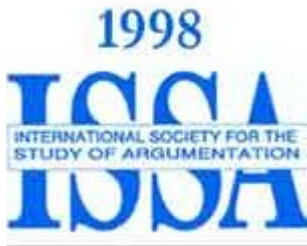


# ISSA Proceedings 1998 - Constitutive Rules And Rules Of Inference



## *1. Introduction*

The notion of a constitutive rule was placed on the philosophical agenda by John Searle who opposed constitutive rules to regulative rules. Where 'regulative rules regulate antecedently or independently existing forms of behaviour ..... constitutive rules do not merely regulate, they create or define new forms of behaviour. The rules of football or chess, for example, do not merely regulate playing football or chess, but as it were they create the very possibility of playing such games.' (Searle 1969: 33).

If we take the notion of behaviour rather broad, to make it include not only physical, but also mental behaviour such as believing and making inferences, rules of inference can be considered as a kind of regulative rules. Rules of inference indicate what we are allowed to infer, and, in an epistemological context, what we are justified to believe, given our other beliefs. On this view, the distinction between constitutive rules and rules of inference is a special case of the distinction between constitutive rules and regulative rules.

In this paper I want to explore the distinction and the relations between constitutive rules and rules of inference. In section 2 I elaborate on the distinction between these two. In section 3 the distinction is exploited to explain the defeasibility of reasoning with rules of inference. In section 4 I will argue for the surprising view that propositional logic is in the first place an ontological theory, and only in the second place a theory of valid reasoning. The argument of section 4 is supported in section 5 with a sketch of the outlines of a general theory of valid reasoning. The paper is summarised in section 6.

## *2. Constitutive rules and rules of inference*

The distinction between constitutive rules and rules of inference is based on another distinction, that is the distinction between the world and our beliefs about it. Let us follow Wittgenstein (1922, 1.1) in defining the world as the set of all facts. Facts are what corresponds in the world to true sentences. Since sentences are language-dependent, facts are also language-dependent. And so is

the world, because the world is the set of all facts.

This view does not imply that the world depends completely on human culture, but rather that the world is captured by means of concepts that depend on human culture. The conceptual framework in terms of which the world is captured is a cultural phenomenon. That does not preclude the possibility that this conceptual framework has been adapted in time, e.g. through both physical and cultural evolution, to capture the world as well as possible.

The facts in the world are not independent of each other. There are physical laws that create law-like connections between facts of certain types. Physical laws should be distinguished from human attempts to describe them. These attempts form hypotheses that may be true or false. The laws themselves are not true or false, but exist or not. An example of a physical law is the law of gravitation. This law creates a connection between the facts that body 1 has mass  $m_1$ , body 2 has mass  $m_2$ , and that the distance between them is  $d$ , and the fact that between the bodies 1 and 2 there exists a gravitational force that equals  $\frac{\gamma m_1 m_2}{d^2}$ , where  $\gamma$  is the gravitational constant. That the law of gravitation holds seems to be a fact about the world. This fact brings with it that other facts in the world are related in the way indicated in the law.

Our world is not merely a physical one. By means of culture, humans have created lots of additional facts. The fact that the guilder is (still) the monetary unit of the Netherlands is an example of such a humanly conditioned fact. **[i]** The same counts for the fact that John is obligated to pay Mary ten guilders, because he promised to do that. Humanly conditioned facts are related to other facts by means of constitutive rules. One such a rule is that if one promises to do A, one thereby incurs the obligation to do A. Another constitutive rule is the rule that if something is a rectangle with equal sides, it is a square.

Constitutive rules are similar to physical laws in that their existence is a fact about the world that brings with it that other facts in the world are related in the way indicated in the rule. They differ from physical laws in that their existence depends on human culture, while physical laws are assumed to exist independent of human culture.

In my examples I have presented the linguistic convention that squares are rectangles with equal sides as a constitutive rule. This view seems reasonable to me, because linguistic conventions are a kind of rules, and the existence of these rules has effect on relations between other facts. Because of the ways in which we use the words 'rectangle', 'square', 'equal' and 'side', squares are rectangles with

equal sides. In general, conceptual relations based on linguistic conventions have repercussions on the world, because the world is language-dependent.

