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Regula et sententia convertuntur: On classified inferences in linguistic understanding

ABSTRACT

It seems helpful to distinguish between norms that implicitly govern our action and determine its correctness in view of forms of (linguistic and non-linguistic) cooperations on one side, explicit rules that tell us what we may or must do under certain conditions on the other side. As a result, rules are made explicit in systems of (hypothetical) sentences (with premises) and sentences express rules. Under this view, the logical connectives and quantifiers can be seen as means to express complex admissible rules, as all versions of rule- or proof-theoretical semantics for the logical words convincingly show for all pure, i. e. ideal cases. In the non-pure or empirical case of world related words, admissibility turns into a condition of general harmony of the relation between differentiation and attached default inference of the corresponding 'inferentially thick' concepts. In the *Tractatus*, Wittgenstein does not see yet the difference between standing sentences that express paradigm inferences for prototype cases and their empirical applications. Since the treatment of exceptional cases must be externalized to good judgement in singular and particular applications, we need to see the contrast between an always monotonic "and" in standing sentences or pure theories and a non-monotonic "but", which is not just an "and" with some colouring connotations, as Frege has said: the dialogical norms of its use cannot even be expressed by a list of rules or sentences.

Keywords: Normativity; Rules; Logical Connectives; Proof Theory; Classified Inferences.

RESUMO

Parece útil distinguirmos, de um lado, normas que implicitamente governam nossas ações e determinam a correção em termos de formas de cooperação (linguísticas e não-linguísticas) e, de outro lado, regras explícitas que nos dizem o que podemos ou que devemos fazer sob algumas condições. Consequentemente, regras são feitas explícitas em um sistema de sentenças (hipotéticas e com premissas) e sentenças que expressam regras. Sob esta perspectiva, os conectivos lógicos e quantificadores podem ser vistos como meios para expressar regras admissíveis complexas, i.e., casos ideais. No caso não-puro ou empírico de palavras relacionadas ao mundo, admissibilidade se torna a condição da harmonia geral da relação entre diferenciação e padrão anexado de inferências dos correspondentes conceitos "inferencialmente densos". No Tractatus, Wittgenstein não enxerga ainda a diferença entre sentenças estruturantes que expressam inferências paradigmáticas para casos prototípicos e suas aplicações empíricas. Uma vez que o tratamento de casos excepcionais deve ser externalizado para bons julgamentos em aplicações singulares e particulares, nós precisamos enxergar o contraste entre um "e" sempre monotônico em sentenças estruturantes ou teorias puras e o não-monotônico "mas", que não é apenas um "e" com algumas conotações irrelevantes, como Frege disse: as formas dialógicas do seu uso não podem nem mesmo ser expressas por uma lista de regras ou sentenças.

Palavras-chave: Normatividade; Regras; Conectivos lógicos; Teoria da Prova; Inferências Classificadas.

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1 Sentences are Rules

Sentences are defined in grammar and philosophy as minimal expressions by which we can make claims or perform speech acts, from questions to commands, promises to excuses. We restrict our considerations here to *assertions*. But we shall distinguish between *empirical* statements that express particular information from the standpoint of singular speakers and *standing sentences* (Quine). The later express, as a moment of reflection shows, situation-invariant *generic inferences* conditioned to *generic differentiations*. As such, they articulate default rules for a whole genus, which only in exceptional cases are universally quantified statements about every singular member of it or about all items of an arbitrary sortal class of things. The same holds, when we talk about situations or events.

Even when we talk about singular cases, we talk about them in a general, but usually particularized way. This is especially so when we express or infer modal expectations and predictions: On the ground of classifying an (actual) thing or item (at hand) by bringing it under a certain concept, we view it as a particular case of a *genus*, *species* or *type*. And this means that we apply generic inferences to it: We expect that the particular case behaves in a certain sense 'normally', that it shows the usual 'dispositions' of the genus. It is therefore rather cheap to criticise our necessary way of generic reasoning as flawed because we 'conclude' from the fore-knowledge that (European) swans are white that any new swan encountered can be expected to be also white. Notice that we should not conclude that it *will* be white, because we might have to count with exceptions anyway. The crucial point, however, is this: Any prediction of the future is a modal expectation and rests on generic fore-knowledge which is in principle defeasible because it is only formulated for a generic case, even if this case is already particularized to the singular situation to which we actually, empirically, refer. Therefore, in any empirical application of a concept we must distinguish with Hegel (who was heavily influenced by Kant's Critique of Judgement) the generality of the genus in which the concept is defined, the singularity of the actual empirical case and reference and the particularity of choosing an appropriate sub-species in the genus or, what amounts to the same, of fitting the concept to the actual case. This structure of the concept is necessary because the 'validity' of conceptual inferences is always only designed for typical paradigms, standard situations or ideal model cases. In using them, we need experienced judgement (*Urteilskraft*). It is always a particular act of judgment to 'subsume' a particular case under a certain general concept.

However, already Plato had seen this deep structure of the (application of) concepts when he showed us the narrow connection of the word (*logos*) with a classifying type, species or genus (*eidos*) and a real or ideal exemplary case (*paradigma*): The *eidos* E 'defines' in a sense the extensional *horos*, the classification, and the *meros*, the class of the things that fall under the *eidos*. Extension and classification, labelled by the *logos* or concept-word L_E, make up the *differential* part of a *concept*. Its *inferential content* is not directly connected to the elements of the class but to the general name L_E labelling the whole genus, species or type of things that belong to the class.

Generic sentence usually express normal dispositions.[1] They tell us, so to speak, what 'the L_E does', i. e. what 'a typical L_E' usually does. This is a kind of paradigm semantics that works in just the same way if the *eidos* refers to an *ideal case*. In any case, the *logos* or *linguistic expression* L_E is a central mediator between the *form* of differentiation and default *norms* of inferences, between the classificatory and the dispositional moment of the concept E. The *concept* as a whole (*eidos* in a wider sense) consists, so to speak, of four moments, namely *logos, horos, eidos* in the narrower sense and what we could call "*idea*". That means, it consists of the *word* as a fitting expression, a (default) *classification*, appropriate (default) *inferences* or *normal expectations* and a real or ideal *prototype* that can be deictically *shown* and may function as standard or paradigm case. We should now also not be surprised that the Greek word "*eidos*" in its use made by Plato and Aristotle means "form", "species", "genus", "concept", "idea" and "ideal" at the same time.

In empirical, i. e. situation- and context-dependent applications of a concept in the actual world of phenomena, we always have to evaluate 'how near' the particular case lies to the (ideal) paradigm case. Therefore, an *eidos* is always also an *ideal* prototype, frequently such that all of its ideal normal dispositions are never fully satisfied, just as we see this at the example of ideal geometrical forms. The leading example for this eidetic or prototype semantics developed by Plato was, indeed, the use of geometric words and forms. When we apply, for example, the notions of a circle, a triangle or a straight line to empirical gestalts, we always have to make use of a relevance filter with respect to the precision conditions and formal inferences attached to the ideal forms: No straight line is 'absolutely' straight. Only ideal triangles in Euclidean (plane) geometry fulfil the so-called *parallel axiom* saying that the sum of the angles in a triangle add up to 180° or two rectangles.

