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Truth as Consistent Assertion

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Abstract: This paper presents four key results in the philosophy of language. Firstly, it distinguishes between *partial* and *consistent* assertion of a sentence, and introduces the concept of an *equivocal* sentence, which is both partially asserted and partially denied. Secondly, it proposes a novel definition of truth, stating that *a true sentence is one that is consistently asserted*. This definition avoids the Liar paradox, does not restrict classical logic, and applies to declarative sentences in the language used by any particular person. Thirdly, the paper introduces an epistemic model of language, called *assertional language*, which formalizes the definition of truth. Finally, it provides an argument for the falsity of so-called Liar sentences. The proposed definition of truth can be viewed as a formal account of the correspondence theory. The epistemic model is a powerful concept that allows for combining different languages in a meaningful way. This model is uniquely capable of reflecting on epistemic inconsistencies, such as logical paradoxes, in a consistent manner and without resorting to non-classical solutions.

Keywords: ajdukiewicz, assertion, correspondence theory, epistemic model, liar paradox, natural language, pattern, tarski, theories of truth

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1. Introduction

So much has been written about the notion of truth and the importance we attach to it in our daily lives, yet our *common* understanding of it remains poor. Grasping all the major accounts of truth considered today is not a simple task, and even if one eventually succeeds, they are faced with a choice between the so-called 'substantial' and 'deflationary' accounts. One may argue whether the former actually provide any *substantial* information about truth, and whether the latter provide any information at all. There is an urgent need for our societies to find a common ground in terms of an account of truth, especially in light of pervasive relativism, or the 'Who is to say?' and 'That's just your opinion' mantras, as Blackburn put it (Blackburn, 2005).

With this article, I aim to contribute to changing this pessimistic picture. I aim to provide a sketch of a theory of truth that is intuitive and straightforward to apply. To this end, I will draw upon some lesser-known ideas of the Polish analytic philosopher Kazimierz Ajdukiewicz.

2. Assertional Rules

Ajdukiewicz, in (1931) and (1934), developed theories of meaning based on what he called 'language directives', 'meaning directives', or 'meaning rules'.[1] These rules establish a relationship between the forms of language sentences on the one hand and specific circumstances on the other. They are meant to reflect the fact that the language user, in certain circumstances, feels motivated to assert sentences of a certain form.

Ajdukiewicz specified three types of meaning rules, with the reservation that the list may not be exhaustive:

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[1] These are my translations of: Polish 'dyrektywy języka' (1985, p. 129); Polish 'dyrektywy znaczeniowe' (1985, p. 149); German 'Regeln des Sinns' and 'Sinnregeln' (1934, p. 111). For an English edition of the referenced papers, see Giedymin (1978).

1. An *empirical* rule makes the assertion of a sentence dependent on empirical data. For example: if an English speaker feels pain, the speaker asserts the sentence 'it hurts'.[2] Another example: if an English speaker sees a fire, the speaker asserts the sentence 'fire!'. It is worth noting that the asserted sentence need not be a grammatically complete declarative sentence, but must be a sentence in the logical sense (cf. 1985, pp. 126, 148–149).
2. A *deductive* rule makes the assertion of a sentence dependent on the assertion of other sentences. For example: if '2' has been defined in the language of arithmetic as '1 + 1', and a user of this language asserts a sentence S including '2', the user asserts the sentence built by replacing the '2' in S with '1 + 1'.
3. An *axiomatic* rule makes the assertion of a sentence independent of any circumstances, i.e., the sentence is to be unconditionally asserted. For example, an English speaker unconditionally asserts every sentence of the form 'every A is A'.

The meaning rules have interesting characteristics (cf. 1985, pp. 129–130, 149–154):

i. They do not determine nor establish the *truth* conditions of a sentence, but only the *assertion* conditions.
ii. They are closely related to the meaning of a sentence, but they are *not* the meaning itself.
iii. The assertion of sentences according to the meaning rules 'is marked by strict obviousness and irrevocable decisiveness'[3] (because of that, it is not possible to indicate meaning rules for every sentence of a natural language).
iv. Together with the vocabulary and syntax rules, they co-define the language. If someone does not follow the meaning rules of a given language, they cannot be said to speak that language.
v. The user of a language does not have to *know* the meaning rules of that language, they just have to *follow* them.

The features i. and ii. make the meaning rules a suitable basis for defining truth for a given language, as they seem to be a simple, low-level concept.

