Why Fallacies Appear to be Better Arguments Than They Are

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Abstract: This paper explains how a fallacious argument can be deceptive by appearing to be a better argument of its kind than it really is. The explanation combines heuristics and argumentation schemes. Heuristics are fast and frugal shortcuts to a solution to a problem. They are reasonable to use, but sometimes jump to a conclusion that is not justified. In fallacious instances, according to the theory proposed, such a jump overlooks prerequisites of the defeasible argumentation scheme for the type of argument in question. Three informal fallacies, *argumentum ad verecundiam*, *argumentum ad ignorantiam* and fear appeal argument, are used to illustrate and explain the theory.

Resumé: Dans cet article on explique comment un argument fallacieux peut nous tromper en semblant être un meilleur argument qu'il ne l'est en effet. L'explication réunit des heuristiques et des schèmes d'argumentation. Des heuristiques sont des raccourcis rapides et économes employés dans une solution à un problème. Il est raisonnable de les employer, mais parfois elles arrivent à une conclusion injustifiée. Dans les cas fallacieux de leur usage, on propose qu'elles négligent des conditions nécessaires des schèmes d'argumentation défaisable qui devraient être prises en considération dans l'évaluation du type d'argument en question. Pour illustrer et expliquer cette théorie, on emploie trois sophismes non formels: *argumentum ad verecundiam*, *argumentum ad ignorantiam*

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In the informal logic tradition, fallacies are commonly used sophisms or errors in reasoning like hasty generalization, *argumentum ad hominem* (argument against the person), *argumentum ad verecundiam* (appeal to authority, especially inappropriate argument from expert opinion), *post hoc ergo propter hoc* (false cause), straw man argument, *peititio principii* (begging the

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question) and so forth. Many of the most common forms of argument associated with major fallacies, like argument from expert opinion, *ad hominem* argument, argument from analogy and argument from correlation to cause, have now been analyzed using the device of defeasible argumentation schemes (Walton, Reed and Macagno, 2008). Recent research in computing has also embraced the use of argumentation schemes, linking them to key logical notions like burden of proof (Gordon, Prakken and Walton, 2007). Argumentation schemes have been put forward as a helpful way of characterizing structures of human reasoning, like argument from expert opinion, that have proved troublesome to view deductively. Many of the schemes are closely related to specific informal fallacies representing types of errors that come about when a scheme is used wrongly. Such schemes represent the structure of correct forms of reasoning used wrongly in specific instances where an argument is judged to be fallacious. Studies of fallacies in argumentation and informal logic have mainly taken a normative approach, by seeing fallacies as arguments that violate standards of how an argument should properly be used in rational thinking or arguing.

However, fallacies also have a psychological dimension. They are illusions and deceptions that we as human thinkers are prone to. They are said to be arguments that seem valid but are not (Hamblin, 1970, 12). Even so, little is known about how the notion 'seems valid' should be explained (Hansen, 2002). Could it be psychological? Psychology studies heuristics and cognitive biases in human decision-making (Tversky and Kahneman, 1974). Heuristics may be broadly characterized as rules of thumb that enable us to rapidly solve a problem even where information is insufficient to yield an optimal solution, but in some cases they are known to lead to errors and cognitive biases. In this paper, it is shown how heuristics are closely connected to fallacies in a way that helps to explain why fallacies appear to be better arguments than they really are. Three examples of heuristics that are also known to be fallacies are used to bring the normative dimension better into relation with the psychological dimension.

The problem is solved by placing the notion of a heuristic as a mediating concept between the notions of fallacy and defeasible argumentation scheme. These are the three heuristics, as we will call them. If it is an expert opinion, defer to it. If there is no reason to think it is false, accept it as true. If it is fearful, avoid taking steps to whatever might lead to it. These three heuristics are interposed between three argumentation schemes underlying three informal fallacies by introducing a new device called a parascheme. The parascheme represents the structure of the heuristic. Each parascheme sits alongside a given scheme in the background, like a ghostly double. It comes into play to explain the relationship be-

tween a reasonable argument that fits an argumentation scheme and the same kind of argument that has been employed in a way that makes it fallacious. It is shown how the parascheme, along with the scheme and the heuristic, can be used to explain what has gone wrong in fallacious instances of these three kinds of arguments.

1. Heuristics and paraschemes

Gigerenzer et al. (1999) explore the cognitive theory that we have two minds—one that is automatic, unconscious, and fast, the other controlled, conscious, and slow. In recent years there has been great interest in so-called dual-process theories of reasoning and cognition. According to dual process theories in cognitive science, there are two distinct cognitive systems underlying human reasoning. One is an evolutionarily old system that is associative, automatic, unconscious, parallel, and fast. It instinctively jumps to a conclusion. In this system, innate thinking processes have evolved to solve specific adaptive problems. The other is a system that is rule-based, controlled, conscious, serial, and slow. In this cognitive system, processes are learned slowly and consciously, but at the same time need to be flexible and responsive.

The old system uses what are called heuristics to rapidly jump to a conclusion or course of action. An example would be the use of trial and error when one cannot find a better way of solving a problem. Argument making has been combined with heuristic thinking by Facione and Facione (2007) to help explain the complexity of human reasoning of the kind used in decision-making. They distinguish between two kinds of thinking (Facione and Facione, 2007, 5). One, based on heuristics, applies to situations that are familiar, like making a fast decision to brake while driving on a freeway. The other is useful for judgments in unfamiliar situations, processing abstract concepts and deliberating where there is sufficient time to plan carefully and collect evidence.

Heuristics are said to be "fast and frugal" in use of resources (Gigerenzer et al., 1999). They are extremely useful in arriving at a decision to proceed tentatively on a defeasible basis under constraints of time pressure and lack of complete knowledge. Gigerenzer et al. (1999, 4) offer the example of a man who is rushed to a hospital while having a heart attack. The physician needs to decide under time pressure whether he should be classified as a low risk or a high risk patient. This can be done using three variables. (1) The patient who has a systolic blood pressure of less than 91 is classified as high risk without considering any other factors. (2) A patient under age 62.5 is classified as low risk. (3) If the patient is over that age, the additional factor of sinus tachycardia (heart rhythm of greater than 100 beats per minute) needs to be taken into

account. These three variables can be applied using the decision tree in Figure 1.