We should not get confused by the fact that there are limits of realizing straight lines and triangles in physical space: It is uninformed empiricism when sceptical sophists from Protagoras via Sextus Empiricus down to Hume and his present-day followers claim that there were no straight lines or triangles in reality or that we today 'know' that outer space is 'not Euclidean,' even though it is absolutely correct always to remember that there are limits for applying

[1] With respect to the syntactic forms of generic sentences, cf. G. N. Carlson, F. J. Pelletier, The generic book, Chicago: Univ. of Chicago Pr. 1995.

the ideal definitions of mathematical truths onto real measurements. (Why Euclidean structures are reduced to tangent planes in Riemannian tensor analysis is not our topic here.)

In the following, we shall see more clearly what it means to view (true) sentences as (valid, admissible) rules of inference. We shall see how this works inside formal, mathematical, discourse in sortal domains, for example when we talk about pure numbers, pure sets or pure geometrical forms. And we shall investigate how different the situation gets when we talk about the real, phenomenal, empirical world.

It is especially easy to read a sentence of the form 'if p then q' as a rule. But a sentence of the form 'N is P' can also articulate a rule, for example when we read the generic sentence 'the lion eats deer' as a mere expression of a (default) rules of the form 'if x is a lion, x usually eats deer'. So we might agree that at least *some* sentences express rules. But in which sense can we say that *all sentences*, especially standing sentences, express rules?

If we distinguish *norms* from *rules* by saying that in the latter case we need a full sentential expression of the rule, then it holds by stipulation that all rules can be made explicit by sentences. But notice that *labels* attached to norms or principles – as when we talk about the modus ponens for applying rules – do, as such, not yet turn the norms into rules. This is important because not all norms that govern our actions can be made explicit in all details in the form of explicit rules or sentences. John Searle's principle of expressibility thus turns out wrong, at least in a certain sense, as we shall systematic show in our discussion of the modus ponens.

But all I say here is a mere proposal to develop our logical meta-language or the way we comment on language use. As such it is no claim. For to make a claim presupposes already some well defined truth or satisfaction conditions. A claim seems to need a 'proof' or at least 'arguments' that show that the presupposed conditions are fulfilled. The situation is fairly different when we propose to look at the notions and functions of sentences and rules in a certain way, mode or perspective. In such a case, arguments consist in showing why and how some or many mysteries in our usual way of thinking disappear. Such mysteries are, for example, produced by our formal meta-talk about the truth-values of sentences and the truth of propositions, or by other all too naïve understandings of our logical meta-vocabulary.

But let us now first consider a special case of our proposal to read rules as sentences and sentences as rules. This seems to be clear for implications of the form if p then q. But how can we say that a logical conjunction, i. e. a sentence of the form p&q, is a rule? The answer is simple: The &-rule combines two rules into one. The same holds for quantification. A rule of the form "all lions eat deer", which in a first step may get the formal notation $(\forall_x)(L(x) \rightarrow D(N)$, is just a family of rules of the form $L(N) \rightarrow D(N)$: if Jonathan is a lion it eats deer, if Paul is a lion it eats deer and so on. Notice that D stands for the generic expression 'eating deer'.

The real challenges are the negated sentences. What does it mean to negate a rule? Of course it means that the rule *is not valid*, i. e. that we should never use it. The point is that it is not clear how to 'use' a negated rule *as a rule*. We shall see that this is no trivial question at all. Negation even 'seduces' us to truth-value or truth-conditional semantics. But then we do not get much more than a system of defining logically complex sortal predicates A(x) with or without further parameters in ideal sortal sets, i. e. in lower or higher mathematics: This is the real function of the logical connectives '&', 'not' and 'for all' in this context. The constitution of (the names, equations and named objects resp. the values of the variables) in the sortal domains G is already presupposed and not logically analysed. Even though Brandom's approach to inferential semantics is very idiosyncratic, his scepticism against standard truth conditional semantics has quite some good reasons: The interplay between classification and inference cannot be accounted in its framework. In any case, I do not follow Robert Brandom's attempt to *replace* truth-conditional semantics altogether by some *formal* inferential system. Moreover, I am sceptical of non-standard approaches to logic inside mathematics. However, their discussion of rule- or 'proof'-theoretical logics, i. e. of Gentzen-style systems of natural deduction, sequence analysis[2], and dialogical tableaux[3] can help to understand better that and how sentences are rules and rules are sentences. This also helps to make the basic decisions explicit that are already presupposed when we use truth-functional definitions of logical symbols.

Astoundingly, reading 'true' standing sentences (i. e. tautologies) as rules goes back to Wittgenstein's *Tractatus*. The astonishment results from the fact that the work is a most influential proposal to look at truth-table-semantics as a general moment in a most general deep structure of *empirical* sentences by which we can express *actual*, *past* or future *states of affairs*. Wittgenstein wants to show us the implicit or 'hidden' logical *form of representation*. But Wittgenstein stresses also that logically true sentences and mathematically true sentences *do not represent anything*. They must be understood as *valid rules of general inference*. Moreover, Wittgenstein points out that when we prove the truth of an arithmetic sentence, we do this not only because we want to classify the true ones and distinguish them from the sentences to which we have attached the value 'False' by some norm or rule.

[2] Cf. G. Gentzen, 'Untersuchungen über das logische Schließen'. I/II. *Math. Z.* 39, 1934/1935, 176-210/405-43. Cf also chpt. VII 'Regellogik' in the wonderful encyclopedia Karel Berka & Lothar Kreiser, *Logik-Texte. Kommentierte Auswahl zur Geschichte der modernen Logik*. Berlin 1971, P. Schröder-Heister, *Untersuchungen zur regellogischen Deutung von Aussagenverknüpfungen*. Diss. Bonn 1981 und P. Stekeler-Weithofer, *Grundprobleme der Logik, Elemente einer Kritik der formalen Vernunft*. Berlin 1986.

[3] Cf. Kuno Lorenz Dialogspiele als semantische Grundlage von Logikkalkülen, in: *Archiv für mathematische Logik und Grundlagenforschung 11*, 1968, 32-55, 73-100.

We do not fill books or tapestries with true arithmetic sentences. Rather, we are interested in the true sentences because they articulate *admissible rules of arithmetical calculation* or *inference*. Therefore, Wittgenstein can say that no formally logical true sentence corresponds to any 'reality'. No arithmetically true sentence 'depicts' states of affairs. They only express (default) rules of inferential calculation.

This insight must now be broadened to all conceptual truths, which leads us to a new distinction between really empirical assertions and material but still conceptual inferential norms. Some of them, but not all of them can be expressed by situation-independent sentences, which express 'valid' or admissible default rules of prima-facie or a-priori understanding. Their dialectic norms of application in dialogues, however, cannot be expressed in this way. Therefore it is just a myth that we always can make all the premises and rules of a good inference explicit by sentences. Inferring or reasoning is not just applying formal deductive rules to sentences as premises. Axiomatic systems do not make valid inference explicit as 20th century logic believes. They only help us to provide some overview over systems of valid conclusions which hold in whole classes of models that turn the axioms into true sentences or valid rules.