From now on, I will modify the concept of meaning rules to suit the task of defining truth for a natural language spoken by any particular person. To avoid confusion with Ajdukiewicz's original concept, I will rename it 'assertional rules'.

We can allow assertional rules to indicate not only the *assertion* conditions of a sentence, but also its *denial* conditions. Additionally, we would like assertional rules to be indicated for any sentence of a natural language in any context. When no decisive conditions can be found for the assertion or denial of a given sentence—as feature iii. suggests—then we will stipulate that the assertional rules governing assertion and denial of that sentence are *inconsistent*.

3. Partial Assertion and Consistent Assertion

Let us consider an individual who believes that eating meat is morally neutral, neither right nor wrong. However, they are vulnerable to the argument that 'Eating meat causes suffering to innocent sentient beings, therefore eating meat is morally wrong'. As a result, the individual tends to *deny* the sentence 'Eating meat is morally wrong' most of the time, but when exposed to the argument that supports this sentence and that they are unable to refute, they are somewhat motivated to *assert* it. In this scenario, their attitude can be described as ambivalent, as they are motivated to both deny and assert the sentence 'Eating meat is morally wrong', albeit for different reasons.

To model this ambivalent attitude using assertional rules, we can postulate the presence of two such rules within the individual's language. The first rule dictates denying the sentence 'Eating meat is

[2] The examples of meaning rules I provide are somewhat simplified. The original examples given by Ajdukiewicz refer to a kind of *disposition* or *readiness* to assert a sentence in certain circumstances (1985, pp. 124–129, 153).

[3] Originally: 'Uznawanie zdań, przebiegające według dyrektyw znaczeniowych, odznacza się ścisłą oczywistością i nieodwołalną stanowczością' (1985, p. 154).

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morally wrong' irrespective of context (or in all contexts), while the second requires its assertion under specific circumstances, namely when the individual is directly presented with the aforementioned ethical argument. Consequently, in the context of being presented with the ethical argument, the individual is subject to two inconsistent rules. To describe such a condition in a generic manner, we would say the individual *partially asserts* and *partially denies* the sentence 'Eating meat is morally wrong' in the given context.

If an individual partially asserts a sentence without partially denying it in a given context, we would say they *consistently assert* it. Conversely, if they partially deny a sentence without partially asserting it, we would say they *consistently deny* it. A sentence that is both partially asserted and partially denied in a given context will be called *equivocal* in that context.

A single assertional rule, responsible either for assertion or denial of a sentence, only determines *partial* assertion or denial of that sentence. It is the combination of *all* assertional rules related to a sentence that determines whether assertion or denial of that sentence, in a given context, is consistent or not.

4. Tarski's Strive for Consistency

Alfred Tarski, in (1935), proposed a general scheme that represents the necessary and sufficient conditions for a sentence to be true. The sentences that instantiate this scheme are referred to as 'T-sentences' or 'unrestricted Tarski-biconditionals' (Kirkham, 1992; Horsten, 2011).[4] A commonly used version of the scheme, sometimes called the 'Tarski schema' (Field, 2008), although slightly different from Tarski's original proposal, is:

'p' is true if and only if p, (Tarski Scheme)

where the variable '*p*' ranges through all sentences in a given language, i.e. the language for which we are defining the truth predicate.[5] For the English sentence: 'Snow is white', the corresponding T-sentence would be: '"Snow is white" is true if and only if snow is white'.

Tarski believed it was impossible to give a correct definition of the truth predicate for everyday language due to the latter's inherent inconsistency (Corcoran, 1983, pp. 164–165). This inconsistency is demonstrated by the existence of the so-called Liar sentence:

LS is not true. (LS)

If we consider LS *true*, we are asserting that LS is not true, which motivates us to consider it *not true*. Conversely, if we consider it *not true*, we are denying that LS is not true, thereby motivating ourselves to consider it *true*. The ambiguities involved in the logical analysis of LS are referred to as the Liar paradox. LS is an example of an equivocal sentence, but expressing this fact unequivocally is not straightforward. Later I provide a special metalanguage that will allow us to do so.

Tarski's approach to addressing the inconsistency introduced by the Liar sentence and other similar paradoxical sentences was to make it impossible to formulate them. However, as Tarski could not ban everyday language from creating such sentences, he concluded that providing a consistent definition of the truth predicate for everyday language was not possible. Instead, he focused his efforts on devising consistent definitions for formal languages.

