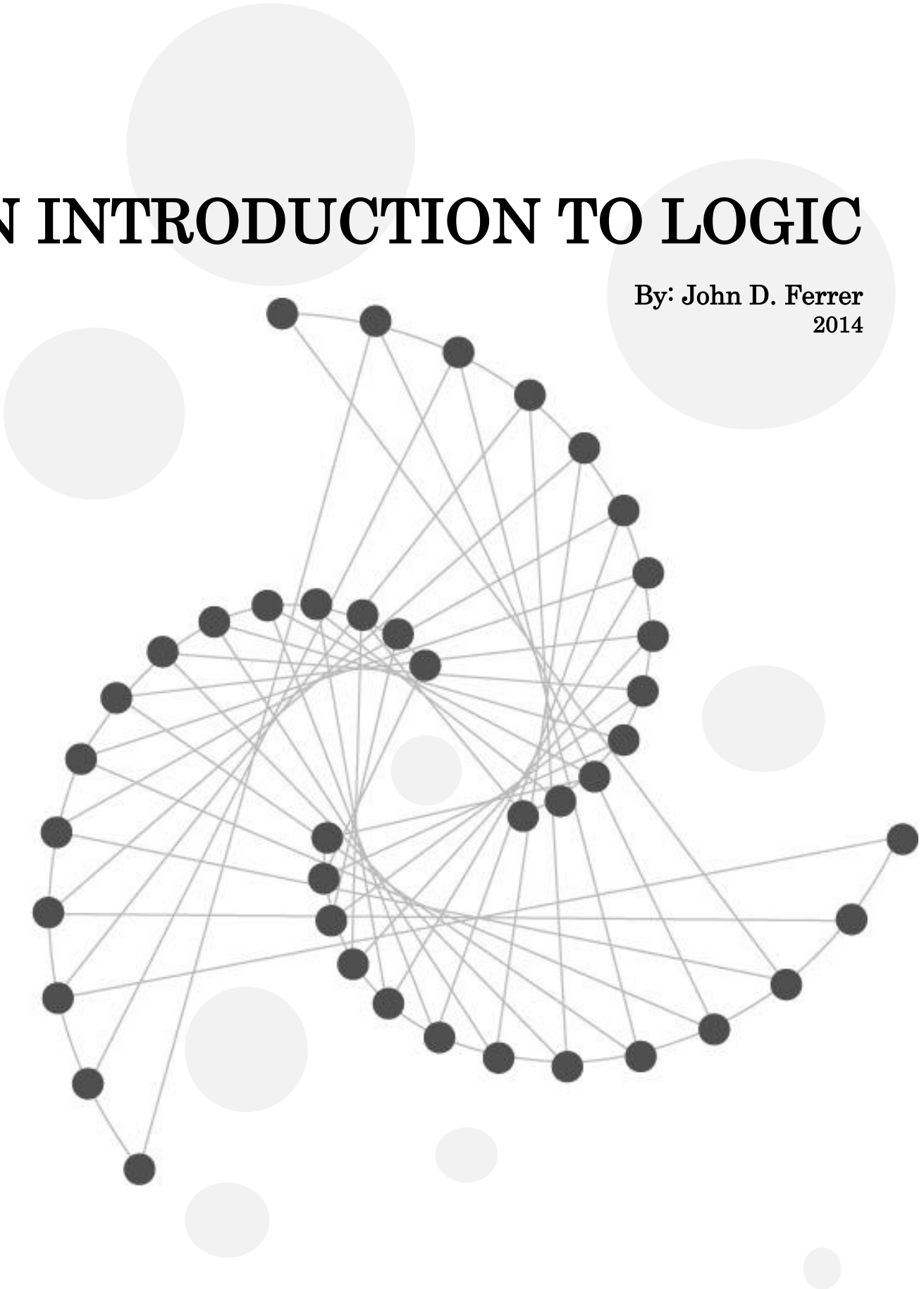


# AN INTRODUCTION TO LOGIC

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## A Note from the Author

This packet is intended as a study guide only and is meant to supplement, not replace, introductory level logic courses. These notes have served me well in teaching introductory courses in logic at the undergraduate level, but could also supplement middle school or high school classes covering the same material. This packet is not, however, suited to intermediate logic, modal logic, Boolean logic, or other more advanced matters in logic (Fuzzy Logic, Mathematical Logic, etc.) but is instead geared primarily towards classical Aristotelean logic and informal logical fallacies. Suggested logic texts to accompany this packet may include but are not limited to: Copi and Cohen *Introduction to Logic*, Hurley's *Concise Introduction to Logic*, or Geisler and Brooks, *Come Let Us Reason*.

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GENERAL INTRODUCTION

I. General Introduction

A. Definition of Logic

1. **Practically speaking, logic is the ordering of thought. It is thinking and understanding things according to their right relations and values.**
2. **Technically speaking, logic is the study of right reason or valid inferences and the attending fallacies, both formal (it's structure) and informal (it's meaning).**
3. Logic is not so much an invention as a discovery. The world appears to operate in logical ways. We of course invent the signs and symbols that constitute the language of logic, but once those terms are agreed upon, and assuming the logical method you're using is actually appropriate to reality, then it is similar to math or science in its ability to predict and critique reality.

B. Foundationalism

1. **Logic is a foundationalist study** (contra contextualism/coherentism). It asserts certain undeniable laws or “first principles” on which is based its inferences and conclusions. These undeniable laws are a “foundation” on which further knowledge or learning can be built.
2. **First Principles**
  - 1) **Law of Identity—A is A**
  - 2) **Law of Non-Contradiction—A is not non-A**
  - 3) **Excluded Middle—Either A or non-A**
  - 4) **Law of Rational Inference—A implies A** (the implication is a kind of inference)

C. Logic can proceed either by deduction (formal logic) or induction (informal logic)

<b>Deduction</b>	<b>Induction</b>
General to Particular	Particular to General
Cause to Effect	Effect to Cause
<i>A Priori</i> Reasoning	<i>A Posteriori</i> Reasoning
Philosophic	Scientific
Necessary/Certain Conclusion	Probable Conclusion
Formal Logic	Informal Logic

D. Distinguishing truth

1. Truth—correspondence to reality (ie: “telling it like it is”)
2. Falsity—non-correspondence to reality (ie: “telling it like it is not”)
3. Reality—what is, ie: whatever exists.
4. Validity—whenever an argument is arranged properly, regardless of the content of its propositions.

## FORMAL LOGIC: CATEGORICAL SYLLOGISMS

### II. Formal Logic: The Categorical Syllogism

#### A. The Syllogism

1. **Syllogism**—a 3 proposition argument. In categorical syllogisms, there is a major premise, a minor premise and a conclusion. When organized properly, the premises together necessitate the conclusion.
2. **Proposition**—a statement of affirmation or denial. It has two terms: the subject and the predicate. For example: "All Rain is wet."
3. **Class**—any category for a given set. Includes plural sets (2+ members), null sets (zero members), or singular sets (one member). A helpful concept for understanding how formal logic works, but not unique to logical terminology.