The deep reason why the *Tractatus* fails to provide us with a sufficient picture of the representational content of empirical sentences lies not so much in the wrong or at least unclear premise that elementary empirical sentences are 'logically independent' – being blue is certainly not independent from not being red, yellow or green –, rather in the related more general fact that Wittgenstein's logical empiricism does not account for conceptual though material norms and rules of inference. Like Hume he does not see that such norms turn our conceptual classifications of empirical situations into inferentially thick assertions. Truth-conditional connectives in their standard Fregean reading are only a means to define logically complex classifications or taxonomies of sets of things, possible situations or possible worlds. An inference from the fact that an animal is a mammal to the fact that it has a liver is conceptual, generic, not 'empirical' in the sense of a mere quantification about singular objects. The same holds for statements telling us that water boils at 100°C or that a gold ring does not rust.

2 Empirical Sentences

Empirical statements belong to Hegel's category of *singularity*, i. e. of merely narrative, often only *anecdotic historia*, in which we talk about *one or many singular situations, events and things*. It is of utter importance to see that even statistical *relative frequencies* as such are only historical anecdotes, in deep systematic contrast to any *generic*, hence, *a priori probability measure*. Such *probabilities* are already *default estimations* of *generic* relative frequencies.[4]

We can talk, for example, about one or all apples in a basket here or about one or all battles of Napoleon. *Historia* as such can be seen as a set of 'idiographic' propositions (assertions) about what has happened. In a sense, Hume was utterly right to point out that we do not, should not and cannot go *immediately* from merely 'empirical' propositions of the category of singularity to generic, time-and-space-general, sentences or rules. But the way Hume and his empiricist followers argue is nevertheless misleading. They say that we cannot 'conclude' with 'necessity' the general rules. By this, they assume that the general rules are valid only if they are *universally valid*, i.e. if we can use them in making inferences *automatically, schematically, formally*, just as we use *universal quantifications* about all singular entities in a sortal domain or abstract set. But this is already a much too idealistic reading of the default norms or rules of drawing conclusions on the ground of distinctions. As a result, ironically, the empirical scepticism of Hume and his followers in 20th century Logical Empiricism (like Carnap) and even in Critical Rationalism (like Popper) are much too *idealistic* with respect to their readings of theoretically sentences and rules and the very notions of necessity and aprioricity, whereas *Plato* and his followers like Hegel are much more *realistic* about the *ideal* status of the conceptual default rules of inference with respect to their empirical applications: Both Popper and Carnap do not give a satisfying account for the fact that when we evaluate theories as systems of generic default rules or materially true conceptual inferences as 'valid', we only compare learnable and *feasible theories* with each other and *choose the best available*. This is precisely the (apparently until today 'unknown' or 'secret') 'dialectical method' which Marx has inherited from Hegel. The method includes the insight that in science we cannot care too much for merely singular exceptions and anecdotes, and not at all for all future contingencies. Any other procedure would be as impossible as non-realistic, as the case of probability immediately shows: If there is absolutely no fore-knowledge about a possible non-homogeneity of the dices we use in a game, there is *no better a priori expectation* of throwing a 6 (generically by a die) than by attaching to it the value 1/6, i. e. by an *equal distribution* of probability values to the outcomes 1-6. In the 'unlikely' but 'possible' case that you throw 50 times in a row a 6, we might get suspicious that the die or dice are forged or that you play some other tricks on us. But when we do not find the causes we must admit that things like this *can happen* and are not a priori excluded by the a priori distribution of the generic probability values. But notice that by far not all generic inferences,

[4] Cf. Pirmin Stekeler-Weithofer, 'What is objective probability', in: O. Tomala, R. Honzik, *The Logica Yearbook 2006*, Prague 2007, p. 237-250.

dispositions or expectations are probabilistic. When we say that cats have four legs we do not say the same as when we say that the probability or generically expressed average frequency of a cat having four legs and not less is, say, 0,99. And when we say that oaks grow out if acorns we do not say that the success rate is, say, 0.0003.

We do not even justify generic sentences only 'empirically', by looking at relative frequencies. We do not say: Every morning the sun went up. Therefore I or we expect it to continue to do the same tomorrow and in all future days. We rather never ask for such a 'poof' and our fore-knowledge refers only to types, not to singular cases. We say to people who expect the end of the world at a certain date that this might be a thrilling game but it plays only tricks with some moods of fear and anguish – or with our secret love for states of emergencies as we have sadly encountered it in August 1914 all over Europe.

The fact that any prognosis is generic is the deep reason why it is so idealistic to assume that we could predict the future precisely by well-justified universally quantified empirical sentences. There are only some minor, even though quite impressive, possibilities to produce or predict future events causally, as in kinematical and dynamical ballistics or physical mechanics. But it would be ridiculous to infer from this nice success that in principle any future can be predicted or is already determined by nature or God, just as we can determine some future in our technical interventions into nature. For most future-related empirical sentences rather the following fact holds: They can turn out as true *post hoc*, but if they do, it still is a mere accident that they do. The situation is different with *generic sentences* that belong to the category of generality (Hegel's *Allgemeinheit*): They are not true by mere accident. We do not wait and see as in the case of merely empirical assertions. We *set* them as true or *declare* them as reliable and justify such declarations or proposals as the best fore-knowledge possible. We do so already in the case of a priori probabilities: They are justified as the best thumb rules possible for expecting relative frequencies in standard cases of sufficiently long runs of mechanical devices that generate equally distributed chances.

Only if we see that the generality of generic sentences is very peculiar, we can develop a realistic semantics for linguistic understanding as well as the important modal notions of possibility, necessity and contingency. In fact, only under this condition can we reconstruct the basic step which leads away from Hume's law-sceptical empiricism to Kant's philosophy and Hegel's logical improvements: Kant sees that *we need* generic laws, that there is no understanding without generic norms. This is so because, in understanding, we (have) to draw inferences from what we hear and what we see. Kant thus detects inferential normativity in human understanding that cannot be accounted for in a merely behavioural story of what we only *frequently* do, as Hume or sceptical empiricism let these things appear.

However, from the fact that we *need* 'laws' in order to understand 'dispositions' it does not follow that we *have them available*. Nevertheless, we can at least distinguish a 'transcendental deduction' of the categories as a system of categorical presuppositions for objective claims from a 'metaphysical exposition'. Such a 'transcendental deduction' must not be taken as an alleged proof of some transcendent truth but in the sense of *justifying the functional need and application of the norms expressed in the system of categories and the list of principles*.

When we make these norms explicit, we call them 'rules' or, alternatively, 'synthetic a priori principles' or 'synthetic a priori sentences'. The point why they are called 'synthetic a priori' and not 'analytical' is this: Only those norms that follow, deductively, from merely conventional terminological definitions are called 'analytic'. If a generic norm or rule surpasses this realm of analyticity, it is called 'synthetic *a priori*'.

But are there synthetic a priori norms, rules or sentences at all? What precisely is the logical status of generic sentences? How is their aprioricity justified? And how are they used? If we assume with Hume that generic rules are quantified empirical sentences, we turn with some necessity into sceptical pragmatists: We then 'believe' that we 'believe' in universal empirical statements just because it is pragmatically convenient for the time being, even though we 'know' that we cannot 'know' that they are true.

The point is that Kant starts to see that the logical status of generic theoretical truths is different from universally or all-quantified empirical statements of the category of singularity or empirical concept-application. Hegel sees, moreover, that there is nevertheless some need of assessing these generic laws and sentences. Scientific giving and asking for reasons mainly is concerned with the development of our system of 'the concept', i. e. of 'conceptual' norms or generic truths. If anyone proposes a new truth, he or she has to give arguments why it is good to add them into our 'canonical' system of generic norms. Hence, it is Hegel, rather than Kant, who asks for the status of synthetic a priori sentences, rules or norms. Kant only has shown their function and, by this, why we need them and that we presuppose them in our practice of producing and understanding empirical judgements in an application of our conceptual or rational faculty of thinking, judging and inferring.