When the Tarski Scheme is added to the inference rules of a formal language, a truth predicate must already be part of the language to enable the construction of sentences of the form '*x* is true'

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4 The 'T' in 'T-sentence' stands for 'truth' rather than for 'Tarski'.

5 The '"*p*"' in the Tarski Scheme can be straightforwardly interpreted as the quotation-mark name of the lower-case letter '*p*'—rather than the quotation-mark name of any *sentence* in the range of the variable '*p*', as it is here intended to be. To avoid such a misinterpretation, corner quotes can be used instead of single quotes (cf. Smith, 2020, p. 99).

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and 'x is not true', where 'x' represents a name of a sentence. Unfortunately, this makes it possible to create LS in the language. When the scheme is applied to LS, it proves the following self-contradictory biconditional:

$$\textit{LS is true if and only if LS is not true.} \qquad (\mathrm{TS}_{\mathrm{LS}})$$

Therefore, the use of the scheme introduces inconsistency to the language.[6]

To counter the threat of such inconsistency in formal languages, Tarski restricted the scheme by differentiating between the metalanguage and the object language (Corcoran, 1983, pp. 167, 187–188). The restricted version of the scheme employs a restricted truth predicate, which can only be used in the metalanguage and can only be applied to the sentences of the object language. The Liar sentence, as well as other paradoxical sentences that mix up the two languages, cannot be formulated in either of them. As a result, the restricted scheme cannot be applied to the Liar sentence and is safe from introducing the Liar paradox to the language.

5. Giving up on the Tarski Scheme

When appropriately restricted, the Tarski Scheme may be effective for *formal* languages. However, these restrictions do not apply to *everyday* language. The primary critique claims that self-referential sentences are not rare in everyday language. Therefore, the prohibition of a specific class of such sentences, namely those that ascribe truth or falsity to themselves, appears unjustified (Beall et al., 2018, p. 69).

It seems that among logicians and philosophers of language, there is a widespread belief that, although paradoxical, sentences like the Liar sentence have a rightful place in everyday language. However, their paradoxical consequences are a different matter: while the Liar *sentence* is acceptable, the Liar *paradox* is not so welcome. To address this issue, various solutions have been put forward, as listed by Field (2008) in his exploration of approaches to the Liar paradox (p. 117). If we choose not to exclude the Liar sentence from everyday language, we are faced with two options: either to restrict some laws of classical logic or to abandon, at least in part, the Tarski Scheme.

Some scholars contend that classical logic cannot fully govern everyday language. This view is supported by the fact that two widely recognized formal accounts of truth, which allow for the creation of Liar sentences, are not entirely classical (Kripke, 1975; Gupta & Belnap, 1993).[7] Beall (2007) openly acknowledges this: 'We know that, due to paradoxical sentences, there's no truth predicate in, and for, our "real language" if our real language is fully classical' (p. 8).

In this paper, however, I explore an alternative option that seeks to *preserve* classical logic in everyday language. The Tarski Scheme does not guarantee consistency within the set of true sentences and, more concerning, it requires accepting certain equivocal sentences as true. Given these shortcomings, it appears reasonable to abandon the Tarski Scheme in favor of preserving classical logic.

The next step is to explicitly define a true sentence as one that is *consistently* asserted. Consequently, a false sentence will be one that is at least partially denied. To take into account contexts, which are crucial for assertional rules, the definition of a true sentence will be context-relative: in a given language, a sentence is considered true with respect to a given context when it is consistently asserted in that context.

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6 For a detailed analysis of the impact the Liar sentence has on a abstract formal language that incorporates the Tarski Scheme, see Beall et al. (2018, pp. 16–22).

7 Under Gupta and Belnap's *revision theory*, for instance, the truth valuation of the Liar sentence involves infinite switching between true and false.

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6. Assertional Language

I will now introduce the concept of an epistemic model of language, called the 'assertional language'. The purpose of this model is to provide a formal framework for the analysis of various languages in their epistemic aspect. It will also serve as a tool to formalize the definition of truth.

