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Context-Dependence and the Defining of Logical Fallacies

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ABSTRACT: This paper illustrates the difficulties that context-dependence poses for defining the so-called logical fallacies of *affirming the consequent* and *denying the antecedent*. In particular, I question whether these fallacies can be identified with specific argument patterns. I argue that judging such patterns as fallacious is relative to a) the type of underlying reasoning, and b) the world-knowledge deemed relevant to the argumentation at hand. It is concluded that a more context-sensitive definition should be pursued.

KEY WORDS: argument pattern, classical logic, context-dependence, defeasible reasoning, fallacy, interpretation, logical form, validity.

1. INTRODUCTION

Fallacies are central in the study of argumentation; it has been a perpetual challenge for argumentation theorists to distinguish types of fallacies and to formulate unambiguous and systematic definitions that can make it possible for fallacious arguments to be identified. For a long time, classical logic provided the hope that such definitions could be formulated in terms of argument patterns that can be found in natural language. The argument patterns of *denying the antecedent* (DA) and *affirming the consequent* (AC) have been thus defined as the fallacious counterparts of the unquestionably valid *modus ponens* (MP) and *modus tollens* (MT). Although the use and relevance of classical logic (henceforth CL) has been questioned time and again in the study of argumentation, the fallacies of DA and AC have remained as the bare minimum of logic to be regarded relevant to argumentation. Such has been the connection of these fallacies with logic that argumentation textbooks still opt to call them the 'logical fallacies' to distinguish from the rest.

The question posed in this paper is whether it is at all possible to define the fallacious inferences DA and AC in terms of argument patterns. I begin by making some preliminary remarks on the notion of *logical form* and the role it plays in establishing semantic interpretation (section two). The importance of interpretation will be highlighted in the third section, by reporting on some experimental results: it will be shown that validity is meaningful only relative to the logical form assigned to the argument at hand. The next sections explore the consequences of the observation that a logical form in which rules are defeasible plays a prominent role in natural language. The main consequence for argumentation is that the resulting notion of

[1] The experiments reported in this paper were conducted while the author was teaching in *University College Utrecht* as part of her affiliation with the Department of Speech Communication, Argumentation and Rhetoric of the University of Amsterdam.

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validity is context-dependent. This notion of validity will be made more precise in the fourth section. It will be illustrated (again by the help of experimental results) that the validity of the four inference types is relative to: a) the type of underlying reasoning (classical or defeasible) as well as b) the world-knowledge deemed relevant to the argumentation at hand. Defining the fallacious inferences in terms of argument patterns will then be no longer possible (sections five and six). In the end it will be claimed that formalizing a more context-sensitive notion of fallacy can restore some of logic's pertinence to the study of argumentation.

2. NATURAL LANGUAGE AND LOGICAL FORM

In order to talk about argument patterns and detect the so-called logical fallacies, one has to distinguish the argument as it manifests itself in natural language from its formal representation. This is because the meaning of natural language expressions is far from being transparent. One cannot rely solely on the syntactic configurations and the occurrence of some key-words to guarantee a common ground understanding of the logical form of natural language expressions. What the formal representation is called out to do then is to fix an interpretation that is accurate and precise enough to determine the standards against which an argument can be evaluated. In what follows, formal representation is understood as meaning interpretation in this sense.

For a long time, classical logic has been regarded as the arbiter of thought, and this bias has given rise to some dramatic twists and turns in the history of the study of reasoning. At first, experiments like the famous Wason's selection task led theorists to think very poorly of the logical capacities of the general population, which gave rise to considerable skepticism concerning the general standards of rationality (Wason 1968). These experiments basically tested whether the subjects were able to solve the given task by means of classical logic. Not providing the classically right answer was categorically marked as a sign that the subjects were not able to reason logically.

Soon, a vehement opposition to these hasty conclusions was forwarded. All these experiments have managed to achieve is to show in the starkest manner how much distance actually exists between classical logic and ordinary reasoning. Consequently, those interested in the more mundane task of comprehending how people actually reason were driven to repudiate classical logic, and the whole canon of formal logic fell along with it.