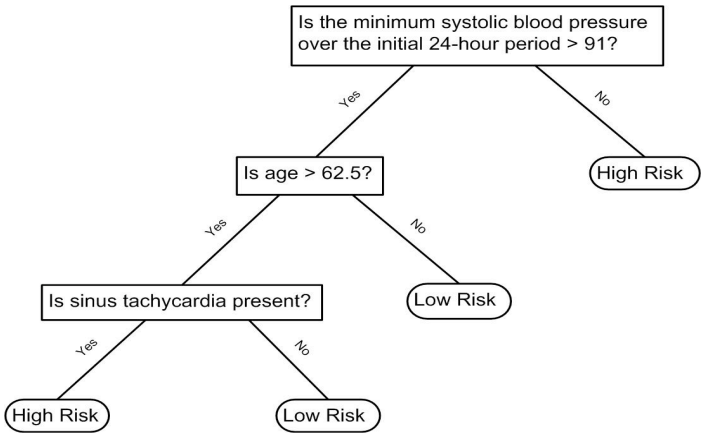

Figure 1. Decision Tree for Heart Attack Victim (adapted from Gigerenzer et al., 1999, 4)

This decision strategy is very simple and ignores quantitative information, hence it makes us suspicious that it might be inaccurate compared to a statistical classification method that takes much more data into account. A heuristic is only a shortcut, and if there is enough time for more evidence to be collected, a better method can often be found. The controlled, conscious and slow system of reasoning can pose critical questions, looking at evidential considerations pro and contra. An argument based on a heuristic might stand up or not under this more detailed kind of scrutiny. Still, heuristics can not only be useful but often highly accurate. According to Gigerenzer et al. (1999, 4-5), the decision tree heuristic "is actually more accurate in classifying heart attack patients according to risk status than are some rather more complex statistical classification methods".

We need to be aware, however, that the term 'heuristic' has different meanings in different disciplines. In psychology it refers to the use of simple and efficient rules that can be used to explain how people make decisions and solve problems under conditions of incomplete information. Such rules can be practically useful and work well in many situations, but they can also be known to lead to errors in some cases. Philosophers of science have emphasized the importance of heuristics for invention of hypotheses in scientific investigations. In engineering, a heuristic is a rule of thumb based on practical experience that can be used to save time and costs when solving a problem.

Russell and Norvig (1995, 94) have presented a brief history of how the meaning of the term 'heuristic' has evolved in computer science. Originally the term was used to refer to the study of methods for discovering problem-solving techniques, especially ones that can be used to find mathematical proofs. Later, the term was used as the opposite of an algorithm. In other words, it was defined as a process that may solve a problem, but offers no guarantee of solving it. Still later, during the period when expert systems dominated artificial intelligence, "heuristics were viewed as rules of thumb that domain experts could use to generate good solutions without exhaustive search" (Russell and Norvig, 1995, 94). However, this notion of a heuristic proved to be too inflexible, leading to the current usage that refers to heuristics as techniques designed to solve a problem even if the solution cannot be proved conclusively to be the correct one. This usage is the one used in work on devising intelligent search strategies for computer problem solving. Many examples of typical uses of heuristics in computer problem solving are given by Pearl (1984). An example Pearl gives (1984, 3) is the case of the chess master who decides that a particular move is most effective because it appears stronger than the positions resulting from other moves. This method is an alternative to rigorously determining which sequences of moves force a checkmate by precisely comparing all these available sequences.

Heuristics are clearly related in some way both to defeasible argumentation schemes and to fallacies, as we can see by comparing them. For example, the heuristic 'If it's an expert opinion, defer to it' is clearly related to the argumentation scheme for expert opinion. The heuristic appears to be a fast and shorter version of the scheme, which, as will be seen in the next section, is longer, depending on which version of the scheme is selected. Perhaps the heuristic, since a heuristic is known to be capable of leading to error, is part of the fallacy, or can be used to explain how the fallacy works. To explore this suggestion, here we introduce a new concept into logic.[1]

A parascheme is a device that can be used to represent the structure of a heuristic as a speedy form of inference that instinctively jumps to a conclusion and is commonly used to make decisions. Here are three examples of paraschemes. I name the first the parascheme for expert opinion: an expert says *A* is true, therefore *A* is true. I name the second the parascheme for lack of a better reason: *A* is not known to be false (true) therefore *A* is true (false). I name the third the parascheme for fearful consequence: consequence *C* is fearful, therefore, do not carry out any action α that would have consequence *C*. These paraschemes are obviously re-

[1] It may not be all that new, if one recalls that one of the words Aristotle used for fallacy was paralogism.

lated in some interesting way to two well-known informal fallacies, *argumentum ad verecundiam* (fallacious appeals to authority), *argumentum ad ignorantiam* (arguments from ignorance), and to fear appeal arguments, sometimes associated in logic textbooks with fallacious *ad baculum* arguments, or arguments that appeal to threats.

2. Variants of the scheme for argument from expert opinion

Argument from expert opinion has long associated with the fallacy of appeal to authority, but recent work in informal logic has shown that it also very often a reasonable argument that has the structure of a defeasible argumentation scheme. The following form of reasoning represents its argumentation scheme: if *E* is an expert and *E* says that *A* is true then *A* is true; *E* is an expert who says that *A* is true; therefore *A* is true. This scheme is defeasible. It is not deductively valid, since what an expert says often turns out to be wrong, or at least subject to revisions as new information comes in. Such a defeasible scheme is inherently subject to critical questioning. Moreover the conditional in the major premise is not the material conditional of the kind used in deductive propositional logic. It is a defeasible conditional. Here is the version of the scheme for argument from expert opinion from Walton, Reed and Macagno (2008, p. 309). Let's call it the simple version of the scheme.

> Major Premise: Source *E* is an expert in subject domain *S* containing proposition *A*.
> Minor Premise: *E* asserts that proposition *A* is true (false).
> Conclusion: *A* is true (false).

The simple version is short, having only two premises. It expresses the nature of the basic type of argument very well. It brings out how argument from expert opinion works as a fast and frugal heuristic in everyday thinking. But there are some problems with it.

The first problem was pointed out by Walton and Reed (2002). The scheme above, usually taken to represent the basic scheme for argument from expert opinion, seems to be incomplete. Walton and Reed (2002, 2) suggest that the structure of the argument could be more fully expressed in the following version, which they call Version II.

> Explicit Premise: Source *E* is an expert in subject domain *S* containing proposition *A*.
> Explicit Premise: *E* asserts that proposition *A* (in domain *S*) is true (false).

Conditional Premise: If source *E* is an expert in subject domain *S* containing proposition *A* and *E* says that *A* is true then *A* may plausibly be taken to be true (false).

Conclusion: *A* is true (false).