The idea of assertional language is clear-cut, as it enables the testing of its sentences—or sentence-shapes, more specifically—against different contexts. The result of such a test is called the 'effective assertional valuation' (EAV) of the given sentence-shape in relation to the given context. An EAV is always a set of *assertional values*, such as assertion or denial, available in the language. If we model a language where only these two assertional values are available, an effective assertional valuation can be a singleton of assertion (for consistently asserted sentence-shapes), a singleton of denial (for consistently denied sentence-shapes), a set containing both assertion and denial (for equivocal sentence-shapes), or an empty set.[8]

Definition 1 (Assertional Language)**.** *An* assertional language *is defined as a tuple* (V, P, S, W, E)*, where:*

- V *is a set of* assertional values *that contains at least two featured elements, referred to as* $\langle + \rangle$ *(*assertion*) and* $\langle - \rangle$ *(*denial*).*
- P *is a set that includes* V*; it is referred to as the* patterns *or* known patterns*.*
- S *is a non-empty subset of* P*; it is referred to as the* sentence-shapes*.*
- W *is a set of* worlds*, which are disjoint subsets of* 2^P*, excluding the empty set; the elements of a given world,* w*, are referred to as* contexts in w*.*
- E *is a function* $S \times C \to 2^V$*, where* C *is the set of all contexts in all worlds; it is referred to as the* effective assertional valuation*.*

At the core of this definition lies the notion of 'pattern', which encompasses everything that a language user is capable of recognizing or distinguishing.[9] This all-inclusive term empowers the user to communicate any conceivable idea. The choice of 'pattern' as the descriptor for this concept stems from two facts. First, the expression 'pattern recognition' has been widely embraced in recent years (cf. Bishop, 2006), which suggests that the term 'pattern' has become readily associated with the notion of *something to be recognized*. Second, patterns can be recognized by both humans and machines, making the proposed language definition applicable to languages used by either or both. Still, from a formal perspective, any set that contains the two featured elements can qualify as the set of patterns.

The definition allows for additional assertional values beyond the mandatory two. Sentence-shapes are considered known patterns. They are represented by a separate set because it is crucial for the user of a given language to recognize certain patterns as sentences of that language. Contexts are represented as arbitrary, non-empty sets of known patterns. Different worlds, or disjoint families of contexts, are introduced to make it easier to devise assertional rules that operate on separate sets of contexts. For example, a distinct collection of assertional rules would be required for our everyday world as opposed to the one that applies to a specific professional domain or the fictional world portrayed in a novel.

The model defined above does not use the concept of an assertional rule directly. Instead, it encapsulates this concept in the effective assertional valuation function. This allows it to represent the epistemic aspect of languages, including natural languages, without being tightly coupled with their structure (the problem Tarski deemed insuperable, cf. Corcoran, 1983, pp. 164–165, 267).

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8 Sentences that are effectively evaluated with an empty set of assertional values cannot later be classified as true or false. The definition by itself does not impose classical logic on an assertional language.

9 The straightforward candidates for the term in question are 'object' and 'state of affairs'. However, neither term alone can fully capture our intended meaning, as there exist objects that cannot be classified as states of affairs (e.g., a dog) and states of affairs that cannot be classified as objects (e.g., the absence of a dog in the room). In contrast, the term 'pattern' is abstract enough to accommodate our requirements.

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Therefore, I will not present a precise definition of an assertional rule. The effective assertional valuation of an assertional language can be directly provided, and in such a case, a set of assertional rules can be derived from it.[10] However, this method of defining an assertional language may be deemed, at most, as a supplementary approach. A more pragmatic approach involves furnishing a set of assertional rules in conjunction with an algorithm capable of computing the effective assertional valuation from those rules.[11]

7. Effective Assertional Valuations

Definition 2 (Effective Assertional Valuations). *Let* $(\cdot, \cdot, S, W, E)$ *be an assertional language,* $s \in S$, $w \in W$, *and* $c \in w$.

(a) s is partially asserted with respect to c *iff.* $\langle + \rangle \in E(s, c)$.
(b) s is partially denied with respect to c *iff.* $\langle \breve{} \rangle \in E(s, c)$.
(c) s is consistently asserted with respect to c *iff.* $E(s, c) = \{\langle + \rangle\}$.
(d) s is consistently denied with respect to c *iff.* $E(s, c) = \{\langle \breve{} \rangle\}$.
(e) s is equivocal with respect to c *iff.* $\langle + \rangle \in E(s, c)$ *and* $\langle \breve{} \rangle \in E(s, c)$.

The definition above creates a specific metalanguage that allows for reporting the basic epistemic status of sentence-shapes of a given assertional language in a consistent manner. The consistency of this metalanguage only depends on whether the effective assertional valuation function in the given assertional language, or in the relevant object language, is well-defined, which is already guaranteed by Def. 1.