Formalizing natural language is undoubtedly a difficult enterprise and the relevant problems are discussed in the literature at length. For the purposes of this paper it is important to take notice of one particular aspect of the involved difficulties, which relates to the traditional notion of a logical form. For many years the conception of logical constants as the skeleton of natural language endured among logicians (the literature is extensive; three prominent references are: Copi 1954; Strawson 1952; Tarski 1994). In this view, conjunction, disjunction and the like are seen as such primitive concepts that language and thought cannot escape them. Identifying the conjunctive meaning where it occurs was naturally seen as simply 'recovering' part of the logical meaning already inherent in the language, or alternatively, of its (underlying) logical form.

However, it is not at all clear, in fact, it is rather doubtful, whether such inherent meanings serving the role of logical constants can actually be identified in natural language. Take conjunction as an example: whereas in classical logic conjunction is a commutative connective, in tense logics the meaning it takes is a non-commutative one. At the same time, both notions are excessively used in natural language. In brief, there is no formal system to propose a one-to-one mapping from natural language expressions to logical constants such that it can be trusted to ''recover'' *the* logical form.

2. THE IMPORTANCE OF INTERPRETATION: 'TWO-RULE TASK'

What the early experiments on reasoning tasks failed to appreciate is that the interpretation that an arguer has of linguistic discourse may systematically and consistently differ from that intended by the analyst. To illustrate this, consider an adaptation of the following reasoning problem, the 'two-rule task' (Stenning and van Lambalgen 2004). The task was given to a group of 25 first-year students in spring 2006. It was used as a kind of preliminary, warm-up exercise to precede the instruction of elementary propositional logic in an introductory course on argumentation. The task was also used later in the course as a means to illustrate material implication by explaining what the classically right answer would be. The experimental material went as follows:

Below is depicted a set of four cards, of which you can see only the exposed face but not the hidden back. On each card, there is an 8 or 3 on one of its sides and a U or I on the other.

Also below there are two rules, which apply only to the four cards. It is given that exactly one rule is true. Your task is to decide which if any of these four cards you must *turn in order to decide which rule is true. Don't turn unnecessary cards.*

1. *if there is a U on one side, then there is an 8 on the other side.*
2. *if there is an I on one side, then there is an 8 on the other side.*

Cards:

U	I	8	3

Please, circle your choice out of the possible choices below:

The students were provided here with choices like 'no cards', 'only U', 'U & I', 'U or 3', 'U or I or 8 or 3', '3 & (U or I)', and so on: in total, 44 combinations of the letters, the numbers, conjunction and disjunction. In the classical understanding of the implication, the correct answer is to choose 'only 3'. Surprisingly no student gave this answer. Instead 75% chose for 'U or I or 8 or 3' which meant that turning any card would do. The students were asked to provide arguments to justify their answers. Here is a characteristic justification of an answer opting for 'U or I or 8':

Subject 12: *When you turn I and there is an 8 at the back, then the U-rule is false. When you turn the card with an 8 and there is an I on the back, then you prove the I-rule and when it has an U on the back you prove the I-rule wrong.*

Faced with such an argument, the analyst has two possibilities: either to convict the student of committing a fallacy, or to inquire into the meanings that the students assigned to the conditional, as well as truth and falsity. This paper is in favor of the second option, which allows for more logical forms than the one dictated by classical logic. Natural language contains several different notions of the conditional, and for anybody who has given a course on basic classical logic it is clear that material implication is not the most intuitive one. What's more, opting for a different notion of conditional entails choosing notions of truth and falsity that can be different from those of classical logic.

The linguist Fillenbaum observed that about half of his subjects interpreted the statement $p \rightarrow q$ *is false* as $p \rightarrow \neg q$ (Fillenbaum 1978). Applied to the present task this means that the U-rule is false iff U only goes with 3. In other words, this notion of falsity is much stronger than the classical notion, which allows both a 'U-8' and a 'U-3' combination. The vast majority of the students in this experiment seemed to adopt this stronger notion of falsity. Here is one more characteristic quote of a student opting for 'U or I or 8 or 3':

Subject 7: *If you turn around any card, 'I' or 'U' or '8' or '3', you will find out the rule. If, for example, you turn around I and it has a 3 on the other side, you know that behind the U is an 8, that behind an 8 is a U, behind 3 an I and vice versa. Therefore, by turning around any of the four cards you can eliminate one of the two rules and prove that only one rule is correct. After all, a 8 cannot be on the back of a card of both an I and a U.*

In this interpretation, the subjects' most prominent answer that any card suffices is of course completely logical. So, this example shows that it may be impossible to simply read off a logical form from the linguistic expressions given. A fortiori it is impossible to charge the subjects with simply committing a fallacy.