Standing sentences hold, as we say, by conceptual reasons. When we therefore also say that they hold with some necessity, we talk, at least at first, about *a necessity of our understanding*: Without them, we would not be able to articulate any inferential orientation. In fact, any talk about *dispositions* and *forces*, even about our own *faculties*, *powers* and *competences* has the form of *default expectations* and *default inferences*.

Logical empiricism fails nowhere more dramatically than in its virtually non-existent account of forces, dispositions and inferentially 'thick' predicates.

It fails because quantificational logic, constructed for defining logically complex predicates or classifications in sortal domains, is just not good enough to analyse such thick predicates, not even with the additional framework of *possible world semantics*. In other words, neither Hume's empiricism nor 20th century logical empiricism can analyse the notions of *force* and *efficient cause* in a satisfying way. Therefore, their alleged critical approach collapses. They fall back into a dogmatic metaphysical naturalism, which may turn out as physicalism or biologism. In my reading Hegel takes side with Kant against the claim that any meaningful sentence or judgement (proposition) is empirical, i. e. empirically true or false. He denies that all questions are epistemological in the sense that they ask what gives us the right to 'believe' in the (empirical) truth of the sentences or propositions. He rather asks what we really do when we explain appearances by theories.

3 Singularity, generality and particularity

We now want to distinguish between applicative speech acts of the category of singularity and generic speech acts with generic forms as topics, i. e. of the category of generality. It is clear, then, that a speech act in which we assess the fulfilment of the norms of application must reflect on both sides: on the generic norms for paradigm or standard cases and on the norms of how to apply them in particular circumstances. Applicative speech acts thus belong to the category of *particularity*, i.e. the category in which the relevant generic norms are developed out of the singular cases. Only if we see that a generic statement like 'cats have four legs' is governed in its 'empirical' application to singular cats by special norms or duties of assessing the relevant fulfilment conditions of the paradigm or prototype case for the speaker and corresponding default entitlements for the hearer (pace all possible errors on both sides) we can distinguish the status of generic truths from the status of empirical sentences. The universal sentence 'all cats have four legs' is empirically wrong, whereas the following sentence is true: all (living) cats have a (still functioning) heart and liver (or some functional equivalent). In other words, there are generic statements that allow for exceptions, and there are general rules that hold universally as, for example, men are, as all animals, mortal. The statement that cats have hearts and livers is a *universal generic* statement. It is true for any living cat (if we include possible functional equivalents). Its status is nevertheless similar to the generic statement that cats have four legs: Cats have four legs, if they are not mutilated, sick, or monsters. A 'normal' cat has four legs, just as a 'normal' human can speak and walk and read and write. As it were, we might distinguish now between universally necessary conditions for being an X (like a cat) as, for example, to be an offspring from cats or to have parts that are functional necessary for living or surviving (if we exclude dying cats as a separate subclass and dead cats as being no cats anymore). It is fairly safe to infer necessary conditions from the empirical truth that something (y) is a cat. This something, then, has with 'conceptual' or 'generic' necessity livers and hearts. It does not have four legs with the same universal necessity. An adult and healthy she-cat *usually* has quite many kittens. But not every cat is a usual cat. Nevertheless, it is a generic truth that she-cats have between 4 and 8 kittens, love milk, are very clean if well bred and well educated and usually detest swimming. If some of these normality conditions are not fulfilled, there might be some need to say so, to make it explicit, for example when I sell my cat Kitty. Then I might be committed to say that Kitty is a healthy cat, *but* she is castrated, so she will *not have* kittens. Perhaps I have to say also that Kitty is well behaved *but* she is not clean. Or I might be proud about my training of Kitty and tell you that she is a normal cat *but* she loves to jump into lakes like a dog.

This logic of the word 'but' or of the words 'although' or 'nevertheless' is much more interesting than formal logics or logicians have hitherto realized. It is so interesting because at first it looks as if the 'but' is just a version of the logical operator 'and' in logical conjunctions as Frege hat proposed in a first move. In this reading, to say that I will come this evening but not before 11 o'clock, just means the same as saying: I will come and it will be this evening and it will be after 11 o'clock. The use of the word 'but' only warns you here that there might be some expectation on your side that I might come between 6 and 11 pm. This possible case is excluded by the addition 'but I come after 11'. It might be a law of etiquette to be as precise as possible when announcing my arrival. But there is no 'logical norm' to do so.

In the case of our cat, however, the exclusion of normality conditions is different. Here, we might be obliged by general reasons or general norms of linguistic charity and cooperativeness to exclude from a salient set of usually relevant normality conditions for being an F those conditions explicitly of which we know that they do not prevail. In order to make this case explicit we use the words 'but' or 'although' or 'nevertheless' or the like and say, for example, 'even though x is an F it is no G', when we usually are entitled to infer (in the default cases) that Fs are Gs.

All this supports our claim that on the level of the concept or genericity with its norms and rules of generic inferences, we better distinguish two classes, namely universal material implications of generic necessity that articulate really *necessary* conditions for something being an F or for some pains or n-tupels x,y,z ... standing in the relation R on one side, merely *default* conditions on the other.

As a result, if we hear that x is F or that x,y,z ... stand in the relation R we might have to distinguish between two classes of material inferences M already on the generic level: those that the speaker is committed to support in any case (M1) and those that we are entitled to in a default case (M2). In other words, the speaker entitles us hearers by his claim that x is F or that x,y,z ... stand in the relation R to both forms of drawing consequences, namely M1 and M2, but in different ways: M1 are 'necessary' consequences I can rely on if the speaker has told the truth. M2 are default consequences which I also take as reliable – as long as they are not explicitly excluded. As such, we do not calculate just with possibilities or frequencies, but with default entitlements that 'follow', in a sense, from the information given in the speech act. They can be subject of accurate control either by the speaker or by the hearer and, as such, they belong to the reasons for the very possibility of non-monotonic inferences, entailments or conclusions.

If this is so, and I belief that it is so, then we do not have non-monotonic reasoning and entailment throughout, but only with respect to the weak material inferences M2. In other words, further information about the properties of x beyond the information that it is F or beyond the property that xyz stand in the relation R can *reduce* the default inferences M2. But further knowledge *always widens* the necessary conditions M1 *monotonously*. Hence, we must distinguish additional knowledge (which may contradict the fact that x is F or that xyz stand in relation R and thus disproves the claim and shows that it was, as an empirical proposition, wrong) from additional knowledge that is still *generically compatible* with x being F or xyz standing in the relation R, *even though* some *default* entailments are bracketed.

If this is so, or rather, because this is so, we have to distinguish between different versions of *adding information*. The first is the easy one: it is normal conjunction of information, as can be often made explicit by conjunction of sentences of the form p&q. This is monotonic in the sense that anything which we can infer from p (or q) can be also inferred from p&q. Of course, the speaker is committed to all necessary conditions of p and of q, hence of p & q. But if we are in a situation in which additional information q *restricts* the default-inferences of the proposition p (saying that x is F, for example) then q expresses some *privation*. In such cases, we better do not read the addition of information as p&q.

