1. Directival theory of meaning explained

Directival theory of meaning was developed by Kazimierz Ajdukiewicz in two papers: *O znaczeniu wyrażeń (On The Meaning Of Expressions)[1]* and *Sprache und Sinn (Language and Meaning).[2]* Although only the latter paper presents the full-blown version of the theory, it is important to remember also about the former as it contains some preliminary considerations which shed much needed light on the assumptions which are crucial for understanding the theory.[3]

It is worth starting with the central intuition which motivated DTM. It is so ubiquitous and common that it could be summed up in a popular slogan: "People don't argue over semantics". What this means is that sometimes the argument between two sides reaches a point where the sides start to suspect that the disagreement is merely verbal.

What happens next is interesting because of two reasons. The first interesting thing is that (for most of the time) people know how to test their suspicion. Contrary to what might seem to be the obvious solution they do not expect their interlocutors to provide a full definition of the problematic term. Instead, they try to detect the suspected verbal difference by asking a few key questions about the term. So, for example, if I was to discover if my interlocutor uses the term "idea" the same way I do, I may start by asking if "ideas" are mental entities. If the answer indicates a difference in usage, it might be enough to decide that the dispute was only verbal, that she meant something different – e.g. platonic ideas.

The second interesting thing is that the moment the sides discover that the difference was only verbal the disagreement disappears.[4] Most of the time people don't have the motivation to fight with conventions because there is no right or wrong here and some of the conventions are mandatory: either you accept the convention and stay with the community that supports it, or you don't and you

are automatically excluded from that community. Starting with these common sense observations Ajdukiewicz presumed that for every term there are mandatory conventions and that they are adhered to in the act of confirming certain sentences. When someone knows the meaning of a given term, then when asked, she has to confirm certain sentences this term figures in. And if she refuses to do so, she is excluded from the community of users of this particular term. Naturally, the model examples of these mandatory conventions are analytic sentences. For example, if you refuse to confirm a sentence "A circle is a figure" then you will be denied the knowledge of the meaning of the term "a circle"[5] and once it is revealed that there is a (admittedly unspecified) number of terms you don't know the meaning of, you won't be treated as an English speaking person.

The novel idea Ajdukiewicz adds to these observations is his insistence that it should work both ways - if you accept a certain set of sentences which contain a given term, you can be said to know its meaning. There is nothing more to it - to know the meaning of a word is to have a disposition to confirm its meaning directives (as the specified set of obligatory sentences are to be called). So, how do these meaning directives look like? In general a directive can be presented as a sentence of the form:

If u is a user of a language L and u is in a situation S then u confirms a sentence p.

It is easy to see that the normativity of meaning is built into the directives from the start. Using a simple rule of transposition we can derive a following consequence: if someone does not confirm a sentence p than either she is not in the situation S or she is not a speaker of the language L. It means that if the user allows herself to disregard language directives she is automatically excluded from a given speaking community. One thing to keep in mind is that what we talk about is the act of confirmation of a sentence and not the act of utterance. It is worth pointing this difference out because ignoring it may easily lead to a significant misinterpretation. The theory does not require the user to produce utterances automatically whenever she is in a given situation but only to react accordingly

whenever she is asked to confirm the sentence *p* in a proper situation. Again, analytic sentences are a good example here. We are not expected to walk around and whisper them to ourselves all the time. What we are expected instead is a constant, enduring disposition to confirm them when asked to.

We can now group the meaning directives into three sets depending on the type of situation *S*.

Table 1 – Types of meaning directives

Directive type	*Axiomatic*	*Inferential*	*Empirical*
Character of S	Anything	Set of sentences	Physical stimulus
Example of S		"*p* implies *q*" "*p* obtains"	touching of a nerve
Sentence to confirm	"*A* is identical to *A*"	"*q* obtains"	"It hurts!"

Now, let me characterize the types of directives indicated above.