#### B. The Proposition

1. **Premise**—one full proposition within an argument. Should include a subject and a predicate. The premises provide the rational evidence for concluding/summary premise (the conclusion).
2. **Conclusion**: the final premise. In a valid argument it follows necessarily from the supporting premises.
3. **Term**—the smallest component part in an argument. The term may be a predicate or subject, middle, major, or minor. Roughly interchangeable with "word" or "thought."
4. **Subject (term)**—the subject in a proposition, designates the subject *class*. "All Rain is wet."—that is, of all the kinds of rain that are under the category of "rain" all of them are wet.
5. **Predicate (term)**—what is said about the subject, designates the predicate class. "All Rain is wet"—that is, of all the kinds of wetness, rain qualifies as at least one kind of wetness.
6. **Major Term**—the predicate (second term) in the conclusion. Appears in the first premise (aka: **Major Premise**) of the syllogism.
7. **Major Premise**—the first premise in a correctly arranged categorical syllogism.
8. **Minor Term**—the subject in the conclusion. Appears in the second (ie: **Minor**) premise of syllogism.
9. **Minor Premise**—appearing as the subject in the first premise.
10. **Middle Term**—the term common to both premises, whereby a relation happens and a conclusion can be drawn. When the syllogism is correctly arranged, the middle term does not appear in the conclusion, but is in both premises.

#### C. The Term

1. **Quality**—whether a term is affirmed or negated. Referred to as "positive" or "negative." For example: "Rain is not dry" (negation)
2. **Quantity**—whether all, some or none of a subject class is referenced. Referred to as: "universal" or "particular," For example: "All rain is wet" (universal)
3. **Distribution**—like quantity, except applied to either subject or predicate. That is, a term is distributed if all or none of its class is included; it is undistributed if only some of its class is included. Referred to as "distributed" or "undistributed." For example: "All rain is wet" ("rain" is distributed, "wet" is not); "Only rain is wet" ("wet" is distributed).

#### D. Proofing

1. **Validity**—correct structure of an argument
2. **Truth**—correctness of the conclusion. Correspondence theory—truth is whatever corresponds to reality. AKA: fidelity to the original. AKA: faithfulness to the referent.
3. **Soundness**—an argument that is both valid and true.

#### E. Symbology of Categorical Syllogisms

##### 1. Connectives

- a. the relation between the subject and predicate terms. For example, in categorical syllogisms, the connective is usually a copula, "is" (regardless of tense, ie: "was" "has been," "will be" etc.).
- b. For example: All rain is wet.
- c. Some connectives do not change the proposition type, say between a hypothetical, categorical or disjunctive proposition.

##### 1.1 Parentheses and Brackets ( ) [ ] { }

- 2.1 respectively called parentheses, brackets, braces/curly brackets
- 2.2 these section off components that are supposed to be functioning together and so should be understood/kept together.
- 2.3 Parentheses ( ) are framed by brackets [ ] which are framed by braces { }
- 2.4 Every proposition more than three terms long requires at least one set of parentheses.
- 2.5 Parentheses are necessary to clarify how any logical operator is applied. For example:  $A \bullet B \vee C$  is meaningless unless parentheses are added to achieve either  $A \bullet (B \vee C)$  or  $(A \bullet B) \vee C$ .

**1.2 Conclusion Sign ∴:**

- 2.1 "three dots," translate as "therefore" or "in conclusion."
- 2.2 It functions to indicate the concluding premise.
- 2.3 logically translates into a hypothetical marker, indicating implication. Later logic does just that, and allows it to be converted directly into the horseshoe (see below),  $\supset$ .

**1.3 Negation ~**

- 2.1 "Not"
- 2.2 Negation Symbol:  $\sim$ , called the "tilde" (*til-day*). Translate as: "Not" "None" "No", or "un-"
- 2.3 Alternative symbols include  $-$ ,  $\neg$

**2. Categorical Proposition**

- a. "this is that"
- b. Categorical symbol:  $<$ , called the "less than" sign. Translate as "is."
- c. Treated as a connective term, this part of the proposition is called the copula. Copula refers to any and all forms of "to be."
- c. Note, that this sign is used in math to signify "less than."
- d. Some primers use a lower case "a" instead. Since this creates problems when using "a" as a term variable I use the  $<$  instead. Many use no symbol at all, but only "is." In some cases an "=" sign ("equals") is appropriate, but this is not standard since "is" only sometimes means "equals."

**F. Categorical Syllogisms**

**1. The Four Types of Propositions**

- a. The **A** Proposition: All S is P—universal affirmative
- b. The **E** Proposition: No S is P—universal negative
- c. The **I** Proposition: Some S is P—particular affirmative
- d. The **O** Proposition: Some S is not P—particular negative

**2. Quantity:**

- a. A, E—Universal
- b. I, O—Particular

**3. Quality:**

- a. A, I—Affirmative (from Greek: *Affirmo*)
- b. E, O—Negative (from Gk: *Negō*)

**4. Distribution:**

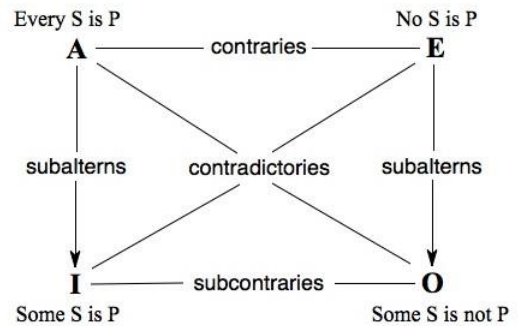
- a. A—S is distributed, but P is undistributed
- b. E—S & P are distributed
- c. I—S & P are undistributed
- d. O—S is undistributed, but P is distributed.

**5. Inferences**

- a. Mediate inference—deduction from 2+ premises
- b. Immediate inference—deduction from 1 premise

**6. Square of Opposition →**

- a. **Contradictories**—one denies the other
- b. **Contraries**—both cannot (together) be true.
- c. **Subcontraries**—cannot both be false
- d. **Subalternation**—same S and P but differ in quantity (aka: “Corresponding Propositions”).



- 7. **Mood**—the types of each proposition in a syllogism, listed together as a trio: AAE, IIO, IOA, etc. The total number of possibilities is 4 types x 3 digits, which is  $4^3$  or 64.

- 8. **Figure**—refers to the location of the middle term in major and minor premise.

- a. 1—the middle term is 2<sup>nd</sup> in Maj. and 1<sup>st</sup> in Min.
- b. 2—the middle term is 2<sup>nd</sup> in Maj. and 2<sup>nd</sup> in Min.
- c. 3—the middle term is 1<sup>st</sup> in Maj. and 1<sup>st</sup> in Min.
- d. 4—the middle term is 1<sup>st</sup> in Maj. and 2<sup>nd</sup> in Min.

