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Recognizing argument types and adding missing reasons

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ABSTRACT: The article develops and justifies, on the basis of epistemological argumentation theory, two central pieces of the theory of evaluative argumentation interpretation: 1. criteria for recognizing argument types and 2. rules for adding reasons to create ideal arguments. Ad 1: The criteria for identifying argument types are a selection of essential elements from the definitions of the respective argument types. Ad 2: After presenting the general principles for adding reasons (benevolence, authenticity, immanence, optimization), heuristics are proposed for finding missing reasons, for deductive arguments, e.g., semantic tableaux are suggested.

KEYWORDS: adding missing reasons, authenticity, charity, deductive minimum, definitions of argument types, enthymemes, immanence, indicators for argument types, recognizing argument types, semantic tableaux

1. TOPIC OF THE STUDY: RECOGNIZING ARGUMENT TYPES AND ADDING REASONS AS STEPS IN ARGUMENTATION EVALUATION

The aim of this paper is to develop a theory of recognizing argument types and supplementing missing reasons or premises. This theory, in turn, is part of a broader theory of argumentation interpretation for the purpose of evaluating arguments in terms of their validity and situational adequacy (Lumer, 2003). The basis for the theory to be developed here as well as the source of the criteria for argumentation assessment is epistemological argumentation theory, or more precisely: the version of this theory known as "Practical Argumentation Theory" (Lumer, 1990; 2005; 2011a).

2. PROBLEMS WITH THE RECOGNITION OF ARGUMENT TYPES AND THE APPROACH TO THEIR SOLUTION: LISTS OF CHARACTERISTIC FEATURES

The need to determine the argument type first in order to be able to evaluate the argumentation only exists because there are different argument types in the first place, which also differ as to their criteria for the validity of an argument. In order not to measure an argumentation against the wrong standards, the corresponding argument type and therefore, also the corresponding list of criteria must be determined beforehand.

Various argumentation theorists share the idea that for the epistemic assessment of an argumentation one must first identify the argument, then recognize the argument type, and add missing premises; only then one is able to assess the argumentation (e.g. Govier, 1999, p. 85). However, there are several major difficulties when it comes to implementing this idea, and in particular identifying the type of argument.

1. There is still no agreement on the types of non-deductive argument types; and the lists of argument types proposed by various theorists differ greatly. This paper is based on the classification of argument types developed in the epistemological approach to argumentation theory, which distinguishes argument types according to their respective underlying epistemological principles (Lumer, 2011a).

2. The problem of the previously required lists of argument types is exacerbated by the fact that many existing arguments are molecular, i.e. composed of several elementary arguments, usually in such a way that subordinate parts of the overall argument justify premises of the central argument. The elementary arguments can be of different types. In the literature, certain more frequently occurring types of molecules, such as arguments to the best explanation or justifications of actions, are often conceived as a separate, irreducible types of argument. This shows how poorly understood these molecules are. For the classification, the fact that these arguments can then fulfill the criteria of several argument types is particularly confusing.

3. The arguments themselves usually do not contain any explicit indication of which type they are or which type of argument the arguer intended to produce.⁴ Even recourse to the arguer's intention does not help any further, firstly, because this intention must usually first be inferred from the argument text – because often one cannot ask the arguer beyond the text of the argument – and, secondly, because the vast majority of arguers argues only intuitively and, therefore, does not entertain explicit thoughts about the type of argument, and does not have theoretical knowledge to indicate the type of argument.⁵ Most argumentation theories distinguish between ideal and non-ideal but still valid arguments. For example, the latter contain linguistic impurities or variations, which, however, can usually be corrected relatively easily. But, above all, valid non-ideal arguments are mostly enthymematically abridged; thus, along with the lack of reasons, central characteristics of ideal arguments on the basis of which one can relatively easily identify the argument type are often also missing. The problem is aggravated by the fact that non-ideal arguments account for the overwhelming majority – over 99% – of the available arguments.

6. In addition to valid non-ideal arguments, there are also invalid ones. And these deviate even further from the ideal, making it still more difficult on average to assign them to a particular type of argument. If one also wants to assess these arguments afterwards according to certain argumentation standards – in order to then find out or to show that they are not valid – then one must be able to assign them to a certain argument type beforehand. The sense of the whole enterprise of argument assessment presupposes that the vast majority of arguments can be assigned to a certain type of argument.