Where constitutive rules create relations between facts in the world, rules of inference create *relations between our beliefs* about the world. Rules of inference permit certain inferences, and thereby allow us to believe something if we believe something else. For instance, the rule of inference that smoke signals fire allows us to believe that there is a fire if we believe that there is smoke. To be sure, rules of inference are usually not formulated in terms of beliefs, but rather in terms of the belief-contents. The rule 'smoke signals fire' is a case in point. It refers to the phenomena smoke and fire, and not to beliefs about them. Nevertheless, as a rule of inference, it is relevant for our beliefs and not for the phenomena themselves. The rule of inference does not indicate a relation between facts, but allows us to conclude to the presence of one fact if we believe or hypothesise that one or more other facts are present.

Although the rule of inference 'smoke signals fire' does not indicate a relation between the fact types 'presence of smoke' and 'presence of fire', our use of this rule is justified by such a relation. If smoke tends to go together with fire, and we know that, we are justified in using the concerning rule of inference. This use in turns justifies our believing that there is a fire if we believe that there is smoke.

Another way to state that we are justified in believing that there is a fire if we believe that there is smoke, is to say that the conclusion that there is a fire can validly be drawn from the premise that there is smoke. Validity in this sense does not imply that the conclusion must be true if the premise is true. It only implies that the inference at issue is a 'good' one.

Using a rule of inference can be seen as another kind of mental behaviour, next to believing and drawing inferences. Such a use may be justified or not. I have already given the example that if one knows that smoke tends to go together with fire, one is justified in using the rule of inference that smoke signals fire. In general the use of a rule of inference is justified if one has reason to believe that there is a big chance that the conclusion of the rule of inference is true if the rule's antecedent is true. **[ii]**

One way to obtain such a reason is when one believes that a constitutive rule exists. For instance, if the rule exists that thieves are punishable, this is a reason to use the rule of inference that if somebody is a thief, (s)he is punishable. This rule of inference has the same formulation as its underlying constitutive rule. Nevertheless their functions are quite different. The constitutive rule makes that

somebody who is a thief is punishable, while the rule of inference permits one to believe that somebody is punishable if one believes that this person is a thief. In general, the existence of a constitutive rule is a reason to use the corresponding rule of inference.

This relation cannot be turned around, however. Not every justified use of a rule of inference indicates that there is an underlying constitutive rule. The rule of inference that smoke signals fire is a case in point. There is no constitutive rule that makes that there is a fire whenever there is smoke.

### *3. Reasoning by default*

The difference between constitutive rules and rules of inference has profound implications for the ways these rules behave from an (onto)logical point of view. Constitutive rules attach consequences on the level of the world (in contrast to our beliefs about the world) to facts in the world. In this respect they resemble physical laws that also create correlations between types of facts.

Because constitutive rules operate on the ontological level, all facts are potentially relevant for the operation of these rules. Take again the rule that thieves are punishable. This rule makes that thieves are punishable, but it is subject to exceptions. For instance, if a thief acted under force majeure, she is not punishable. As a consequence, the operation of the rule that thieves are punishable depends not only on the fact that somebody is a thief, but also on the existence of rules and principles that identify which facts count as force majeure, and the actual presence of these facts. Moreover, the rules that define force majeure may also be subject to exceptions, defined by still other rules. The existence of those additional rules and the presence of facts that satisfy their conditions are also relevant for the effects of the rule that thieves are punishable, and so on ...

Because of these possibilities of exceptions, and exceptions to exceptions, it may be hard to establish whether some concrete thief is punishable, but given the constitutive nature of the rules involved, it is assumed that the question whether she is punishable is provided with an objective answer by the existing rules and the facts that match their conditions. The rules so to speak automatically attach legal consequences to cases, and in doing this, they take all relevant facts into account, including the facts that are exceptions to exceptions, etc...

