

RATIONALITY AND REQUIREMENTS OF LOGIC

Ryszard KLESZCZ

Abstract

In this paper I discuss the problem of rationality of beliefs. The standard model of rationality proposes three conditions: 1) proper articulation, 2) respecting the requirements of logic (“logical rationality”), 3) sufficient justification. The second condition is usually understood as two requirements: one concerning consistency, the other suitable deductive abilities. This idea of logical rationality (commonly accepted) is idealised and not used in practice. For this reason the idealized conception should be reformulated. The conception of *minimal logical rationality* requires the fulfilment of some conditions but it would not presuppose logical omniscience.

1. Beliefs, truth-value and rationality

In what follows the term “rationality” refers to the domain of beliefs, not of actions. The very concept of “a belief” is sometimes identified with the set of propositions admitted or with the distinguished set of propositions held by a given person. However, beliefs can be distinguished from propositions or sentences. The difference between them has been brought to light in the tradition originating with Franz Brentano and is visible e.g. in Kazimierz Twardowski’s works. The Polish philosopher discerns propositions pronounced (*gefällte Urteile*) and propositions presented (*vorgestellte Urteile*), the latter are not susceptible to acceptance (see [7] p. 150–151, 238–240). In logic we speak about presented propositions, the results (products) of the action of presenting the proposition to oneself. Within such an approach sentences are expressions of the presented propositions. The fact that presented propositions need not be accepted brings into relief their dissimilarity to beliefs. *Beliefs* being something different from sentences (propositions) *would be propositional attitudes*. Statement x-a: “I believe that p” expresses the relation between this x (the person who believes) and a given proposition p (“a person x believes that p”). Obviously, this presumes that the content of the proposition must be under-

stood at every time. Understanding a proposition is a starting point leading to its acceptance or repudiation. Beliefs being such attitudes would not be susceptible to truth-value qualification so characteristic for sentences (propositions). *Beliefs undefined in terms of truth-values could be characterized as rational or not.*

2. Criteria of rationality

Beliefs in order to be characterized as rational should possess certain features; in other words, they should meet some requirements. According to the approach, which may be treated, as standard there are three conditions to be satisfied: 1) *proper articulation*; 2) *respecting the laws of logic*; 3) *sufficient justification*. Thus formulated range of conditions, however, may give rise to difficulties when these criteria start to be specified and when univocal terms of their application are to be found. In case of *the postulate of proper articulation*, a unique and univocal set of criteria for linguistic precision may be never ascertained. The case of justification is likewise troublesome; on the ground of the very science, which provides paradigms, this question is disputable. Hence the contemporary tendency is to transpose the conditions in a certain set of indications rather than to code them as rigidly fixed directives. In this paper I wish to focus exclusively upon the problems connected with the second condition, i.e. the postulate of respecting the requirements of logic, which, in the sequel, is called the requirement of logical rationality.

3. Classical logic and logical rationality

Logical rationality may be expressed as a negative postulate recommending the avoidance of contradiction. In a broader sense this postulate is changed to the demand of the compliance with logic in general. As it seems, it may be right to bring *logical rationality* to *two requirements*: one stipulating *the avoidance of contradiction*, the other presupposing *the ability to deduce*.

If the considerations were confined to the first of the above postulates, then *prima facie* the occurrence of contradiction, i.e. two contradictory sentences, would indicate that some elementary requirements of rationality were infringed. In the classical logic, as we know, the law of contradiction, $\neg(p \ \& \ \neg p)$, is valid. Preserving and fulfilling it may be treated as the basic requirement of rationality. But also another law of classical logic should be mentioned in the context of our considerations, namely Duns Scotus' law which in propositional logic can be expressed

as: $p \rightarrow (\neg p \rightarrow q)$. It states that to admit contradiction (and rules of substitution and derivation) is to allow any sentence to be a theorem. This law is logically tantamount to the formula $(p \& \neg p) \rightarrow q$, which in turn corresponds to the medieval maxim *ad impossibile sequit quodlibet*. The maxim says that the impossibility, which the conjunction of contradiction is, implies any sentence.