Of course the above should not be taken to imply that no evaluation of the subjects' answers can be performed. In both cases mentioned the students' answers directly followed from their interpretation. But there were also students whose answers were inconsistent with the arguments they provided. In such cases it does make sense to invoke the notion of a fallacy, albeit only after the interpretation of the subject has been determined. This last point will be further illustrated in the following section by the help of a variant of the so-called suppression task.

3. VALIDITY AND CONTEXT-DEPENDENCE

We now come to a much more radical deviation from the classical logical form, which will lead us to question the very possibility of defining valid and invalid argument patterns. A number of technical notions need first to be established. One identifies argument patterns in natural language by means of the following procedure. First, some logical constants are identified, for instance, 'if-then', 'and', 'or', 'not'[2]. One then identifies logical propositions, that is, the propositions that do not contain these logical constants, and replaces them with variables 'p', 'q' etc. The result is what is called an 'argument pattern' in natural language.

The next task is to define validity and non-validity for such an argument pattern. To do so, one needs a semantics and a definition of valid consequence. It is important to note that one cannot talk about validity in an absolute sense but only relative to a semantics and a definition of validity. If the logical constants are given by two-valued truth-tables, and if one furthermore defines valid consequence as 'whenever the premises are true, so is the conclusion', then there are two prominent valid inferences, MP and MT, and two prominent fallacies, DA and AC. Both the validity of MP and MT and the invalidity of DA and AC follow directly from the truth-table of material implication. As a consequence, these four argument patterns have the effect that adding context does not change the (in)valid status of the

[2] For simplicity I consider here propositional logical constants only.

argument. In fact, it is this context-independence that allows one to separate the inferences made from backward assumptions.

These seemingly trivial conceptualizations have been called into question both by theoretical developments in logic and by experiments on human reasoning. Below is a variant of a standard propositional inference task that investigates reasoning with conditionals in the presence of context. The task was given to three groups of students, total population size 56, in autumn 2006; these groups were similar to the one that took part in the two-rule task, as were the motivation and the use of the task in the classroom afterwards.

The students were given argument patterns with either two or three premises and a putative conclusion, and were asked to judge whether the argument pattern was valid or invalid. Here is the first example of the list:

1) *valid / invalid*
If she has an essay to write, she will study late in the library.
If the library is open, she will study late in the library.
<u>She has an essay to write.</u>
She will study late in the library.

On the face of it, this is a MP inference with an extra conditional premise added. Since the argument pattern MP is invariant with respect to context, one would expect roughly the same amount of students to endorse this inference as those endorsing the two-premise version of MP, which is typically 95% of the population. This, however, did not turn out to be the case. In the population tested the percentage dropped to 60%, which is comparable to what was found in other studies.

This experimental paradigm was devised by Byrne to argue against the so-called mental logic view of reasoning, which holds that reasoning consists in the application of rules such as MP (Byrne 1989). For even if a premise is added, the rule MP remains applicable. Byrne took her results to be support for the rival mental models theory, but it will be argued here that the implications of the experiment go much deeper and affect the very nature of reasoning. First, however, the full set of experimental materials and the results that were obtained are provided for the convenience of the reader.

Essays and Libraries: A Reasoning Task

This is meant as a training exercise in reasoning. It is neither an intelligence test, nor an exam on propositional logic (the answers are not graded!).

(a) Determine whether the following argumentation is valid or invalid.

1) *valid / invalid*
If she has an essay to write, she will study late in the library.
If the library is open, she will study late in the library.
<u>She has an essay to write.</u>
She will study late in the library.

2) *valid / invalid*
If she has an essay to write, she will study late in the library.
If the library is open, she will study late in the library.
<u>She will study late in the library.</u>
She has an essay to write.

3) *valid / invalid*
If she has an essay to write, she will study late in the library.
If the library is open, she will study late in the library.
<u>She does not have an essay to write.</u>
She will not study late in the library.

4) *valid / invalid*
If she has an essay to write, she will study late in the library.
If the library is open, she will study late in the library.
<u>She will not study late in the library.</u>
She does not have an essay to write.