But how to analyse such an utterance of the form 'x is F but q' or 'x is F but it is also G, even though normally non-G holds for F's'? For at first we certainly have here two assertions: 'x is F' and 'x is G'. Hence, we seem to have 'x is F & x is G', that is the conjunction of information. Nevertheless, the default inference of 'x is F & x is G' to which we are entitled does *not* add up from the default inference of 'x is F' and 'x is G'. Rather, there is an asymmetry here. The default inferences of the but-clause q seem to remain intact, but not of the original clause p. If I say that the Kitty is a cat but she has only three legs, that she is blind and that Kitty must be fed by a certain diet, I indeed say that kitty is blind, has only three legs and that we must feed her, which might be a nuisance for us all in comparison to a cat which feeds herself by hunting the mice in the barn. By the but-clause q, I cancel some default inferences of Kitty which would be valid if he were a normal cat. So if I would promise you to bring Kitty as a present and you would ask me who Kitty is, and if I then say, well Kitty is a cat, without informing you about q, you are in fact entitled to expect that Kitty is a normal cat. In other words, you are entitled to the default expectation that Kitty is neither dead nor blind, neither a toy cat nor a three-legged cat. That is, you are entitled to believe that Kitty has the normal faculties of a cat and that the normal possibilities to deal with Kitty as a cat prevail.

If a speaker knows that relevant normal conditions of this sort do not prevail, he is *committed* to inform us about it. That is, he has to add some but-clauses to his information that Kitty is a cat. Or else we can hold him at least partly responsible for our erroneous belief that Kitty is a normal cat – which is a default inference from the information that Kitty is a cat.

This shows in which sense additional information about Kitty can reduce the default inferences or expectations the hearer H is entitled to work with if the speaker S tells him that Kitty is a cat, without giving him the additional information q, that tells us that Kitty is sick. Therefore, default entailment is not monotonic.

If we would do some formal regimentation, we perhaps better use the whole but-clause as a kind of operator that changes the default entailments of the clause to which it is attached. As a result, a sentence of the form 'Kitty is a cat but she is blind' gets the form '(But blind)(Kitty is a cat'). How does such an operator 'But blind' work semantically? It cannot change the necessary conditions for being a cat. But it can change the realm of default inferences we are entitled to believe or rely on under the condition that the uttered proposition is true and the speech act fulfils the normality conditions of good communicative acts. And it does so in the following fashion: If M2 are the default inferences we are entitled to assume as possibly or probably prevailing in the normal case of an empirical information-act that just says that p, then the default inferences M2* of '(But q)p' contain all default inferences of q together with those default inferences of p that do not contradict q.

In other words, an empirical proposition p that says that x is F can still 'contain' quite some 'contradictions', namely that x is G even though 'normally' we would expect that Fs are not Gs. But we always have to distinguish between the monotonic logic of the necessary conditions of the propositions p, q, r … that are uttered with positive support by the speaker and the entitlements that are default conditions of the usual utterances of p, q, r … which do not add up monotonic. That is, the logic of default inferences is non-monotonic, the logic of necessary conditions is.

An example: There is a table in the kitchen, but it is 'Japanese' (*chabudai*), but, on the other hand, it is for some reasons or other nevertheless higher than

Japanese *chabudais* usually are, but still less high than American tables. Here we might expect that the kitchen table is neither as high as Western kitchen table usually are nor as low as Japanese tables are. The second 'but-clause' is a kind of revision of the first but-clause such that we have here a kind of nested 'buts' – and this is why I have presented the case.

So we see why it might be a good idea to express the non-symmetry between the original clause p and the additional revising clause 'but q' already in the syntax. We have done so by the operative form '(But q)(p)' by which we can distinguish the but-operator 'But q' and the base p on which it works. 'But' is a sign for some (possible) non-monotonic revision. Viewed in this light, it could be misleading to develop a 'non-monotonic logic for the conjunction &': There would be no non-monotonic conjunction 'and' in this approach at all.

A critic might say that I use here a notational trick. This might be so or not. For the notational trick just shows what I want to show, namely that we should be more careful in distinguishing conjunction '&' in sentences 'p&q' and a mere adding up of utterances without clear logical connections – which might be correctly understood as conjunction, but also can contain what I want to call a non-monotonic 'but-information'. Hence, there is an ambiguity in the idea of a mere 'adding up information': it can be monotonic conjunction but it can also contain non-monotonic restrictions or denials of default inferences which we usually would be able to use or rely upon if. The interesting point now is that the norms that govern our 'dialectical' commitments to express but-knowledge if we know about relevant restrictions of default-inferences as speakers, cannot be expressed as sentences or rules, only as general principles.

In contrast to this, on the level of generic and timeless truth (as in mathematics) 'adding up' propositions is conjunctional, i.e. monotonic. In the sciences, which tell us how things behave generically 'as such' or '*an sich*' in Hegel's sense, there is no non-monotonic 'but'. Here, any 'but' is only an 'and' which is accompanied by some expression of surprise, as Frege had assumed about *all uses* of the word 'but'. In fact, this harmless use shows already up when we say that any two numbers p and q can be divided by each other 'but' nothing can be divided by 0, such that any number but 0 can be a divisor.

In other words, there is no non-monotonic logic in merely generic knowledge or on the level of conceptual truth. However, the analytical tools and distinctions of inferential semantics are not developed and sharpened yet – as long as we do not add some new features to the whole setting.

4 A rule-theoretic approach to logical connectives

A sentence of the form 'if S, then S*' can, in a first step, expressed by the use of two distinct symbols. The first is the arrow '⇒' that expresses a meta-level rule or form of inference. The second is the sign '→' expressing a 'subjunction' in the sense of a corresponding sentential connection like 'and'.

We say that a sentence 'if S_1, then S_2' is valid if the deductive scheme of *modus (ponendo) ponens* or the corresponding rule that leads us from S_1 to S_2 is valid or can be applied (in some way or other). The deductive form *modus ponens* is applied by going over from two premises, the sentences 'S_1' und 'if S_1, then S_2' to the sentence 'S_2'. In order to express this step or rule by a sentence, we would have to write something like 'if S_1 and if S_2 in case of S_1, then S_2', or, using symbols, '$S_1\&(S_1\rightarrow S_2)\Rightarrow S_2$' which corresponds to the sentence '$S_1\&(S_1\rightarrow S_2)\rightarrow S_2$'. It is obvious that we already must know how to use the arrows. The *implicit* or em*practical competence of* using the form modus ponens is basic for the very concept of a rule expressed by ⇒ or by →.

In a sense, the meta-rule *modus ponens* for rules (MPR) – using the symbol '⇒' in corresponding expressions of rules – says that we are entitled to pass from

(MPR) 'S ⇒S*'and '⇒S' to '⇒S*'

In our formulation of MPR, we already use a seemingly strange notation, the arrow without premise, namely in the expression '⇒S'. It corresponds, in a sense, to Frege's assertion sign. As we can see in this comparison, Frege's assertion sign does not say 'I Frege, think that the following is valid', but expresses a that the S is 'valid' or 'true'. Only on the ground of understanding (MPR) as a commentary on how to follow a rule expressed by arrows, an expression like 'S ⇒S*' gets its (jointly intended) sense.