Thus in view of the classical logic, those who do not accept, or not respect *de facto*, the principle of contradiction situate themselves by definition beyond rationality. This problem, however, becomes more complicated when we take into account the fact that it is difficult to speak about contradiction in the classical logic without falling into troubles. Since on its ground, contradictory objects (having contradictory properties) cannot be dealt with without contradiction and thus no properties may be ascribed to non-existent objects. It is a well-known fact that if we say “*a is A*”, then in order to have sense, it must fulfil some condition: *a* must be an individual name, i.e. the name of an existing object. Problems arising *when* something is stated about non-existing objects have been known since the times of Plato. While even if we adhere to the thesis that contradictory objects do not exist in the real world, this does not mean that we relinquish using the names of such objects. The possibility to speak about such contradictory objects seems indispensable and is called for by the very convenience of the linguistic communication, on the one hand; and by normal practice thoroughly adopted in a natural language, on the other hand.

The classical logic brings forth also another inconvenience appearing when the contradiction of some theory is to be investigated. Let us consider as a theory, a deductively closed set of sentences. When speaking about contradiction we must consider its two kinds: weak and strong. In a weak version, a contradictory theory contains two contradictory sentences as its theorems. In a strong version a contradictory theory has as its theorems all formulas that can be formulated in the language of the theory. In the classical logic which includes Duns Scotus law, the metalogical consequence of the above, is the equivalence of both concepts of contradiction of theory. Thus having adopted classical logic, we have rendered every contradiction strong. Already at first sight this leads to many troubles.

The possible solution of the problem is the recourse to logical systems different from classical logic. The idea of logic whose characteristic feature is the dearth of laws of contradiction and of the excluded middle appeared at the beginning of the 20th century. It is not amiss here to refer to the ideas of a Russian logician, Vasil'ev, who formulated the so-called “imaginary logic” in the second decade of the 20th cen-

ture¹. His starting point was the assumption that a world different from the real can be imagined. A different world would have different logic where neither the law of contradiction nor the laws of the excluded middle are valid. Also logics without the law of Duns Scotus (relevant logic) or logic based upon two valued systems and close to the classical but without the law of contradiction, may be constructed. Such are the mentioned relevant logic and a logic **LZ** proposed by a Polish logician, Jacek Pasniczek similar to two-valued classical logic.² In **LZ** logic the law of the excluded middle is preserved while, among others, the laws of contradiction and of Duns Scotus are not.

At the same time it is evident that the problem of contradiction, especially in the context of beliefs, requires further analysis. To this aim, it is favorable to have the recourse to the remarks of Aristotle devoted to contradiction. He distinguished, as Jan Łukasiewicz has showed, three meanings of the principle of contradiction (see [5], p. 24). According to the *psychological version* of this principle: “two beliefs which correspond to contradictory propositions cannot exist simultaneously in one mind”. It is a known fact that the analysis of the systems of beliefs borne by real people leads to the conclusion that very often we come across the systems comprising contradictory propositions. It seems to violate the psychological principle of contradiction. *En passant*, let us notice here that the fact that people have contradictory (inconsistent) beliefs serves the adherents of paraconsistent logic as one of the arguments justifying the existence of this type of logic. Since in their opinion the formalization of our real and not idealized structures of beliefs becomes plausible only when a paraconsistent logic is adopted (see [2], p. 3).

To realize the aim of this paper we have to refer to the considerations of Leon Koj. He notices that if the linguistic expressions (utterances) are to be treated as linearly ordered and if verbal thinking is linear as well, these two facts exclude the possibility of two thoughts co-existing in mind at the same time (see [4] p. 30). Thus no thoughts

¹ It is worth to refer to the ideas of Vasil'ev, who at the beginning of the second decade of 20th century formulated the ideas of the so called “imaginary logic”. He began with assumption that a world different from real can be imagined and it would be governed by different logic (imaginary logic). In this logic neither the law of contradiction nor the law of the excluded middle would be valid. See [8] p. 59–94; [9].

² Truth and falsehood are complementary values in this logic, and connectives preserve their classical sense. Axiomatization of this semantics allows to admit all axioms of classical logic if only they include negation. In case of negation weaker axioms are necessary. See [6], p. 194.

about some p and some q ($p \rightarrow q$) can occur simultaneously and the impossibility to have two contradictory thoughts, p and $\neg p$, is a special case of the above. According to Koj the psychological version of contradiction is justified as far as thoughts (acts of thinking) are considered, and thus beliefs are also justified. But this principle would hold only for verbal thinking and, what is essential, for a short period of actual process of thinking. While the system of beliefs of an individual consists of contents (which constitute beliefs) gathered during long periods. The totality of these beliefs has potential (dispositional) character and solely some beliefs get actualized (activated). Therefore, the supposition that this not-yet-actualized part may comprise beliefs which when verbalized yield contradictory sentences is, in fact, legitimate. However, of these contradictions the holder of beliefs may have no idea.