- 9. **Form**—the combination of mood and figure: AAA-1, IOE-4, etc. Only nineteen valid forms. [Note the vowel arrangement between the figure and its associated Latin name]

- a. First Figure:
  - 1) AAA-1 *Barbara*
  - 2) EAE-1 *Celarent*
  - 3) AII-1 *Darii*
  - 4) EIO-1 *Ferio*
- b. Second Figure
  - 5) AEE-2 *Camestres*
  - 6) EAE-2 *Cesare*

7) AOO-2 *Baroko*

8) EIO-2 *Festino*

c. Third Figure

9) AII-3 *Datisi*

10) AAI-3 *Darapti*

11) IAI-3 *Disamis*

12) EAO-3 *Felapton*

13) EIO-3 *Ferison*

14) OAO-3 *Bokardo*

d. Fourth Figure

15) AAI-4 *Bramantip*

16) AEE-4 *Camenes*

17) IAI-4 *Dimaris*

18) EAO-4 *Fesapo*

19) EIO-4 *Fresison*

G. Rules for Categorical Syllogisms

1. Avoid four terms (ala, **Four Term Fallacy**)
2. Distribute the middle term at least once. (ala **Undistributed Middle Fallacy**)
3. Any term distributed in the conclusion must be distributed in the premises (ala **Illicit Process—major or minor**)
4. Avoid two negative premises (ala **Fallacy of Exclusive Premises**)
5. If either premise is negative the conclusion must be negative

(H.) CHART OF CATEGORICAL PROPOSITIONS

<b>Standard Form: Proposition</b> Quality [subject] copula [predicate], "Some S is not P"				
<b>Standard Form: Syllogism</b> Premise 1: Major Premise (has predicate from conclusion) Premise 2: Minor Premise (has subject from conclusion) Conclusion: Concluding premise (subject and predicate)				
<b>Proposition Type</b>	<i>A-Proposition</i>	<i>E-Proposition</i>	<i>I-Proposition</i>	<i>O-Proposition</i>
	All S is P	No S is P	Some S is P	Some S is not P
<b>Immediate Inferences</b>	<i>Contradictories</i>	<i>Contraries</i>	<i>Subcontraries</i>	<i>Subalternation</i>
A. All S is P	O. Some S is ~P	E. No S is P	-invalid-	I. Some S is P
E. No S is P	I. Some S is P	A. All S is P	-invalid-	O. Some S is ~P
I. Some S is P	E. No S is P		O. Some S is ~P	
O. Some S is ~P	A. All S is P		I. Some S is P	
<b>Other Immediate Inferences</b>	<i>Conversion</i>	<i>Obversion</i>	<i>Contraposition</i>	
A. All S is P	I. Some P is S	E. No S is ~P	A. All ~P is ~S	
E. No S is P	E. No P is S	A. All S is ~P	O. Some ~P is ~~S	
I. Some S is P	I. Some P is S	O. Some S is ~~P	-invalid-	
O. Some S is ~P	-invalid-	I. Some S is ~P	O. Some ~P is ~~S	
<b>Mood:</b> the three-types of propositions used in a given syllogism. Listed together, such as: AOA or EIA				
<b>Figure:</b>	<i>First Figure</i>	<i>Second Figure</i>	<i>Third Figure</i>	<i>Fourth Figure</i>
Major Premise	M-P	P-M	M-P	P-M
Minor Premise	S-M	S-M	M-S	M-S
Conclusion	S-P	S-P	S-P	S-P
<b>Valid Forms</b>	<i>First Figure</i>	<i>Second Figure</i>	<i>Third Figure</i>	<i>Fourth Figure</i>
AAA	1. AAA-1 (Barbara)			
AEE		5. AEE-2 (Camestres)		15. AEE-4 (Camenes)
AAI			9. AAI-3 (Darapti)	16. AAI-4 (Bramantip)
AII	2. AII-1 (Darii)		10. AII-3 (Datisi)	
IAI			11. IAI-3 (Disamis)	17. IAI-4 (Dimaris)
AOO		6. AOO-2 (Baroko)		
EAE	3. EAE-1 (Celarent)	7. EAE-2 (Cesare)		
EAO			12. EAO-3 (Felapton)	18. EAO-4 (Fesapo)
OAO			13. OAO-3 (Bokardo)	
EIO	4. EIO-1 (Ferio)	8. EIO-2 (Festino)	14. EIO-3 (Ferison)	19. EIO-4 (Fresison)

\*Black shaded regions indicate invalid forms.

FORMAL LOGIC: NON-CATEGORICAL SYLLOGISMS

III. Formal Logic: Non-Categorical Syllogisms

A. Non-Categorical Syllogisms

1. **Conjunction:**
  - a. "This and that"
  - b. Conjunction Symbol:  $\cdot$ , called the "dot." Translate as "and," "also," "both . . . and"
  - c. Alternative symbols include:  $\&$ ,  $\leftrightarrow$ ,  $\wedge$
2. **Disjunctive Proposition**
  - a. "This or that"
  - b. Disjunctive symbol:  $\vee$ , disjunctive, called the "vee." Translate as: "or"
  - c. Normally understood as the inclusive disjunct—either or both are true, but not neither. IE: both can be true, or one or the other can be true, but they cannot together be false.
  - d. The exclusive disjunct (symbolized by  $\oplus$ ) denies the "both" option of the inclusive disjunct. One or the other is correct, but not both or neither. This usage must be specified, it shouldn't be assumed for just any disjunctive.
3. **Hypothetical Proposition**
  - a. "if this then that," or, "this implies that"
  - b. Hypothetical Symbol:  $\supset$ , called the "horseshoe" Translate as: "If . . . then" or "implies"
  - c. This category can also be called the conditional and implies either a coincident or a causal relation.
  - d. Alternative symbols include:  $>$ ,  $\rightarrow$
4. **Material Implication/Biconditional**
  - a. "if this then that" or "implies"
  - b. Material Implication Symbol:  $\equiv$ , two terms or propositions having the same truth value (both are T or both are F).
  - c. This is the minimal form of implication since it doesn't show any causal relation as the hypothetical can. However in much of logic, the hypothetical and the biconditional are equivalent since they are treated largely the same (proven/disproven in the same ways).

B. Truth Tables

1. Non-categorical syllogisms can be evaluated exhaustively by means of truth tables.
2. Each kind of non-categorical syllogism is a kind of relation between the term. These relations have definitions expressed in truth tables

$\sim$ (Neg.)		$\cdot$ (Conj.)			$\vee$ (Disj.)			$\supset$ (Cond.)			$\equiv$ (Bicond.)		
$\sim p$	$p$	$p$	$q$	$p \cdot q$	$p$	$q$	$p \vee q$	$p$	$q$	$p \supset q$	$p$	$q$	$p \equiv q$
T	F	T	T	T	T	T	T	T	T	T	T	T	T
F	T	T	F	F	T	F	T	T	F	F	T	F	F
		F	T	F	F	T	T	F	T	T	F	T	F
		F	F	F	F	F	F	F	F	T	F	F	T

3. To read a truth table understand that T = True, F = False, and read from left to right by row. For example, for the conditional, row 1, "When p is true and q is true, then p implies q is true." Row 2, "When p is true and q is false then p implies q is false."
4. Truth tables can be made for any non-categorical proposition or argument.
5. Truth tables are arranged like so
  - a. The variables are each listed individually in order of appearance (p, q, r, etc.) at the top of the truth table. Each of these designates a different column. The variables are ALWAYS listed first.
  - b. Beside these, to the right, are listed each of the premises of the given non-categorical argument. These are listed in order of appearance (premise 1 then premise 2, etc.) (You may treat negations as separate premises or not. Just be consistent, and make sure you don't confuse yourself).
  - c. Sometimes however, a premise has a component relation. This means that more than one relation occurs in a premise. For example:  $(p \vee q) \cdot r$ , the component relation is " $p \vee q$ "
  - d. If any of the premises has a component relation not already charted, it must be included as another column at the top and before that whole premise is listed
    - 1.1 For example: if premise one is  $(p \vee q) \cdot r$  the " $p \vee q$ " relation would have to be listed separately, to the left of that whole premise.
    - 1.3 Include each component relation as it appears, going from "inside-out." For example, if premise 2 is:  $[(p \vee q) \cdot r] \supset (q \cdot r)$  then list, as separate columns, from left to right,  $(p \vee q)$ , then  $(p \vee q) \cdot r$ , then  $(q \cdot r)$  then  $[(p \vee q) \cdot r] \supset (q \cdot r)$ .
    - 1.4 This method assures that each component relation is resolved before any given premise is evaluated. Hence, each column addresses only one variable or one relation.



