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1. INTRODUCTION

The title of Douglas Walton and Thomas F. Gordon's paper points to the widespread research direction in the contemporary argumentation theory, which is to bridge the gap between the formal and the informal approach to arguments. The expression "formalizing informal logic" seems to be pretty obvious for the number of researchers who deal with formal and computational models of argument, within which a formalization of everyday argumentation constitutes the crucial area of inquiry. However, some formal logicians who accept the purely deductive approach to logic may still treat this expression as a paradox.

Walton and Gordon's project stems from the discussion on the relationship between formal and informal logic which took place at the very beginning of the Informal Logic Initiative which originated in the early 1970s (Johnson, 1996). Within the last decade the development of many software tools motivated researchers to put the projects of formalizing informal logic into the frameworks of the computational models of argument that were provided by computer science (and AI). The project is clearly in line with this trend, since it is carried out by means of the Carneades Argumentation System. Because of the fact that Carneades is still being developed, what may cause some differences among definitions and solutions included in a variety of papers devoted to it, we will focus on the description presented in the commented article.

Mohammed, D., & Lewiński, M. (Eds.). *Virtues of Argumentation. Proceedings of the 10th International Conference of the Ontario Society for the Study of Argumentation (OSSA), 22-26 May 2013.* Windsor, ON: OSSA, pp. 1-7.

2. THE PROGRAM OF FORMALIZING INFORMAL LOGIC

Walton and Gordon's approach has a number of advantages, amongst which we should mention the following:

(*i*) The capability of grasping all important "requirements something has to meet to be an informal logic" (p. 1). The paper is a pronounced manifesto of formalizing informal logic around ten pillars (pp. 1-2). The list is a clear illustration of the fact that the Authors do not focus on formalizing just some selected aspects of argumentation, but their goal is much more ambitious: they show the legitimacy of building a full formal theory of argument. In this respect, the above characteristics may serve as a coherent and systematic methodological framework for formal theories of "real" argument.

(*ii*) The proposed model is in line with the claim that the formal and the pragmatic accounts to arguments are complementary, and not competing. It takes into account the pragmatic features of arguments, which were discussed from the very beginning of the Informal Logic Initiative. Following Johnson's suggestion to capture arguments which occur in the real-life context, it conceives argumentation as a teleological process (p. 1, *cf.* Johnson, 1996, p. 106). With regard to this crucial postulate of informal logic we may observe that Walton and Gordon's program takes into account not only the description of the structure of arguments, but also their goal-driven character. Amongst the goals of argumentation which are included into the proposed model there are: making arguments relevant and sufficient and making the claim acceptable. Thus, the inclusion of the RSA (relevance – sufficiency – acceptability) triangle underlines, amongst other features, the teleological nature of argumentation.

(*iii*) The Carneades software allows us also to include the social context in the computational model of argument. Hence, the third advantage of the proposed approach may be seen in the fact that the Authors aim at proposing the ambitious task of giving possibly broad characteristic of the social argumentative procedures. Thus, we observe that the authors aim at taking into account not only *inferential*, but also *dialectical* and *rhetorical* aspects of argumentation. The *dialectical* approach may be seen in including arguments *pro* and *con*, and the *rhetorical* – in modeling possible reactions of an audience.

Stressing the advantage to introduce the audience to the model, we would like to propose a slight modification of this notion. *Audiences* are defined as tuples <*assumptions, weights*> (p. 2). In our opinion, they may be also linked with the proof standards as socially determined paradigms of argument evaluation. Thus, besides *assumptions* and *weights*, the third element could be added to audiences, namely a *function assigning proof standards to statements of the considered language*.

3. CARNEADES AS A FOUNDATION FOR THE RESEARCH PROGRAM

3.1. Argument graphs

The proposed definition of the argument graph (p. 2) aims at grasping a number of key features of arguments. This task is commendable, but it results in a very complex argument representation. The possible objection is that the proposed structure departs from the everyday, intuitive understanding of argumentation, according to which conclusions and premises seem to be the nodes rather, and arguments — relations between them, *i.e.* the edges. This order is reversed in Carneades. The fact that premises and conclusions are the edges of the graph may be seen as particularly surprising. It may be technically justified by the software application, but from the methodological point of view the question arises whether it is possible to propose a more simple model of argument representation, which will not lose the crucial structural features of argumentation that are encoded in argument graphs. A proposition is to simply sum up triples of the form <*P*, *c*, *d*>, where *P* is a finite set of premises, *c* is a conclusion, and *d* is a Boolean value representing the direction of the premises (it is true if they are *pro*, and false if they are *con*). Within a parallel attempt to formalize informal logic (Selinger, 20xx) sets of ordered pairs of the form <*P*, *c*> (*i.e.* without exceptions) are considered as argumentative structures. Thus an argument is simply a relation between sets of statements and single statements (and Boolean values if also exceptions are to be taken into account).