The basic insight or rather technique of a rule-theoretical approach to a logic of sentential connectives (and later, quantification and modal operators) now consists in this: We replace *valid rules* 'S⇒S*' by *implicative sentences* 'S→S*', more precisely by ,valid theorems' '⇒S→S*' and arrive from the *modus ponens for rules* the following modus ponens for *subjunctive sentential connections:*

MPS: We are entiled to pass from ⇒'S' und ⇒'S→S*' to ⇒'S*'

or, if we look at inferences or conclusions that still depend on a list of further premises Q:

MPS*: We are entiled to pass from 'Q⇒S' and 'Q⇒S→S*' to 'Q⇒S*'

Lewis Caroll has famously shown in his dispute between Achilles and the Turtoise[5] that an implicative (or subjunctive) sentence *is not the ground* but only

[5] L. Carroll, 'What the Turtoise said to Achill', in: The Complete Works, London 1966, 1104-1108.

an expression of a *valid inferential form*. The validity of the 'form' of deduction or the 'norm of inference' is only made explicit by the arrow-expressions and implicative sentences. But, of course, we can now stenographically articulate 'axiomatic' theories as sentence- or rule-producing *generative systems*. As we have already seen, we can use a logical symbol like 'and' or '&' in articulating complex rules by complex sentences as 'hypothetical' premises and rules for their use in a system of conditioned rule following.

A rule-theoretical approach to logic does not really start with conditioned rules of the form 'S⇒S*', but with absolute or unconditioned rules or basic truths as, for example, the true logic-free or elementary sentences of arithmetic. Such 'prime rules' might be of the form '⇒0+1=1', '⇒1+1=2', '⇒2+3=5' or '⇒2·3=6'. They are defined by schematic systems of producing well-formed elementary number-terms, formally true equations and true orderings of the form n<m. The schemes concern conventionally ordered sequences of number terms as in our decimal system, but they correspond in an obvious way to much easier sequences like I,II,III, IIII, and the trivial equalities of the form III=III.

For any 'true' basic sentence S we can declare that ' S' and 'Q⇒S' are 'valid' with respect to the elementary system we started with.[6] More generally, we declare that the following meta-rules 'define' the system of 'valid sequences', which, in turn, can be read as 'valid rules':

(Basic formulas) If S is an elementary formula (or a basic sentence in a domain G of discourse like elementary arithmetic such that S may be true or false in G), then all rules of the form 'Q,S S' are 'axioms'.

(→-Introduction): If 'Q,S ⇒S*', then 'Q⇒S→S*'
(→-use): If 'Q,S→S*⇒S', then 'Q,S→S*⇒S*'.
(&-Introduction): If 'Q ⇒S' and 'Q ⇒S*', then 'Q ⇒S&S*'
(&-use$_1$): If 'Q,S,S&S* ⇒S**', then 'Q,S&S* ⇒S**'.
(&-use$_2$): If 'Q,S*,S&S*⇒S**', then 'Q,S&S*⇒S**'.

(∀-Introduction): If 'Q⇒S(b_x)' for any possible interpretation b_x of the variable x in the relevant domain G and if x is free in S (just in order not to confuse the scope of the quantifier), then 'Q⇒∀xS(x)'

(∀-use): If 'Q, ∀x.S(x).,S(x/b_x)⇒S*' for any possible interpretation b_x replacing the free variable x in S, then 'Q, ∀xS(x)⇒S*'.

5 Negation as a step into truth evaluation

(¬ -Introduction) If S* is any wrong elementary sentence and if 'Q,S⇒S*', then 'Q⇒¬S'.

[6] Cf. for this also Paul Lorenzen, *Einführung in die operative Logik und Mathematik*, Berlin 1955.

According to this rule, we want to declare any rule S (relative to the conditions Q) as 'false' if it leads us together with Q to a *particular* elementary S*. But as long as this were the only rule, the negation would still silently depend on the wrong S*, since '¬S' would more or less 'mean' the same as 'S→S*'. We get a parameter-free negation if we add the rule, *Ex Falso Quodlibet*' EFQ.

(EFQ) If 'Q,¬S⇒S', then 'Q,¬S⇒S*'
for all sentences S*.

In fully formal systems with parameter-free negations, *consistency* means that *not for all* formulas F the unconditioned sequence '⇒F' can be derived; in '*half-formal*' systems it means that for no wrong *prime sentence* S the unconditioned sequence ⇒S can be derived.

Derivations take, of course, the form of *trees*. If we read them from top to bottom, we arrive at possible *search strategies* for a derivation or a 'proof': The search strategy corresponds to a search tree. The search-tree for a proof succeeds if all branches end in finite steps at true prime sentences S or at *sequences* of the form 'Q⇒S' with *true elementary S* in the domain. Because of the rule of the introduction, of the quantifier, the search tree can be infinitely branched. A formula F is proven as *derivable* not just when it is derived in a tree, but also when we give a sketch of a search tree and prove that it 'must' end in axioms. Another form of proof could convince us that there 'must be' a derivation even though we are not (yet) in the position to describe it. It is the deep mistake of the defenders of some version of intuitionism *and* of the defenders of 'classical' logic not to appreciate the (importance of) this distinction in a proper way.

As a result, we can see what *half-formal proofs* in such a system are: They are descriptions of searching trees together with arguments that show that each branch ends in finite steps. This means to describe a *winning strategy* in a dialogical game.[7] Notice that we have, at least at first, assumed that if S is elementary, then S is true or false; and we can decide in finite steps (in principle) if it is true. If for any n S(n) is true or false, so is ∀xS(x), even though we might not be able to decide it. Assume that in our search tree for 'Q⇒∀x S(x)' a sequence 'Q⇒S(n)' leads to an infinite branch. Then we know that Q 'is true' and S(n) 'is wrong'. For if Q would be wrong, we 'could' succeed in finding a derivation by the rule EFQ.

It is not too difficult to see that for any formula or sentence S and any series of further condition Q the sequence 'Q,S⇒S' is derivable and, hence, represents a 'valid rule'. But we also get the following meta-rule, which somehow

[7] For a short sketch of searching trees cf. P. Stekeler-Weithofer *Grundprobleme der Logik*, Berlin (de Gruyter) 1986, 544f.

corresponds to the 'modus ponens' even though it is a particular property of our sequence of derivations and is well known under the label 'cut rule':

(Cut Rule) If 'Q⇒S' (is valid) and 'Q,S⇒S*' (is valid), then 'Q⇒S*' (is valid).

The validity of the cut rule is a kind of proof for the fact that the introduction rules and the use-rules *stand in a certain harmony* to each other.[8]

By the way, Gentzen has called the use-rules 'elimination rules', even though in our interpretation of his 'sequence-calculus' as a way to explain the stenographic technique of condensing complex rules of inference in logically complex sentences the only real 'elimination' of a logical sign in the list of premises or rules is the *introduction rule for the subjunctive*. This gets even clearer when we look at the following 'deduction theorem' (DT):

(DT) 'Q⇒S→S*' is valid if and only if 'Q,S⇒S*' is valid, with empty or non-empty Q.

Nuel Belnap discusses an interesting example of an alternative system of introduction and use-rules; for which the crucial condition of *harmony* does not hold:

(Belnap's wrong &-Introduction): If 'Q⇒S', then 'Q⇒S&S*'

The rule (&-use$_2$), i.e. if 'Q,S*,S&S*⇒S**', then 'Q,S&S*⇒S**' would allow us now to 'derive' *any* sentence '⇒S**' and, by the same token (this is the 'meaning' of the derivation) to declare it as 'valid'. This shows that Belnap's introduction rule is *not in harmony* with the use-rule: The system cannot *define any difference* between 'valid' and 'not valid' formulas or between 'true' and 'false' sentences or rules. (Belnap names his 'logical sign' 'tonk').

