

Section 4: Enthymemes and Sorites

In the last chapter we used the rules of validity to discover whether or not a given passage contains or expresses a valid argument. However, for purposes of logical analysis, the proper function of the Rules of Validity is to uncover the argument that we assume the passage contains. Philosophers generally do not dismiss an argument simply on the grounds that it is invalid. Rather, they attempt to offer interpretations of the argument. The Rules of Validity can be a powerful tool in distinguishing between successful and unsuccessful interpretations.

The Principle of Charity

In my view the principle that is probably the most fundamental to the analysis and critique of reasoning is the principle of charity. It is adherence to this principle that separates a true philosopher from a mere sophist. A sophist is one who believes that the purpose of arguing is to win debates. For such a person the underlying principle of logic would be, "Fight dirty. Always put your opponent's argument in the worst possible light." But a philosopher is one who believes that the purpose of arguing is to discover the truth. Philosophers do not engage in debates where the object is to defeat an opponent. Philosophers engage in inquiry, where the object is to defeat false opinions. In order to avoid rejecting a true opinion, it seems advisable, not to put arguments in their worst possible light, but always to put arguments in their best possible light.

The Principle of Charity - Always treat an argument in the way which will make it the best argument possible.

Adherence to the Principle of Charity would require...

- (1) that, when a passage is reworded to put it into categorical form, it should be reworded in a way that shows its logical structure. Thus one should keep the Principle of Charity in mind when solving parameter problems.
- (2) that, when different interpretations of an argument are possible due to ambiguous language, the best interpretation is the one that gives the argument a valid structure (if such an interpretation can be found).
- (3) that the interpreter may need to force some form of validity upon the argument by *adding additional premisses*, or by drawing an implied but unstated conclusion.
- (4) that any premisses added to the argument be true, if this is possible.

Enthymemes

Our ideas reach no further than our experience. We have no experience of divine attributes and operations. I need not conclude my syllogism, you can draw the inference yourself. —David Hume, *Dialogues Concerning Natural Religion*

It is quite common for authors of arguments to leave certain things unsaid. Sometimes what they leave unsaid is so obvious that stating it would seem silly and boring to the reader. Sometimes authors merely expect an intelligent reader to be able to figure out what was left unsaid. Sometimes authors are hiding (intentionally or unintentionally) a premiss that would be recognized as false if it were stated openly. An incomplete argument is called an **enthymeme**.

enthymeme - an argument in which at least one of the propositions required for formal validity (either a premiss or a conclusion) is left unstated.

An enthymeme cannot be regarded as invalid. Rather, it is up to us to *make* the enthymeme valid by adding the missing statement.

Example:

‘Anyone with common sense knows better than to stand outside in the rain.
Thus most people know better than to stand outside in the rain’.

All C are K.

C – people with common sense.

K – people who know better than to stand outside in
the rain.

—————
Most P are K.

P – people.

The syllogism can be made valid by adding the premiss ‘Most P are C’, which says, ‘Most people have common sense’.

In this case, other statements could have been added to make the argument valid, e.g. ‘All people have common sense’. However, since the Principle of Charity requires that we add a true statement whenever possible, it is better to add the weaker statement, since it is more likely to be true. On the other hand, if a conclusion is missing, we will wish to let the author draw the strongest statement possible. Hence, the Principle of Charity dictates the following rules:

- (1) If a premiss is missing, add the *least* general proposition that will make the argument valid.
- (2) If a conclusion is missing, add the *most* general proposition that will make the argument valid.

Exercises:

A. Add the categorical proposition that will make each argument deductively valid.

1. Many A are not B.

Some C are not B.

2. All D are E.

Most F are not D.

3. Some J are K.
Some K are not L.

4. Almost all M are N.
Almost all M are O.

5. No P are Q.

Few R are Q.

6. Many S are T.
Many S are U.

B. Each of the following arguments has a missing statement. Put the arguments into syllogistic form, and add the statements that will make them deductively valid.