Let's call this version of the scheme the conditional version. It has what appears to be a *modus ponens* structure, but it represents a defeasible variant of this form of argument that is not well modeled as deductive or inductive. Note that it even adds a new dimension from the simple scheme by adding 'may plausibly be taken to be' in the conditional premise. These remarks suggest a second problem. A distinction needs to be drawn between the deductive form of argument commonly called *modus ponens* and its defeasible variant defeasible *modus ponens*, called *modus non excipiens* by Verheij (1999, 5). This type of argument has the following form: if *A* then (defeasibly) *B*; *A*; therefore (defeasibly) *B*. It is a type of argument that can hold tentatively under conditions of incomplete knowledge of the full facts of a case, but that can defeated by exceptions. It is not a deductively valid form of inference. In defeasible logic (see Nute, 1994), a rule-based non-monotonic formal system, a conclusion derived is only tentatively accepted, subject to new information that may come in later. Where $\Rightarrow$ represents the defeasible conditional, the statement $A \Rightarrow B$ reads: if *A* then defeasibly *B*. It means that 'if *A* then *B*' holds tentatively, subject to new information that might come in, providing an instance where *A* holds but *B* doesn't.

Taking into consideration how such arguments can be defeated or cast into doubt brings us to the asking of appropriate critical questions matching each defeasible scheme. The six basic critical questions matching the argument from expert opinion are given in Walton, Reed and Macagno (2008, 310) as follows.

CQ_1: *Expertise Question*. How credible is *E* as an expert source?

CQ_2: *Field Question*. Is *E* an expert in the field that *A* is in?

CQ_3: *Opinion Question*. What did *E* assert that implies *A*?

CQ_4: *Trustworthiness Question.* Is *E* personally reliable as a source?

CQ_5: *Consistency Question.* Is *A* consistent with what other experts assert?

CQ_6: *Backup Evidence Question.* Is *E*'s assertion based on evidence?

The critical questions are provided to teach skills of critical thinking concerning how best to react when confronted with a particular type of argument.

There is also a third problem with the simple version of the scheme. This problem was first noticed in a general discussion of schemes and critical questions by Verheij (2001). The problem as applied to the simple version of this scheme is that the field question appears to be redundant, because the major premise already states that the field (domain) of the proposition that is claimed to be true matches the field (domain) of the expert. Since this assertion is already made in the premise, there is no need to add consideration of it as a critical question as well, because anyone who disagrees with the argument, or wants to question it, can simply disagree with the premise, and ask for support for it. So it might seem that, in order to use these critical questions, the simple version of the scheme could be shortened even further. We return to this problem in the next section.

Four of the six critical questions of the scheme for argument from expert opinion can be modeled as implicit premises that supplement the explicit premises of the scheme (Walton and Gordon, 2009). These four questions are modeled as additional assumptions, added to the ordinary premises. First, consider CQ_1. When you put forward an appeal to expert opinion, you assume, as part of the argument, that the source is credible, or has knowledge in some field. Second, consider CQ_2. You assume that the expert is an expert in the field of the claim made. Third, consider CQ_3. You assume that the expert made some assertion that is the claim of the conclusion, or can be inferred from it. Fourth, consider CQ_6. You assume that the expert's assertion was based on some evidence within the field of his or her expertise.

Questions are not premises, but the Carneades model represents the structure of the scheme to represent them as premises. The new fully explicit argumentation scheme no longer needs critical questions in order for it to be subject to evaluation. The premise can be questioned or argued against in the usual way, shifting a burden of proof onto the arguer to defend it, or to the questioner to back up his criticism. That does not end the process of questioning if critical sub-questioning is possible. But this process can be modeled by Carneades in the same way, just by moving the process another step.

Questions CQ_4 and CQ_5 can also be modeled as implicit premises of the scheme for argument from expert opinion, but they need to be handled in a different way. One does not assume the expert cited is untrustworthy without some evidence to back up such a charge. The burden of proof to support such a claim, once made, would shift to the respondent to back up his charge before the given argument from expert opinion would fail to hold up. To successfully challenge the trustworthiness of a witness, some evidence of bias or dishonesty must be produced. Nor would one assume, without further evidence, that what the expert said is inconsistent

with what other experts say. To successfully challenge the consistency of an expert's claim with what other experts in the same field say, some evidence of what the others say must surely be produced. The difference between these two kind of critical questions can be seen as one of burden of proof (Gordon, Prakken and Walton, 2007). Before they refute the argument from expert opinion, CQ_4 and CQ_5 have a burden of proof that needs to be met, whereas the other critical questions refute the argument just by being asked, unless the proponent offers some appropriate reply to the question.

The Carneades model of argumentation uses the following procedure for determining the acceptability of an argument (Gordon and Walton, 2006).

- At each stage of the argumentation process, an effective method (decision procedure) is used for testing whether some proposition at issue is acceptable given the arguments of the stage and a set of assumptions.
- The assumptions represent undisputed facts, the current consensus of the participants, or the commitments or beliefs of some agent, depending on the task.
- The evaluation of an argument depends on the proof standard applicable to the proposition at issue in a type of dialogue appropriate for the setting.
- A decidable acceptability function provided by the Carneades model of argument is used to evaluate how strong or weak an argument is.

The Carneades model for reasoning with argumentation schemes distinguishes three types of premises, ordinary premises, assumptions and exceptions. Assumptions are assumed to be acceptable unless called into question (Gordon and Walton, 2006). Like ordinary premises, they have a burden of proof on the proponent, who must either give an appropriate answer or the argument is refuted. Ordinary premises and assumptions are assumed to be acceptable, but they must be supported by further arguments in order to be judged acceptable. Exceptions are modeled as premises that are not assumed to be acceptable. They only become acceptable when the appropriate evidence is given to show they hold. On the Carneades model, the major and the minor premise of the scheme above are classified as ordinary premises, while the first four questions are treated as assumptions and the last two are treated as exceptions.

Following the proposal above that argument from expert opinion has a defeasible *modus ponens* form (DMP), the scheme for argument from expert opinion can be presented in an amplified form that reveals its implicit premises as follows.

Ordinary Premise: *E* is an expert.
Ordinary Premise: *E* asserts that *A*.
Ordinary Premise: If *E* is an expert and *E* asserts that *A*, then *A* is true.
Assumption: *E* is an expert in field *F*.
Assumption: *A* is within *F*.
Assumption: It is assumed to be true that *E* is a credible expert.
Assumption: It is assumed to be true that what *E* says is based on evidence in field *F*.
Exception: It is an exception to the generalization stated in the conditional premise if it is found to be false that *E* is trustworthy.
Exception: It is an exception to the generalization stated in the conditional premise if it is found to be false that what *E* asserts is consistent with what other experts in field *F* say.
Conclusion: *A* is true.