The real reason why Ennis' attempts to determine the argument type before the assessment (Ennis, 2001) fail is, I think, that he has no more or less complete list with precise validity criteria for the various argument types (see problem 1 above). Ennis is gradually compiling a list of argument types with their characteristics; and this list is excellent when compared to others in the literature. But this list is a bit ad hoc and therefore not complete and systematic enough, e.g. without attempts at reduction, thus without differentiating between elementary and molecular types or between general types and more specific variants thereof. Furthermore, the validity criteria for the individual argument types are incomplete, vague and often incorrect. If, instead, one has an independent and elaborated positive theory of argument types with precise and complete criteria for the validity of the individual types arguments, then it should be possible to compile lists of characteristics of the individual argument types, which in the vast majority of cases leads to a correct classification of the argumentation. The basic idea of such a list is then to take the structural characteristics of the respective argument type as the characteristic features and thus capture the essence of this type. The epistemological approach in argumentation theory comprises such a positive theory of argument types (Lumer, 2011a). It is the basis for the following list of characteristics of the individual argument types, which are then used to classify individual arguments. In order to do justice to the problem of non-ideal, especially invalid arguments (problem 6), this list of characteristic features, of course, cannot always contain all the conditions for the validity of arguments of a certain type. Rather, a selection of particularly conspicuous characteristics, which show either all or nevertheless most of the arguments of this type, has been made here.

In a certain sense, the characteristics that, according to this list, are fulfilled by all the arguments of the respective type define the argument type; if an argument does not have these defining characteristics, it cannot be assigned to this type.

3. A LIST OF CHARACTERISTICS FOR IDENTIFYING ARGUMENT TYPES

The starting point for creating a list with the characteristics for recognizing argument types are the criteria for valid – ideal and non-ideal – arguments of this type (Lumer, 2011a; 2011b; 2014). With regard to these criteria, in each case it is necessary to decide which of them should constitute defining or at least very characteristic features for the argument type, and which should not: Are they striking, conspicuous and central? Are they still sufficiently broad to leave many fallacies which can still be assigned to this type? Are they sufficiently narrow to define the different argument types without overlaps? etc. (see the discussion above). I made such an analysis in a working paper that I use in my courses. However, that paper is far too comprehensive to be presented here in full. Instead, I will only present the core of the result of this analysis, the summary list.

A few explanations are required beforehand. The practical theory of argumentation, i.e. the variant of the epistemological approach I created, develops argument types on the basis of so-called epistemological principles; these are general statements about when certain types of propositions are true. For example the deductive epistemological principle, says: 'A proposition is true if it is logically implied by true propositions'. These epistemological principles in turn originate from branches of epistemology in the broad sense: deductive logic, probability theory and rational decision theory. Accordingly, there are three basic argument types: deductive, probabilistic and practical. In addition to these three basic types, however, several derived argument types are dealt with below. Some of them are frequently occurring *specializations* of these basic types. For probabilistic arguments, for example, arguments from authority are such specializations. Another part of the derived arguments are frequently used *molecular arguments*, such as arguments to the best explanation or justifications of actions. The following list contains the characteristics for the basic forms and only those for the most important derived argument types. But following the principle recognizable from this list, the list can be readily extended by characteristics for the other argument types contained in the classification of valid arguments (Lumer, 2011a). – In addition to the characteristics necessary for a particular argument type, the list includes some, not necessary but characteristic, features that facilitate recognition. Therefore, the descriptions of the single indicators are always preceded by a qualification stating whether the indicated feature must necessarily be present or, if not, how often it is present: "necessary", "frequent", "fairly frequent", "occasionally".

D: DEDUCTIVE ARGUMENTS:

1. *Occasionally: deductive argumentation indicator*: Deductive argumentation indicators: 'from this follows'; 'by implication it holds'.
2. *Necessary: Repeating terms*: If the singular and general terms of the argument have been made uniform (which, according to the rules of argument interpretation, should happen in the step to be worked through beforehand (Lumer, 2003, pp. 717-718: steps 4 and 10)), then singular or general terms from the thesis are also repeated in the reasons and possibly also from one reason to another.
3. *Necessary: deductive inference structure*: The structure of the argument's judgments, constituted by the logical operators, 3.1. in the ideal case corresponds to one of the (known or also less known) deductive inference schemes or 3.2., with valid but not ideal deductive reasoning, corresponds to a shortened version thereof, or 3.3., with invalid deductive reasoning, the structure resembles at least one of these abridged versions.