1. This hot dog tastes great, since this hot dog is served with Blanche's Home Made Mustard.
2. No terrorists are pacifists. Yet, many Muslims are pacifists. What do you make of that?
3. Practically every working woman is underpaid, so it is clear that some underpaid workers are too frightened to stand up for their rights.
4. Well, what do you know! Nearly everyone who lives in this neighborhood is a multimillionaire, and most of them were late in filing their income taxes.
5. Selling marijuana is morally detrimental to the youth of this nation, so selling marijuana should be prohibited by strict laws.
6. Many wars are noble causes, since many wars are fought to preserve freedom.
7. You have good taste. Therefore you will want to buy Invisible Brand panty hose.
8. I'll tell you what I think of Sunday school teachers. Most Sunday school teachers are morally upstanding citizens; and all morally upstanding citizens are prudes!

Using Immediate Inferences

Enthymemes, like complete arguments, may have too many terms when both a term and its complement appear in the enthymeme. The extra term can often be eliminated by using conversion, contraposition, and obversion.

Example:

‘All invalid forms of reasoning are forms of reasoning that employ more than three terms. Therefore all syllogistic arguments are valid forms of reasoning’.

All non-V are M.

V - valid forms of reasoning.

M - forms of reasoning that employ more than three terms.

All S are V.

S - syllogistic arguments.

The extra term, ‘non-V’, can be eliminated by performing a contraposition on the stated premiss. The premiss then becomes, ‘All non-M are V’. The missing premiss can then be found by using the Rules of Validity. In fact the missing premiss must be ‘All S are non-M’, which says, ‘All syllogistic arguments are forms of reasoning that don’t employ more than three terms’.

Another problem that can be solved by using the Immediate Inferences is apparent violations of the Rule of Negatives.

Example:

‘No categorical propositions make an existential claim, so all categorical propositions are statements about fictional beings’.

No C are E.

C - categorical propositions.

E - statements that make an existential claim.

All C are F.

F - statements about fictional beings.

There are three terms, but apparently no valid syllogism could be made since the premiss is negative while the conclusion is affirmative. The solution is to make the premiss affirmative (or the conclusion negative) using obversion. If we make the premiss ‘All C are non-E’, then the missing premiss is, ‘All non-E are F’, which says, ‘All statements that don’t make an existential claim are statements about fictional beings’ (a statement which is, by the way, false).

Exercises:

A. Eliminate extra terms and resolve Rule of Negatives problems by using conversion, contraposition, and obversion. Add the categorical proposition that will make each argument formally valid.

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| 1. All G are H.
<u>Many I are non-H.</u> | 5. <u>All Y are Z.</u>
All non-Z are A. |
| 2. <u>No M are L.</u>
Some non-L are non-P. | 6. Most D are C.
<u>Some E are not non-D.</u> |
| 3. Many Z are not B.
<u>Almost all Z are not D.</u> | 7. <u>No G are W.</u>
Most W are M. |
| 4. No non-V are W.
<u>Few S are V.</u> | 8. <u>Few F are G.</u>
Some non-G are H. |

B. Each of the following arguments has a missing statement. Put the arguments into syllogistic form, and add the statement that will make them valid.

1. Some things that aren't worth reading are boring. I know this is true, because few books are worth reading.
2. Only fair-minded people are seated on this jury. I am therefore confident that the people seated on this jury will vote to acquit my client.
3. Anyone worth listening to can talk without quoting the Bible every other sentence. So, many Christians are not worth listening to.
4. Mr. Johnson owns stock in a major oil corporation. Therefore, Mr. Johnson has no right to express his opinions on solar energy.
5. Hardly any president of the United States has been completely honest. It stands to reason that this is true, since every president of the United States has been a politician.
6. Many of our cardholders are currently unemployed. It follows that many of our cardholders are not financially dependable people.