5) *valid / invalid*
If she has an essay to write, she will study late in the library.
If she has some textbooks to read, she will study late in the library.
<u>She has an essay to write.</u>
She will study late in the library.

6) *valid / invalid*
If she has an essay to write, she will study late in the library.
If she has some textbooks to read, she will study late in the library.
<u>She will study late in the library.</u>
She has an essay to write.

7) *valid / invalid*
If she has an essay to write, she will study late in the library.
If she has some textbooks to read, she will study late in the library.
<u>She does not have an essay to write.</u>
She will not study late in the library.

8) *valid / invalid*
If she has an essay to write, she will study late in the library.
If she has some textbooks to read, she will study late in the library.
<u>She will not study late in the library.</u>
She does not have an essay to write.

9) *valid / invalid*
If she has an essay to write, she will study late in the library.
<u>She has an essay to write.</u>
She will study late in the library.

10) *valid / invalid*
If she has an essay to write, she will study late in the library.
<u>She will study late in the library.</u>
She has an essay to write.

11) *valid / invalid*
If she has an essay to write, she will study late in the library.
<u>She does not have an essay to write.</u>
She will not study late in the library.

12) *valid / invalid*
If she has an essay to write, she will study late in the library.
<u>She will not study late in the library.</u>

She does not have an essay to write.

Please, answer the following questions:
(b) If you have evaluated 4, 8, and 12 differently, explain why:
………………………………………………………………………………………………
(c) If you have evaluated 2, 6, and 10 differently, explain why:
……………………………………………………………………………………………..

A few explanations are in order. The added premises are of two kinds: (a) If the library is open, she will study late in the library, and (b) If she has some textbooks to read, she will study late in the library. Premise (a) is called additional; intuitively speaking this type of premise introduces an additional condition for the conclusion to hold. Premise (b) is called alternative; it can be read as introducing another sufficient condition for the conclusion to hold. Additional premises affect the rate of endorsement of the inference MP and MT, whereas alternative premises affect the rate of endorsement of the traditional fallacies DA and AC. The following table presents some pertinent results. It should be read as follows. In the case of MT 75% of the tested population endorses the two-premise inference. The percentage drops to 43% in the presence of an additional premise. Similar for the other inferences.

MP2	MPad	MT2	MTad	DA2	DAalt	AC2	ACalt
99%	60%	75%	43%	75%	10%	66%	24%

Before discussing the theoretical implications of these results I present some of the characteristic arguments that the students provided for their answers.

First, an answer to question (b) in the test:
Subject 19: *As regards 8 and 12, since she does not go to the library apparently she has no essay to write. As regards 4, it could also be the case that she does not study late in the library because it is closed.*

And as regards question (c):
Subject 32: *I have evaluated 6 differently from 2 and 10 because 2 and 10 don't say anything about other possible reasons/assignments for the girl studying in the library.*
Subject 55: *In 10 there is no exception whereas in 2 and 6 there are other possibilities.*

Strict adherence to classical logic would force us to conclude that the subjects who suppress MP and MT in the context of an additional premise are reasoning illogically, as it happens with those subjects who suppress DA and AC in the context of an alternative premise. But in accordance with what was said earlier, such a conclusion would be rather insensitive to the logical forms that the subjects may give when interpreting the task they are given.

Examples such as these exploit the fact that conditionals in natural language are defeasible. The problems become more severe when one tries to take into account that most rules stated in natural language are actually defeasible. The consequent follows from the antecedent only *ceteris paribus*. Here is a direct example of this defeasibility. Suppose we have a rule saying that if a patient has cystitis, she must be given penicillin (example taken from Johnson-Laird and Byrne 1991). If the patient with cystitis presents herself the doctor will give her penicillin, but he will no longer do so if he has the additional knowledge that she is allergic to penicillin. So what seems as a simple MP inference is in fact retracted. The so-called suppression of MP in the suppression task can be viewed as an instance of this phenomenon.