- e. When the chart is fully laid out (not *filled* out), each column will designate a single variable or relation and the conclusion always occupies the final column. The variable (terms) always occupy the first columns.
- f. To fill out the truth table, start by figuring out how many rows are needed. To find out, take  $2^x$  and x is the number of terms. For example, if there are three terms, p, q, and r, then that is  $2^3$  which equals 8 rows. If it is 5 terms, p, q, r, s, t then that is  $2^5$  or 32 rows.
- g. Then for the first variable (the first column), take that number, and moving down, write T for half, then F for half. (ie: if there are 8 rows, then that's 4 T's and 4 F's).
- h. Then repeat for the next variable except half it again (ie: if 8 rows, then that's 2 T's, 2F's, 2 T's and 2F's)
- i. Repeat this process till all the variables are filled out (ie: if there are 8 rows, the third column will have 1T, 1F, 1T, 1F, 1T, 1F, 1T, 1F)
- j. Once the variables are all filled out, proceed to answer for each of the premises by referring to only the relevant variables and the definition (truth tables) for each relation. (see truth table below)
  - 1.1 For example column 4 refers to variables p and q and the disjunctive relation.
  - 1.2 For example, Column six refers to r, column 4, and the conjunctive relation.
- k. The following argument is charted below (Column and Row numbers are listed as learning aids, and would not normally be included in a truth table

Premise 1:  $(p \vee q) \cdot r$   
 Premise 2:  $[r \cdot (p \vee q)] \supset (q \cdot r)$   
 Conclusion:  $\therefore r \cdot q$

	Column1	C2	C3	C4	C5 (premise 1)	C6	C7	C8 (premise 2)	C9 (Conc.)
Row1	p	q	r	$p \vee q$	$(p \vee q) \cdot r$	$r \cdot (p \vee q)$	$q \cdot r$	$[r \cdot (p \vee q)] \supset (q \cdot r)$	$r \cdot q$
R2	T	T	T	T	T	T	T	T	T
R3	T	T	F	T	F	F	F	T	F
R4	T	F	T	T	T	T	F	F	F
R5	T	F	F	F	F	T	T	F	F
R6	F	T	T	T	T	F	F	T	T
R7	F	T	F	T	T	F	T	T	F
R8	F	F	T	T	T	T	F	T	F
	F	F	F	F	T	T	T	T	F

- 6. For evaluating truth tables there are 5 relevant assessments.
  - a. Contingent—meaning the conclusion column has at least one T and at least one F
  - b. Contradictory—meaning the conclusion column has only F's
  - c. Tautology—meaning the conclusion column has only T's
  - d. Valid—wherever the premise columns are all T, the conclusion is also T
  - e. Invalid—in at least one case, where the premise columns have only T's the conclusion is still F
- 7. Shortened truth-table method—instead of doing the whole truth table, if one suspects that an argument is invalid, one can identify invalidity if just one row has True premises and a False conclusion. This abbreviated form requires listing only the (relevant) variables, and the premises—but one may include component relations to avoid error. The trick is learning how to guess what truth values for the variables will show the argument's invalidity.

C. Formal Proofs

1. **Conjunctive Syllogism**

Affirmative Proof | Negative Proof

$P \cdot Q$                        $P \cdot Q$   
 P                                 $\sim P$   
 $\therefore Q$                           $\therefore \sim Q$

2. **Hypothetical**—If [antecedent] then [consequent].

Modus Ponens                      Modus Tollens

$P \supset Q$                           $P \supset Q$   
 P                                  $\sim Q$   
 $\therefore Q$                           $\therefore \sim P$

3. **Disjunctive**—Either [alternant] A or [alternant] B

Disjunctive Proof (either works)

$S \vee P$                           $S \vee P$   
 $\sim S$                                  $\sim P$   
 $\therefore P$                                 $\therefore S$

4. **Categorical**—S is P or S is not P.

$M < P$   
 $S < M$   
 $\therefore S < P$

5. **Dilemma** (complex proposition)

Constructive                      Destructive  
 $(P \supset Q) \cdot (R \supset S)$              $(P \supset Q) \cdot (R \supset S)$   
 $P \vee R$                                  $\sim Q \vee \sim S$   
 $\therefore Q \vee S$                           $\therefore \sim P \vee \sim Q$

6. **Sorite**

$A < B$   
 $B < C$   
 $C < D$   
 $\therefore A < D$

D. Rules of Inference

1. Modus Ponens (M.P.)
 
$$\begin{array}{l} p \supset q \\ p \\ \hline \therefore q \end{array}$$
2. Modus Tolens (M.T.)
 
$$\begin{array}{l} p \supset q \\ \sim q \\ \hline \therefore \sim p \end{array}$$
3. Hypothetical Syllogism (H.S.)
 
$$\begin{array}{l} p \supset q \\ q \supset r \\ \hline \therefore p \supset r \end{array}$$
4. Disjunctive Syllogism (D.S.)
 
$$\begin{array}{l} p \vee q \\ \sim p \\ \hline \therefore q \end{array}$$
5. Constructive Dilemma (C.D.)
 
$$\begin{array}{l} (p \supset q) \cdot (r \supset s) \\ p \vee r \\ \hline \therefore q \vee s \end{array}$$
6. Absorption (Abs.)
 
$$\begin{array}{l} p \supset q \\ \hline \therefore p \supset (p \cdot q) \end{array}$$
7. Simplification (Simp.)
 
$$\begin{array}{l} p \cdot q \\ \hline \therefore p \end{array}$$
8. Conjunction (Conj.)
 
$$\begin{array}{l} p \\ q \\ \hline \therefore p \cdot q \end{array}$$
9. Addition (Add.)
 
$$\begin{array}{l} p \\ \hline \therefore p \vee q \end{array}$$

E. Rules of Replacement

(read each "≡" as "tautologically necessary")

10. De Morgan's Theorems (De M.)
 
$$\begin{array}{l} \sim(p \cdot q) \equiv (\sim p \vee \sim q) \\ \sim(p \vee q) \equiv (\sim p \cdot \sim q) \end{array}$$
11. Commutation (Com.)
 
$$\begin{array}{l} (p \vee q) \equiv (q \vee p) \\ (p \cdot q) \equiv (q \cdot p) \end{array}$$
12. Association (Assoc.)
 
