

## Enthymemes, Common Knowledge, and Plausible Inference

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The study of enthymemes has always been regarded as important in logic, critical thinking, and rhetoric, but too often it is the formal or mechanistic aspect of it that has been in the forefront. This investigation will show that there is a kind of plausibilistic script-based reasoning, of a kind that has mainly been studied in artificial intelligence, that should have a much more important role to play in the study of enthymemes. But then curiously, as will also be shown, this plausibilistic type of reasoning was familiar in the ancient world, to the Sophists, as well as to leading philosophers such as Plato and Aristotle. By linking this ancient notion of plausibility to the modern notion used in computer science, this investigation reveals an important basis for the enthymeme that has a type of logical structure in its own right, but also has an informal aspect.

An enthymeme, in current usage, is an argument that has one or more premises, or possibly a conclusion, not explicitly stated in the text, but that needs to have these propositions explicitly stated to extract the complete argument from the text. Sometimes enthymemes are described as arguments with "missing premises." That vocabulary is awkward, however, because the nonexplicit statement that needs to be added can be a conclusion, at least in a minority of cases. To make the exposition below smoother, the term *nonexplicit assumption* will be used to cover either the case of a nonexplicit premise or that of a nonexplicit conclusion. The problem with enthymemes is that if the nonexplicit assumptions in an argument are supposed to be propositions used by the arguer (as opposed to just the propositions needed to make the argument structurally correct, according to some standard), reasonable people can have differences of opinion on what the nonexplicit assumptions are supposed to be. The problem is that filling in the missing parts of enthymemes depends on interpreting the natural lan-

guage in which the argument was put forward to try to determine what the speaker meant to say.

The solution to the problem comes through the recognition that enthymemes rest not only on formal (structural) criteria, but also on informal criteria. One of the most important of these informal criteria is something often called "common knowledge" (Govier 1992; Freeman 1995). But as shown below in a set of selected case studies of enthymemes, "common knowledge" is not really a kind of knowledge at all. It is really plausibility, or *eikos*, something well known in the ancient world and often misleadingly translated as "probability." Curiously, Aristotle's original doctrine of the enthymeme was based on this notion of plausibility. This historical fact has often been a source of puzzlement and confusion, and sometimes it has even been taken to indicate a defect or contradiction in Aristotle's treatment of the enthymeme. However, the goal of this investigation is not primarily historical. It is to work out one of the most important required steps toward a solution to the problem of enthymemes. But to do this, it is necessary to come back to the ancient notion of plausible inference.

### 1. The problem with enthymemes

Once you have any formal theory of inference, like syllogistic, for example, you will be confronted by cases of arguments in everyday discourse that meet all the requirements for a structurally correct inference except that some part or parts, usually a premise or a conclusion, is missing. By "missing" is meant that the proposition in question has not been explicitly stated in the text of discourse. even though it may be clear enough that the speaker (writer) was relying on it, or including it, as part of the argument. The classic example is the following inference: All men are mortal; therefore, Socrates is mortal. To evaluate such an argument, surely some account of the "hidden" or "missing" assumption needs to be taken. The problem with enthymemes (Burke 1985; Gough and Tindale 1985; Hitchcock 1985) is that, if given carte blanche to fill in any proposition needed to make the inference structurally correct, we may insert assumptions into the text of discourse that the speaker or audience didn't realize were there, doesn't accept, or didn't even mean to be part of the argument.

Faced with this problem, we should first make a distinction, following Robert H. Ennis (1982, 63-66), between needed and used assumptions. *Needed assumptions* in an argument are missing propositions such that (1) the argument is not structurally correct as it stands, but (2) when the propositions in question are inserted, the argument becomes structurally correct. *Used assumptions* in an argument are propositions that, even though not explicitly stated in the text of discourse, are meant to be part of the argument by the speaker (and are likely to be so taken by the hearer, once they are identified by the hearer). The difference, according to Ennis (64), is that used assumptions are "unstated reasons" while needed assumptions may not be. Filling in needed assumptions, given some logical calculus like syllogistic, can be done mechanically, for the most part, and is not a difficult problem, compared to filling in used assumptions.