L: PROBABILISTIC ARGUMENTS (IN GENERAL):

1. *Necessary: probabilized thesis:* The thesis is probabilized. This is a necessary and sufficient condition for probabilistic arguments.
2. *Frequently: probabilistic or statistical reason:* In ideal probabilistic arguments at least one of the reasons is a statistical or probabilistic judgment. Mostly – but not always – this reason is also contained in abridged but still valid probabilistic arguments.

Le: GENESIS OF KNOWLEDGE ARGUMENTS (arguments from authority, arguments from testimony, quotations from historical sources, ...):

1. *Often: probabilized thesis:* The thesis can have very different contents, but should actually be probabilized. If it is not probabilized, the argument is invalid.
2. *Necessary: description of the genesis of knowledge:* The reasons are, first, excerpts from a narrative of how and by whom the thesis was examined with a positive result and, second, how this thesis then progressed from examination to being uttered by the arguer. These excerpts can be extremely fragmentary, e.g. a reference to a historical source (descriptions of the verification as well as the tradition from the verification to the production of the source text are missing) or to a statement by an authority or a witness.
3. *Frequently: reliability assessment of the genesis of knowledge:* Ideally, the reasons also include probabilistic assessments of the correctness (truth conformity) of the verification and transfer of the thesis. However, these reasons can be missing even in valid genesis of knowledge arguments; and they are missing quite regularly in invalid ones.

Li: INTERPRETIVE ARGUMENT:

1. *Necessary: thesis about past event(s):* The thesis is a (probabilistic) judgment with a description of a (past) event or state or a set of such events or states. This description can also be concealed, for example as a statement about the meaning of an object, especially a text, in which case the associated event is the author's intention.
2. *Necessary: explaining a fact with the thesis:* The main reason is 2.1. a hypothetical explanation 2.2. of a known fact; in this explanation the event or state mentioned in the thesis occurs as a (partial) cause. This hypothetical explanation can be very short, containing only central elements.
3. *Fairly common: alternative explanations:* In more complex interpretive arguments there are several such explanations of the known fact as further reasons. 3.1 Then, for each of the additional explanations, these additional reasons state that this explanation is inconclusive (pseudo explanation which is incompatible with certain known facts) or 3.2. that it is less likely than the explanation by the event mentioned in the thesis.

P: PRACTICAL ARGUMENTS:

1. *Necessary: value judgment as thesis:* The thesis is a value judgment (but this alone is not enough to be a certainly distinguishing feature).
2. *Necessary: implications of the value object and / or their valuation:* The most important reasons are pairs of 2.1. judgments about the implications (mostly causal consequences) of the value object and 2.2. value judgments about these implications. One of these judgments is often omitted. There are often several such pairs.

Pa: JUSTIFICATION OF AN ACTION:

1. *Necessary: the thesis is an optimality judgment about action:* The thesis is an optimality judgment about an action *a* or – in impure forms, which are often not valid – a proposal for action: 's should do *a* / let's do *a*!'
2. *Often: evaluation of the action(s):* The main reasons are 2.1. evaluations of *a* and 2.2. – in valid justifications of action – of at least one alternative *b*. This comparative evaluation is often lacking in invalid justifications of action.

3. *Necessary: practical argument for the evaluation*: The evaluation or the evaluations from 2 is / are justified in a practical argument. Pairs from 3.1. judgments on the implications of action *a* (or alternatives *b*₁, ..., *b*_{*n*}) and 3.2. evaluations of these implications are given as further reasons.