These ontological effects of constitutive rules must be distinguished from the epistemic role played by the rules of inference that are based on these constitutive rules. The judge who must decide whether some thief is punishable

gives a decision on whether the person in question legally *is* punishable. The presumption is that the issue of punishability is decided by the law, and that the judge only tells us what the law is.

One might object that in hard cases the judge does not tell us what the law is, but rather makes the law herself. Even if this is correct, it does not subtract from it that in easy cases the judge describes the legal consequences of the case. The operation of legal rules is at least in easy cases assumed to be on the ontological level, independent of human activities such as the active application of the rules.

A parallel with physical laws may be useful here. What happens with a particular object in a field of forces depends on all physical laws and on all facts that are relevant for these laws. It may be very difficult, if not impossible, to predict what will happen, but that does not stand in the way of all laws and all facts contributing to the actual movement of this object. At least ideally the same counts for constitutive rules. All constitutive rules and all facts are presumed to contribute to the constitution of the world, even if it is hard to determine the outcome.

To find out whether some person is punishable, the judge draws a conclusion from the fact that this person is a thief. The validity of the conclusion is based on the rule of inference that thieves are punishable. Rules of inference are applied to draw conclusions about the effects of constitutive rules. These facts themselves are assumed to obtain independently of human reasoning. The effects that constitutive rules create in the world are mimicked by rules of inference in our beliefs about the world.

Because of the ontological level on which constitutive rules are presumed to operate, it is not possible that rules 'overlook' some facts that might be relevant for their outcome. For instance, it is not possible that some thief is punishable, because the fact that she operated under force majeure was overlooked by the constitutive rules of law. Constituted facts are not revisable on the basis of additional information, because constitution by definition takes everything that is relevant into account. Constitutive rules may have exceptions, but the facts that form exceptions are automatically taken into account in the operation of the rule. It is not possible that an exception comes up later and causes the effects of the rule to disappear.

The punishability of a person *as an ontological issue* is established by taking all relevant factors in consideration.

With rules of inference, matters are very different. Essentially a rule of inference

indicates what one is allowed to believe *given one's other beliefs*. The beliefs from which one starts may be incomplete in the sense that relevant information may be lacking. **[iii]** Rules of inference may give a definitive answer to the question what other beliefs may be held given these beliefs, but they cannot give an answer to the question which beliefs may be held that is not relative to some set of beliefs. But then conclusions drawn on basis of good rules of inference may be revisable in the light of new information. If one only knows that somebody is a thief, one may infer that this person is punishable. If later on one comes to believe that the thief acted under force majeure, the conclusion that this person is punishable must be withdrawn. This conclusion may be reinstated again if still later on one comes to believe that the force majeure was caused by the thief's own fault. Notice, however, that whether the thief is really punishable does not depend on what one is justified in believing. It depends on all relevant rules and facts, whether they are taken into account in human decision making, or not.

An argument and its conclusion are said to be defeasible, if it is possible that new information invalidates the argument and its conclusion. We have seen that reasoning with rules of inference is defeasible. It would, however, be wrong to extrapolate the defeasibility of reasoning with a rule of inference to the defeasibility of the operation of its underlying constitutive rule. Constitutive rules are assumed to take all relevant facts into account, while rules of inference only operate on beliefs that are actually held and that may be incomplete.

Summarising, we can state that although all rules may be amenable to exceptions, this amenability only gives rise to defeasible reasoning in the case of rules of inference, because only rules of inference operate on beliefs, which may be incomplete. Constitutive rules operate on the facts of the world, which cannot be incomplete. Therefore the operation of constitutive rules is not defeasible. **[iv]**

#### *4. Propositional logic as an ontological theory*

Logic is the theory of valid reasoning. As such it does not presuppose a notion of logical validity. The traditional characterisation of a logically valid argument as an argument which cannot have a false conclusion if its premises are true is just one interpretation of what logical validity amounts to.