This list of premises and conclusion represents the Carneades style of modeling the scheme for argument from expert opinion. In effect, the critical questions have been absorbed into the scheme as additional premises. Another aspect of the Carneades version of the scheme that requires comment is that the three ordinary premises can be taken as explicit premises whereas the assumptions and the exceptions, although they are also premises required to support the conclusion, are implicit in nature.

In this section we have observed that there are various reasons why the scheme for argument from expert opinion is potentially useful and interesting. One reason is that one might want to use argumentation schemes in an argument map that represents premises and conclusions as statements in text boxes, but has no straightforward way of representing critical questions matching a particular scheme. The Carneades style of representing arguments solves this problem. Another reason is that we might want to study the relationship between the scheme and its corresponding parascheme.

3. Relation of the parascheme to the scheme

How is the parascheme for argument from expert opinion related to the above versions of the full scheme? First, note that the parascheme is even simpler than the simple version of the scheme above. The simple scheme at least takes the field of expertise into account. But above, it was questioned, following Verheij's observations, whether this was necesssary, since the field of expertise is

already taken into account in one of the critical questions. Should the simple scheme be made even simpler as in the following version, which could be called the simplest version of the scheme.

Explicit Premise: *E* is an expert.
Explicit Premise: *E* asserts that proposition *A* is true (false).
Conclusion: *A* is true (false).

This simplest version matches the parascheme. A simpler variant of the conditional variant of the scheme can also be considered.

Explicit Premise: *E* is an expert.
Explicit Premise: *E* asserts that proposition *A* is true (false).
Conditional Premise: If *E* is an expert and *E* says that *A* is true then *A* is true.
Conclusion: *A* is true (false).

So which of these versions of these schemes for argument from expert opinion should be taken as the correct one, at least for standard purposes of analyzing and evaluating arguments? The disadvantage of the simplest version is that it does not take the domain of expertise into account. But is that more of an asset than a liability, if it can be taken into account in the critical questions, or in the assumption on that matter in the Carneades version of the scheme? Another solution would be to leave the domain issue in the ordinary premise of the scheme but delete the field question from the critical questions. In other words, we delete the parts of the ordinary premises pertaining to domain of expertise and leave it as an assumption in the Carneades list of premises.

A nice approach that seems to works very well for our purposes is to opt for the simplest variant of the conditional version of the scheme. One reason for selecting this version as the main one for general use is that it is important to include the conditional, because it acts as the so-called warrant or inference license linking the premises to the conclusion. It expresses the rationale, the presumption on which the inference is based to the effect that what an experts states is generally reliable as a defeasible reason for accepting something as true, in the absence of contravening reasons to think it is false. Another reason is that the defeasibility of the conditional will turn out to be important for analyzing the fallacy of argument from expert opinion. If the conditional is treated as a material conditional of the kind used in deductive logic, it makes the inference inflexible, in a way that ties it in with fallacious argu-

ment from expert opinion, as will be shown below. Let's provisionally work with the simplest conditional variant.

The parascheme jumps straight to the conclusion from the first two ordinary premises to the conclusion. It does not take the conditional ordinary premise of the simplest variant of the conditional scheme into account, nor does it take any of the assumptions or the exceptions made explicit in the Carneades version of the scheme into account. The structure of the reasoning can be modeled by defeasible logic. A defeasible rule has the form of a conditional, $A_1, A_2, ..., A_n \Rightarrow B$, where each of the A_i is called a prerequisite, all the A_i together are called the antecedent, and B is called the consequent. Argumentation schemes, like the one for argument from expert opinion, take the following general form in defeasible logic.

$$A_1, A_2, ..., A_n \Rightarrow B$$
$$A_1, A_2, ..., A_n$$
$$B$$

The parascheme omits one of the prerequisites of the scheme. The fallacy is not one of a false premise, or of a premise that is inadequately supported by evidence. It is one of overlooking a premise that is a prerequisite of the scheme.

How the parascheme works in an instance of the scheme for argument from expert opinion is shown in Figure 2, where the argument jumps ahead from two of the ordinary premises to the conclusion without taking the other premises into account.

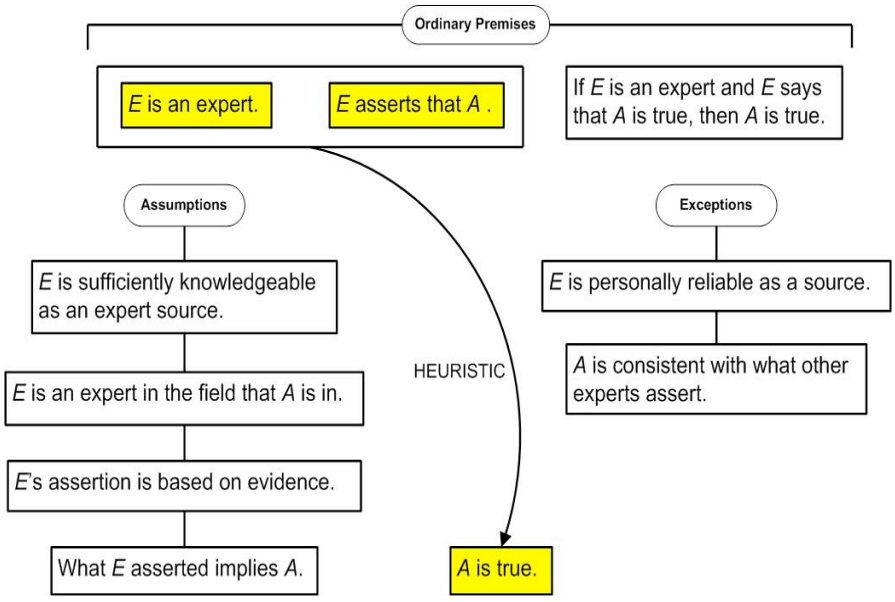

Figure 2. Heuristic of Argument from Expert Opinion

Look at the two premises in the darkened boxes at the top left of Figure 2, and the arrow representing the inference to the conclusion in the darkened box at the bottom. This inference represents a simplified version of the scheme that is understandable enough as a familiar heuristic, but does not take the other factors into account. These other factors include the conditional premise linking other two ordinary premises to the conclusion (shown in the top box at the right) and the implicit premises, the assumptions and the exceptions (shown below the top boxes on the left and right respectively). So here we see the problem. The heuristic takes us by a fast and frugal leap directly to the conclusion. It is the old cognitive system of reasoning. However it overlooks the implicit conditional premise, the assumptions and the exceptions, all factors that need to be taken into account by the controlled, conscious, and slow inferential procedure of the new cognitive system. The first problem is how this analysis relates to the *ad verecundiam* fallacy.