7. Every acrobat has a marvelous sense of balance; but nearly all financial planners have a terrible sense of balance.
8. Few building contractors are financially secure. Hence some financially insecure people are people who save for retirement.
9. Unripe fruit is never tasty. Yet, no fruit sold in the grocery stores these days is ripe!
10. Only the natural disasters for which we are unprepared are likely to be really dangerous, since any really dangerous situation is the result of poor planning.

Sorites

Historically, the word ‘sorites’ was used to refer to any argument that had more than two premisses. For this reason dilemmas, for example, were regarded as a type of sorites, since any dilemma has three premisses. In contemporary symbolic logic there is nothing particularly unusual or surprising about arguments that have more than two premisses, so in symbolic logic there is no reason to distinguish arguments on the basis of the number of premisses that they employ. Hence the term ‘sorites’ has come to be used exclusively with reference to *syllogistic* logic. In syllogistic logic a sorites is a polysyllogism in which every conclusion except the final conclusion has been left unstated. Hence,

sorites - a chain of enthymemes wherein the unstated conclusion of one argument is also the unstated premiss of a subsequent argument.

Sometimes the premisses of a sorites are arranged so that the conclusion drawn from the first two premisses becomes the major premiss of the next syllogism. When the premisses are arranged in this order it is called a ‘progressive’ or ‘Aristotelian’ sorites. In other cases the premisses are arranged so that the conclusion drawn from the first two premisses becomes the minor premiss of the next syllogism. When the premisses are arranged in this order it is called a ‘regressive’ or ‘Goclenian’ sorites.² Of course, for logical purposes the order does not make the least bit of difference, just as it does not matter, for logical purposes, whether the conclusion is stated at the beginning, at the end, or somewhere in the middle. The distinction between Aristotelian order and Goclenian order may have some rhetorical value, however. In particular, when stringing many premisses together, it is probably a good idea to put them either exclusively into Aristotelian order or exclusively into Goclenian order. Mixing the two patterns will make your argument confusing, and difficult to follow (as the next section on Lewis Carroll puzzles will illustrate). In the examples given below, the first is an Aristotelian sorites, while the second is a Goclenian sorites.

Examples:

‘No syllogistic argument has more than two premisses, and all valid arguments are syllogistic arguments. But many arguments in common speech have more than two premisses. Hence many arguments in common speech are not valid’.

No S are M.	S – syllogistic arguments.
All V are S.	M – arguments with more than two premisses.
<u>Many C are M.</u>	V – valid arguments.
Many C are not V.	C – arguments in common speech.

becomes...

No S are M.	[No V are M.]
<u>All V are S.</u>	<u>Many C are M.</u>
[No V are M.]	Many C are not V.

‘Almost all arguments in common speech are valid, and many arguments in common speech have more than two premisses. But no argument that has more than two premisses is a syllogistic argument. So, some valid arguments are not syllogistic arguments’.

Almost all C are V.	C – arguments in common speech.
Many C are M.	V – valid arguments.
<u>No M are S.</u>	M – arguments with more than two premisses.
Some V are not S.	S – syllogistic arguments.

becomes...

Almost all C are V.	No M are S.
<u>Many C are M.</u>	<u>[Some M are V.]</u>
[Some M are V.]	Some V are not S.

Exercises:

A. Organize the following sorites into chains of syllogisms, showing the connections among the syllogisms.

- All A are B.
 All C are D.
All B are C.
 All A are D.

- Most I are H.
 No H are G.
All F are G.
 Most I are not F.