Otherwise than the definition of an argument present in (Gordon & Walton, 2006, def. 3), the definition of an argument node formulated in this paper (p. 2) seems to be insufficient: "Each argument node in *A* is a structure *⟨s, d⟩*", where both parameters are Boolean values. It follows that there are actually only four different argument nodes, namely: <true, true>; <true, false>; <false, true> and <false, false>. Figure 3 (p. 5) can serve as an example. Both circles seem to denote the same argument node, which is supposed to be the pair <false, true>, since both convergent components are defeasible and *pro*. Thus, in fact, the premises happen to be linked.

3.2. Conductive arguments

The Authors define conductive arguments as *pro-contra* arguments (p. 8). They make it possible to capture the dialectical aspect of argumentation in a single diagram, what is an undoubted benefit.

From a purely dialectical point of view, however, arguments in a dialogue are in game. They are attacked and defended by the proponent and the opponent in a dialogue. The order of moves in this game can affect the final result (as in some juridical procedures). Thus, conductive arguments reflect rather this result, but not the course and structure of the game. This restriction is not valid if there is no game involved as for example in an individual decision process of some rational being, who has to consider the *pros* and *cons*, and who can simply sum up them in the end. Such a process, however, is only, so to say, quasi-dialectical, so that one can say that conductive arguments introduce as much of dialectics to argumentative structures as can be adopted by an essentially logical approach.

At this point a question arises: how some more complex decision processes can be modeled in the Carneades system? We mean particularly the situation in which we have to accept exactly one of some (more than two) exclusive propositions. For example, we are to choose a place to spend holidays. Thus we have many propositions: "It would be the best to go to *A*", "It would be the best to go to *B*", "It would be the best to go to *C*", etc., and hence many conductive arguments for each of them. Can Carneades warrantee that exactly one (or at most one) of them will be evaluated as acceptable? (If we have only *pro* arguments, the preponderance of the evidence standard can be obviously applied).

3.3. Premise acceptability

Carneades, in the form presented in the article, does not allow for precise modeling arguments with premises which are not fully acceptable. Such uncertain and merely probable premises often occur in everyday argumentation (as regards, for example, the criticism or skepticism of the audience), and doubts about them affect the acceptability of their conclusions. In agreement with the characteristic given by the Authors, "informal logic is concerned with analyzing real arguments" (p. 1). Carneades, however, tells the audience to evaluate premises (as well as conclusions, consequently) using only three values: *in*, *out*, *undecided*. It follows that if a dubious premise is classified as *in*, any doubt of the audience will be actually ignored, *i.e.* it will not affect the acceptability of the conclusion. The argument will be overestimated in this case. Otherwise, if a dubious premise is considered as *undecided*, it will entirely block further reasoning, and the argument will be underestimated.

The considered simplification allows us to avoid an effect of, so to say, "doubts accumulation" concerning the premises of linked arguments. By analogy to probability, it seems reasonable to assume that the whole set of uncertain but to some degree acceptable (independent) statements can be not acceptable itself and thus undercut the conclusion (the acceptability of a set of statements can be identified intuitively with the acceptability of their conjunction). But in Carneades, if all uncertain premises would be considered as *in*, then (assuming the argument node is *in*) the conclusion will be *in*, too. In summary, one of the RSA triangle postulate (as adopted by Carneades), which requires that the premises should be only *individually* acceptable (p. 6), is not enough restrictive with respect to the domain of linked arguments with uncertain premises.

3.4. Argument weights

The Authors recommend real numbers in the range <0.0...1.0> to represent relative weights of arguments (p. 3). However, they do not explain the intuitive meaning of these degrees.

Despite of offering a fairly large number of weight values, Carneades does not allow us to find out weights of convergent arguments. But it is just summing the weights of such arguments and, in this way, strengthening the acceptability of their conclusion that seems to be the reason to use this kind of reasoning, when a definitive proof is not at hand. But the Authors warn us against summing the weights of convergent arguments due to some possible dependence between them that can result in the double counting fallacy (p. 10). This difficulty is very hard to overcome; however, the question of the relationship between the converging arguments can probably be slightly simplified by reducing it to the question of the relationship between the conjunctions of their premises. It is also noteworthy that an algorithm for summing the weights of independent arguments (Yanal, 1988; Selinger, 20xx) can be still useful, even in this troublesome case, since it defines an upper bound for the sum of the weights of arguments which are dependent.