Filling in used assumptions is a serious problem because it depends on an interpretation of what a speaker meant to say, in a given case. Notoriously, natural language texts of discourse are hard to interpret. In some cases, a speaker may be confused, may use misleading or ambiguous language, or may claim no commitment to some assumption that seems to be an assumption in the argument. There is always the danger of the *straw man fallacy*, of attributing as a premise or conclusion of a speaker's argument a proposition that exaggerates or distorts the argument in order to make it easier to refute (Scriven 1976, 85-86). The usual remedy for dealing with this problem is to call in the *principle of charity*, which requires that, given a pair of possible assumptions that could be used to make an argument structurally correct, we pick the one that makes the argument stronger. This principle, however, only leads to additional problems, two of which are cited by James Gough and Christopher Tindale (1985, 102): (1) whether or not the evaluator has produced a new argument to support the conclusion, as opposed to the original argument, and (2) how many premises should be required to produce the best possible argument out of the given text. In short, the task of filling in the used nonexplicit assumptions in an argument is a contextual one that involves an attribution of the arguer's position or viewpoint, in addition to structural aspects of the argument.

In evaluating any argument with unexpressed premises or conclusions, we must break down the task into three steps: (1) extract the stated premises and conclusion, (2) apply some structural model of correct inference to determine what unstated premises or conclusions are needed to make the argument structurally correct according to the requirements of

the model, and (3) make hypotheses about what the used premises supposedly are. In the reconstruction of the argument, it should be clearly stated which of the three categories each attributed proposition falls into. Is it an explicitly stated premise or conclusion? Is it a nonexplicit one of the need type? Or is it a nonexplicit one of the used type? It is the third question that is by far the most difficult to answer, and it is to the problems posed by trying to answer that question that we now turn.

The first thing to observe is that there are a number of distinct bases (factors) on which determinations of nonexplicit premises and conclusions of the use type may be founded. In the analysis of enthymemes given in *Argument Structure: A Pragmatic Theory* (Walton 1996, chap. 7), I cite six different bases for distinguishing missing (nonexplicit) premises: (1) common knowledge shared by the speaker and reader (or audience); (2) the known position of the speaker on the issue; (3) custom, habit, or normal ways of doing something; (4) conceptual links holding an argument together; (5) assumptions of practical reasoning in ways of carrying out actions; and (6) innuendo, based on conversational implicature. Working with each of these different factors present in enthymemes involves different skills and techniques. Factor 1, common knowledge, seems to be a particularly important kind of basis for many enthymemes, and it is this factor, illustrated by the cases presented in section 3, below, that will be the concern of this study. Assumptions based on common knowledge in a case are propositions that are not in issue in the case. They are taken for granted by the speaker, and they would not likely be questioned or disputed by the hearer. So they represent a kind of basis for the enthymeme that is relatively easy to identify and that tends to be noncontroversial once identified. It has even been said that if a premise is based on common knowledge, then it should be regarded as acceptable (Govier 1992, 120).

According to Trudy Govier (1992, 120), a premise in an argument is a matter of *common knowledge* if it states something that is known by virtually everyone, even though such matters are dependent on audience, context, time, and place. She cites examples like "Human beings have hearts" and "Many millions of civilians have been killed in twentieth-century wars" (120). According to James B. Freeman (1995, 269), however, to say that a claim is a matter of common knowledge is to say only that many, most, or all people accept the claim, and "popularity is never sufficient to warrant acceptance." Popularity is even associated with the fallacy *argumentum ad populum*, the fallacy of appealing to popular opinion instead of giving proper support for a claim. Freeman rehabilitates common knowledge as a basis

for premise acceptance by arguing that it is not just popularity; and neither is it "knowledge," for that matter. He sees it as a form of presumption based on the shared "lived experience" of a speaker and hearer (272). In Freeman's analysis, the challenger of an argument needs to take into account not only which propositions have been proved by an arguer, but also which propositions can be presumed to be acceptable, based on common knowledge, and do not need to be challenged (270). It does seem reasonable that common knowledge, thus analyzed, can be a basis for premise acceptance in a case (although not an absolute one). And it does seem reasonable that common knowledge, as defined by Freeman, could be a reasonable basis for enthymemes, where the nonexplicit premises or conclusions are treated as presumptions. According to Sally Jackson and Scott Jacobs (1980, 263), rules of conversation allow participants to work together collaboratively, and therefore there is no need to fill in nonexplicit assumptions in enthymemes that are already known and accepted by both parties. Presumptions are propositions that are accepted by both speaker and hearer in a given case because neither party questions or disputes them. They are tentatively accepted, for the moment in a dialogue, even though they have not been proved, and in a different case, or at some future point, they may be questioned and even rejected. Presumptions based on common knowledge are plausible, and they may therefore be accepted (tentatively) as part of an argument, even though they have not been proved. Plausible reasoning has been much neglected in modern logic, but it was well known in the ancient world, where it was even associated with the doctrine of the enthymeme, as is shown in the next section.