We can see now in which sense valid rules are expressed by valid sentences and how valid sentences can be viewed and used as rules. Validity is *admissibility of use*. One of the most general conditions is that we want to rule out that we can derive '*wrong*' results from sentences or rules that are classified as valid or labelled as true. In our example of elementary arithmetic, for example, all those logically complex sentences S are evaluated as 'true' for which the following holds: There is no wrong elementary sentence S* such that 'S⇒S*' can be shown as valid. The interesting point now is that if we add the 'constructivist' rules for introduction and use of the 'or' and 'there is' and if we have a strategy to derive sentences of the form 'for all x there is exactly one

[8] Cf. Hong Zhou, *Laws and Skill. An Inferential Diagnosis and Defense*, PhD Diss. University of Frankfurt/Main 2010.

y such the S(x,y)' we can define in any G a notion of an effectively *computable* function. On the meta-level, we can show that for any logically complex S defined on a system of basic sentences that are either true or false and not both that either '⇒S' or that '⇒¬S' must be valid and not both, but we often cannot *decide* which one is valid. And even if we know that S is true, we often do not have a *direct winning strategy* for '⇒S'.

It can be convenient to describe such winning strategies in dialogical games, as proposed by Kuno Lorenz, Paul Lorenzen and copied by Jaakko Hintikka. In such a dialogical logic, we can present our 'sequence- or rule-semantics' by rules of entitlements and commitments in a dialogical game with two players, such that the 'opponent' delivers the 'rules' that the 'proponent' is entitled to use: The 'proponent' of a sentence (or rule) wins the game if he has a *winning strategy against any opponent* – which is just the same as knowing that a *search tree* for a proof *ends in all branches* after *finite steps* at some 'true' basic sentence.

The rules of classical truth-evaluative logics presuppose a given system of elementary sentences S that are already evaluated a true or false, such that, if $S(x/b_x)$ is true or false $S(x/{}^*b_x)$. is true or false as well, i. e. the sentences define truth-value *functions* in a given domain G of (abstract!) objects or entities, such that the Leibniz-principle is fulfilled, i. e. such that the values are the same if $^*b_x=b_x$.

Rule-theoretical logic gives a use-theoretical *semantics* of the logical signs (including quantifications). The format of defining validity and truth is different from truth-conditional semantics, but even more so from a Davidson-Tarski-approach, which is purely formalistic insofar as they only work with fully formal axiomatic systems without considering the basic sentences and entities of G that interpret the formulas as sentences.

Tarskian semantics is only pseudo-semantics insofar as it adds a truth-predicate 'S is true' to a merely formal language taken as an axiomatic system. One adds some most general axiom-schemes of the form 'S is true if and only if S'. This leads to interesting investigations of so called internal semantics in *axiomatic* set theory. But all this stops short before any *external model theory*, as we need it when we interest a set of formal axioms. Formal axioms define formal theories as sets of rules that hold in any model in which the axioms are valid. The half-formal valid sequences considered here are valid rules or true sentences *in G* (and in *isomorphic* domains).

6 The flexible use of rule-theoretical logic

A rule-theorical view on the use of our logical vocabulary shows that the formally analytical or terminologically valid sentences or rules of inference can and must be distinguished from material but still generic or conceptual rules of inference expressed by standing sentences. These are different from empirically valid truths. The latter can and must be read as distinctions of situations labelled by inferentially thick expressions.

The classical idea that *perceptions* are *theoretically loaded* is, in the end, the insight that full human perception is *conceptually informed*. This conceptual information is, however, mediated by an a priori or pre-established 'harmony' of differentiations and default inferences, which, at first, might be just learned as practical schemes of standard reactions, including the production of verbal labels as a first step to make the conceptual form and norm explicit. In a second step, we can articulate sentences that make the default inferential rules explicit, such that we can control the supposed 'harmony' of the default expectations or inferences and the default criteria for classifying the relevant things, persons, situations or events, just to name a few 'categorical objects' that may be relevant here.

To give some examples: The empirical sentence 'it rains' obviously functions as a situation-predicate. To utter it is to classify the present situation or the situations referred to as a situation of a certain sort. We might expect in default cases inferentially that the water will wet the earth, even though in some cases the whole water may evaporate very soon or almost immediately.

In a similar way, a sentence with a demonstrative pronoun like 'this dog is dangerous' also classifies not only dogs but also situations: In a sense, the utterance 'says' in the *mode of a conceptual presupposition* that in the situation referred to there is a living animal of the species of dogs which is *shown* and can be *singled* out. The assertion says in the *mode of predication* that it (i. e. *the dog pointed out*) is dangerous. One part of the inferential content of the utterance thus is a *warning* like 'beware of the dog!', but another part of it is the *information* that the dog belongs to the class of dogs for which such a warning is in place.

The problem of harmony between the default criteria of classification and the default norms or forms of inference can be nicely shown if we look at an example proposed by Dummett and cited by Brandom: the French word '*boche*' or, alternatively, the English '*hun*' for a German. In these words, the war propaganda in World War I got linguistic so to speak: The differential criteria of the words are supposed to be the same as those of the word 'German'. But the default inferences are different: A *boche* or *hun* is supposed to be an especially cruel, barbarous and stupid human subspecies or race.

The example shows, *ex negativo*, why and how we have to work on our concepts, i. e. on the default connections between differential criteria and entitlements to default inferences or default expectations that are mediated by the expressing word or linguistic expressions. As a result, we see, firstly, that virtually any word or expression of language is *inferentially thick*, often even in an evaluative or moral sense, secondly, that some of the default (entitlements to) inferences or expectations can or must be ruled out in the particular speech act if they do not prevail. Think, for example, of a situation in which you ask me for matches and I give you only wet ones. In such a case, I have to inform you about this 'privative' status of my matches. That is, the commitments of an actor and speaker goes well beyond merely 'literal truth', just because we must always adjust cooperatively the situation-transcendent default inferences to the particular situation of communication.

On the general level, we develop the harmony of default differences and inferences by developing generic knowledge. In fact, we cannot neatly separate material general knowledge as, for example, that there is a building called 'la tour Eiffel' on the left hand side of the Seine in Paris, and the 'semantic' knowledge what the expression 'names' i. e. to which object it refers to. The same holds for predicates and sentences, as we can see when we look into the 'explications' and 'explanations' of an encyclopaedic lexicon.

Hence, the generic validity of generic norms or general norms or rules of (dispositional) inference as they are already attached to *empirical* words and their criteria (or as we actually and locally might propose to attach them) does not just consist in the idea that in *all situations* the inferences are correct, but only that they are well justified as *default expectations* and *default orientations*. As a result, giving and asking for reasons takes quite different forms when we talk about empirical (historical, situation-related) statements (with or without quantifications over singular things or cases) and when we talk about generic or *situation-independent* default knowledge or conceptual 'truths', i.e. inference rules that are 'admissible' in *paradigm cases* and govern the entitlements of default expectations of a hearer, when a speaker asserts empirical things in order to give some empirical information.