In my opinion an argument is logically valid (in contrast to other forms of validity such as legal validity, or the validity of moves in chess) if its conclusion is sufficiently justified by its premises. There are in principle different possible ways in which the premises of an argument may justify the conclusion, and the

traditional notion of logical validity provides one of them. In the rest of this paper I will exploit the distinction between constitutive rules and rules of inference to argue that the traditional notion is not the most attractive interpretation of logical validity. In my argument I will take propositional logic as a starting point, although another variant of deductive logic would do just as well.

I assume that all propositions express a *state of affairs*, and that logical relations between propositions are reflected in ontological relations between the corresponding states of affairs. To facilitate my argument I use the notational convention that propositions are represented by capitals, while the corresponding states of affairs are represented by corresponding lowercase letters. For instance, the proposition P expresses the state of affairs p, and the proposition P & Q represents the state of affairs p & q.

A proposition is then *true* and expresses a *fact*, if and only if the corresponding state of affairs *obtains*. So there is a perfect parallel between the truth of propositions and the obtaining of the states of affairs expressed by them. As a consequence the truth-functional definition of the logical operators has repercussions on the ontological level:

- (1) the state of affairs  $\sim p$  obtains, if and only if the state of affairs p does not obtain;
- (2) the state of affairs p & q obtains, if only if the states of affairs p and q both obtain;
- (3) the state of affairs p  $\_$  q obtains, if and only if either the state of affairs p, or the state of affairs q obtains, or if both states of affairs obtain.

These ontological repercussions of the definitions of the logical operators illustrate the constitutive function of meaning rules. The rules that define the meanings of the logical operators create connections between states of affairs. These relations are in their turn reflected in the truth values of the propositions that express them. In deviation from the traditional view, I assume that the definitions of the logical operators have primarily effects on the ontological level, and only indirectly on the truth values of propositions.

Since the ontological relations between states of affairs are reflected in relations between truth values of the propositions that express these states of affairs, it is possible to use the knowledge about these ontological relations to make inferences about the truth values of these propositions. For instance, since the state of affairs that it is both raining and the sun shines obtains if the states of

affairs that it is raining and that the sun shines both obtain, it is possible to infer from the propositions 'It is raining' and 'The sun shines' the proposition 'It is raining & The sun shines'.

Given the relations between the states of affairs expressed by these propositions, it is not possible that the premises are true while the conclusion is false. This is impossible because it is impossible that if the states of affairs that it is raining and that the sun shines both obtain, the state of affairs that it both raining and the sun shines does not obtain. The impossibility on the ontological level is primary, and the impossibility on the level of truth-values is derived. Similarly the use of the rule of inference that it is justified to conclude that 'It is raining & The sun shines' from 'It is raining' and 'The sun shines', or in general, to conclude 'P & Q' from 'P' and 'Q', derives its justification from the ontological effects of the meaning rules for the word 'and', respectively the operator '&'.

On this view propositional logic is nothing else than a study of the ontological implications of a particular set of meaning rules, that is the meaning rules for the so-called 'logical words'. In a similar way, it is possible to study the implications of other sets of meaning rules. For instance one can study the ontological implications of the meaning rules for the words 'quadrangle', 'rectangle', and 'square'. These rules also have implications for the truth values of some propositions given the truth values of other propositions. For instance, given the usual meanings of the words 'rectangle' and 'square', the proposition that squares are rectangles is (necessarily) true.

The same counts for the meaning rules for the words 'obligated', 'permitted', and 'forbidden', that make it necessary that the proposition that this act is permitted is true given the truth of the proposition that this act is not forbidden. In fact the study of the ontological implications of these meaning rules has been conducted under the name of 'deontic logic'.

In general it holds that all constitutive rules have ontological implications which may be studied in the form of a logic. Propositional logic and predicate logic, deontic logic, logics of events and logic of actions (dynamic logic) are all examples of this kind of research. All of these logics can be seen as ontological theories, cast in the form of theories of valid reasoning.

Should we conclude, then, that logic is really a form of ontology instead of a theory of valid reasoning? In my opinion this conclusion is not inevitable. It is possible to develop a logic as a general theory of valid reasoning that is not the study of the ontological implications of constitutive rules. In the next section I will argue for another form of logic, the topic of which is the study of how rules of



inference operate.