## 2. Aristotle and the history of the term *enthymeme*

The term *enthymeme* is a source of some historical and etymological confusion. The Greek term used by Aristotle that has been translated as "enthymeme" does not mean "nonexplicit assumption in an argument," which is the modern meaning of the English term. As H. W. B. Joseph (1916, 350) explained in a long footnote, the term *enthymema*, as used by Aristotle (*Prior Analytics* 70a11), referred to the syllogism based on probabilities or signs (*syllogismos ex eikoton e semeion*). Joseph cites the following inference as an example: Raw foods are not wholesome; this bit of food is raw; therefore this bit of food is not wholesome. In some cases, this

inference could be defeated. While it may generally be true that raw foods are not wholesome (as thought in Joseph's time), in the case of this particular bit of food, it may be wholesome if taken in raw form. Eikotic arguments are arguments based on defeasible inferences or generalizations. The most famous example is the Tweety inference: Birds fly; Tweety is a bird; therefore Tweety flies. In a defeasible (default) inference of this kind, the premises may be true while the conclusion is false in some cases (exceptions to the rule). For example, in the case where Tweety is a penguin, the inference fails. This kind of eikotic inference used to be called an argument based on *probability*, but since that term has been taken over by the statisticians, it is better to use the term *plausibility* (Rescher 1976). Used by Aristotle in this way, the term *enthymeme* did not mean "missing" or nonexplicitly stated premises (or conclusions) in an argument. But since the term *enthymeme* has taken on this meaning in such a well-established way in modern logic, it is probably best to stick with the modern meaning of the term. At any rate, that is the accepted meaning the term now has.

As Sir William Hamilton (1874, 389) explained, it may seem like Aristotle has contradicted himself because in some passages he defines the enthymeme as a syllogism "from signs and likelihood" while in other passages he defines the enthymeme as an argument in "imperfect form," that is, an argument with missing premises. This apparent contradiction is a problem, according to Hamilton (389), because "a syllogism from signs and likelihood does not more naturally fall into an elliptical form than a syllogism of any other matter." Hamilton resolves the problem by arguing (389-90) that the latter interpretation is a later insertion into the Aristotelian manuscripts—an interpolation that has been rejected from the best editions. R. C. Jebb (1893) agreed that Aristotle did not use the term *enthymeme* to refer to arguments with a missing premise. According to Jebb (291), by enthymeme Aristotle meant syllogism from probabilities and signs, and it is a "misapprehension" of his meaning to think that he conceived of an enthymeme as a syllogism in which one premise is suppressed.

As Daniel J. Goulding (1965) pointed out, however, there is a kind of connection between the two meanings of the term *enthymeme*, and evidence of the connection can be found in Aristotle's *Rhetoric*. In the *Rhetoric*, Aristotle repeatedly insists that premises used for constructing enthymemes should represent the attitudes, beliefs, and commonly accepted opinions of the audience to which an argument is addressed. There is a kind of link here between the enthymeme and the appeal to popular opin-

ion as a kind of argumentation. In the *Rhetoric* (1355a30), Aristotle wrote, "We must use as our modes of persuasion and argument, notions possessed by everybody." As Goulding (1965, 108) makes clear, in the *Rhetoric*, Aristotle associated enthymemes with maxims (topics), showing how a popular audience cannot be convinced by long, abstract chains of reasoning, but must be convinced by arguments containing suppressed premises representing practical topics with which they are familiar. What we see is that in the *Rhetoric* there seems to be a connection between the two meanings of *enthymeme*. In rhetorical persuasion, it seems that eikotic or plausibilistic arguments are frequently combined with arguments that have nonexplicit premises or conclusions. More information on how the appeal to popular opinion can sometimes be a reasonable form of argumentation based on additional assumptions that are not explicitly stated can be found in *Appeal to Popular Opinion* (Walton 1999).

### 3. Selected case studies

In many cases, a nonexplicit assumption is a "fact" or proposition that is generally known to be true and would (probably) be known by the writer and the readers. The following case, from *Informal Logic Examples and Exercises* (Acock 1985, 103), is a tricky illustration.