In the case of axiomatic directives there are no requirements specified as to what the situation S has to be. It can be any possible stimulus - verbal, physical or a combination of both. There can be no stimulus at all. The point here is that in each and every situation the user is expected to confirm some of the sentences of her language (such as the identity statement used in the table).

The inferential directives seem to be an another intuitive example of the idea of obligatory rules: after all, this is how most of us learn logic - we are told that whenever we confirm a given sentence we have to confirm another, subsequent sentence. If we do not follow those instructions we will not master logic because it is exactly what mastering logic boils down to. This normative aspect of logic works exactly the same way as it is supposed to work in the DTM.

Last but not least, we have the empirical directives. It is important to note that the way I explain them here presents the most significant departure from Ajdukiewicz's version. As can be seen in the Table 1 I described the situation S which precedes the confirmation of the sentence p as a physical stimuli. Contrary to this, Ajdukiewicz referred to mental states rather than to their physical

causes. But despite the psychological language that he was using most of his examples of empirical directives adhere to physical stimuli and not of their mental correlates. Case in point: in the example I used in the table above Ajdukiewicz talks about the expected confirmation of the sentence "It hurts!" when a dentist touches the nerve of a patient's tooth and not about the feeling of pain.[6]

There is an additional difficulty that most of the examples of empirical stimuli lead to. If I am presented with an object and asked to confirm the sentence "This object is red", I may refrain from doing so because I believe that the lighting in the room is so different from normal lighting that I am no longer sure of the object's color. It complicates matters because we have to expand the directive by a requirement that the user has a belief that the situation (understood as a state of the environment and the perception apparatus) is typical or normal. The addition of beliefs introduces a hybrid category of directives, a mix between the empirical and the inferential ones, one part of the situation S being a sentence expressing the belief and the other being a stimulus. Ajdukiewicz mentions this complication but doesn't elaborate on it . I too am going to skip it in the present exposition of the DTM.

So, how is the notion of meaning to be derived from these three types of directives? Let us assume that we created a list of directives for every term of the language. Once we have it, the next step would be to get the notion of *synonymy*. The intuitive formulation of the relation between the meaning directives and synonymy is this: terms are synonymous when the meaning directives describe them identically. To present the notion of synonymy in a less metaphoric fashion we have to use an example of a very simple language. Let's say that it contains only the following axiomatic directives:[7]

P(a), S(c), R(c), R(d), Q(b), P(b), P(c), Q(a)

Now, focus on terms *a* and *b*. The interesting thing about them is that if you switch their places - replace every instance of *a* with *b* and *vice versa* you will end up with the same list of directives – the only difference being the order of the directives:

P(b), S(c), R(c), R(d), Q(a), P(a), P(c), Q(b)

Using this observation Ajdukiewicz proposes to use this operation of systematic simultaneous replacement of terms to define the notion of synonymy:

Terms *a* and *b* are **synonymous** iff they can be simultaneously replaced in all respective meaning directives without changing the sum of all the meaning directives of the language.

The obvious next step is to use abstraction to obtain the definition of meaning:

The **meaning of a term** is the set of all the terms which are synonymous with it.

It is easy to see that in most cases this definition yields rather disappointing results: in the case of terms which are not synonymous with any other term their meaning turns out to be a singleton consisting only of themselves. To counter this, Ajdukiewicz introduces a new (and at the time rather novel) idea: he proposes to define meaning by appealing to notion of *translation*. To present it, we will use another example of a simple language, let us call it *L*. Let *L* contain the following terms: two one-place predicates - $P(x), Q(x)$; three constants - a,b,c; one zero-place predicate (a sentential constant) Z. Additionally we introduce three symbols which signify physical stimuli: α, β, γ. It is important to stress that these symbols are not parts of *L*. They symbolize the extra-linguistic element in empirical directives. Now assume that *L* contains the following directives:

Axiomatic directives:

1. $P(a)$ [8]

2. $P(a)$ & $Q(b)$

Inferential directives:

1. $P(a) \models Q(b)$ [9]

2. $P(a)$ & $Q(b) \models Q(c)$

3. $Q(b) \models Z$

Empirical directives:

1. α; Z^{10}

2. β; Q(b)

3. γ; Z

Having all this we are ready to build something Ajdukiewicz calls a *language matrix*.[11] A language matrix is divided into three sections corresponding to three types of directives. In our example they are designated by numerals 1, 2 and 3 in the first column of the table. Horizontally the table is divided into two parts indicating two parts of a directive: first part (designated by the Roman numeral I) contains the situation specified by the directive (or the lack of a specified situation in the case of axiomatic directives), the second part (designated by the Roman numeral II) contains the sentence which the directive requires to be confirmed. Every sentence which is put into a language matrix is divided into its constituent parts using a following procedure: the first cell contains the sentence itself, the next cell contains its main connective or a predicate (in case of an atomic sentence), the next cell contains the first argument of the connective (or an argument of the predicate). Then the same procedure applies to the first argument - we put its main connective first, then its first argument and so on. When we achieve the level of atomic parts we move on to the second argument of the main connective of the sentence we started with. The pattern is repeated for as long as there is nothing more to decompose. If we applied this procedure to our simple language we would end up with the following table (note the extra-linguistic part in the left bottom corner).

Table 2 – The language matrix of *L*

	I								II							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1.1									P(a)	P	a					
1.2									P(a) & Q(b)	&	P(a)	P	a	Q(b)	Q	b
2.1	P(a)	P	a						Q(b)	Q	b					
2.2	P(a) & Q(b)	&	P(a)	P	a	Q(b)	Q	b	Q(c)	Q	c					
2.3	Q(b)	Q	b						Z							
3.1	A								Z							
3.2	B								Q(b)	Q	b					
3.3	Γ								Z							

The main point about a language matrix is that it enables us to extract the structure of the language and abstract away from the actual expressions it uses. We could do that in a variety of ways but I find it the easiest to simply use some sort of visual indication. To extract the structure we are interested in we simply replace the symbols with colors, let's call it an *expressionless language matrix*.

Table 3 – The semantic structure of *L* (expressionless language matrix)

	I								II							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1.1									dark red	red	green					
1.2									yellow	green	dark red	red	green	orange	light blue	blue
2.1	dark red	red	green						orange	light blue	blue					
2.2	yellow	green	dark red	red	green	orange	light blue	blue	tan	light blue	magenta					
2.3	orange	light blue	blue						purple							
3.1	A								purple							
3.2	B								orange	light blue	blue					
3.3	Γ								purple							

Now you could fill this table anew using the following rules:

(1) You don't change the α, β, γ records as they are extra-linguistic elements of the table.

(2) You do not fill the white records.

(3) Whenever you put something in the record you have to repeat the same symbol in every record with the same color.

Every table obtained this way represents a language which is *translatable* to the language we started with. This notion of translatability enables Ajdukiewicz to give a new definition of meaning:

(D1) The **meaning of a term *t* in the language *L*** is the property it shares with any term *x* from some translatable language *M* such that *x* is a translation of *t*.

At first it may sound like we were only dodging the problem, because the really interesting question is - what property is that? Fortunately, at this point we are able to answer also this, more interesting, question. Let us revise our definition.

(D2) The **meaning of a term *t* in the language *L*** is an ordered pair <SL, P> consisting of the structure of *L* (SL) and the set of places *t* occupies in this structure (P).[12]