(Stenning and van Lambalgen 2005) claim *closed world reasoning* (henceforth CWR) to be the appropriate logic for defeasible conditionals. According to CWR, what is not considered to be true can be assumed to be false. As a form of underlying reasoning, CWR can explain both the suppression of the classically valid inferences and MP and MT and the endorsement of the traditional fallacies of DA and AC. Applied to AC, CWR takes the following form. If $p \to q$ is the only known rule whose consequence is q, and if we know q to be the case, then we can conclude that p must have 'caused' q. The assumption behind this reasoning pattern is that the effect is generated by causes, so that if there is only one cause for a given effect, the cause must actually have occurred. For DA the argument runs as follows: since p is the only possible cause for the effect q, non-occurrence of p entails non-occurrence of q. This explanation also accounts for the so-called 'conditional perfection', that is, the tendency to read conditionals as bi-conditionals in some contexts (Geis and Zwicky 1971). Suppression of DA and AC is now easily explained, because the provision of the alternative premise $r \to q$ highlights a second possible cause r for the effect q.

Explaining the suppression of MP and MT now requires taking full account of the fact that natural language conditions are defeasible. A formal representation of a defeasible conditional can be given as 'p and nothing abnormal is the case implies q'; formally, $p \wedge \neg ab \to q$. With this representation the categorical premise p does not itself warrant the conclusion q. But here CWR comes to our rescue because if there is no positive information about exceptions, we may assume that they do not occur, giving us the second conjunct of the antecedent. Note that in this way we have justified the pattern MP for two premises on the basis of non-classical reasoning. This justification no longer works in the presence of the additional premise, for in that case the possibility that the library is closed highlights a possible exception to the rule.

It appears then that in CWR all four inference patterns become context-sensitive. This leads us to the question of whether there are general definitions of valid and invalid argument patterns that can replace the 'gang of four'.

5. VALID AND INVALID ARGUMENT PATTERNS

A natural language argument pattern (i.e. with intuitive semantics for logical operators) is valid (fallacious) if it is an instance of an (in)valid argument pattern in a logical form. In this section it will be inquired whether it is at all possible to define argument patterns that can be used with certainty for the familiar fallacies to be detected in natural language. First, a more detailed description will be attempted of how these argument patterns would look like for the two logical systems mentioned above, that is, CL and CWR. For reasons of brevity, only two of the four inferences will be treated here, those of MP and AC.

The argument patterns for MP and AC in CL are defined as follows[3]:

(i) MP $=_{\text{def}}$ $p;\ p \to q\ /\ q$

(ii) AC $=_{\text{def}}$ $q;\ p \to q\ /\ p$

What is characteristic about these definitions is that they constitute sufficient information to decide the normative status of an argument. In other words, no additional information can (in)validate the inferences if it is indeed the case that p implies q. This phenomenon is known as monotonicity. It follows that no

[3] The forward slash separates premises and conclusions.

considerations need to be taken into account regarding the context in which such patterns occur; the definitions are complete as they stand. This notion of context can be made more precise by formulating it as theory *T*, that is, a set of sentences considered to be true in the language in which we are working (here propositional logic). The context-independence of the (in)validity of these argument patterns then means the following: if we have two theories *S* and *T*, and from *S*, *p* and $p \rightarrow q$ it follows that *q*, then this also holds with *S* replaced by *T*. And similarly for AC, that is, if *S*, *q* and $p \rightarrow q$ entail *p*.

By contrast, in non-monotonic logics, the above argument patterns would not do if they are to serve as absolute reference points for the (in)validity of arguments. At the very least and in accordance with what was observed in the previous section, a slot should be included in MP that would allow for what the subjects usually call the ‘exception’ to be incorporated, and which explains the suppression effect:

(iii) MP $=_{\text{def}}$ $p;\ p \wedge \neg ab \rightarrow q\ /\ q$

But this cannot yet serve as a pattern of a valid argument form, since the validity of the arguments depends on whether such an exception actually holds. A second clause is then needed to ensure that no such exception can be proven. This can be intelligibly stated only relative to a particular context, that is, relative to a particular theory *T*. The enriched pattern would have to include one more clause:

(iv) MP $=_{\text{def}}$ $p;\ p \wedge \neg ab \rightarrow q;\ \neg ab\ /_T\ q$

Appealing to CWR, which featured prominently in the subjects’ argumentation in the suppression task, the negation of the abnormality *ab* should be understood as follows. Suppose $\varphi_1 \rightarrow ab, \ldots, \varphi_n \rightarrow ab$ are all the clauses in *T* which have *ab* as a consequent. If no φ_i can be proven in *T* where $1 \leq i \leq n$, then we can conclude $\neg ab$.