#### Case 1

The 1980 census spotlights one significant fact: Many Americans lied on their returns. Over ninety-three million people answered yes to the question, "Did you vote in the 1980 presidential election?" ("The Lie That Millions Tell About Voting").

When you first encounter this example, you might think that the nonexplicit assumption is the known or verifiable fact that less than ninety-three million people actually voted in the 1980 presidential election. But if you don't know very much about American politics, you may think it is implied that, in fact, there was no 1980 presidential election. Accordingly, the two nonexplicit assumptions needed to properly fill out the argument would appear to be the following two propositions:

1. There was no 1980 presidential election.
2. Anyone who said they voted in the 1980 presidential election must have lied.

This way of filling out the argument is based on a factual error. But it would seem that the conclusion of the argument that millions told a lie is supported by assumption 2, and it would seem that assumption 2, or something like it, is needed to get from the information given to the conclusion. On this analysis of the argument in case 1, certainly assumption 1 is needed as a non-explicit assumption. The basis for assumption 1 is that it is a known fact, or at least a proposition that can be verified by examining the facts of U. S. history, that there was no 1980 presidential election. This assumption is one that is false, however, and that the author might reasonably expect many readers to know is false as well. So, the notion of common knowledge identified by Govier and Freeman would seem to be applicable to this case. The curious fact about this case, however, is that there are probably quite a few people who do not know whether there was a 1980 presidential election. But there is still some basis of plausible guessing that such a person could use to fill in the nonexplicit assumptions. Even a reader who did not know whether this proposition is true or not can guess that it may be meant to be assumed to be true as part of the argument, by means of a little reflection on the case.

One type of nonexplicit assumption comes from everyday human experience of the way things can be generally expected to go. It seems hard to pin down the exact nature of this kind of assumption, but a case will identify what it is like. The following case is presented as an exercise in Irving M. Copi's *Introduction to Logic* (1986, 233).

#### Case 2

Although these textbooks purport to be a universal guide to learning of great worth and importance, there is a single clue that points to another direction. In the six years I taught in city and country schools, no one ever stole a textbook (Jones 1974).

The three most likely candidates for nonexplicit assumptions in this case are the following propositions:



1. Anything that is a universal guide to learning of great worth and importance would be regarded as highly valuable.
2. Anything that is regarded as highly valuable, and would not be too difficult to steal, would likely be stolen.
3. These textbooks would not be too difficult to steal.

Once these three assumptions are stated explicitly, it is not too difficult to reconstruct the logical chain of reasoning used in the case. Since, in the writer's experience, no one ever stole a textbook, it follows from the three assumptions above, along with the explicitly stated premises, that it is false that these textbooks are regarded as highly valuable. From there, the suggested conclusion can be drawn that these textbooks are not really the universal guide to learning of great worth and importance that they purport to be.

But where do assumptions 1, 2, and 3 come from? They all come from things we could expect anyone to reasonably know or assume to be true about the way things generally work, about human institutions and values, and about the way we can expect people to generally behave-not all people, but a broad mass of people. Proposition 1 is somewhat flattering to people, but probably pretty accurate. Proposition 2 is unflattering, but probably even more accurate. Proposition 3 stems from our knowledge about how textbooks are used in the schools. They have to be distributed to the students, and that need for accessibility makes them easy to steal. Presumably, we all know this because we know how textbooks are used in a school situation, from our own personal experiences of being a student or having some other role in schools. And yet, it is a kind of misnomer to say that propositions 1, 2, and 3 are common knowledge, or any kind of knowledge at all. Really, they are plausible presumptions about the way things can be generally expected to go in a kind of situation that would (presumably) be familiar to anyone reading this argument. It is assumed that the reader is familiar with how textbooks are normally used in the schools, with how fairly common theft is in that setting, and so forth. The data base drawn from in such a case is not knowledge, properly speaking, but a grasp of the setting of an everyday, familiar type of situation, sometimes called a *script* in artificial intelligence studies-see section 5 below.

In some cases, the enthymeme depends on the way we know how things work, based on our common experience of doing things in everyday life. This, too, seems to represent what would be called a script, but one of a somewhat different sort. For example, we all know, or could be assumed

to know, that eating soup with a fork would be a highly inefficient way to try to eat soup. We also know that if anyone tried to eat soup with a fork while other people were watching, the act would be regarded as highly unusual, and even ridiculous. This assumption would appear to be the basis of the following argument, quoted from *Informal Logic Examples and Exercises* (Acock 1985, 106).