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| <p>3. No J are non-K.
 No K are non-L.
 Few O are M.
 <u>No L are non-M.</u>
 Few O are J.</p> | <p>5. Few P are non-E.
 All S are non-Q.
 All E are N.
 <u>Many P are Q.</u>
 Some N are non-S.</p> |
| <p>4. All non-T are R.
 No U are T.
 All non-Y are X.
 Few Z are Y.
 <u>All X are U.</u>
 Few Z are non-R.</p> | <p>6. Most C are A.
 No non-G are non-D.
 No G are non-H.
 No non-B are H.
 <u>Most C are not D.</u>
 Some A are B.</p> |

B. Organize the following sorites into chains of syllogisms, showing the connections among the syllogisms.

1. Philonous—Sensible things are all immediately perceivable; and those things which are immediately perceivable are ideas; and these exist only in the mind. Thus much you have, if I mistake not, long since agreed to.
 Hylas—I do not deny it.
 Philonous—The brain therefore you speak of, being a sensible thing, exists only in the mind.

—George Berkeley, Three Dialogues between Hylas and Philonous

2. Many people with serious illnesses are too poor to afford the cost of treatment on their own. Yet even those who are too poor to afford the cost of treatment on their own have a right to decent health care. Anybody with a right to decent health care is entitled to government assistance in covering their health costs. Therefore many people with serious illnesses are entitled to government assistance in covering their health costs.

3. Some cases in which infants are born with congenital birth defects are cases in which we should not hesitate to employ some form of active euthanasia. In many cases in which infants are born with congenital birth defects, it is generally felt that the infant’s life could only be painful and unfulfilling. Whenever it is generally felt that an infant’s life could only be painful and unfulfilling, it is regarded as morally acceptable to allow the infant to die. But surely any time it is regarded as morally acceptable to allow an infant to die, it is incumbent upon us to see that the infant dies as comfortably and painlessly as possible; and any time it is incumbent upon us to see that an infant dies as comfortably and painlessly as possible, we should not hesitate to employ some form of active euthanasia.

4. Throughout most of the American Midwest people believe in the value of individual effort and hard work. Any place where people believe in the value of individual effort and hard work is a place where people hold to traditional values. Therefore Republicans should do well throughout most of the American Midwest, since Republicans should do well wherever people hold to traditional values.

5. Every blossom of summer makes the bluebirds sing.
 Whatever makes the bluebirds sing makes glad the heart;
 And that which gladdens heart releases Cupid's dart.
 All things that speed great Cupid's shaft upon its way
 Are precious things indeed; and therefore we must say
 That every summer flower is a precious thing.

Lewis Carroll Puzzles

Lewis Carroll was fond of creating elaborate puzzles that could be solved by stringing together complex chains of syllogisms. In a Lewis Carroll Puzzle you are given a group of premisses. By matching the statements together and drawing the appropriate conclusion you can eventually discover a final conclusion that follows from all of the premisses taken together. That conclusion is the solution.

Example:

Most barons are fat.	Most B are F.	→ Most B are F.
Anyone who would rescue a damsel in distress is chivalrous.	All R are C.	→ <u>Most B are U.</u>
Most barons are unscrupulous in the pursuit of political power.	Most B are U.	→ [Some U are F.]
All fat people are dangerous adversaries on the field of battle.	All F are D.	→ [Some U are F.]
No one unscrupulous in the pursuit of political power is chivalrous.	No U are C.	→ <u>All F are D.</u>
		→ [Some D are U.]
		→ No U are C.
		→ [Some D are U.]
		→ [Some D are not C.]
		→ All R are C.
		→ [Some D are not C.]
		→ [Some D are not R.]
SOLUTION: 'Some dangerous adversaries on the field of battle wouldn't rescue a damsel in distress'.		

Exercises:

*Solve the following Lewis Carroll Puzzles.*³

Puzzle #1

Poets rarely spend most of their time doing things they don't enjoy.

A lot of poets are Irish.

Anyone who doesn't spend most of his time doing things he doesn't enjoy is a wastrel.

Puzzle #2

Quite a few beautiful paintings are hung in the Louvre.

Nothing hung in the Louvre is not a masterpiece.

Nothing fails to take my breath away, except art that matches the decor of my apartment.

Everything that matches the decor of my apartment fails to be a masterpiece.

Puzzle #3:

Any creature that is bound to be bad tempered in the springtime should be carefully avoided during the month of June.