4. A THEORY OF ADDING REASONS

Most normative theories of argumentation require that possibly missing reasons must be supplemented for the assessment of an argument (e.g. Ennis, 1982; Govier, 1999; Hitchcock, 1985; 1998; 2003); but not all require this. For example, Walton's argument schemes (e.g. Walton, Reed & Macagno, 2008; critique: Lumer, 2016), even if they are supplemented by the answers to the "critical questions", do not contain all the reasons that other argumentation theories would add. So why is it necessary to add reasons at all? 1. As explained at the beginning, the aim of supplementing reasons is generally to make it possible to assess the argumentative validity (and situational adequacy to convince) of the argument. And this assessment has the following sense: Argumentation theories, and the epistemological approach in particular, have set standards for ideal arguments. In the epistemological approach, these standards are constructed in such a way that they are based on underlying *epistemological principles*, i.e. very general epistemologically justified principles which specify conditions under which a thesis (perhaps of a specific type) is acceptable, i.e. true, truth-like or probably true. Therefore, if an argument fulfills these standards it is guaranteed that: *i.* the argument's thesis is acceptable, and *ii.* the thesis can be recognized as acceptable by an addressee on the basis of the reasons contained in the argument (Lumer, 2005, in particular pp. 215; 221-222; 225-228; 233). Hence, if the assessment of an argument can show that the argument meets these standards, then the thesis is also acceptable, and this acceptability of the thesis can be recognized by checking the reasons. 2. For various reasons, the arguments to be found in everyday life, science, politics etc. are generally not ideal in this way. Nevertheless, they often work quite well in these practices and fulfill their argumentative function. Therefore, the theory of argumentation should also acknowledge that they are good arguments, but at the same time not renounce its standards (*i* and *ii*). The usual way to do this, which also enables an argument assessment according to standards *i* and *ii*, is: to bring the found arguments into an ideal form, in particular to add missing reasons. Since prior to the assessment one cannot assume that the found argument is really good, more precisely, the aim of adding missing reasons is: to bring the argument found into an ideal form as far as possible – meaning that it is practicably as close to ideal as fulfilling a number of conditional permissions permit.

What is my own proposal for adding missing reasons? I will set out the conditions for adding missing reasons in the form of '*principles for supplementing reasons*'. These principles in turn are specifications of the general principles of argument interpretation (Lumer, 2003, pp. 716-717) for the particular purpose of adding missing reasons.

In the theory of text interpretation, this basic way of finding out a somewhat bounded but still as ideal as possible reading of a text is generally called "*benevolence*" or "*charity*". This is then the name of the first principle of the theory of argument supplementation developed here. Further principles will limit the idealization to a certain extent.

P1. Benevolence, charity: The completed arguments should transform the argument into an ideal argument as far as possible, i.e. a complete argumentatively valid and situationally adequate argument, without violating the other principles of argument supplementation. To this end, the additional reasons should (i) be as true or acceptable as possible, (ii) be accepted by the addressee, and (iii) contribute to the argument's conclusiveness.

The aim of charity is, for one, to recognize the good core, the central idea of an argument in a cooperative manner. For another, charity is a concession of argumentation theorists who have introduced relatively formal criteria for the validity and adequacy of arguments that cannot be expected to be fulfilled in everyday life. (Lumer, 2003, pp. 716-717)

As the phrase "without violating the other principles of argument supplementation" already suggests, benevolence has its limits. One of these limits is that the idealized argument must still be that of the author, i.e. attributable to her. Unfortunately this idea cannot be specified as some standard approach to text interpretation does, namely by the requirement that the author must have intended the idealized version. This requirement would be mistaken, because authors of arguments usually think as they write or speak, they jump to conclusions; i.e. they did not first imagine the missing reasons and then omit them (perhaps for stylistic reasons). The requirement to allow only reasons intended by the author would therefore mean that almost no additional reasons should be added. A weaker operationalization of the idea that the supplemented arguments must be accepted by the author is:

P2. Authenticity: The reconstruction has still to be a reconstruction of the *original author's* argument. Therefore, impute only such implicit reasons, types of inferences, argument schemes and steps to the author which she accepts or for which holds that she plausibly would accept them when her attention were drawn to them!