Specifically, if the Liar sentence (previously referred to as 'LS') belongs to the sentence-shapes of the object language, and if some intuitive assertional rules dictate both assertion and denial of LS in any scenario, as previously discussed, then this metalanguage enables LS to be consistently classified as equivocal with respect to any context. This way, we avoid the Liar paradox.

8. Truth Valuations

Definition 3 (Local Truth). *Let* $(\cdot, \cdot, S, W, \cdot)$ *be an assertional language,* $s \in S$, $w \in W$, *and* $c \in w$.

(a) s is (locally) true with respect to c *iff. s is consistently asserted with respect to c.*
(b) s is (locally) false with respect to c *iff. s is partially denied with respect to c.*

Definition 4 (Global Truth). *Let* $(\cdot, \cdot, S, W, \cdot)$ *be an assertional language,* $s \in S$, *and* $w \in W$.

(a) s is (globally) true in w *iff. for every* $c \in w$, *s is true with respect to c.*
(b) s is (globally) false in w *iff. for every* $c \in w$, *s is false with respect to c.*

Def. 3 presents a formal account of the concept of truth described in a previous section, while Def. 4 provides a generalization of it. Both definitions are useful extensions of the metalanguage in Def. 2 and allow for the consistent reporting of the Liar sentence, as well as other equivocally self-referencing sentences, as globally false.

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[10] For example, if $E(s, c) = \{\langle + \rangle\}$, then we can derive one assertional rule: '*s* is asserted with respect to *c*'. If $E(s, c) = \{\langle + \rangle, \langle - \rangle\}$, then we can derive the previous rule and another one, inconsistent with it: '*s* is denied with respect to *c*'. These and other potential formulations of assertional rules, although similar to the metalanguage statements specified in Def. 2., should be differentiated from the latter. Here, I endeavor to adhere to a convention in which simple predicates, such as 'is asserted' and 'is denied', are utilized in the formulations of *single* assertional rules; while metalanguage statements, which abstract information conceptually from *all* assertional rules associated with a particular sentence, employ modified predicates such as 'is consistently asserted' or 'is partially denied'.

[11] The computation of EAV from a set of assertional rules is a topic in its own right and falls outside the purview of this paper.

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9. Consistent Assertions as Facts

The correspondence theory is considered 'perhaps the most important of the neo-classical theories [of truth] for the contemporary literature' (Glanzberg, 2018). This section seeks to bridge the correspondence theory and the concept of truth proposed in this paper.

According to a commonly held version of the correspondence theory, a sentence is true if it corresponds to a fact of a certain kind. It is reasonable to assume that a user of a given assertional language can recognize a consistent assertion of any sentence-shape within that language, which results in such a consistent assertion becoming a known pattern in the language. It may be tempting to equate patterns of this kind with *facts*. For example, if a user recognizes the sentence-shape 'Snow is white' and is aware of this sentence-shape being consistently asserted, we can say that the user is aware of the *fact* that snow is white, which is the fact the sentence 'Snow is white' corresponds to.

Moreover, an assertional language can recognize known patterns not only from the effective valuations of its own sentence-shapes but also from the effective valuations in other assertional languages. For instance, if a user of an assertional language recognizes the sentence-shape '$2+2=4$' being consistently asserted in the language of arithmetic, we can say that the user recognizes an arithmetic *fact*, that is, $2+2=4$, which is the fact the arithmetic sentence '$2+2=4$' corresponds to. Defs. 1–4, which explicate the truth of a sentence as its consistent assertion, can be seen in this interpretation as a formal account of the correspondence theory.

10. Conclusion

Whether or not the proposed account of truth is accepted, the concept of an assertional language, as defined in Defs. 1–2, is worthy of consideration in its own right. It offers a simple and versatile framework for determining and reporting the epistemic status of sentences in languages of various kinds, both context-dependently and context-independently. The framework is versatile because it can be applied to languages of any definition, provided that the definition can be translated into an effective assertional valuation function.

Another feature, which is hard to overestimate, is that it can handle languages that may be perceived as inconsistent in terms of their epistemic aspect. It does so without resorting to non-classical or not fully classical solutions.

Moreover, due to its broad notion of a pattern, the framework allows for the combination of different languages in a meaningful way. An assertional language or part of it can be nested within another assertional language by including effective assertional valuations of the former within the known patterns of the latter.

Paris, February 2023

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