$$\begin{array}{l} \sim(p \cdot q) \equiv (\sim p \vee \sim q) \\ [p \vee (q \vee r)] \equiv [(p \vee q) \vee r] \end{array}$$
13. Distribution (Dist.)
 
$$\begin{array}{l} [p \cdot (q \vee r)] \equiv [(p \cdot q) \vee (p \cdot r)] \\ [p \vee (q \cdot r)] \equiv [(p \vee q) \cdot (p \vee r)] \end{array}$$
14. Double Negation (D.N.)
 
$$p \equiv \sim\sim p$$
15. Transposition (Trans.)
 
$$(p \supset q) \equiv (\sim q \supset \sim p)$$
16. Material Implication (Impl.)
 
$$(p \supset q) \equiv (\sim p \vee q)$$
17. Material Equivalence (Equiv.)
 
$$\begin{array}{l} (p \equiv q) \equiv [(p \supset q) \vee (q \supset p)] \\ (p \equiv q) \equiv [(p \cdot q) \vee (\sim p \cdot \sim r)] \end{array}$$
18. Exportation (Exp.)
 
$$[(p \cdot q) \supset r] \equiv [p \supset (q \supset r)]$$
19. Tautology (Taut)
 
$$\begin{array}{l} p \equiv (p \vee p) \\ p \equiv (p \cdot p) \end{array}$$

## INFORMAL LOGIC

- I. Introduction to Informal Logic
  - A. Introduction: Deduction is not the only kind of logic. There is also induction, which employs reasoning without necessarily having the mathematical structure of formal logic and often lacking the clean and clear patterns of syllogisms.
  - B. We can think of formal logic as being concerned with the form or structure of thought. Informal logic however focuses on the content and credibility of those thoughts.
  - C. Informal logic asks: does a given idea even make sense? Is it worthy of belief?
  - D. Something can have an informal fallacy but be formally valid.
  - E. Truth: **refers to whether something is a correct statement about reality.**
  - F. Belief and Credibility
    1. **Belief is an attitude of assent. It is where a person grants, admits, or agrees that something is true.**
    2. **Credibility refers to whether belief is justified.**
    3. **Something may be discredited (ie: incredible) without addressing whether it is true.**
    4. For example, a person in court may be proven biased and deemed an incompetent witness even if he or she is reporting the truth.
  - D. **Informal fallacies deal in credibility, addressing whether a message or messenger is worthy of belief.**
  - E. **Informal fallacies also can deal in basic communication and grammar. Informal fallacies then can mar one's speech, obscure listening and obstruct understanding.**
- II. Informal Logical Fallacies, by category (adapted from Geisler and Brooks, 90-131; and Copi and Cohen, 121-175; material in brackets is my own)
  - A. Fallacies of Ambiguity.
    1. **Equivocation/Simple Ambiguity** (A1-Copi and Cohen)
      - a. A word is used with two or more meanings.
      - b. "If all men are created equal, then why are basketball players so tall?"
    2. **Amphiboly** (A2-Copi and Cohen)
      - a. The words are clear but the grammatical construction is not
      - b. "Save soap and waste paper."
      - c. "Slow children at play."
    3. **Ambiguity of Accent/Emphasis** (A3-Copi and Cohen)
      - a. The use of accent, emphasis, or tone changes the meaning.
      - b. "The value of my beach-ball collection is beyond estimation. I had an accountant here the other day to look at it, and he said he couldn't say what it was worth." Harlan Pepper, *Best in Show* 2000
    4. **Ambiguity of Significance/Circumstance**
      - a. Conditions or circumstances change the meaning of the words.
      - b. "I had a hole in one" (said by a golfer about his sport or by a seamstress about two garments).
    5. **Ambiguity of Scope** (<http://www.fallacyfiles.org/scopefal.html>)
      - a. The scope of a claim is grammatically ambiguous.
      - b. Includes quantity terms like: "every," "some," "all," "none."
      - c. "All that glitters is not gold.  
This rock glitters.  
Therefore, this rock is not gold."
      - d. "everyone loves someone, so somebody is loved by everyon."
    6. **Open Question**
      - a. An open question is used to imply or lead or persuade the listener without the burden of making a claim or defense. Usually some sort of assumption is implied as if the question itself were some kind of support for the hidden premise. This fallacy does not apply just any open question since some can be used in discussion openers, or Socratic dialogue, or any sort of question and answer.
      - b. "What if there are infinite universes, wouldn't the emergence of life be inevitable in at least one of them?"
  - B. Relevance
    1. **Appeal to Force** (*Argument ad Baculum*) (R5-Copi and Cohen)
      - a. Physical coercion to win an argument
      - b. "You will agree with me or else I will release the dogs on your family."
    2. **Abusive Argument ad Hominem**
      - a. "Argument against the man," a personal attack. Does not attack the proposition but the person.
      - b. "Elizabeth Kubler-Ross's views on the stages of grief should be rejected because she has contact with departed spirits."
    3. **Circumstantial Argument ad Hominem** (R4-Copi and Cohen)

- a. An attack on the special circumstance surrounding the debater.
- b. Ad hominem arguments, however, can show that testimony is not credible, but it does not even address whether the testimony is true.
- c. "His view of the age of the earth is wrong because that's an antiquated religious teaching."
4. **Poisoning the Well**
  - a. A kind of *ad hominem* where one's entire argument is side-stepped by an attack on one's credibility, rationality, or ability to discourse. In essence, this leaves the victim helpless to defend himself since even his defense is interpreted as evidence against himself.
  - b. Though mentioned separately here, this can also be thought of as a subcategory of abusive *ad hominem*. Though every fallacy of "poisoning the well" is an *ad hominem*, not every *ad hominem* is "poisoning the well."
  - c. "Because my opponent is an atheist, he has no fear of God to keep him honest, and so we cannot trust a word of what he says, even if he swears that he's not lying. By what God or on what Bible is he swearing?"
5. **Wishful Thinking** (<http://www.fallacyfiles.org/wishthink.html>)
  - a. Deeming something true on the grounds that you wish it were true.
  - b. "My ship is gonna' come in. My lucky day is waiting. I just have to keep hoping and trying."
6. **Appeal to Nature (Argumentum ad Naturum)** (<http://www.fallacyfiles.org/adnature.html>)
  - a. Appeals to what is "natural" as a standard and authority of what is or should be.
  - b. Differs from the Naturalistic fallacy in that the naturalistic or "is-ought" fallacy wrongfully derives an moral "ought" from the "is" of nature whereas the *ad naturum* fallacy tries to justify anything by saying "its natural"—which "natural" is quite irrelevant to the issue.
  - c. "Marijuana is natural, mother nature's gift. So I don't see why people have a problem with it."
7. **[Utilitarian Fallacy (Argumentum ad Consequentiam)]**
  - a. Something is deemed true or good because its consequence is preferable, good or true.
  - b. "We should exterminate everyone over 65yrs old to save on rising health care costs."
  - c. "I believe in the flying spaghetti monster because I've had good luck ever since I started believing in him."
8. **[Motivational Fallacy]**
  - a. Something is deemed false because the person asserting it has questionable motives. This also works positively: a person has good intentions/motivations therefore his/her assertion is deemed true. This may also be thought of as a brand of circumstantial *ad hominem*
  - b. "These people intend to make abortion illegal, therefore we cannot believe their video and testimony about the corrupt Planned Parenthood worker."—the problem is that regardless of their intentions, the video and testimony may still be true.
  - c. "His healthcare bill is great because he just wants to make healthcare more accessible."—The problem is that his intentions are no proof that the healthcare policy will actually make healthcare more accessible.]
9. **[Clarification Fallacy]**
  - a. Something is deemed false because it does not achieve some unreasonable or irrelevant degree of clarity. This also works positively: something is deemed true because it is clear. This fallacy hinges on the fact that any theory, true or false, has some aspects that are unclear, complicated, or hard to understand. If true theories were altogether clear, then no theory would be true.
  - b. "Rational people cannot believe in morality since so many people disagree over it and it has so many gray areas."—The problem with this line of thinking is that true things may still be complicated, difficult to understand, or still have "rough" edges that need to be smoothed out.]
- C. Inappropriate Authority
  1. **Argument from Ignorance (Argument ad Ignorantiam)** (D1-Copi and Cohen)
    - a. Something should be believed until it is shown to be false
    - b. "Ghosts must exist because because no one has disproven them."
  2. **Argument from Pity (Argument ad Misericordiam)** (R1-Copi and Cohen)
    - a. Literally, "An argument from pity," an appeal to pity or emotions irrelevant to the point at hand.
    - b. "This man should not die for his crime. Who will take care of his wife and kids?"
  3. **Popular Appeal (Argument ad Populum)** (R1-Copi and Cohen)
    - a. "Argument from Popularity," a popular appeal irrelevant to the issue.
    - b. "Abortion is a contentious issue so we should stop addressing it in congress."
    - c. *Please note, Copi and Cohen confuse the Popular Appeal [Ad Populum] fallacy with the Argument from Pity [Ad Misericordiam]*
  4. **Majority Appeal (Consensus Gentium)**
    - a. Appeal to the majority opinion
    - b. "Slavery was good in 1840 because most American's polled were in favor of it."
    - c. "You should take up smoking because most of your friends do."
  5. **Appeal to Authority (Argument ad Vericundium)** (D2-Copi and Cohen)