### *5. The operation of inference rules*

In section 2 I have argued that constitutive rules have corresponding inference rules that allow us to make inferences that match constitutive relations in the world. Propositional logic as a theory of what we may infer deals with the rules of inference that correspond to the meaning rules for the logical operators. It seems a little restricted, however, to limit the study of valid reasoning to the implications of just a small set of meaning rules. As a general theory of valid reasoning, logic should have something to say about all arguments, not only those based on the meanings of a few so-called 'logical words'.

The traditional idea that logic should abstract from the topic of arguments is still a good one. It should however be realised that a logic that deals with the meanings of just a few words does not abstract from the topic of the argument. A theory that deals with the meanings of the words 'and', 'or', 'not', and the construction 'if ...then ...' is just as restricted as a theory that deals with the meanings of the words 'quadrangle', 'rectangle', and 'square'. This last theory is not called 'logic', however, but rather 'geometry'.

How, then, is it possible to have a theory about valid reasoning in general, which is not confined to the study of the meanings of some special category of words? I think that such a general theory of valid reasoning should study the logical behaviour of inference rules. There are many kinds of inference rules, some of them counterparts of constitutive rules, others based on empirical evidence or the result of legislation, and again others are based on statistical laws. The contents of these rules are domain (or field-)dependent. In the previous section I have argued that this is even the case for the inference rules of propositional logic. To the extent that they are domain dependent, inference rules are less interesting from a logical point of view. What is interesting is the role of these rules in making valid inferences. If it is possible to develop a general theory about the operation of inference rules in making valid inferences, such a theory would be a worthy candidate for the label of 'logic'.

Is such a theory possible? In my opinion, the answer to this question is affirmative. Well-known examples of such theories, although not advertised as such, are Toulmin's theory about the lay-out of arguments (Toulmin 1958), and Naess' work on reasons for and against a conclusion (Naess 1976). Less known are the thesis of Verheij (Verheij 1996), and my own work on 'Reasoning with

Rules' (Hage 1997). In the following paragraphs I will give an outline of the last work, in some respects amended and rephrased as a theory about the function of inference rules. There is, however, no room for argument here, and consequently my presentation must be rather apodictic, more an illustration of what is possible than an attempt to convince sceptics. Those who are interested in the subject are referred to Hage 1997.

I consider rules of inference as rules that indicate which inferences are allowed. Since inferences are a kind of transitions between (hypothetical) beliefs, rules of inference may also be characterised as rules that indicate which beliefs may justifiedly be held, given that some other beliefs are held. As a consequence, the theory about the operation of inference rules is part of the more general theory of rational belief, which is in its turn part of the theory of rational action.

A rule of inference is used by some person, if this person is disposed to believe the conclusion of the rule if (s)he believes the conditions of the rule. Using a rule of inference is a form of mental behaviour that is subject to evaluation from the point of view of rationality. The standards for this evaluation are part of a theory of rational action, the contents of which are for the most part not a logical issue. For instance, it is not a logical issue to determine whether it is justified to use a rule of inference if that rule was recommended by Sherlock Holmes in 'A Study in Scarlet'. It is, however, a logical issue to the extent that facts to which the standards are to be applied may be the conclusions of inferences which in turn may be evaluated by logical standards. Inference rules justify inferences either if it is justified to use them, or if they are used in the sense described above, and this use is not irrational.

An inference rule makes the facts that satisfy its conditions into reasons for believing its conclusion. In most case it suffices to have one reason to believe something. For instance, if I read in the newspaper that there was an accident on the highway, I have a reason to believe that there was an accident on the highway. This reason normally suffices to be justified in believing that this accident occurred.

Sometimes, however, we have both reasons to believe something and to believe something different. For instance, if my friend lives near the place where the highway accident was reported to happen, and my friend tells me that he was home all day and did not notice anything of an accident, I am not fully justified to believe the newspaper report anymore. Somehow I must balance two reasons, one for believing that there was an accident and one against believing it.

