

# Count-as Conditionals, Classification and Context

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**Abstract.** Searle represents constitutive norms as count-as conditionals, written as ‘ $X$  counts as  $Y$  in context  $C$ ’. Grossi *et al.* study a class of these conditionals as ‘in context  $C$ ,  $X$  is classified as  $Y$ ’. In this paper we propose a generalization of this relation among count-as conditionals, classification and context, by defining a class of count-as conditionals as ‘ $X$  in context  $C_0$  is classified as  $Y$  in context  $C$ ’. We show that if context  $C_0$  can be different from context  $C$ , then we can represent a larger class of examples, and we have a weaker logic of count-as conditionals.

## 1 Count-as conditionals, classification and context

Searle [7] argues that there is a distinction between two types of rules.

“Some rules regulate antecedently existing forms of behaviour. For example, the rules of polite table behaviour regulate eating, but eating exists independently of these rules. Some rules, on the other hand, do not merely regulate an antecedently existing activity called playing chess; they, as it were, create the possibility of or define that activity. The activity of playing chess is constituted by action in accordance with these rules. The institutions of marriage, money, and promising are like the institutions of baseball and chess in that they are systems of such constitutive rules or conventions” ([7], p. 131).

For Searle, regulative and constitutive norms are related via institutional facts like marriage, money and private property. They emerge from an independent ontology of “brute” physical facts through constitutive rules of the form “such and such an  $X$  counts as  $Y$  in context  $C$ ” where  $X$  is any object satisfying certain conditions and  $Y$  is a label that qualifies  $X$  as being something of an entirely new sort. E.g., “ $X$  counts as a presiding official in a wedding ceremony”, “this bit of paper counts as a five euro bill” and “this piece of land counts as somebody’s private property”. Regulative norms refer to these institutional facts. E.g., consider a society which believes that a field fenced by an agent counts as the fact that the field is the agent’s property. The fence is a physical “brute” fact, while being a property is an institutional fact. Regulative norms forbidding trespassing refer to the abstract concept of property rather than to fenced fields.

Grossi *et al.* [4] study the relation between on the one hand count-as conditionals and on the other hand classification and context. They formalize a class of count-as conditionals as contextual classifications, and thus do not claim that all count-as conditionals can be represented in this way. Roughly, as we understand it, their idea of classification is that  $X$  and  $Y$  are interpreted as sets (of facts, objects,

events, actions, etc) and that ‘ $X$  is classified as  $Y$ ’, or ‘ $X$  is-a  $Y$ ’ for short, is interpreted as ‘the set of interpretations of  $X$  is a subset of the set of interpretations of  $Y$ ’. Thus, classification is the is-a relation frequently studied in conceptual modeling, for example as a subsumption relation in type theory, or as a T-Box expression in description logics.

Moreover, Grossi *et al.* use modal logic to represent their count-as conditionals as contextual classifications. They represent  $X$  and  $Y$  as propositions, and the context as a modal operator (to be precise, as a particular kind of KD45 modality). Roughly, representing the classification relation as a material implication ‘ $X \rightarrow Y$ ’, they propose the following definition.

‘ $X$  counts as  $Y$  in context  $C$ ’ is represented by  $[C](X \rightarrow Y)$ .

For example, consider a regulative norm stating that vehicles are forbidden in the park, and the constitutive norm ‘bicycles count as vehicles in the park’. This count-as conditional classifies bicycles as vehicles in the context of being in the park, and can be formalized as  $[park](bicycles \rightarrow vehicles)$ .

The logic of Grossi *et al.* turns out to be much stronger than other logics of count-as conditionals, such as the one of Jones and Sergot [5]. In Jones and Sergot’s study of count-as conditionals, the logic of count-as conditionals is very weak. It just satisfies replacements of logical equivalents, left disjunction and right conjunction. Moreover, they are inclined to accept transitivity. In addition, the logic of Grossi *et al.* satisfies, for example, reflexivity and contraposition.

We believe that there are two important advantages in representing count-as conditionals as contextual classifications. The first advantage is that it may help to better understand constitutive norms. Defining count-as conditionals as contextual classifications might lead to a more precise characterization of count-as conditionals – though it will not cover the whole class of count-as conditionals.

The second advantage of defining count-as conditionals as contextual classifications is that it may help us to understand how count-as conditionals are related to regulative norms like obligations and permissions, which is one of the main open questions in normative systems. Since regulative norms can be defined as classifications of behaviors in obligatory, permitted and unnormed ones, count-as conditionals as contextual classifications may explain this relation.

Given these two advantages, we are interested in generalizing the class of count-as conditionals that can be considered as contextual classifications. One reason to look for generalizations is that the formalization does not seem to take Searle’s distinction between brute and institutional facts into account. For example, since  $X$  are brute facts and  $Y$  are institutional facts, this distinction may suggest that it does not seem straightforward to represent examples. For example, what is the context in “this bit of paper counts as a five euro bill” or in “this piece of land counts as somebody’s private property”?