Almost all dragons are allergic to forsythias.

Many dragons are friendly.

Any creature that is allergic to forsythias is bound to be bad tempered in the springtime.

No creature that should be carefully avoided during the month of June is entirely safe company in October.

Puzzle #4:

Most creatures from Alpha Centauri are entitled to diplomatic immunity when they visit this planet.

Anyone who hates Bach just doesn't appreciate great music.

The only three-footed algosprilliums are from the vicinity of the Horse-head Nebula.

Creatures from Alpha Centauri usually appreciate great music.

Only creatures who hate Bach come from the vicinity of the Horse-head Nebula.

Puzzle #5:

More than a few of the knights who dwell in Ansteorra are ferocious fighters.

No knight who is eager to slay the terrible three-headed giant of Carolingia is a coward before the wrath of Queen Guinevere.

Any knight of the Round Table is brave enough to face the ferocious Red Dragon of Treetgirtsea.

Almost all knights who dwell in Ansteorra are knights of the Round Table.

The only knights brave enough to face the ferocious Red Dragon of Treetgirtsea are cowards before the wrath of Queen Guinevere.

Puzzle #6:

The only very wealthy animals are those that happen to be movie stars.

Anyone who doesn't enjoy luxuries doesn't bother to wear silk pajamas.

Only a few zebras are highly trained.

Those who enjoy luxuries never work for a living.

Only highly trained animals happen to be movie stars.

Just the very wealthy don't work for a living.

Puzzle #7:

All toads wear spectacles.

Those who are unqualified to work in daycare centers always wear muscle shirts while surfing.

Everyone who is willing to read to ogre children reads to gnomes.

Those who wear muscle shirts while surfing are never intellectuals.

None of those who refuse to read to ogre children are qualified to work in daycare centers.

Anyone who wears spectacles is an intellectual.

Puzzle #8:

Every idea of mine, that cannot be expressed as a Syllogism, is really ridiculous.

None of my ideas about Bath-buns are worth writing down.

No idea of mine, that fails to come true, can be expressed as a Syllogism.

I never have any really ridiculous idea, that I do not at once refer to my solicitor.

My dreams are all about Bath-buns.

I never refer any idea of mine to my solicitor, unless it is worth writing down.

Puzzle #9:

The only animals in this house are cats.

Every animal is suitable for a pet, that loves to gaze at the moon.

When I detest an animal, I avoid it.

No animals are carnivorous, unless they prowl at night.

No cat fails to kill mice.

No animals ever take to me, except what are in this house.

Kangaroos are not suitable for pets.

None but carnivora kill mice.

I detest animals that do not take to me.

Animals, that prowl at night, always love to gaze at the moon.

Notes

¹This is the definition given in the Port-Royal Logic. Antonine Arnauld, *The Art of Thinking*, The Bobbs-Merrill Company, New York, 1964. (Originally *La Logique, ou L'Art de Penser*, 1662.) There is some disagreement over the plural form of 'sorites'. Most modern authors insist that the plural form is the same as the singular. Hence the plural of 'sorites' is 'sorites'. On the other hand, Lewis Carroll, who was something of an expert on the subject, gives the plural as 'soriteses', just as one would expect. Lewis Carroll, *Symbolic Logic*, ed. William Warren Bartley, III, Clarkson N. Potter, Inc., New York, 1977. With some regrets, I shall conform to the modern convention, since I cannot verify that Lewis Carroll's usage is anything more than a personal idiosyncrasy.

²Named for Rudolf Goelenius (1547-1628), professor of physics, logic, mathematics, and ethics at the University of Marburg. He described this type of sorites in his *Isogoge in Organum Aristotolis*, 1598.

³In these exercises, the first seven puzzles are puzzles that I created, following Lewis Carroll's style. The last two are taken, without change, from Lewis Carroll's *Symbolic Logic*, where no less than 60 such puzzles may be found.