- a. Appeal based entirely or unjustifiably on authority.
  - 1.1 This can be either employing an authority outside of his field (**irrelevant authority**)  
 Ex: "Drink Coke because Michael Jordan drinks coke."
  - 1.2 Referencing an authority in that field but who is/was not speaking to the issue at hand (**proof-texting fallacy**)  
 Ex: "Jesus says, 'where 2 or 3 are gathered in my name, there I am in their midst' (Mt16:20) so he is present here in our prayer meeting!"
  - 1.3 Presuming one's own authority when he or she is not an authority or not a credible authority (**fallacy of self-authority**)  
 Ex: "Peggy: What if I'm not as smart as I always thought. What if I'm... average?  
 Hank: Peggy, you have an IQ of 175. You said so yourself.  
 Peggy: Well, there could be a margin of error since it's my own estimate."
  - 1.4 Or simply relying too much on authorities (**authority-only fallacy**).  
 Ex: "I know this book is true because my spiritual leader says it is, my parents say it is, I can feel its true in my heart and tons of enlightened people testify that it's true."  
 "God doesn't exist because Richard Dawkins says so."
- 6. **Argument Because of Age** (*Argumentum ad Annis*)
  - a. Dismissal of an idea because it is old. Also called, "Chronological Snobbery"
  - b. "Sexual abstinence before marriage is Victorian."
- 7. **Argument to the Future** (*Argumentum ad Futuris*)
  - a. Something should be believed because it will (or might) be proven in the future.
  - b. "Embryonic stem cell research should be government funded because it may one day cure cancer."
- 8. **Prestige Jargon**
  - a. Attempting to prove the correctness of an idea on the basis of impressive jargon.
  - b. "Folk psychology must give way to inevitable and comprehensive advance of positivistic materialism."
- D. Fallacies of Presumption ("Stacking the Deck")
  - 1. **Begging the Question** (*Petitio Principii*) (P3-Copi and Cohen)
    - a. A circular argument. The conclusion is snuck into the premises.
    - b. "You know that I am telling the truth because I never lie."
  - 2. **Straw Man** (R3-Copi and Cohen)
    - a. An argument based on misrepresentation of the opposing view.
    - b. "Creationists believe the earth was created in 4004B.C."
    - c. "Democrats punch babies and crucify old people, so vote republican."
    - d. "Philosophy is just pointless arguments, so study business instead."
  - 3. **Special Pleading/Selective Evidence**
    - a. Only the supporting evidence is cited.
    - b. "The holocaust proves there is no God."
  - 4. **Hypothesis Contrary to Fact**
    - a. Assuming what "might-have-been" to prove what is. Falsely speculative argumentation
    - b. "If we could only remember our past lives then we would all realize that we are eternal divine beings."
  - 5. **Argument from Silence**
    - a. Argues that a non-statement amounts to an implicit claim. One's silence is interpreted to be saying something when no such claim need be expected of him or her.
    - b. "Governor Jimburn did not vote on the Iraq war, proving his opposition to the American involvement in Iraq."
- E. Fallacies of Cause
  - 1. **False Cause** (D3-Copi and Cohen)
    - a. Attributing the wrong cause or an undemonstrated cause to a given effect.
    - b. "You are a sociable outgoing person because you are a Pisces."
  - 2. **Texas Sharpshooter Fallacy/Reverse Cause (Non-causa pro-causa)**
    - a. Mistaking the effect for the cause and the cause for the effect.
    - b. The "texas sharpshooter", as the story goes, fires at random and then paints a bulls eye around wherever that shot lands."
    - c. "The plane crashed in Lake Michigan because the pilots had died of drowning."
  - 3. **Correlational Fallacy**
    - a. Presumptuously interpreting a correlation in a particular causal relation. IE: because A and B are always found together, A causes B.
      - 1.1 **Cum hoc ergo propter hoc ("with this, therefore that")**: presumes two correlated things are causally related.

Ex: "Ice cream causes rape since there is a direct correlation between the sale of ice cream and reports of rape."

**1.2 Post hoc ergo propter hoc ("after this, therefore that"):** presumes a thing which consistently follows after another is its effect.

Ex: "There must be some kind of magic built into street lights, because their red lights make almost every car stop."

4. **Complex Cause**

- a. Attributing many causal factors where there are only one or a few relevant causes.
- b. "The leading cause of traffic fatalities is not drunk driving or text messaging, it is actually automobile accidents themselves with concurrent blunt force trauma or cardiac failure."

5. **Simple Cause**

- a. Attributing only one or a few causal factors where there are many relevant causes.
- b. "The internet is the downfall of America!"

6. **Ad Hoc Reasoning**

- a. Lit. "for this," refers to extraneous after-the-fact explanations, or causes proposed to help keep a theory from being falsified. *Ad hoc* reasoning is not proposed for its internal plausibility or truth status, but instrumentally, just to rescue an idea or theory. It can still work just fine, and turn out to be true and valid, but it sacrifices credibility because it is biased and "tacked on."
- b. "Perhaps my client is innocent because his letter of confession was signed under low-light, after 2 hours of questioning. He could not have possibly known what he was writing."