Another restriction for the reasons to be added is that the idealized argument must still be an idealization of the initial argument. In extreme cases, a mathematical argument, for example, could simply contain the axioms of the mathematical theory and then the theorem, without any intermediate step. So the real proof would be missing. To ask the interpreter (and addressee) to construct this proof in the course of interpreting the argument would be an imposition for the interpreter and addressee; and an argument so incomplete could not guide the addressee in recognizing the thesis, which however is its main function. In short, to allow for additions of too many reasons would mean that an argument, which should actually contain the proof as a guidance for recognizing the truth of the thesis, would also be regarded as proof although it contains nothing of the proof. Therefore, the essential elements of the complete proof, of the complete argument must already be contained in the existing argument. For the missing reasons to be supplemented, this means that they must be accessible from the material contained in the found argument.

P3 Immanence: The given argument must already contain the most important contentual elements of the additions in the sense that the reasons necessary for the ideal version must be constructible from the existing components by means of standard reconstruction procedures. (Such reconstruction procedures are presented below.) – The following concretizations are only a few examples: *All arguments:* The essential predicates and singular terms of the reasons to be supplemented must already be contained in the existing ones. *Practical arguments:* In any case, at least one element of the pairs from consequence assumptions and their evaluation must be contained in the argument found.

That the missing pieces must be extracted from the existing pieces does not mean that a layman can do this or that an expert can do it without much work. The completion of enthymematic *deductive* arguments together with the elimination of their ambiguities is often extremely laborious, because a multitude of different combinations of premises have to be tried out (Lumer, 1990, p. 83).

It is possible that no supplement to the arguments fulfills the conditions of the above principles. However, the opposite is also possible: several sets of additions may fulfill the conditions of the previous principles of argument supplementation. In this comfortable situation, the ideal version of the argument, in the spirit of benevolence, should be as good as possible beyond argumentative validity and adequacy – stronger, more elegant, simpler etc.

P4. Optimization: strength and simplicity: If several sets of additions meet the previous conditions, choose the one that makes the argument strongest and simplest!

5. HEURISTICS FOR FINDING FITTING REASONS

The principles just mentioned for adding premises only formulate conditions for the end product, i.e. criteria by which a proposal for adding reasons can be assessed. They do not say anything about which method can be used to construct the reasons to be added. Unfortunately, there is no real algorithm by which one can simply construct these missing reasons. The only fundamental method here is trial and assessment, i.e. a hypothesis as to which set of reasons could meet the above criteria is developed followed by a critical examination of whether the hypothesized set of reasons fulfills the conditions. If the assessment is negative, i.e. the hypothesis for a suitable supplement does not meet the above criteria, then the procedure must be repeated, possibly several times.

Although we do not have algorithms, there are some heuristics for finding fitting reasons; these heuristics change with the respective argument type. Because of the strong structural requirements of *practical arguments*, adding reasons with this type of argument is usually not very difficult. Especially if one of the elements of the pairs of consequence judgment and valuation is missing, the given element already contains a denotation for the event or state that occurs once in the *description* of the thesis' value object *o*'s consequence and the other time as the object of the *value judgment* on *o*'s consequence.

Because of the polymorphism of *deductive arguments*, finding the missing reasons for deductive arguments is often much more difficult. However, some methods proposed by argumentation theorists as *the method of adding premises* – even if this claim is far too strong – can at least be used as *heuristics* for finding missing premises of deductive arguments. With these methods, *hypotheses* can be created about which premise is missing. However, as already mentioned, these hypotheses must then be reassessed as to whether the proposed addition fulfills the above conditions. The simplest heuristics is the *deductive minimum*:

Deductive minimum: If the argument consists of the premises p_1, \dots, p_n , and the thesis t , then the missing premise is the material implication connecting these two components: ' $p_1 \& \dots \& p_n \rightarrow t$ '.

Adding the deductive minimum definitely makes the argument deductively conclusive; and the deductive minimum must also be true if the premises and the thesis are true; and because this premise is simply obtained mechanically, the immanence condition is also fulfilled. But the premise so constructed often does not fulfill the pragmatic subcondition of charity that the premise is also accepted by the addressee (P1.ii).