As we have seen, empirical statements about what will happen in the future might turn out as 'true' *post hoc* or *a posteriori*. But it is perhaps not at all settled today if they will be true. In such a case, a mere claim that the statement will be *true* is *totally empty*. If our expectation that a predicted situation will or might be the case (perhaps in a certain measure of probability), is not justified generically on the basis of what is true now we better should not 'predict' anything. In other words, precisely with respect to prognostic forecasts, we have to learn to distinguish between merely verbal possibilities and real possibilities, between future expectations that are just arbitrary and those that can be justified as reasonable on the ground of our jointly developed and controlled generic and nevertheless experiential, but not just empirical conceptual knowledge. As a result, we must distinguish in a new way between general experience and empirical knowledge-claims. Empiricism does not realize the difference.

In any case, we must distinguish standing sentences expressing default rules of inference and empirical sentences expressing historical truths *ex post*. In order to see all this we need our insight into the relations between sentences and rules should help: We make practical norms of differentiation and inference explicit by sentences, such that we can, *expressis verbis*, discuss the general validity or generic harmony of the connections between default criteria of classifications and default rules of inference.

7 Dialogues and scorekeeping

In dialogues of giving and asking for reasons we can and must distinguish between the entitlements and commitments resp. attributions and undertakings of the speaker (and hearer) in a discourse. Correctness, proprieties, fulfilling of norms, including frame-norms like sincerity and accuracy and meta-evaluation norms like truth, beauty and goodness are assessed in some 'scorekeeping'. But scorekeeping is always already a joint enterprise. It would be wrong to reduce it on the 'low' level of individual performances (as it appears in Brandom's approach). Of course, any explicit act of scorekeeping is, like any object-level act of making a claim, an individual act of a speaker. But any such act makes an appeal to joint acknowledgment and transpersonal validity. (Brandom does not like these complications, which look 'spooky' to anybody who avoids the use of generic expressions).

As a result, we better distinguish between the individual speech act and the generic realm of publicly accepted or presupposed norms, criteria and validities. Even though the acceptance of these criteria, norms or truth- or correctness conditions show up only in overt behaviour and action which is always individual action performed by individuals, the logical and discursive status of implicit or practical acceptance is different from speech acts in which we only *apply* the norms.

The speech acts of application belong to the category of singularity with respect to the norm or rule that is supposed to be applied. So, if I apply the word 'lion' to what I see before me, I make a singular statement perhaps about a singular lion. I might want to inform or warn you by this statement of the danger, the supposedly dangerous lion.

Quantification always stays in the corresponding domain of possible names or situation dependent designations. Or they are empirical, referring to past, present and future singular caser. These domains are either generic as in the case of 'abstract' objects like paradigmatic types of a species or genus. We never should mix up the domains.

Applications of generic rules cannot be expressed by sentences. Particularity is a form of knowing how, not of knowing that. It happens neither on the level of generic (conceptual) nor on the level of empirical (singular, historical) knowledge claims (a posteriori). Applying generic sentences presupposes a differentiation between necessary conditions and default conditions. Default conditions open up a space of 'real possibilities' in contrast to merely verbal possibility. As such, it is only defined by formal consistency. Such a system of merely formally consistent (empirical) sentences is called a 'pure possible world'. It is 'defined' by a novel-like 'mythos'. But since we do not know at all which default norms of generic inferences should hold in such a world of a mere mythos, of mere stories, we cannot conclude anything beyond what we have stipulated arbitrarily in our list of sentences. Unfortunately, all the 'empirical' words occurring in the list loose their conceptual content – such that the talk about verbally possible worlds runs into the same problems as the talk about mythological gods. Whereas the latter are told to be like humans but only, in their immortality and other properties, entirely different, the former are like actual or historical situations in the one and only real world, but as merely possible worlds entirely different. David Lewis talks about trans-world relations. But this does not help[9]: it cannot be defined at all outside a merely formal structure of purely mathematical model-theory. In other words, we cannot know at all what may hold in such a possible world. In the end, such a possible world collapses into a structured sortal set of pure set theory. Hence, it is *only metaphorically called 'a world'*.

Therefore, no *material* argument can work with possible worlds. When we want to talk about really possible situations in the world and not just about formal truths of higher arithmetic or set theory, we have to ground our concepts in the real world on our real generic knowledge or material default inferences: They 'define' the very notion of possibility and necessity. Talking about 'the rest' of all models for axiomatic systems (of first order) is of no help here.[10]

Real possibilities can be contingent, exceptional, or they can be 'normal variations' of 'normality conditions'. For example, men and animals come normally in two sorts, as men or as women, But there are exceptional cases of undefined sex. That means that when a human being is born, it is always possible that it is neither female nor male but, in rare cases: non of the above. So we can distinguish between default possibilities and contingent possibilities or exceptions.

We arrive at some 'results':

We tend to accept the following principle or rule: If it is not necessary that non-p then it is possible that p. This leads to a reading of necessity as a universal quantifier and of possibility as an existential quantifier, hence to the development of possible world semantics in their readings of empirical

[9] David Lewis, 'General Semantics', *Synthese 22*, 1970, 16-67; 'Counterpart Theory and Quantified Modal Logic, *Journ. Phil. 65*, 1968, 113-116; *On the Plurality of Worlds*, Oxford, 1984.

[10] A much better approach to modal logic than in possible word semantics is developed by N. Belnap, M. Perloff 'branching time', e.g. in 'Seeing to it that', *Theoria 54*, 1988, 175-199; repr. in: H. Kyburg, R. Loui, G. Carlson (eds.) *Knowledge Representation and Defeasible Reasoning*, Amsterdam 1990, 167-190; c.f. especially N. Belnap, M. Perloff, Ming Xu *Facing the Future, Agents and Choices in Our Indeterminist World*, Oxford 2001.

sentences (resp. the expressed 'propositions') as *properties of worlds or predicates of situations*.[11] In contrast to this we could and should define the modalities on the ground of our system of generic knowledge.

Truth conditions are not independent of conceptual truth i.e. of dialectical thinking as giving and asking for reasons in favour of generally classified inferences in a public domain of generic knowledge: This knowledge plays the role of a system of criteria for correct understanding and rational judgement in the categorical domain of empirical singularity.

Humean empiricism is a kind of accidentalism and, as such, the superstition of total contingency. It says: Nothing can be known with necessity. All what we know is vague belief in contingent frequencies. But this way of looking at things misses the point of generic and empirical knowledge altogether, even though it rightly stresses that our knowledge is always finite, and that the infinite idea of a universal prediction of an empirical future is hopelessly counterfactual: Any reasonable judgement is generic orientation of the category of particularity.

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[11] There is an additional structure of 'forcing trees' (defining a formal notion of accessibility) in the semantical models of modal logic S4 and intuitionistic logic; see e.g. E.W. Beth, *Formal Methods. An Introduction to Symbolic Logic and to the Study of Effective Operations in Arithmetic and Logic*. Amsterdam 1958 & 1962 and Saul Kripke, 'Semantical Analysis of Intuitionistic Logic'. In: J. N. Crossley, M. Dummett (eds.), *Formal Systems and Recursive Functions*, Amsterdam 1965. Cf. also J. P. Cohen 'The Independence of the Continuum Hypothesis' I/II. *Proc. Nat. Acad.* USA 50, 1143-1148/ 51, 105-110.

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