### Case 3

Risi e bisi is often listed on menus among the soups, and some gastro-nomic writers dare to call it one. Nonsense! It is served with a fork. Who ever heard of eating soup with a fork? (Root 1990, 219).

The argument in this case is a refutation of the claim made by some writers that risi e bisi is a soup. One stated premise is that risi e bisi is served with a fork. Another explicit premise is that risi e bisi is served with a fork. Then the rhetorical question, "Who ever heard of eating soup with a fork?" states the proposition that nobody eats soup with a fork (as a general practice). In this case, there are two nonexplicit assumptions. The first one can be put in the form of a conditional:

1. If something is served with a fork, and nobody eats soup with a fork, then what was served is not soup.

Once assumption 1 is inserted, the explicitly stated premise that risi e bisi is served with a fork enables the following conclusion to be drawn:

2. Risi e bisi is not a soup.

This conclusion is not stated explicitly in case 3, however, and so it is an unstated assumption in the argument. So here is a case in which one of the nonexplicit assumptions is a conclusion.

But the main interest in this case is assumption 1. What is the basis of this assumption? Part of it is that we know that soup is not normally eaten with a fork, and we know that a restaurant will generally try to furnish a diner with the appropriate or most useful utensil. But behind these assumptions, we all know that eating soup with a fork would not normally be practical. And so, the expectation is that if something is served with a

fork, it is probably not soup. Of course, this assumption could be wrong. But it is a kind of indicator or clue that what is served is not soup.

Note that the word *clue* was explicitly used in case 2. In both case 2 and case 3, the inference from the premises to the conclusion is defeasible. The argument is not deductively valid, and the premises only serve to make the conclusion plausible or likely, on the assumption that the premises are true, or can be accepted. This plausibilistic aspect seems to be a common characteristic of arguments that depend on enthymemes.

In some cases, this plausibilistic aspect of the argument is made fairly evident in one of the nonexplicit assumptions, especially where this assumption has the form of a conditional. Case 4 is from *Informal Logic Examples and Exercises* (Acock 1985, 102).

#### Case 4

It is impossible to look through these old cookbooks without being struck by the quantity of dough that was crammed into the human system. Bread, rolls, biscuits, cakes, and pastry are accorded the lion's share of their space (Root and de Rochemont 1976, 136).

The conclusion of the argument is expressed by the first sentence in case 4. This conclusion could be paraphrased as saying that in those days (some unspecified time in the past), "dough," or flour-based food, was a kind of food eaten by a great many people. The explicitly stated premise is that flour-based foods, such as bread, rolls, biscuits, cakes, and pastry, were accorded the lion's share of the space in the cookbooks of those days. The two nonexplicit premises in this case can be represented by the following propositions:

1. Bread, rolls, etc., are made (mainly) of dough.
2. Anything that was accorded the lion's share of the space was a kind of food that that was eaten by a lot of people.

Assumption 2 is especially interesting because it is a plausibilistic guess that could be wrong. There could have been some reason why a particular type of food was accorded the lion's share of space in a cookbook, even though that type of food was not eaten by a lot of people. But as a guess, or rule of thumb, you would probably be justified in assuming, in the absence

of any indications or information to the contrary, that a cookbook would tend to give more space to recipes for foods that were eaten by a lot of people at the time. Why? Well, cookbooks tend to respond to popular demand by featuring dishes that are eaten by a lot of people, at any given time, because the authors generally want the book to be used, and to sell as many copies as possible. However, that assumption could fail in some cases. Suppose the author of the cookbook was trying to reform or change tastes in a particular direction. Or suppose publication of the cookbook was funded by a food producer who was trying to promote a certain type of food. Then there would be other reasons why a particular type of food might get the lion's share of attention in the recipes featured. So proposition 2 is an assumption that probably holds true in the general run of cases, if there is no special information that suggests otherwise in the given case. But it is not a universal generalization in the absolute or 'for all x' type, of the kind we are so familiar with in deductive logic.