4. Fallacious arguments from expert opinion

Argument from expert opinion can be a reasonable argument in some instances of its use, while in other instances of its use, it can be fallacious. But there can be different kinds of problems in using it as an argument. Some uses are merely blunders or errors that make the argument either weak or worthless, depending on the standard of proof required to make the argument of some probative worth to prove a point. On this dynamic approach, a distinction has to be drawn between two kinds of fallacies. In some cases, a fallacy is merely a blunder or an error, while in other cases, it is a sophistical tactic used to try to get the best of a speech partner in dialogue unfairly, typically by using verbal deception or trickery. The evidence of the use of such a tactic is found in the pattern of moves made by both sides in the exchange. It is important for fallacy theory to avoid confusing these two types of problematic argumentation moves. To deal with the problem, a pragmatic theory of fallacy (Walton, 1995) distinguished between two kinds of fallacies. The paralogism is the type of fallacy in which an error of reasoning is typically committed by failing to meet some necessary requirement of an argumentation scheme. The sophism type of fallacy is a sophistical tactic used to try to unfairly get the best of a speech partner is an exchange of arguments.

To cite an example of this latter type of problem in arguments from expert opinion, consider a case where a movie star who is not a physician makes claims about the healing properties of a skin cream to cure acne or other skin conditions. This person may be a role model, and may think that the cream cured her skin condition, but she is not an expert of the type required to provide scientific or

medical evidence of the kind required to support her claim, based on the scheme for argument from expert opinion. The error could be diagnosed as a failure of the ordinary premise of the scheme for argument from expert opinion claiming that the source cited is an expert. Alternatively, if the movie star is being put forward as some sort of expert, the problem is that she may not be an expert in the right field needed to support the claim. Let's take up these two kinds of cases separately, beginning with the second one.

This kind of case takes us back to the question of formulating the scheme studied in Section 2. Should we use a version of the scheme for argument from expert opinion where it is required that the field of the subject proposition *A* is the same as the field of the expert cited? This requirement holds in the conditional version called Version II by Walton and Reed (2002, 2). Or should we use a version of the scheme for argument from expert opinion where it is not required that field of the subject proposition *A* be the same as the field of the expert cited? This requirement does not hold in the simple version of the scheme in Section 2. Nor does it hold in the simplest version of the scheme presented in Section 3, or in the simpler version of the conditional version of the scheme (also in Section 3). Another variant of the scheme that needs to be considered is the Carneades version, where there are two assumptions as premises, one stating that *E* is an expert in field *F* and another stating that *A* is within *F*. This version dispenses with the critical questions and ensures by having these two assumptions as premises that the field of the claim matches the field of the expert. In this instance the argument is a failure to fulfill the assumption that the supposed expert is an expert in the field appropriate for the argument.

Now let's consider the first kind of case, where the movie star cited was not an expert at all, even though she was put forward as an expert in the appeal to expert opinion argument. A problem posed by such cases is whether the failure should be classified as an instance of the *ad verecundiam* fallacy or merely as a false explicit premise. The problem here is that the notion of fallacy is generally taken in logic to represent a fallacious inference of some sort, an argument from premises to a conclusion, and not merely a false or insufficiently substantiated explicit premise in the argument. This problem appears to recur in all the versions of the scheme. Even in the Carneades version '*E* is an expert' is an explicit premise. On the other hand, the failure to fulfill the assumption that the supposed expert is an expert in the field appropriate for the argument could plausibly be diagnosed as a fallacy on the ground that the assumption is implicit in the argument. If the fault is merely the failure of an ordinary premise, which is part of the parascheme, and which is explicit, it is harder to make a case for classifying it as a fallacy. The reason, to repeat, is that a sharp dis-

tinction needs to be drawn in logic between a fallacious argument and an argument that merely has a false premise. If the premise is an implicit assumption that corresponds to a critical question however, the case is different.

To cite another side of the problem, consider a different type of case of fallacious argument from expert opinion where the proponent of the argument treats it as infallible, and refuses to concede that it is open to critical questioning. That would be a fallacious misuse of the argument. For example, let's suppose he dismisses the respondent's attempts to question the argument critically by counter-attacking, replying, "Well, you're not an expert". This move attempts to block critical questioning, in effect treating the argument as holding by necessity. But argument from expert opinion is defeasible in nature, and needs to be seen as open to critical questioning. If you treat it as a deductively valid argument, serious problems can arise. When examining expert witness testimony in law, for example, it would be against the whole process of examination to assume that the expert is omniscient. There is a natural tendency to respect expert opinions and even to defer to them, but experts are often wrong, or what they say can be misleading, so one often needs to be prepared to critically examine the opinion of an expert. Openness to default in the face of new evidence is a very important characteristic of defeasible reasoning. If the conditional premise in the simple conditional version of the scheme is treated as a material conditional of the kind used in deductive logic, it makes the scheme deductively valid. It is no longer defeasible, and open to critical questioning.

This second kind of case represents an even more serious instance of a fallacious appeal to authority (*argumentum ad verecundiam*)[2]. The problem is that the argument from expert opinion has been put forward in such an aggressive fashion that it shuts down the capability of the respondent to raise critical questions. For example, suppose the proponent puts forward an argument based on expert medical opinion, and in response to critical questioning, she replies aggressively by saying, "You're not an expert in medicine, are you? Are you a doctor? What you're saying is merely anecdotal". There might be some truth in these claims. The respondent may not be a doctor. He is not an expert in medicine. It may be indeed true that what he's saying is not based on scientific findings that have been proved by published medical studies. All this may be true, but what makes the proponent's reply fallacious is the way it was put forward to leave the respondent no possibility of critically questioning the claim. No room is left for critical questioning, and for undergoing the controlled, conscious, and slow process of

[2] Literally it means argument from modesty or respect.

questioning the assumptions made and the exceptions that need to be taken into account.

This parascheme treats the conditional premise as not defeasible. As shown above, defeasible logic has defeasible rules of the form $A \Rightarrow B$, but it also has strict rules. Strict rules are rules in the classical sense: whenever the premises are indisputable (e.g., facts) then so is the conclusion, e.g. 'Penguins are birds'. A strict rule has the form of a conditional, $A_1, A_2, ..., A_n \rightarrow B$, where it is not possible for all the A_i to be true and the B false. Defeasible rules are rules that can be defeated by contrary evidence, e.g. 'Birds fly'.The problem in this fallacious case of argument from expert opinion is that the argument is set forth as if it should be treated as deductively valid. The major premise is put forth as the rule that what an expert says must always be true, without exception. Hence the conclusion follows necessarily from the premises. If the premises are true, that conclusion must be accepted. To accept the premises but not the conclusion is logically inconsistent. Such an argument is not defeasible, and not open to critical questioning. The fallacy is the shutting off of the possibility of critical questioning of the argument by putting forward the heuristic in a strict (non-defeasible) form.