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## 2 Contexts as views

To generalize the notion of count-as conditionals as contextual classifications, we again make use of the terminology and methodology developed in conceptual modeling. As we already observed, classification is a central relation used in conceptual modeling. In software engineering, for example, the world (or a system) is modeled using various models of the Unified Modelling Language (UML) (class diagrams, sequence diagrams, *etc.*), and the is-a relation is used to define classification of concepts in class diagrams.

In this paper we use the notion of viewpoint and view to give an interpretation of context. A viewpoint is a particular way to look at the world [1]. For example, a structural viewpoint only describes the things staying the same over time, an action or process viewpoint describes the behavior over time, a brute viewpoint describes only brute facts, an institutional viewpoint describes only institutional facts, a power viewpoint describes the world in terms of powers of agents, a dependency viewpoint describes the world in terms of dependencies among actors, *etc.* Such a viewpoint is associated with a stakeholder having particular concerns; this aspect is not further discussed here. Each viewpoint gives a view on the system or the world.

There are two issues in conceptual modeling: defining each of these models or views, and defining the relations among them. In practice, it is the latter which is most problematic [3]. System descriptions often comprise many heterogeneous models and other descriptions, with ill-defined or completely lacking relations, inconsistencies, and a general lack of coherence and vision. UML for example does not define the relations among its models (nor does it define a semantics for its models).

In this interpretation, ‘ $X$  counts as  $Y$  in context  $C$ ’ is interpreted as ‘ $X$  counts as  $Y$  in viewpoint  $C$ ’. Our notion of context as view seems to be compatible with the framework of Grossi *et al.* In this interpretation, the conditional is interpreted as ‘ $X$  is classified as  $Y$  in viewpoint  $C$ ’. However, the count-as conditional can be used only to classify concepts within a single view, not to relate concepts in two or more views.

## 3 Count-as as relations among contexts or views

Generalizing the contextual classification to incorporate relations among contexts is straightforward. If we represent the classification relation again as a conditional ‘ $X \rightarrow Y$ ’, then we propose the following definition.

‘ $X$  in context  $C_0$  counts as  $Y$  in context  $C$ ’ is represented by  $[C_0]X \rightarrow [C]Y$ .

The following examples illustrate our definition. The third example illustrates how counts-as conditionals can be used to define properties of regulative norms too.

1. [brute](‘ $p$  is a piece of paper’)  $\rightarrow$  [institutional](‘ $p$  is money’): This piece of paper  $p$  counts as money. The contexts or views are the physical world and social (institutional) reality, respectively.
2. [facts](‘this is a piece of paper’)  $\rightarrow$  [actions](‘using the piece of paper for paying’): This piece of paper can be used to pay for things. The contexts or views are facts and actions, respectively.
3. [brute](‘the occurrence of behavior  $p$ ’)  $\rightarrow$  [deontic](‘ $p$  is a violation’): Behavior  $p$  counts as a violation. The contexts or views are physical world and deontic reality, respectively.

The context or view  $C_0$  often refers to the world of physical (observable) facts. As an abbreviation, we can thus use ‘ $X$  counts as  $Y$

in context  $C$ ’ to mean that ‘ $X$  in context ‘brute facts’ counts as  $Y$  in context  $C$ ’. Moreover, as a first approximation of the relation between count-as conditionals, classification and context, we can use the following definition:

‘ $X$  counts as  $Y$  in context  $C$ ’ is represented by  $(X \rightarrow [C]Y)$ .

The advantage of this definition is that we can compare the logical properties among count-as conditionals of our proposal with the existing ones in the literature. In this case we end up with a weaker logic than the one proposed by Grossi *et al.*, since we no longer have reflexivity or contraposition. It is more in line with earlier proposals, such as the approach of Jones and Sergot.

## 4 Concluding remarks

Constitutive norms play an important role in normative systems like organizations and institutions, which have received much attention in artificial intelligence and multi-agent systems. According to Searle, the simple mechanism of count-as conditionals can explain the complexity of the construction of social reality. This aspect of constitutive norms does not get a satisfactory explanation in Grossi *et al.*’s definition of count-as conditional as a contextual classification. It is hard to believe that all complex mechanisms found in social reality, can be explained by classifications only.

When count-as conditionals act also as bridges between contexts or views, then they can be used to define new contexts from existing ones. They can be used to relate for example observable brute facts and institutional facts, or observable and legal facts. This at least partly explains why constitutive norms play such an important role in the construction of social reality. However, there are still aspects of count-as conditionals which cannot be satisfactorily explained by our generalized contextual classifications. For example, as we have shown in [2], constitutive norms can also be used to formalize how normative systems like organizations can regulate their own evolution. How to incorporate this aspect is subject of further research.

Another subject of further research is the logical analysis of counts-as conditionals as contextual classifications. We do not have that  $X$  counts as  $X$ , the absence of this reflexivity property was suggested also by Jones and Sergot’s analysis. We thus need a logical framework of conditionals that not necessarily satisfy this property, such as the framework of input/output logic [6].

Finally, a subject of further research is to examine relationships between concepts. For example, the context [facts] consists of the contexts [brute] and [institutional]. Existing logics of context may be useful here.

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