In this context it seems natural to impose more strict conditions of logical rationality upon the activated set (sub-set) of beliefs than upon dispositional beliefs. Nevertheless we can suspect that also the actualized part could reveal contradiction concealed from its holder. This is possible since logical relations of beliefs between where some contradiction occurs, can be neither clear nor recognized. Adopting the standard approach wherein the presence of contradictory sentences condemns the system breaking the principle of rationality, leads to the undesirable consequence of drastic reduction of individuals who foster rational beliefs, the reduction to those only who apply extremely restrictive strategies of beliefs acquisition. This undesirable consequence results from the idealized conception of rationality adopted. Theories of rationality constructed, among others within the framework of epistemic logic, refer to ideal subjects and not real people. The former are intellectually inclined, have perfect memory and apply faultless methods of reasoning. Such ideal subjects are supposed to never accept any contradictory set of sentences or, if contradiction appears within the adopted set of sentences, they feel obliged to make necessary changes. What is sought, in other words, are the criteria of consistency at least comparable to those which function in various branches of logic. Real people cannot be confronted with such an requirement even if they supposingly tend to accept true sentences and try to avoid errors. Possible occurrence of contradiction in case of humans is connected with their deficiency of memory and reasoning, and their radically finitistic status. It may be assented then that the demand to treat as irrational every adoption of a set of sentences with contradiction could concern only the set of ideal individuals in the above sense. The rules of rationality thus understood would have normative and not descriptive character. Moreover, the fact that real people are not able to observe them is obvious.

4. Beliefs, rationality and contradiction

Our intuitions speak for not depriving beliefs of rationality only because there is one contradiction among them. Such an approach is evident in case of potential (non-activated) beliefs but can also concern already activated beliefs. It assumes that stipulating the complete elimination of contradiction is, for the reasons stated above, unfeasible. This, in fact, need not result in ascribing some particularly positive role to contradiction. We should remember about it dealing with some contemporary views like that of P. K. Feyerabend where the role of contradiction in science is promoted to be vitally useful. Far from this, I would rather see in such an approach sort of misunderstanding. Contradictions occurring in (really existing) science are easily traced but stating this fact and noticing that sometimes they may stimulate the development of investigations do not imply that they should not be eliminated, no matter how prolific they are at the stage of heuristics.

Another reason of misunderstanding is the opinion that once a contradiction has been discovered within a theory, the theory itself must be immediately rejected and abandoned. Notwithstanding the borderline between a pair: “to accept - not to accept” and “further elaboration” is vague here, which should be carefully marked since the fact that a theory comprises contradiction does not mean that it cannot be further developed and analyzed.

5. Minimal logical rationality

Now let us consider how to understand the postulate of respecting the laws of logic, referred to as “logical rationality”. The conception of rationality commonly accepted - sometimes *expressis verbis* and more often assumed *implicit* - is an utterly idealized conception. It requires, in case of the non-contradiction postulate, that each contradiction in the set of beliefs should be eliminated. Such non-contradiction (consistency) cannot be applied, as I have already stated, by the real existing people entertaining some beliefs. Then the aim is to avoid the difficulties arising when the principle of contradiction is strictly used and thus the idealized conception posing these difficulties should be abandoned and the requirements of logical rationality re-formulated. Let us recall that rationality of this type is considered in the context of two requirements, one concerning non-contradiction, the other an adequate deductive disposition.

5.1. As far as the postulate of avoiding contradiction is concerned, two opposite approaches may be encountered. On the one hand, there exists the so-called assent theory of truth wherein an individual includes to his set of beliefs all these beliefs which undergo the act of affirmation. In this case there are no requirements concerning logical rationality. Beliefs are included without any deductive abilities previously assumed. At the same time it would allow to admit, as we can think, any inconsistency within the system of beliefs. At the opposite pole there is situated another theory launching an ideal non-contradiction in the system of beliefs. Here the subject of beliefs having a determined set of beliefs ought to consequently remove, in an effective way, all appearing contradictions. This conception presumes the existence of individuals possessing unlimited memory, who are infallible, and, moreover, have no finitary character so typical for men. It is evident that such a conception is not used in practice. Since the appearance of a single contradiction in the set of beliefs does not mean it is devoid of rationality. Otherwise the class of individuals considered as rational would greatly diminish. In addition, as Cherniak emphasizes, in practice an individual complying with the condition of ideal non-contradiction should be occasionally reckoned among *de facto* irrational persons (see [1] *passim*). This is due to the fact that - on the epistemic level - in some situations the forms of activity preferred are not connected with aiming at ideal non-contradiction.