F. Fallacies of Diversion

1. **Non-Sequitur** (Irrelevant Conclusion, *Ignoratio Elenchi*) (R6-Copi and Cohen)

- a. Literally "does not follow." An idea is considered true because of a tangential truth barely related to it.
- b. "Supernaturalism is false since science has made great technological advances."

2. **Red Herring** (R2-Copi and Cohen)

- a. A diversion from the issue. Differs from the fallacy of irrelevant conclusion in that red herring conclusions are totally unrelated to the premises, whereas the Non-Sequitur is only slightly related to the premises.
- b. "Obama is the better candidate, just look at his suit!"
- c. "This candidate must really love America since he's wearing the flag pin."

3. **Tu Quoque**

- a. Literally: "You too"—blends ad hominem and distraction in an accusation of hypocrisy. Instead of addressing the argument it faults the person for doing the same kind of thing they are criticizing. [This might also be called the **Hypocrisy Fallacy**.]
- b. "Who is Senator Nugent to prohibit topless bars within 1 mile of a school zone, he once visited the Playboy mansion!"

4. **[Pragmatic Fallacy**

- a. A diversion centering on the functionality or disfunctionality of something as a test for truth. Functionality is a falsification test, but not a verification test. That is, what is true works, but what works might not be true. Something's functionality only tells us that it works, not that it is true.
- b. "If your religion makes you happy, then it's true for you."

5. **Loaded Word** (<http://www.fallacyfiles.org/loadword.html>)

- a. "A word or phrase is "loaded" when it has a secondary, evaluative meaning in addition to its primary, descriptive meaning. When language is "loaded", it is loaded with its evaluative meaning. A loaded word is like a loaded gun, and its evaluative meaning is the bullet." (<http://www.fallacyfiles.org/loadword.html>)
- b. This is a close concomitant of **Argument from Pity** fallacy
- c. This is similar to the **Equivocation** fallacy, but with the **Loaded Word** fallacy the word can have multiple senses (such as its normal meaning and it's cultural connotation) operating *at the same time* and the error is over some undue or unfair connotation.
- d. "You should go out with her. She has a huge appetite for life, and a great personality."
- e. "This mechanics hiring practices are immoral, he's discriminating against applicants with a criminal record."

6. **Propaganda**

- a. Especially biased, misleading, or stilted information intended to persuade allegiance to a particular party. The diversion regards party allegiance such that any given claim is used instrumentally to incite loyalty to the party. Often overlaps with Loaded Word, Straw Man, and other fallacies. In many cases, this can be thought of as an extreme form of Loaded Word fallacy.
- b. "Republicans are waging a war on women. So fight back! And lets preserve their reproductive rights."

7. **Novel Word**

- a. Creating a new word or phrase to describe a thing in such a way as to distort it, wrongly affiliate it with something else, or discredit it. This can overlap significantly with loaded word and propaganda.
  - b. "Atheists deny all gods, so they can be called "general atheists." Theists, however affirm one God, and are atheistic regarding all the other. We may call theism 'narrow atheism' for denying most but not all God."
- G. Fallacies of Generalization
1. **Fallacy of the Accident/General Rule** (*Dicto Simpliciter*) (P1-Copi and Cohen)
    - a. Generalization from general to particular (ie: most X therefore all x)
    - b. "A wise son obeys his Father."
  2. **Hasty Generalization**—some to every/most, particular to general/absolute. (D4-Copi and Cohen)
    - a. Generalization from the particular to the general (i.e., some X therefore all X)
    - b. "Women are bad drivers."
  3. **[Fallacy of Particularity]**
    - a. Presuming radical particularity where a sufficiently qualified generalization is adequate.
    - b. "We can't say men tend to be physically stronger than women since there are some strong women and weak men out there who defy that stereotype."]
  4. **Cliché Fallacy**
    - a. Something is true because it aligns with a popular axiom or is itself proverbial.
    - b. "We should not buy a new car since, 'A penny saved is a penny earned.'"
  5. **Guilt by Association** (<http://www.fallacyfiles.org/guiltbya.html>)
    - a. To judge something on the status of its associate.
    - b. "Obama is a Islamo-communist because he once had dinner with card-carrying communist, and he once shook hands with a Muslim leader."
  6. **Anecdotal Fallacy/Volvo Fallacy**
    - a. Where an anecdote or personal story is weighed more heavily than overwhelming evidence to the contrary.
    - b. The "Volvo Fallacy" refers to a story about man who studies and finds that a Volvo would be the best car for him to buy, but he decides not to on the basis of one friend's story about a bad Volvo he once owned."
    - c. "I'll never fly on a plane because my friend once went through a crash landing, and I don't think I can handle that."
  7. **No True Scotsman Fallacy**
    - a. Derived from an anecdote given by Antony Flew (*Thinking about Thinking: Do I Sincerely Want to Be Right?* (London: Collins Fontana, 1975). He tells of a Scotsman who is reluctant to admit that any great evil could be done by a fellow Scotsman. Despite all the evidence to the contrary he repeats, "No *true* Scotsman would do such a thing." This is a fallacy of shifting standards to accommodate one's foregone conclusions.
    - b. It is a brand of *ad hoc* (after the fact) reasoning, **fallacy of the accident**, **wishful thinking**, **non-sequitur**, and **special pleading**.
    - c. This is corrected by retaining relevant standards of measurement. A the citizenship of Scotsman is not measured by his behavior but by his birth certificate, Visa, Passport, naturalization papers, and so on.
    - d. "I Don't believe that Jeffrey Dahmer was really an atheist when he committed all those crimes, no *true* atheist would have done such a thing."
- H. Reduction Fallacies—makes an issue overly simple or overly complex by appealing to select aspects of it.
1. **Nothing Buttery** (A.K.A., reductionism)
    - a. Something is "nothing-but" some aspect of it.
    - b. "Religion is nothing but an opiate of the masses"
    - c. "Humans are nothing but meat machines, material parts only."
  2. **Genetic Fallacy**
    - a. Something should be rejected because it comes from a bad source.
    - b. "His politics cannot be trusted because he graduated from OU."
  3. **Complex Question** (P2-Copi and Cohen)
    - a. A single question which asks (or assumes) more than one question.
    - b. "When did you stop beating your wife?"
  4. **Category Mistake**
    - a. Assumes a faulty parallel between two (or more things). Two distinct categories are treated as if they were the same.
    - b. [One example of this fallacy is the **Naturalistic Fallacy** ("**Is-Ought**" **Fallacy**) which is a fallacy in ethics where one derives prescription from descriptive data. That is, one tries to extract a moral "ought" from the "is" of nature.]
    - c. "I don't believe in blue because I can't taste it."
    - d. "Minds don't exist since they can't be seen through a microscope. There is only brain and body."