Instead of dealing with the issue of summing the argument weights, Carneades offers us proof standards to find out if the conclusion of the whole argument is *in*, *out* or *undecided*. However, in convergent arguments (without exceptions), once the conclusion is *in*, it will remain the same, regardless of how many convergent components will be added. Thus, the final result does not contain an information about the weight of the whole argumentation, which can be useful for instance to compare the effectiveness of different convergent combinations of arguments. Using the “preponderance of the evidence” proof standard we can only choose the component with the greatest weight. The rest of them cannot affect the final result of evaluation, so that they are in fact useless. It follows that they may play their role only with respect to some *con* arguments (and not on the basis of the preponderance of the evidence). To sum up, it seems that the cumulative nature of convergent reasoning is not reflected by Carneades with respect to the arguments without exceptions (or only with exceptions).

3.5. Proof standards

Obviously, also the evaluation of conductive arguments can be affected by possible dependences among their components. Thus, for example, two weak but dependent and double counted *pro* arguments could unfairly prevail a stronger *con* one. The proof standards that map the weights of those components into the set of Boolean values are a kind of a specific insurance against this effect. What we do lose by applying these standards is at first sight the precise information how much the *pros* prevail the *cons* (or *vice versa*). If the proof standards can be linearly ordered with respect to their restrictiveness, then a certain scale would be available. Actually, the Authors point to some of them as the ones that are higher than the others (pp. 7-8), but the principle by which one could obtain a complete hierarchy of all of the proof standards is not specified, and therefore it should be precisely defined. If we even give the satisfactory definition, we will still have a rather limited scale, while we dispose the real numbers in the range <0.0…1.0>. Thus, in order to fully exploit them, *i.e.* to map the weights of the components of conductive arguments into the set <0.0…1.0>, some more precise numerical technics must be developed, and the problem of the arguments dependency must be faced.

Actually, such precise information about the argument value, which is to be eventually expressed by the degree of acceptability of the conclusion, may be not always needed. Decision-making can be a good example. Let us imagine that we wonder whether to cross a river. Once we make up a decision, say, on the basis of an argumentation which is acceptable with the degree of 75%, we have to accomplish our task entirely. So to say, we have to cross the whole river, not as *e.g.* one could calculate, a half of it. The sentence in a criminal court action can be only: guilty (*in*) or not guilty (*out*). Some legal systems allow it to be *undecided* too, but not — 75% or 79% guilty. It is fully justified regarding the decision on penalty (especially the death penalty). On the other hand, the amount of penalty in the case of imprisonment could be considered as relativized to this parameter, say, proportionally. This proposal is very controversial, but there are some other domains in which precise, numerical information about the degree of argument acceptability seems to be clearly desired. Our remark concerns in particular the scientific research, within which the methodological criticism requires to have as precise and accurate information about reasoning as possible. So we should neither neglect nor *a fortiori* resign from the studies on the independence of arguments and on evaluation of convergent and conductive arguments in the probabilistic scale. Apart from this purely theoretical interest, such precise information might simply be useful on some occasions as forecasting of atmospheric phenomena, risk assessment *etc*.

The absence of a uniform standard for evaluation of *pro* against *con* arguments motivates us to raise one more question, namely the question of the rules for assigning proof standards to the statements that are considered as the conclusions of evaluated arguments. An unconstrained possibility to change the proof standards by simply clicking the menu bar seems to be too liberal solution. So, our question can be also formulated as follows: which proof standard should be used to evaluate arguments concerning the choice of a proof standard?

Yet, let us note that the applicability of the proof standards can be impeded by the (suggested by us) introduction of not fully acceptable premises. *Pro* and *con* arguments with relatively low weights, but with absolutely certain premises, could be stronger than those that have high weights, but their premises are uncertain. Thus in order to evaluate such *pros* and *cons* an algorithm reducing their weights with respect to the acceptability of premises is needed (*cf.* Selinger, 20xx).

4. CONCLUSION

Since the Carneades system has been already described and discussed on many occasions, the crucial value of the commented paper, in our opinion, is not to present the system itself, but to formulate a list of requirements that any informal logic approach has to meet. We propose to specify this list by introducing two slight but important modifications to this characteristic. Namely, we think that informal logic has to recognize the degrees of acceptability of argument premises, and moreover, it has to analyse the problem of dependent arguments, and distinguish the degrees of acceptability of arguments conclusions whenever it is possible.

We consider the Carneades system as a fairly solid fundament for the formalized construction of informal logic. This belief, however, is not devoid of any criticism. Our most general, critical remark concerning Carneades as a framework for informal logic is that it complicates the structure of argument, on one hand, while it simplifies the evaluation, on the other.

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