There may even be more reasons. For instance if my friend's wife heard unusual noises that might be explained by a crash, this would be an additional reason to believe in the crash. But if she did not notice anything either, this is an additional reason against believing in the crash.

There may also be 'meta-reasons' that deal with the absolute and the relative weight of the reasons. For instance, if I know that my friend uses to work very concentratedly and seldom notices anything of what happens on the highway, the reason that he did not notice anything is not strong on an absolute scale. If I happen to know that my friend makes a custom of contradicting the newspaper, this is a reason to give the reason based on his testimony a smaller weight relative to the reason based on the newspaper report.

If there are both reasons for and against believing a conclusion, it is justified to believe the conclusion either if one is justified in believing that the reasons for believing the conclusion outweigh the reasons against believing it, or if one actually holds that belief and the belief that it was otherwise would not be justified. Notice that the logic of inference rules as such does not say anything about what are reasons or how they should be weighed. This is all 'field dependent', to use Toulmin's phrase.

The conclusion that some set of reasons outweighs another set of reasons will itself be based on a rule that deals with the relative weight of sets of reasons. A legal example of such a rule would be that a set of reasons outweighs another set of reasons, if there was an authoritative court decision in which this relative weight was assumed.

There is one final issue, and that is that there may be exceptions to the use of an inference rule. Normally if the conditions of an inference rule are satisfied, the use of the rule is justified and there is a reason to believe its conclusion. There may be exceptional circumstances, however, in which the rule's conditions are satisfied, but the rule should nevertheless not be applied. The constitutive rule that promises lead to obligations has its counterpart in the rule of inference that if somebody promised to do something, he may be assumed to have the obligation to do it. However, if Jane promised to marry John, it may not be assumed that Jane is under the obligation to marry John, if one believes that Jane mistook John for his brother. This illustrates that exceptions to constitutive rules have counterparts in exceptions to rules of inference.

It is amongst others this phenomenon, that rules of inference may have exceptions, that makes most arguments defeasible. A conclusion based on a rule

of inference may lose its justification if it becomes known that an exception to the rule occurs. Another cause of defeasibility is that it becomes known that there are reasons against a particular conclusion that were not yet taken into account when the conclusion was drawn. These two causes of defeasibility are by and large identical to respectively undercutters and rebutters in the sense of Pollock (1987).

## *6. Conclusion*

At the beginning of this paper I followed Searle in distinguishing between constitutive rules and regulative rules. I continued by assuming a broad notion of behaviour, to make behaviour include mental behaviour such as believing, drawing inferences, and using rules of inference. Rules of inference are on that view a special kind of regulative rules.

I contrasted constitutive rules to rules of inference. Where the former operate on the ontological level and create relations between types of facts, the latter operate on the level of belief and make that some beliefs may be held given that some other beliefs are held.

The distinction between constitutive rules and rules of inference was exploited in two arguments. It was first argued that the use of inference rules can be defeasible while the effects of constitutive rules are not defeasible. Second, it was argued that classical logics such as propositional logic and predicate logic are a kind of ontological theories, that study the ontological effects of a limited number of meaning rules. The derivations that they allow correspond to the ontological relations created by these meaning rules.

The final step in my argument was that it would be attractive to have a logic that deals with valid inference in general, and not only with the meanings of a small number of so-called 'logical words'. I proposed to consider the theory about the operation of rules of inference as part of such a logic, and continued to give the outlines of such a theory.

## NOTES

- i.** The expression 'humanly conditioned fact' stems from Weinberger's paper 'Facts and fact-descriptions', in MacCormick and Weinberger 1986.
- ii.** Some rules of inference are the result of legislation, such as the legal rule that an official deed provides conclusive evidence for what is stated in the deed.
- iii.** I will leave the possibility of wrong beliefs out of consideration.
- iv.** This conclusion adds to and slightly deviates from my views as exposed in Hage 1997, where I did not attach sufficient consequences to the distinction

between constitutive rules and rules of inference.

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