Similar considerations hold for AC, only here the argument pattern (i) is valid in CWR. However, this can only be the case when nothing apart from what is indicated by the categorical premise *p* can be proven to bring about the consequent *q*. In other words, AC is valid only when alternative rules have been excluded, and this can again be determined only with respect to a particular theory *T*. The enriched argument pattern of AC would, therefore, have to include the following information:

AC $=_{\text{def}}$ $q;\ p \wedge \neg ab \rightarrow q\ /_T\ p$, which should be read as follows. Suppose $\varphi_1 \rightarrow q, \ldots,$ $\varphi_n \rightarrow q$ are all the clauses in *T* which have *q* as a consequent. If no φ_i can be proven in *T* where $1 \leq i \leq n$, then we can conclude *p*.

However, these enriched definitions are no longer the type of argument patterns that can be used in order to detect whether a fallacy has occurred in natural language. Whereas in CL argument patterns are *local* and separated from the theory (that is, the general context), in non-monotonic logics an argument pattern for MP or AC turns out to be theory-dependent. This is because *global* considerations need to be taken into account in order for the validity or invalidity of the argument to be established. These considerations relate to exceptions in the case of MP and MT, and alternative rules in the case of the traditional fallacies DA and AC.

6. WHERE DID THE FALLACIES GO?

The latter observations are not meant to repudiate the legitimacy of calling out particular instances of DA or AC as cases of fallacious reasoning. In CL, DA and AC are never valid, and they are not always valid in CWR either. Therefore, it still makes sense to seek for a definition that captures the fallacious forms of DA and AC, that is, a definition that tells us when the inference is wrong. However, the previous sections show that such a definition cannot be restricted to an argument pattern if an argument pattern is understood in the traditional intuitive sense.

The moral to be drawn here is that once a broader, i.e. semantically informed, notion of logical form is accepted together with the possibility of alternative to CL formal systems as plausible representations of how people think, the familiar landscape of absolutely valid and absolutely invalid inferences changes drastically. MP and MT are sometimes considered invalid, and DA and AC are sometimes considered valid. As a consequence, 'DA' and 'AC' turn out to be infelicitous terms for fallacious reasoning (forward inference that negates the antecedent and backward inference that asserts the consequent). In fact, they are not even suitable characterizations of the types of inferences they represent, since they do not cover, for instance, the argument patterns in natural language in which the constituent 'ab' does not occur overtly. Accounting for the fact that covert information can be instrumental in assigning a logical form to an argument and deciding its normative status, a generalized definition of the inferences would look close to something like the following:

MP: Affirmation of the overt part of the antecedent in the overt rule.
MT: Denial of the overt consequent in the overt rule.
DA: Affirmation of the overt consequent of the overt rule.
AC: Denial of the overt antecedent of the overt rule.

Then it depends on the logic at hand to decide whether the inference is valid or not. The logic appealed to here in order to account for a number of experimental results was a non-monotonic system, namely CWR. Non-monotonic systems make it possible to formalize defeasible rules, and as such they seem to be more appropriate for describing ordinary reasoning. Of course, different logics may pose additional challenges in defining fallacious argument patterns. In any case, the coarse grained contrast between monotonic and non-monotonic systems highlighted here is sufficient to support the general claims in this paper, namely the impossibility of defining the particular inferences in terms of argument patterns that will unambiguously decide whether an argument is valid or not.

7. LOGIC IS NOT INSENSITIVE TO ARGUMENTATION AFTER ALL

The significance of a context-dependent notion of validity that one encounters in non-monotonic logics is fully appreciated when one realizes how prominent defeasible reasoning is in ordinary argument. In fact, one could say that operating on defeasible inferences is what makes assumptions, rules and conclusions debatable, and gets argumentation started. Defeasible reasoning manifests itself every time we, as protagonists, retract an argument, or modify it; also whenever, as antagonists, we advance a counter-argument to rebut the reasons adduced by our opponent.[4]

The syntactic product-like representation entailed by CL has made it totally inappropriate for the modelling of ordinary argument. There is no room in such a representation to incorporate what might be disputable in the inference and may give rise to disagreement. As a consequence, there is also no room for the changes that a critical reaction might bring to the argument. This is precisely why a system like

[4] Here I assume the pragma-dialectical terminology, according to which each of the two parties in a difference of opinion assumes the role(s) of 'protagonist' and/or 'antagonist' depending on the attitude towards the standpoint. See (van Eemeren and Grootendorst 2004).