#### 4. The concept of plausibility (probability; *eikos*)

A common basis for many of the enthymemes above is found in propositions that are relied on as acceptable assumptions that need not be explicitly stated because they can be taken for granted as holding on the basis of common experience, or common understanding of the ways things normally work in familiar situations. This concept of the way things can be normally expected to go in familiar situations was lost sight of in logic for two thousand years. But it was known in ancient dialectic and rhetoric as an important basis for logical inferences. One of the most important concepts used by the Sophists was the so-called argument from *eikos*, from plausibility, from what "seems likely." Traditionally, this type of argument has been translated into English via Latin as "argument from probability," a choice of words that, in light of the modern statistical meaning given to *probability* is too easily misleading. Plausible or so-called eikotic arguments are based on a person's subjective understanding of how something can normally be expected to go in a familiar situation. Plausibility is based on something we would nowadays call "empathy," the ability to put oneself into a familiar situation in a story or account in which the actions of some protagonist are described. In modern thinking, the concept of plausibility is typically seen as "subjective" and therefore not something upon

which logical reasoning can be based. But there is plenty of evidence that when logic was originally developed as a science or art of reasoning, before the advent of the syllogism, plausibility was seen as a fundamental part of it.

Eikotic arguments were especially significant for the early philosophers called Sophists. The classic case is the so-called reverse eikotic argument, attributed to two Sophists, Corax and Tisias, who lived around the middle of the fifth century B.C. (Gagarin 1994, 50). This classic example is described by Aristotle in the *Rhetoric* (1402a 17-28), where it is attributed to Corax.

#### Case 5

In a trial concerning a fight reported to have taken place between two men, one man was visibly bigger and stronger than the other. They are described as the weak man and the strong man. The weak man, appealing to the jury, asks them whether it appears likely to them that he, the smaller and weaker man, would have assaulted a much bigger and stronger man. Such a hypothesis would not appear to be plausible, assuming the smaller man is a reasonable person who knew what he was doing, because the likely outcome would be his getting beaten up. And the jury would presumably know that the smaller man would know it. Putting themselves into the position of the smaller man in the given situation, they would know that it would be unlikely they would attack the larger man, unless they were pretty desperate, and perhaps even not then. They conclude that it is possible that the smaller man attacked the larger, but that it is improbable that this is what happened, in the absence of any other hard evidence about what happened.

The logic of the inference drawn in this case hangs on a balance of considerations. It is one man's word against the other's, and, let's say, no witnesses or other evidence proves which account is right. The issue of which man attacked the other hangs in a balance, so even a small weight on one side can tilt the balance. Accordingly, the weight of plausibility yielded by the eikotic argument would go against the hypothesis that the smaller man attacked the larger.

But the nature of the plausible reasoning that could be used in such a case is given an additional twist in Aristotle's description. It is also pos-

Bible to have what he calls a reverse eikotic argument, as described in case 6 below.

#### Case 6

The stronger man asks the jury whether it is plausible that he, an obviously much stronger and larger man, would assault the visibly smaller and weaker man. His reasoning runs as follows: He knows how criminally responsible such an act would make him look if the case ever came to court. He knows he would be likely to be blamed. But he also knows that the jury knows that he would know that. Given this knowledge, is it plausible that he would attack the weaker man? The answer is "no." The conclusion drawn is that it is implausible, other things being equal, that the larger man attacked the smaller.

The reverse eikotic argument draws the opposite conclusion as that drawn by the original eikotic argument. So, it is possible to have eikotic arguments that support both sides in a conflict of opinions. In case 6, however, the reverse eikotic argument restores the balance back to equilibrium, by countering the prior eikotic argument by the smaller man with equally plausible considerations. Michael Gagarin (1994, 51) tells us that the reverse eikotic argument was a typical turning-of-the-tables type of plausible argument used by the Sophists of the second half of the fifth century B.C. In both the eikotic and the reverse eikotic argument, the plausible inference is drawn from a basis of the jury's being able to put themselves into the situation and see it from the perspective of the person who was involved. The argumentation is far from foolproof, in both cases, but it is just the sort of argumentation that would carry weight with a jury.

It was this kind of plausibilistic or eikotic reasoning that Aristotle had in mind when he defined the enthymeme as a syllogism based on probability (*eikos*) and signs. Curiously, then, the account of the enthymeme given by Aristotle in the *Prior Analytics*, cited in section 2 above, ties in quite well with the generally accepted account of the enthymeme as an argument containing nonexplicit assumptions. The concept of *eikos* proved to be one of the most important bases of the enthymeme (in the modern sense), the element of so-called "common knowledge." But this basis is not really a kind of knowledge at all, in the strict sense of the word *knowledge*. It is plausibility, of the kind identified by Corax in cases 5 and 6.