As you saw, the structure can be presented in a form of a language matrix and the set of places a given term occupies can be as well shown visually. So, for example, the meaning of the term Q(b) from our table can be presented via the following diagram.[13]
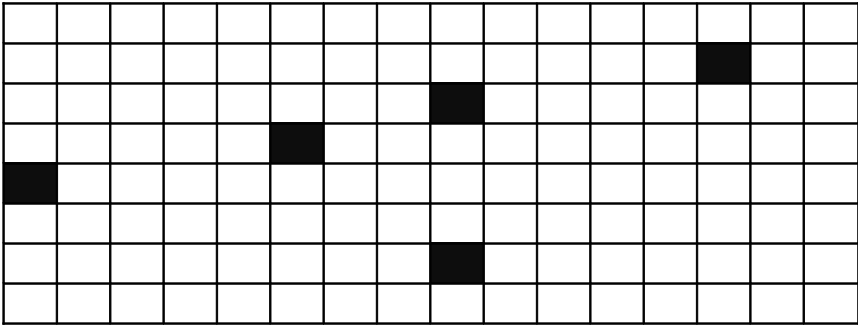
It shows that the DTM realizes the noble goal of a reductive, syntactic definition of meaning - the meaning can be literally represented as a shape, which makes it easy to handle mechanically. The fact that what we started with are acts of confirmation of sentences adds a dash of pragmatics to the definition. Because of this, the DTM could not be called a purely syntactic theory. The fact remains, though, that it is a theory which in no part uses any semantic notion. It is an idea entertained by many, but I guess that it is best summed up by Chomsky:

It is possible that natural language has only syntax and pragmatics; it has a "semantics" only in the sense of "the study of how this instrument, whose formal structure and potentialities of expression are the subject of syntactic investigation is actually put to use in a speech community".

It is important to realize that even though the language matrix contains the extra-linguistic part, the theory does not stipulate that any of the expressions present in the matrix refer to these extra-linguistic elements. Moreover, even if the theory deals with confirmation of sentences, in no part does it assume the sentences to be true. You might assume that they are held to be true by the users but it would be an additional assumption the theory does not depend on.

2. Directival theory of meaning challenged.

Ironically, this attractive feature of the DTM (it's independence from reference) is exactly what killed it. It happened because of a very simple example Alfred Tarski confronted Ajdukiewicz with (he did it in a conversation and it was reported many years later in Ajdukiewicz 1978c). Consider a very simple language of predicate logic (with identity) and add to it two new axiomatic directives:

$A \neq B$

$B \neq A$

A and B are extra-logical constants which appear only in these very directives. The problem is that the two terms are mutually interchangeable in all the meaning directives of the language (because there are only two such directives and you can replace them mutually in them). On the other hand, we have to assume that both terms do not refer to the same object, because it is precisely how we normally interpret the negation of the identity sign. It means that the DTM allows two terms to have the same meaning but a different reference and it seems that we don't have any means within the theory to block this unintuitive result because the theory doesn't say anything about the reference of the terms.[14]

It turns out that in spite of deliberately ignoring all the semantic notions Ajdukiewicz still wanted his theory to be Fregean - the meaning of the term was supposed to determine its reference. It was so obvious to him that he didn't even try to argument for it and remarked only that such a consequence was unacceptable . Fortunately, it is a sentiment we do not have to share today as there

are at least three ways out of the trouble Tarski's example puts us in - ways which do not force us to abandon the reductive , non-semantic aspect of the DTM.

First of all, we can say that the objection works only because the example language does not contain any empirical directives. If it did, they would have differentiated the terms A and B. And in case of uninterpreted languages there is no problem of reference anyway. This is the solution suggested by Ajdukiewicz himself . The question of whether this solution is effective is highly debatable, though (see section 3).

Second thing we can modify is the simultaneous interchangeability requirement of the synonymy relation. It has been shown in that we can modify this requirement and demand only that the terms A and B can be considered synonymous if and only if it is possible to replace A with B and then B with A (but not simultaneously) without changing the character of the directive we applied this procedure to. This means that if something has been an axiomatic directive, it remains an axiomatic directive after the replacement of the term (similarly for the other two types of directives). This solution has some disadvantages, but they won't be discussed here.[15]

The third, perhaps the most interesting option is that we could simply accept and embrace this surprising consequence of the theory – especially that it is not so surprising anymore. After all, this is what Putnam's 'Twin Earth' thought experiment was set to do - it showed us that we do not have to hold to Fregean intuitions about the relation between meaning and reference . Couldn't we simply decide that a sensible strategy for a theory of meaning is to contain two parallel theories - a theory of reference and a separate theory of meaning which answers the questions about synonymy, translatability and meaningfulness of expressions?