The explanation of why the fallacy is deceptive in the first kind of case is quite different. Corresponding to the argumentation scheme for argument from expert opinion, there is the following parascheme: *E* is an expert and *E* says that *A* is true; therefore *A* is true. This heuristic jumps to the conclusion in a way that is fast and frugal but overlooks other implicit premises in the scheme for argument from expert opinion that also need to be accounted for. In the first type of case above, the argument is fallacious because it either overlooks an ordinary premise or an assumption.

These two examples may not be the only kinds of problems, blunders and deceptive moves associated with the *ad verecundiam* fallacy. But they show how the deceptiveness of two important kinds of instances of the fallacy can be explained using paraschemes.

5. Generalizing the parascheme approach

The question now posed is whether the kind of analysis of the fallacy of *ad verecundiam* given above using paraschemes applies to other informal fallacies. Of the major informal fallacies, the following twelve need to be analyzed with defeasible argumentation schemes of the sort that can be found in (Walton, Reed and Macagno, 2008, Chapter 9).

1. *Ad Misericordiam* (Scheme for Argument from Distress, 334)
2. *Ad Populum* (Scheme for Argument from Popular Opinion and its subtypes, 311)
3. *Ad Hominem* (*Ad Hominem* Schemes; direct, circumstantial, bias, 336-338)
4. *Ad Baculum* (Scheme for Argument from Threat, p. 333; Fear Appeal, 333)
5. Straw Man (Scheme for Argument from Commitment, p. 335)
6. Slippery Slope (Slippery Slope Schemes; four types, 339-41)
7. *Ad Consequentiam* (Scheme for Argument from Consequences, 332)
8. *Ad Ignorantiam* (Scheme for Argument from Ignorance, 327)
9. *Ad Verecundiam* (Scheme for Argument from Expert Opinion, 310)
10. *Post Hoc* (Scheme for Argument from Correlation to Cause, 328)
11. Composition and Division (Argument from Composition, p. 316; Division, 317)
12. False Analogy (Scheme for Argument from Analogy, 315)

These may not be the only fallacies that can be analyzed with the help of argumentation schemes, but they certainly are some prominent ones. Other fallacies, like equivocation, amphiboly, accent, begging the question, fallacies of irrelevance, like red herring and wrong conclusion, and many questions, do not appear to fit specific argumentation schemes, or benefit directly from schemes when it comes to analyzing them.

There is no space to try to even comment on all the twelve fallacies listed above, but some of them do look like they could fit the parascheme model very well. For example the *post hoc* fallacy could be analyzed as the employment of the following parascheme: *X* is correlated with *Y*, therefore *X* causes *Y*. Especially the emotional fallacies like appeal to fear seem to be based on heuristics that would respond well to paraschematic treatment. Argument from ignorance is classified by Gigerenzer at al. (1999) as a prominent heuristic, and would also appear to be amenable to this treatment.

The simplest formulation of the scheme for the *argumentum ad ignorantiam* is this: statement *A* is not known to be false (true), therefore *A* is true (false). Calling it argument from ignorance makes it plausibly seem fallacious, but this form of argument is

often reasonable when supplemented by a conditional premise: if *A* were false (true), *A* would be known to be false (true) (Walton, 1996, 254-255). For example there is no evidence that Roman soldiers received posthumous medals in war, only evidence of living soldiers receiving such awards. From this lack of evidence, the conclusion can be drawn by inference that Roman soldiers did not receive posthumous decorations in war. If historical evidence did show a posthumous decoration, the conclusion would have to be withdrawn, showing that the argument is defeasible. But if after much historical research through all the known record no such evidence was found, the conclusion could be a fairly reasonable one, depending on the evidence backing it up (Walton, 1996, 66). It is commonly called the lack of evidence argument in the social sciences or the *ex silentio* argument in history, where it is regarded as a reasonable but defeasible argument.

The structure of the lack of evidence argument, as it could be called less prejudicially, can be represented by a more complex argumentation scheme (Walton, Reed and Macagno, 2008, 328) that uses two variables. *D* is a domain of knowledge and *K* is a knowledge base. Most knowledge bases, of the kind used in scientific investigations, for example, are incomplete, and the reasoning based on the knowledge in them is defeasible.

If *K* is complete, a lack of evidence argument based on it could be deductively valid perhaps, but otherwise it should be seen as a defeasible inference that is open to critical questioning. For example, suppose that after a through security search *X* has never been found guilty of breaches of security. Here, because of the thorough search, it can be said that the conditional premise is supported by good evidence: if *X* were a foreign spy, it would be known to be true that he is a foreign spy. It could be concluded defeasibly, subject to further investigations, that it has been proved (up to whatever standard of proof is appropriate) that *X* is not a foreign spy. However, the possibility remains that *X* could have avoided detection through these security searches, as Kim Philby did. Hence lack of evidence arguments having the form of the argumentation scheme set out above are best analyzed as defeasible arguments that hold or not at some stage of an investigation in which evidence is being collected in a knowledge base and assessed.

Reasoning from lack of evidence [negative evidence] is recognized as a heuristic in computing. If you search through an expert database, and don't find statement *S* in it, that finding can be a reason for provisionally concluding that *S* is false. 'Guyana is a not major coffee producer' can be concluded after searching through an expert system on coffee producing countries and finding Guyana is not listed. The reason is the assumption that the expert system knows all about coffee producers in South America, and if

Guyana were a major coffee producer, it would be in the experts system's knowledge base.

An even simpler argumentation scheme for the lack of evidence argument is based not just on what is known or not known to be true, but also on what would be known if it were true (Walton, 1996, 254).

> Conditional Premise: If *A* were true, *A* would be known to be true.
> Lack of Knowledge Premise: *A* is not known to be true.
> Therefore, *A* is false.

This scheme is a form of defeasible *modus tollens* argument (assuming, as well, the rule of double negation that tells us that *A* is false if and only if *A* is not true). Even though a knowledge base is incomplete, and the search for new knowledge may still be underway, this scheme can still enable a conclusion to be tentatively drawn by defeasible reasoning. In such an instance, the argumentation scheme becomes a defeasible form of argument, holding only tentatively, subject to the asking of critical questions during a search for more knowledge that may continue. The first premise above is associated with the assumption that there has been a search through the knowledge base that would contain *A* that has been deep enough so that if *A* were there, it would be found. One critical question is how deep the search has been. A second is the question of how deep the search needs to be to prove the conclusion that *A* is false to the required standard of proof in the investigation. It is not necessary to go into all the details here, given space limitations, but enough has been said to draw a parallel with the analysis of argument from expert opinion above.