## 5. Plausible generalizations, inferences, and scripts

Several of the generalizations featured in the cases above clearly had a plausibilistic and defeasible nature, especially the following four nonexplicit premises:

- P1. Anything that was accorded the lion's share of the space was a kind of food that was eaten by a lot of people.
- P2. If something is served with a fork, and nobody eats soup with a fork, it can't be soup.
- P3. Anything that is a universal guide to learning of great worth and importance would be highly valuable.
- P4. Anything that is regarded as highly valuable, and would not be too difficult to steal, would likely be stolen.

None of these generalizations is of the form of the usual universal generalization in logic,  $(\forall x)(Fx \supset Gx)$ . They are all defeasible conditions of the plausibilistic type that have the following form: generally, but subject to exceptions in some cases, if the thing in question has property  $F$ , then it can be reasonably expected to have property  $G$ . The Tweety inference cited in section 2 is based on a plausibilistic generalization of this kind. If Tweety is a bird, then it is reasonable to expect, subject to exceptions in some cases, that Tweety flies. This kind of plausibilistic generalization is different from the absolute universal generalization with which we are so familiar in logic that is falsified by a single counterexample. The plausibilistic generalization may still hold generally, even though it has been defeated in a specific case. The case merely becomes an exception to the general rule.

In cases 5 and 6, the same kind of plausibilistic generalizations are also at work as assumptions on which the reasoning used to derive the conclusion is based. Generally, but subject to exceptions, it is implausible that a weaker man would attack a stronger one, at least in a normal kind of situation, where the weaker man is not in a position where he is in a corner or has to defend himself. But then the reasoning in case 6 rests on a different assumption, to the effect that it is implausible that the stronger man would attack the weaker, in a situation where the stronger man knows the case would likely go to court. The argument from plausible reasoning is a little weaker in this case, but it still carries some probative weight in shifting a burden of proof.

These plausibilistic generalizations are extremely important, not only for understanding how enthymemes work, but also for understanding the

fallacy of hasty generalization. They are based on the shared understanding of the speaker and hearer on how everyday things work, and can generally be expected to go. The ancient derivation of the word *enthymeme*, from *en* and *thymos*, meaning "in the mind," is quite appropriate. We all understand how things like forks, cookbooks, and textbooks work. Both a speaker and a hearer can be expected to have "common knowledge." We know that generally, if a restaurant puts certain utensils on the table, then normally these would be the kinds of utensils suited to eating the kind of food served. And we know that eating soup with a fork is not only unusual and socially inappropriate, but also highly inefficient. A typical speaker and hearer would be prepared to grant such assumptions as these and would not question them, unless the case was an unusual one.

As people who take part in normal daily activities, like eating and going to restaurants, we share "common knowledge" of the kind Roger C. Schank and Robert P. Abelson (1977) have identified with a *script*, a body of knowledge shared by language users concerning what typically happens in certain kinds of stereotypical situations, and which enables a language user to fill in gaps in inferences that were not explicitly stated in a text of discourse. Schank and Abelson use the restaurant story to give an example of script-based reasoning. In this story, we are told the following facts: John went to a restaurant. The hostess seated John. The hostess gave John a menu. John ordered a lobster. He was served quickly. He left a large tip. He left the restaurant. Given this story as a text of discourse, anyone can use it to infer that certain events plausibly occurred, even though they are not explicitly stated as having occurred. It is reasonable to infer that John ate the lobster. Of course, it is possible that in some actual case, John did not eat the lobster. But that would not be the normal order of events, judging from what we are told in the given text. It also would be plausible to infer that John not only ate the lobster, but also was satisfied with his meal. These inferences are said by Schank and Abelson to be based on the so-called restaurant script, which specifies the normal course of events that occur when one enters a restaurant and engages in the kind of activity typical of that scene. There is a normal sequence of events—the entering, the seating, the ordering, the eating, the paying, and the leaving. And at each stage in the sequence, there are normal activities that the customer can be expected to engage in. If he orders soup, you would expect the restaurant to provide a spoon, and you would expect the customer to eat the soup with the spoon and not, for example, with a fork. Of course, with a very thick type of soup, it might not be unexpected for the customer to use a fork. But



in the normal run of cases, it would be reasonable to assume that the customer would probably use a spoon.