Unfortunately the DTM has more issues than that. Specifically, there are two problematic theses it holds (one of them being an assumption, the other a consequence) which we have to analyze if the theory is to be useful for contemporary philosophers. We will refer to them later, so it might be convenient to label them:

(T1) The meaning of every word in the language changes whenever a new word is added to the vocabulary.

(T2) Syntaxes of all translatable languages have to be perfectly compatible.

(T1) is a direct consequence of definition (D2) presented above. If the meaning of a particular expression is the ordered pair of a language matrix and a set of places the expression figures in, then the meaning changes whenever the matrix changes, and the matrix changes whenever a new expression is added. It is so because the new expression has to have a set of new directives which regulate its usage and these directives have to be added to the language matrix.

(T2) follows from the way the matrices are built and from the introduced notion of translatability. Whenever a given term A is to be a translation of some term B, both terms have to figure in the same places in identical language matrices. Such a strict notion of translatability doesn't allow the translatable terms to differ syntactically. To see why it is so let's consider the opposite situation – let us say that we found two expressions which figure in exactly the same places of their respective language matrices but one of them is atomic and the other is not. There would have to be a place in the second matrix where the second expression was decomposed into its atomic constituents but there would be no such place in the first matrix (because there was nothing to decompose there). But if the matrices are different then the expressions are by definition not translatable.

It is important to stress that neither of these claims presents serious challenge for the theory – they are simply counterintuitive. Nonetheless, I believe that it is worth to point them out and analyze ways of dealing with them because, as I hope to show, even small modifications of these claims produce interesting and useful variants of the theory.

First, it will be useful to analyze Ajdukiewicz's argument in support of thesis (T1). [16] He deals with it by introducing two additional requirements which turn out to be rather demanding: he decides that the DTM applies only to those languages which are *coherent* and *saturated*.

A given language is **coherent** if every expression it contains is connected to every other expression (directly or indirectly) *via* meaning directives.[17]

In other words - if the language in question is coherent, we should be able to pick any expression and 'reach' any other expression by 'jumping' from a meaning directive to a meaning directive.

A language is **saturated** if for every new expression which is to be introduced to it, it already contains a term synonymous with it.

In other words – a saturated language is a language which already contains all possible meanings there are. Different languages are understood only as different sets of labels for one and the same set of meanings and this optimal set of meanings contains everything that can be labeled. In a nutshell, every language that carves reality in a proper way has the same deep semantic structure. Note that this surprisingly strong requirement can be interpreted as an expression of a very old intuition which can be tracked back as far as Plato's Cratylus .[18]

The bad news is that Ajdukiewicz's solution creates bigger problems than the problem it tries to solve. The second requirement is simply much too strong - there are no existing saturated languages and, what is worse, we could not create a closed language even if we wanted to (I don't have the space to show this as the details are rather technical).

Last but not least – let's get back to the idea of excluding the user who did not follow the directive from the language speaking community. Needless to say it is an idealization. First of all, it seems that Ajdukiewicz believed meaning directives to be immune to context – they were supposed to be the ultimate test of linguistic capabilities. He disregarded the problem by saying that the person has to be "talking seriously" for the directives to work as intended. But the problem persists – meaning directives do not differentiate between users who don't know the language, people who are only joking or constant liars. This is a serious issue to be addressed. The solution I suggested elsewhere is that instead of talking about the intentions of the speakers (deciding whether they are "serious" or not) we have to observe if they are *taken seriously* by their interlocutors. The important difference between

"being serious" and "being taken seriously" is that only the second property is observable. If you ignore a meaning directive, no actual belief is ascribed to you – we may not know if you do not know the word, or maybe if you are joking or lying, but we know for sure that you do not have this particular belief.