natural deduction for first order predicate logic breaks down when used to account for the inferential process that underlies argumentation. Take the additional premise in the suppression task as an example of a critical reaction. One wants to be able to explain how conjoining this premise with the initial rule gives rise to a conditional where the two antecedents are connected by conjunction instead of disjunction, as it would have to be the case according to CL. In other words, one wants to account for the fact that this premise is understood as an additional and not as an alternative one. On the face of such observations, it is no wonder that translating premises and conclusions into classically defined logical patterns has been considered irrelevant to argumentation as well as disconnected from the critical, dynamic processes there within.

At the same time, not all exceptions or alternative reasons are relevant and in need of being taken into account. Appealing to a high improbable cause or abnormal situation might be an entirely uncooperative move in the pragmatics of argumentative discourse. It is, therefore, very strange to be forced to call such ‘‘irrelevant’’ moves instances of valid argumentation. In CL, the truth of the antecedent does not follow from affirming the consequent because it is conceptually possible for *p* to be false. In other words, DA and AC are judged to be fallacious argument patterns on the presupposition that all circumstances can be checked in which the premises are true. However, CWR is based on exactly the opposite assumption, namely that not all possible circumstances are accessible; this is how incorporating new information can revise the interpretation by bringing to notice some situation that has not been deemed relevant at first.

In the present view, endorsement of DA or AC need no longer be seen as a logical mistake. A more fruitful perspective is to view these inferences as the arguer’s attempt to shape the common ground, that is, to establish the underlying reasoning in addition to shared world-knowledge. For instance, the arguer may attempt to elicit agreement for disregarding as irrelevant those exceptions that are not mentioned. In this way one can also disentangle different types of critical reactions. Consider an AC inference based on a causal relation as an example. There is a difference between challenging the relation by adducing an alternative cause and by addressing the intensional meaning of the implication, that is, the sufficiency of the cause to bring about the effect (assuming that CWR holds). For example, it is one thing to deny that ‘she has an essay to write’ by arguing that there might be other reasons to have kept her late in the library, but quite another to do so by claiming that she is not the type of diligent student to work until late no matter how much work she has to do. In most cases, arguing for alternative reasons would entail commitment of the speaker to the main conditional, so that ‘having an essay to write’ is accepted as a good enough reason to have kept her late in the library. This is because the main conditional is given, and usually not attacking given information is tantamount to including it in the common ground. This last point will be discussed briefly in the next, and final, section.

8. CONCLUSION

We have seen how a more liberal view of interpretation alongside with a semantically informed notion of logical form poses insurmountable obstacles in defining the so-called logical fallacies in terms of argument patterns. However, we have not taken this result to repudiate the notion of fallacy altogether. Instead we have tried to inquire into what it is that the validity of the particular argument patterns is relative to. This led to a more precise meaning of the context-dependence of fallacies, which should be regarded as the first step towards formulating a more context-sensitive definition of all four inferences, MP, MT, DA and AC.

The validity of argument patterns has been found relative to both the underlying reasoning and -where this applies, e.g. in non-monotonic logics- to the assumptions of world-knowledge that pertain. At the same time it has been observed that defeasible inferences occupy a very prominent role in ordinary argument. These remarks are in themselves sufficient to explain why CL has been deemed inappropriate for the study of argumentation. However, formalizing argumentation has been pursued here as the means to fix the interpretation which makes it possible for the validity of the argumentation to be judged.

I close with some remarks on the impact of CWR on argumentation, in particular on the notion of common ground. Traditionally, the common ground in argumentation is conceived of as consisting of shared beliefs and assumptions, which are to be used *locally* in argumentation: arguers appeal to these beliefs and assumptions individually to support their argumentation. In CWR, the common ground is used *globally*. The arguer about to use an AC inference $q; p \rightarrow q / p$ appeals to his opponent to concede that the common ground contains no rule of the form $r \rightarrow q$ for r different from p. Thus, the boundaries of the common ground become instrumental in enlarging the common ground itself. In this sense, the boundaries of common ground play an important strategic role in argumentation. Something similar holds for CWR as applied to exceptions: if the common ground gives us no reason to suppose an exception will occur, the non-occurrence of the exception can be added to the common ground.

link to commentary

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