The script provides a background setting for a familiar kind of activity in which is stored a body of "common knowledge" about this type of activity. Included are plausibilistic generalizations that enable a hearer (or reader) of a text of discourse to fill in missing steps in the sequence of inferences used for some purpose, for example, to put forward an argument. Also included in a script are particular propositions about what one would expect to normally take place at some point in a given type of situation that is familiar. Scripts are shared by speakers and hearers who are familiar with the kinds of daily activities that are part of the situation. So when the speaker puts forward an argument that contains nonexplicit premises or conclusions, the hearer can fill in the gaps by drawing on both plausible generalizations and singular propositions that would be reasonable assumptions to make, given the script or common knowledge base shared by the speaker and hearer with regard to this particular type of situation, which is familiar to both.

## 6. Recommendations

When reconstructing arguments from a text of discourse and filling in nonexplicit assumptions, we should first recognize the distinction between need and use. On a need basis, assumptions can be filled in by reasoning backwards in the process known as abduction in computer science. You begin with a model or formal structure that stipulates requirements for a structurally correct argument. The model might be that of deductive logic, or it could be that of an inductive logic, or it could be that of a plausibilistic calculus of the kind constructed in Nicholas Rescher's *Plausible Reasoning* (1976). The need basis does not represent the premises or conclusions actually used by an arguer. It represents only a reconstruction of what you need to get an argument that is structurally correct, according to some standard. On a use basis, assumptions can be filled in either in conjunction with the need reconstruction or independently. There can be various different kinds of use bases, and analyzing all of them is beyond the scope of this investigation. But one of the most important ones is that referred to as "common knowledge." This phrase is a misnomer, however. The basis for filling in this kind of nonexplicit assumption is the background body of

familiar and expected ways of doing things shared by speakers and hearers-*scripts*, to use the term coined by Schank and Abelson. Filling in nonexplicit assumptions by drawing from scripts is usually based not on knowledge (although it could be, in some cases), but on a basis of plausibility. Plausibility is different from knowledge because knowledge claims have a burden of proof attached while plausibility claims are only assumptions. The burden of proof for them is inherently negative in nature—you can accept an assumption as plausible, even though it has not been proved to be true, as long as it has not been proved to be false.

The problem remains of determining, in a given case, just when a proposition can be inserted as a plausible nonexplicit assumption in an argument. In many cases, there will be little disagreement about such determinations, but it is to be expected that there can be disagreements in some cases. What is the evidence that should be used to resolve such a disagreement. The evidence is to be sought in the script. The script is an articulation of sequences of events and expectations we normally take for granted, and in some cases, there is little need to build up an elaborate script to prove or disprove that some assumption is plausible in a case. However, if needed, that is the method that is best to use.

What is most important in working out enthymemes is to use some kind of notation and argument reconstruction to distinguish between the original argument as stated in the text and the nonexplicit assumptions that have been added to complete the argument. Within this latter class, it is also a good idea to use notation to indicate whether the assumption was added on a need basis, a use basis, or both. In practice, as well, when adding in any kind of nonexplicit assumption, we should add some brief account of the evidence on which the insertion is based. Once stated explicitly, plausible assumptions often seem trivial, but what needs to be stressed is that logical rigor sometimes requires the making explicit of all assumptions needed or used in drawing a conclusion. In a hotly contested disputation, what was formerly trivial or taken for granted can become a subject of argumentation.

In the end, then, there does turn out to be a significant connection between the two doctrines of the enthymeme found in Aristotle. Or, if the modern conception of the enthymeme is not really to be found in Aristotle, as Jebb and Hamilton think, then what has been shown is that there is a connection between the Aristotelian concept of the enthymeme and the modern concept that had its origins in the ancient world. The main thing that needs to be recognized is that plausible reasoning, of the kind based

on scripts, is an extremely common and important basis for the enthymeme (in the modern sense). Plausible generalizations, and plausible inferences and assumptions generally, should be seen as representing a distinctive type of reasoning in its own right, one that needs to be studied further if we are to achieve a knowledge of how enthymemes are constructed on a use basis.

It has been noted at various points that investigating aspects of enthymemes has touched on questions relating to certain informal fallacies. In section 1, the straw man fallacy came up. In section 2, the appeal to popular opinion as a type of argument was shown to be closely related to the common knowledge basis for the enthymeme. In section 5, the fallacy of hasty generalization impinged in a significant way on the analysis of plausibilistic generalizations. All three of these points of contact are areas for further study, but pursuing them has to be outside of the scope of the present investigation.

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