Hitchcock (1985; 1998; 2003) has proposed an alternative method for adding premises to deductive arguments, the "*covering generalization*": First, as with the deductive minimum, the premises are again linked with the conclusion to a material implication. A universal generalization is then formed from this: At least one contentual expression occurring in the premise and in the conclusion (i.e. not the logical particles) is replaced by a universal generalization; in addition, other contentual expressions occurring several times can also be replaced by universal generalizations. Also this method always leads purely mechanically to an addition, which makes the argument conclusive; but, unlike the deductive minimum, this covering generalization is not necessarily true if the premises and the thesis are true. Therefore, in each case it is necessary to check whether this premise is true. The heuristics of the covering generalization works quite well with arguments of the classical form of the Toulmin scheme (i.e. with the data expressed and the warrant missing). But yet it does not work with arguments reconstructible as Toulmin arguments but where instead of the data the

warrant is made explicit (e.g. 'All humans are mortal. Therefore, Socrates is mortal.'). And it fares still worse with deductive arguments of a completely different form (e.g. *chaining*: ' $a \rightarrow b$; $c \rightarrow d \Rightarrow d$ ' with the missing premises: a and $b \rightarrow c$).

Semantic Tableaux or *Beth Calculi* (Beth, <1955> 1969; Smullyan, <1968> 1995; von Kutschera & Breitkopf, <1971> 1979, pp. 108-127) are better heuristics for determining the missing premises of deductive arguments.¹ The basic idea of semantic tableaux is to examine the logical conclusiveness of logical inference forms by systematically trying, by decomposing the formulas, to find possible cases/worlds where the premises are true but the conclusion is wrong. In the tabular form of these calculi (Beth, <1955> 1969; von Kutschera & Breitkopf, <1971> 1979, pp. 108-127) a panel is divided vertically into two columns, called "tables", one (left) with true and one (right) with false formulas. The premises are entered on the left (true), the conclusion on the right (false) to check under which conditions the conclusion perhaps is invalid, i.e. the premises are true but the conclusion is nonetheless false. The formulas are then decomposed step by step into elementary formulas according to the semantic rules of the logical operators. A subtable is called "closed" if it contains a contradiction, i.e. if it contains a formula in both the true and false halves of the subtable. A table is "closed" if all its subtables are closed; and this means that all attempts to construct a counterexample against the conclusion lead to contradictions; so the conclusion is valid. If at least one subtable cannot be closed despite all possible decompositions, then there are possibilities, possible worlds, in which the premises are true, but the conclusion is false; thus the conclusion is logically invalid.

Now the latter case is interesting for enthymemes and premise supplementation because enthymemes are logically inconclusive – due to missing premises. The special thing about the semantic tableaux is that the open subtables describe the possibilities by which the conclusion can be refuted. And this in turn means that the premises to be supplemented must be such that they exclude these possibilities. In this way, semantic tableaux provide valuable information as to which conditions the premises to be supplemented must fulfill from a logical standpoint. They thus help in the construction of the premises to be supplemented. But they are only a heuristic, not an algorithm for finding these premises: 1. The open subtables of the semantic tableaux only indicate those cases which must be excluded by the additional premises. However, this can happen in several ways (e.g. by a singular conditional (e.g. $Fa \rightarrow Ga$) or instead by a general conditional ($\forall x(Fx \rightarrow Gx)$)), whereby the existing premises can still simplify these possibilities of exclusion and, vice versa, in order not to beg the question the truth of the conclusion cannot simply be assumed. Thus the creation of interesting possibilities of exclusion sometimes requires creative intelligence. 2. The premise set (or perhaps various premise sets) constructed in this way, which hence would make the argument conclusive, must again be checked "manually" as to whether the other conditions of premise supplementation are also fulfilled.

Semantic tableaux provide very good hints for the construction of missing premises, they work very well as heuristics, where e.g. the heuristic of the covering generalization has problems (e.g. Socrates enthymeme of the second form, chaining). But they do not help much with the simplest deductive arguments with exclusively elementary formulas. Concerning the Socrates enthymeme in the first form (Socrates is a human, therefore he is mortal), for example, they essentially say only: Add a premise which excludes that 'Socrates is a human being' is true and at the same time 'Socrates is mortal' is false – thus hardly more than what one knew before.

Even with the principles set out above and the heuristics just discussed for finding good supplemental reasons, the supplementation often remains a laborious business. But at

¹ Erik Krabbe reminded me of this possibility.

least the principles provide clarity about what is a good addition, and the heuristics and structural hints help somewhat in finding suitable additions.

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