The parascheme is the simple argument from the two basic premises in the simplest formulation of the scheme given above. How it works is shown in Figure 3, where we can see the linked argument based on the scheme for argument from lack of evidence with its two ordinary premises. We have not shown the assumption and exceptions for the argument from lack of evidence, in addition to the ordinary premises, but the reader can imagine them appearing on the right and left, in a way comparable to Figure 2. In Figure 3 the heuristic is even simpler. It is the fast inference from the lack of evidence premise all by itself to the conclusion, without taking the conditional premise into account. The lack of evidence premise and the conclusion are shown in the darkened boxes, showing the heuristic parts of the inference.

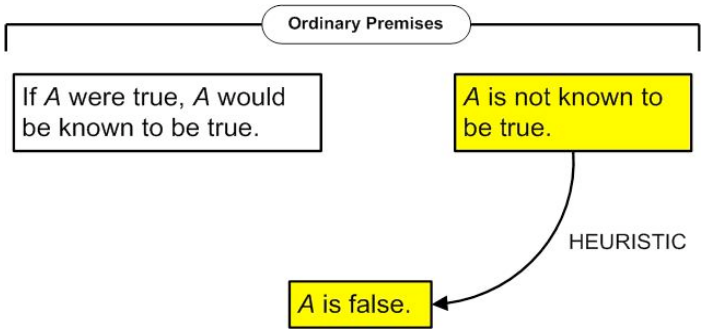

Figure 3. Heuristic of the Lack of Evidence Argument

In contrast to the quick leap of the heuristic, the controlled, conscious, and slow inferential procedure of analyzing and evaluating any given instance of a lack of evidence argument may require the consideration of the conditional premise and the critical questions matching the scheme. To judge whether an alleged argument from ignorance is fallacious the heuristic has to be examined in relation to whether other assumptions and exceptions need to be taken into account that may be acceptable or not.

Another type of argument that is well worth taking a look at is the fear appeal argument. Many of these arguments bypass logical reasoning and hope to convince by raising fears about some horrible consequences of a policy or action directly. The problem is that an argument may all too easily bypass other important aspects of a given situation that should properly be taken into account. Fear is an emotion that moves people powerfully to action and may tend to make them put more careful considerations of the complex features of a situation aside. An immediate response may be to jump to a conclusion, powerfully motivated by fear, instead of taking a more realistic look at all the factors involved in a decision. The heuristic for this kind of reasoning runs as follows. If I carry out action α, it may bring about consequence *C*. Consequence *C* is really scary. Therefore, there is no way I am going to bring about action α. An example is the exploitation of fear appeal arguments in public policy-making on President Obama's proposed health care reforms, which called for more of a government role in health care funding. There was a sign outside an August 2009 town hall meeting in New Hampshire saying, "Obama lies, grandma dies" (Begley, 2009, 41). This fear appeal argument has the effect of suggesting to the reader the immediate action of stopping any health care reform that might condemn one of his/her loved ones to death because a government panel has ruled that treating her disease is too expensive. Because of the emotional fear appeal of this argument, viewers of the sign may tend to jump to the conclusion that the proposed health care reform is scary and should be resisted. It raises the scary idea that government death panels could

make decisions to terminate medical treatment for elderly patients based on calculations of health care costs. When examined critically in relation to the facts, and the particulars of the proposal, this argument may not be very persuasive, but as a heuristic that appeals to fear, it may work very well as a rhetorical strategy.

6. Arguments that appear to be better than they are

The two most fully developed theories of fallacy so far (Tindale, 1997) are the pragmatic theory (Walton, 1995) and the pragma-dialectical theory (van Eemeren and Grootendorst, 1992). According to the earlier version of their theory, a fallacy is a violation of a rule of a critical discussion where the goal is to resolve a difference of opinion by rational argumentation (van Eemeren and Grootendorst, 1992). The theory has been more recently been strengthened by the work of van Eemeren and Houtlosser (2006) on strategic maneuvering. Even more recently, a fallacy has been defined as "a speech act that prejudices or frustrates efforts to resolve a difference of opinion" (van Eemeren, Garssen and Meuffels, 2009, 27). According to the pragmatic theory (Walton 1995, 237-238), a fallacy is a failure, lapse, or error that occurs in an instance of an underlying, systematic kind of wrongly applied argumentation scheme or is a departure from acceptable procedures in a dialogue, and is a serious violation, as opposed to an incidental blunder, error, or weakness of execution. Both theories can benefit from investigating further how schemes are wrongly applied when a fallacy has been committed. The problem is that neither theory has fully taken into account that longstanding intuition, very much evident in Aristotle's treatment of the *sophistici elenchi*, that fallacies are deceptive. They are not just arguments that prejudice efforts to resolve a difference of opinion, wrongly applied argumentation schemes, or departures from acceptable procedures in a dialogue, although they are all that. They are arguments that work as deceptive stratagems. They are arguments that seem correct but are not.

These remarks take us back to the notion attributed to Hamblin in the introduction that a fallacy can be characterized as an argument that seems to be valid but is not. What Hamblin (1970, 12) actually wrote was, "A fallacious argument, as almost every account from Aristotle onwards tells you, is one that *seems to be valid* but *is not so*"[his italics]. Using this sentence to define 'fallacy' is problematic in a number of ways. First, whether or not an argument seems to be valid to any individual or group of individuals is not of much use to us in attempting to determine whether it is an argument that really is fallacious or not. Second, the term 'valid', is typically taken to refer to deductive validity, making the definition too narrow, or even mistaken. Third, a survey of leading logic text-

survey of leading logic textbooks, from Aristotle to the present (Hansen, 2002, 151) has shown that the fallacies tradition does not support wide acceptance of the claim made in Hamblin's sentence quoted above. According to Hansen (2002, 152), however, this tradition does support a comparable generalization: "a fallacy is an argument that appears to be a better argument of its kind than it really is". Either way, the notion of fallacy is taken to have a dimension that could be classified as psychological (in a broad sense, including cognitive psychology), meaning that such a fallacious argument has strong potential for deception. It can often seem correct when it is not, or can appear to be better than it really is.