Hence comes the postulate of leaving these extreme solutions and of moving towards more realistic conception, namely the conception of *minimal rationality*. It assumes that an active human being is rational but never ideally (maximally) rational. The postulate of minimal rationality is realized with respect to the set of beliefs of a certain person if some conditions are fulfilled. Thus it requires with respect to the set of beliefs of a given person that contradictions be excluded. This assumes the existence of elimination mechanism, although this does not mean that every contradiction, without any exceptions, should undergo the process of the effective elimination.

Contradiction elimination would concern both eminent contradictions ($p, \neg p$) and tacit ($p, p \rightarrow q, \neg q$). The adoption of such a condition of minimal non-contradiction does not cause problems that the so-called ideal non-contradiction runs into. At the same time it allows to predict the behavior of a given beliefs' holder.

5.2. The postulate of respecting the requirements of logic is closely dependent upon the deductive abilities one has. This means that the situations where we are dealing with beliefs adopted on the basis of

the above mentioned assent theory of beliefs lie beyond the limits of rationality. Nevertheless, as we know, no man is capable of satisfying the condition assuming that he makes all inferences (and only them) from his system of beliefs (the condition of deductive closure). Neither can he *de facto* fulfil weaker conditions of making all inferences desired in a given context, or feasible for him.

What can be postulated in this situation is the fulfillment of the requirement of minimal inference. Regarding deductive abilities, this requirement states that an individual having a set of beliefs undertake only some inferences from the set. Thus if p implies that q and the individual believes that p , then he need not always infer that q . Such an approach is evidently not compatible to the one represented by epistemic logic. Having adopted such an approach would result in treating such an individual, as for example J. Hintikka does, like an irrational person; and his view as unreasonable (see [3] p. 31). Minimal rationality in the sense of minimal inference, would be a necessary condition of entertaining beliefs at all. Now we may ask what exactly should an individual follow in order to be rational while satisfying the requirement of minimal inference at the same time. Within the scope of minimal deductive ability he could make inferences freely. Hence the necessity to have some system of preferences to decide which inferences should be made. In this respect, as it seems, an individual ought to take into account, apart from obvious feasibility and cogency of inference, its pragmatic aspect, i.e. consider if it is useful. This usefulness would be related to beliefs hold and aims pursued by an individual. So in the situation where p implies q and an individual believes that p , he should make only some inferences q , such which are according to his beliefs useful in a given context. The fact that only some inferences are made of those that are feasible and sound is a symptom of rationality and not of its lack.

Conclusion

The implementation of the principle of respecting the requirements of logic in the shape just presented would limit the possibility for contradiction to arise. Being logically rational would imply the mechanisms of contradiction elimination and some deductive abilities. And this latter possibility in case of human beings seems to be crucial.

University of Łódź, kleszcz@krysia.uni.lodz.pl

REFERENCES

- [1] Cherniak, C., "Minimal Rationality", *A Bradford Book*, The MIT Press, Cambridge 1986.
- [2] Da Costa, N.C.A. & French, S., "Belief and Contradiction", *Critica. Revista Hispanoamericana de Filosofía*, 1988, vol. XX, No 60.
- [3] Hintikka, J., *Knowledge and Belief, An Introduction to the Logic of the Two Notions*, Cornell University Press, Ithaca, N.Y. 1962.
- [4] Koj, L., *Semantyka a pragmatyka* (Semantics and Pragmatics), Warszawa, 1971.
- [5] Łukasiewicz, J., *O zasadzie sprzeczności u Arystotelesa* (On the principle of contradiction in Aristotle), Warszawa, 1987.
- [6] Pańniczek, J., "Czy sprzeczność może być racjonalna?" ("Can Contradiction be Rational?"), in *Czy sprzeczność może być racjonalna?*, K. Jodkowski (red), Lublin, 1986.
- [7] Twardowski, K., *Wybrane pisma filozoficzne* (Selected Philosophical Works), Warszawa, 1965.
- [8] Vasil'év, N.A., "Woobrazajemaja łogika", in *Woobrazajemaja (niearistotelowa) łogika* (Imaginary (Non-Aristotelian) logic), Moscow, 1989.
- [9] Vasil'év, N.A., "Imaginary (Non-Aristotelian) logic", *Axiomathes*, 1993, No 3.