3. **Directival theory of meaning as a theory of narrow content. [This part will be expanded on during the workshop]**

I hope that at this point it is obvious to the reader that the DTM can be used as a theory of narrow content. Let us use the example of Sellars-Block account[19] because the similarity between it and the DTM is striking. Sellars introduced four types of language rules, depending on whether the character of the stimulus provided for the user and her response is linguistic or not . There are three obvious possibilities:

1) Extra-linguistic stimulus – linguistic response

2) Linguistic stimulus – linguistic response

3) Linguistic stimulus – extra-linguistic response

There is also a fourth, less obvious option:

4) Any stimulus – linguistic response.[20]

It is not hard to see that (1) can be understood as empirical directives, (2) as inferential directives and (4) as axiomatic directives. There is nothing similar to (3) in the DTM but what prevents us from adding a new type of directive to the theory?[21] This new category of directives could be called *imperative directives* – they instruct the speaker to perform a certain action whenever she acknowledges a certain sentence by confirming it. A good example of such a directive is the command

"stop!". If you acknowledge it but continue to move you could be said not to understand the command.

Now, the idea Block adds to the mix is that language described this way can be understood as a network of inputs and outputs which in turn enables us to define the narrow content of a term (or its 'conceptual role', as Block prefers to call it) as a role the term plays in this computational structure . The problem with this account is that, while attractive, it does not show us how exactly a set of user actions (sentence confirmations) translates into a network of interrelated expressions of the language. Is the network just a set of beliefs connected by their inferential roles? If so, which ones – all of them? Maybe they should be decomposed somehow or perhaps even translated into language of thought? It is precisely what language matrices can help us with. They start with a set of pragmatic phenomena and then break it down into syntactic constituents of expressions enabling us to see the mechanism that underlies the phenomenon of narrow content.

Notes

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1The original Polish version has been published in and can also be found in the English translation can be found in .

2 The original paper can be found in , Polish translation can be found in , English translation can be found in .

3 Some researchers consider both papers to be two different versions of the theory

4   Or is vastly diminished. The point here is that it is significantly easier to achieve agreement, even if we had different views on which of the available dictionaries is to be treated as obligatory.

5   Of course you might as well be denied the knowledge of the meaning of the word "a figure" but it will be tested the same way - you will be asked to accept some other sentences the term "a figure" figures in.

6The other important reason for preferring physical stimuli over mental states is that it will make our task in section 3 much easier.

7   That these are axiomatic directives can be easily deduced from their syntactic structure. Only axiomatic directives can be presented as a single sentence.

8   Understood as: "in every situation confirm the sentence P(a)" and so on.

9   Understood as: "If you confirm the sentence P(a) you have to confirm the sentence Q(b)" and so on.

10 Understood as "In this situation (when the situation is α) confirm the sentence Z" and so on (I use indexical term to stress the extra-linguistic aspect of α).

11 This part is a substantially modified version of the original example. First of all, I use a modern predicate logic notation, secondly, I present the matrices in a more visual way which I believe makes the whole idea much easier to grasp.

12 The relation of synonymy can still be defined using the notion of mutual exchangeability in meaning directives, just like we did on page 6.

13 To stress the possibility of representing the meaning of the term visually I omitted the extra-linguistic parts of the table. It is possible whenever a language matrix is fixed.

14 It is worth noting that Tarski's example is very similar in spirit to Fodor and Lepore's objection against functional role semantics. As Fodor and Lepore rightly argue the price hybrid theories pay for their flexibility is that there is nothing that prevents a given sentence to have the inferential role of "4 is a prime number" but the truth conditions of "water is greenish" (as there is no necessary connection between inferential role and truth conditions).

15 The results in question has been published only recently by and . Unfortunately both articles are available only in Polish.

16 It seems that (T2) was something he did not realize.

17 Two expressions are directly connected if they figure together in a single meaning directive. Expressions A and B are indirectly connected if they are not directly connected but there exists an expression C such that A and B are directly connected to C.

18 Needless to say, the fact that an idea happens to have an ancient origin does not automatically make it a good idea.

19 This account is neatly summarized in

20 Sellar's calls this type of rule a "free rule".

21 In fact adding new directive types is a very natural way of extending the theory and deserves further inquiry.