Hansen's rephrasing of the expression that says that fallacy is an argument that seems valid but is not is highly significant. We have two choices here. We can expand the use of the term 'valid' so that it no longer just applies to deductively valid arguments, and allow it to include structurally correct arguments of the inductive and plausible types. Or we can just drop the word 'valid', and accept Hansen's way of expressing the criterion by saying that a fallacy is an argument that appears to be better argument of some kind than it really is. By using the expression 'of some kind', we can include argumentation schemes as well as deductive and inductive forms of argument. If we rephrase this expression to say that the fallacy is an argument that appears to be a better argument of its kind that really is, we can widen the account of fallacy to apply both to inductive arguments, and to presumptive argumentation schemes that go by defeasible reasoning to a conclusion that is tentatively acceptable but that that may need to be withdrawn in special circumstances.

7. Conclusions

How then are fallacies deceptive? The explanation offered as a hypothesis in this paper is that many of them are based on heuristics. On this hypothesis, a fallacious argument might look better than it really is because it has the basic structure of a parascheme, and therefore looks reasonable because it is a heuristic of the kind we use all the time in everyday reasoning. However, it may be an inference from a set of premises to a conclusion that only seems to prove the conclusion, but does not, because it fails to meet conditions required for the success of a reasonable argument of that type. When an arguer jumps to a conclusion by a parascheme, while ignoring implicit assumptions and exceptions that ought to be taken into account, or even worse, moves dogmatically to the conclusion while failing to allow that such considerations are relevant, his argument is fallacious. The error here is an unwarranted leap to a

conclusion that is not justified by a careful analysis of the argument that takes its conditional premise, as well as its assumptions and exceptions, properly into account.

This new theory of fallacy began by introducing the new notion of a parascheme, and by using it to connect the logical notion of an argumentation scheme to the psychological (cognitive science) notion of a heuristic. The parascheme helps to explain why an argument seems better than it is, because it represents a heuristic that is a very natural way of unreflective thinking. Heuristics can be extremely useful under some conditions even if they arrive at a suboptimal solution, and there may be nothing inherently fallacious or logically incorrect (in principle) in using them. We can cite again the example of the heuristic used in medicine (Gigerenzer, 1999, 4) when a man is rushed to a hospital while he is having a heart attack. We recall from Section 1 that according to Gigerenzer et al. (1999, 4-5), this particular medical heuristic is actually more accurate in properly classifying heart attack patients than some more complex statistical classification methods. The point to be emphasized is not only that heuristics are useful, but that we often need them and rely on them.

However, precisely because heuristics are shortcuts, or fast and frugal ways to proceed tentatively when there is not enough data and time to arrive at a definitive conclusion, they can be dangerous, and can sometimes take us to a wrong decision. As the cases we have examined show, in some instances they can even be deceptive. We are so used to employing them, almost without thinking, we can sometimes be more easily be persuaded by them than perhaps we should be, if there is time for more careful and deliberate rational thinking on how to proceed. The old system of cognition (the automatic and fast mind) uses a heuristic to jump to a conclusion. It might be right or might not. Under constraints of time, cost and lack of knowledge, it might be the way to go. But if there's time, the new (controlled, conscious and slow) system can come in and ask critical questions, looking at logical considerations pro and contra. The old argument might stand up to this kind of scrutiny, or it might not.

The analysis presented so far offers an explanation of how the paraschemes can explain why people sometimes reason carelessly, and how the argumentation scheme corresponding to a particular parascheme can show us what has gone wrong with the hasty use of the parascheme when a fallacy has been committed. But how, more precisely, does this process work in a real case? Is it that the person who commits the fallacy has both the parascheme and the argumentation scheme in mind and then confuses the two, and reasons only on the basis of the parascheme? This explanation of the process implies that the reasoner explicitly knows the argumentation scheme with its matching list of critical questions, as well as

implicitly knowing the parascheme. Such explicit knowledge may not be there, in many cases where fallacies are committed. The fallacy may be a thoughtless error of jumping too hastily to a conclusion. So this explanation of how fallacies are committed will not generalize to all of the cases we need to explain as fallacies that are arguments that appear to be better, as arguments of a certain type, than they really are.

A better explanation is based on the fact that the use of such paraschemes is habitual, instinctive and natural. As explained in Section 1, in evolutionary terms the parascheme is part of as a system of thinking that is associative, automatic, unconscious, parallel and fast. Thinking in this manner, a reasoner instinctively jumps to a conclusion to accept a proposition as true or to accept a course of action as the right one for the circumstances. To make the mistake that is at the basis of the fallacy that is committed, the reasoner naturally or even automatically jumps to this conclusion by reacting in the same way he has so often acted in the past where this rapid form of action has so often proved to be successful. To make this kind of mistake, the reasoner does not need to have the argumentation scheme in mind. This mistake is that in this instance he is in a set of circumstances where he would do much better if he would only take the time to think twice, and use the rule-based, controlled, conscious, serial and slow cognitive system of bringing the premises and conclusion of the argumentation scheme to bear, while taking into account the appropriate critical questions matching the scheme. But he may not have time for this, or he may simply not think about it, or he may be pressured into not a fast and instinctive but premature action by the argumentation of the other party with whom he is engaged in a discussion. It is this explanation that fills out the meaning of how arguments appear to be better than they really are, and thereby lead to the committing of fallacies either by a single reasoner, or by an arguer engaged in a dialogue with another arguer.

In this paper, a new interpretation of the psychological aspect of the concept of fallacy has been proposed, put forward as a hypothesis that can enable us to explain how fallacies of the kinds based on argumentation schemes have potential for deception and ease of sliding into error. The defeasible argumentation scheme offers a structure such that, if a given argument fits the requirements of the scheme, it is defeasibly tenable, meaning that it tentatively holds, subject to potential defeat as new evidence comes in, and in particular as its implicit assumptions and exceptions are taken into account. In cases where such additional premises are not taken into account, especially where they are highly questionable, or evidence shows they do not hold, a fallacy may have been committed. The argument may appear to be better than it really is, and hence the error of jumping to the conclusion too quickly may

be overlooked. Even worse, if the proponent has actively tried to suppress consideration of premises that really need to be taken into account in a more carefully considered assessment of the argument before the respondent should accept the conclusion, a more serious sort of fallacy may have been committed.

This paper has presented a hypothesis that shows promise of helping us to better define the notion of a fallacy, and to better explain its psychological dimension. It provides a theoretical basis for further research on many other fallacies, to see whether they fit the hypothesis or not. The notion of parascheme has been applied more fully to fallacious arguments from expert opinion, and more cursorily to lack of evidence arguments and fear appeal arguments. However, enough has been done with these examples so that work can go ahead applying it more carefully to these latter two fallacies, as well as to the other fallacies in the list given at the beginning of Section 5.

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