5. **Faulty Analogy**
    - a. An overly simplistic analogy
    - b. "Believing in Allah is like believing in the Tooth Fairy"
  6. **Argument of the Beard**
    - a. Drawing on the illustration of, "When does scruff become a beard?" and thereby supposes that because some distinctions are hard to make, they do not exist.
    - b. "Hitler is no different, morally, than Mother Theresa because cultures disagree on morality."
  7. **Faulty Dilemma**
    - a. Presumed dilemma ("either/or" choice) when no such dilemma actually exists.
    - b. "Either God exists, or evil exists."
  8. **Slippery Slope**
    - a. The domino theory of argumentation. Assumes that B and C . . . necessarily follow from A.
    - b. "If they take away our right to bear arms, what's next? Our right to free speech?!"
- I. Composition
1. **Fallacy of Division** (A5-Copi and Cohen)
    - a. What is true of the whole is true of the parts
    - b. "The atoms in granite are bits of tiny hard matter since granite is hard matter."
  2. **Wholistic Fallacy** (A4-Copi and Cohen)
    - a. What is true of the parts is true of the whole
    - b. "Granite must not be hard matter since its atoms are not themselves hard matter."
- J. Definition
1. **Etymological Fallacy**
    - a. A word is presumed to be defined by its root words or word history.
    - b. "Faggot simply means a bundle of sticks. So quit laughing you perverts!"
  2. **Circular Definition**
    - a. The definition includes the word it defines.
    - b. "Loiter: the act or state of loitering."
  3. **Standard Definition**
    - a. Employing a standard or common definition where a non-standard or less common definition is at work.
    - b. "She slapped me after doing bench press when all I said was, 'Nice form!'"
  4. **Non-standard Definition**
    - a. Employing a non-standard or uncommon definition where a standard or common definition is at work.
    - b. "She complimented me on my knowledge of Plato when I told her she has 'Perfect Form.'"
  5. **Hollow Word Fallacy**
    - a. A word, phrase or sentence is used in a context wherein it is rendered uninformative and vacuous.
    - b. "Our beer is a premium taste sensation, it goes down smooth and refreshing. It is satisfying to the last drop. More beer professionals choose our beer."
  6. **Illicit Totality Transfer**
    - a. Interpreting a word to mean most or all of its senses at once.
    - b. "In the Greek this word means 'righteous,' but is also used to signify correct alignment as well as justice. Here, this verse is saying we should be righteous, correctly aligned, and administering justice."



## CHART OF INFORMAL LOGICAL FALLACIES

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### I. Introduction

- A. Introduction: Deduction is not the only kind of logic. There is also induction, which employs reasoning without necessarily having the mathematical structure of formal logic and often lacking the clean and clear patterns of syllogisms.
- B. We can think of formal logic as being concerned with the form or structure of thought. Informal logic however focuses on the content and credibility of those thoughts.
- C. Informal logic asks: does a given idea even make sense? Is it worthy of belief?
- D. Something can have an informal fallacy but be formally valid.
- E. Truth: refers to whether something is a correct statement about reality.
- F. Belief and Credibility
  - 1. Belief is an attitude of assent. It is where a person grants, admits, or agrees that something is true.
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  - 4. For example, a person in court may be proven biased and deemed an incompetent witness even if he or she is reporting the truth.
- D. Informal fallacies deal in credibility, addressing whether a message or messenger is worthy of belief.
- E. Informal fallacies also can deal in basic communication and grammar. Informal fallacies then can mar one's speech, obscure listening and obstruct understanding.

### II. Informal Fallacies, Listed.

	<i>Fallacy</i>	<i>Description</i>	<i>Example</i>
(A) Ambiguity	<b>(1) Equivocation/ Simple Ambiguity</b>	A word is used with two or more meanings.	"If all men are created equal, then why are basketball players so tall?"
	<b>(2) Amphiboly</b>	The words are clear but the grammatical construction is not	"Save soap and waste paper." "Slow children at play."
	<b>(3) Ambiguity of Accent/ Emphasis</b>	The use of accent, emphasis, or tone changes the meaning.	"The value of my beach-ball collection is beyond estimation. I had an accountant here the other day to look at it, and he said he couldn't say what it was worth." Harlan Pepper, <i>Best in Show</i> 2000
	<b>(4) Ambiguity of Significance/ Circumstance</b>	Conditions or circumstances change the meaning of the words.	"I had a hole in one" (said by a golfer about his sport or by a seamstress about two garments).
	<b>(5) Ambiguity of Scope</b>	The scope of a claim is grammatically ambiguous. Typically includes quantity terms like: "every," "some," "all," "none."	"All that glitters is not gold. This rock glitters. Therefore, this rock is not gold." "everyone loves someone, so somebody is loved by everyone."
	<b>(6) Open Question</b>	An open question is used to imply or lead or persuade the listener without the burden of making a claim or defense. Usually some sort of assumption is implied as if the question itself were some kind of support for the hidden premise. This fallacy does not apply just any open question since some can be used in discussion openers, or Socratic dialogue, or any sort of question and answer.	"What if there are infinite universes, wouldn't the emergence of life be inevitable in at least one of them?"
(B) Relevance	<b>(7) Appeal to Force (Argument ad Baculum)</b>	Physical coercion to win an argument	"You will agree with me or else I will release the dogs on your family."
	<b>(8) Ad Hominem</b>	<i>Ad Hominem</i> means Lit. "Argument against the man." Does not attack the proposition but the person.	"Elizabeth Kubler-Ross's views on the stages of grief should be rejected because she has contact with departed spirits."
	<b>(8a) Abusive Ad Hominem</b>	Personal attack. The more common/default sense of <i>ad hominem</i> .	"You are stupid and don't know anything you *&#!%&#%@!!!"
	<b>(8b) Circumstantial Ad Hominem</b>	An attack on the special circumstance surrounding the debater. <i>Ad hominem</i> s, however, can show that testimony is not credible, but it does not even address whether the testimony is true.	"His view of the age of the earth is wrong because that's an antiquated religious teaching."

	<b>(9) Poisoning the Well</b>	A kind of <i>ad hominem</i> where one's entire argument is side-stepped by an attack on one's credibility, rationality, or ability to discourse. This leaves the victim helpless to defend himself since even his defense is interpreted as evidence against himself. Though mentioned separately here, this can also be thought of as a subcategory of abusive <i>ad hominem</i> . Though every fallacy of "poisoning the well" is an <i>ad hominem</i> , not every <i>ad hominem</i> is "poisoning the well."	"Because my opponent is an atheist, he has no fear of God to keep him honest, and so we cannot trust a word of what he says, even if he swears that he's not lying. By what God or on what Bible is he swearing?"
	<b>(10) Wishful Thinking</b>	Deeming something true on the grounds that you wish it were true.	"My ship is gonna' come in. My lucky day is waiting. I just have to keep hopin."
	<b>(11) Appeal to Nature</b> ( <i>Argumentum ad Naturum</i> )	Lit. "argument to nature." Appeals to what is "natural" as a standard/authority for what is or should be. Differs from the Naturalistic fallacy in that the naturalistic ("is-ought") fallacy tries to draw a moral "ought" from natural facts whereas <i>ad naturum</i> fallacy also admits non-moral things on the basis of their being "natural"	"Marijuana is natural, mother nature's gift. So I don't see why people have a problem with it."
	<b>(12) Utilitarian Fallacy</b> ( <i>Argumentum ad Consequentiam</i> )	Lit. "Argument to consequence." Something is deemed true or good because its consequence is preferable, good or true.	"I continue believing in the flying spaghetti monster because I've had good luck ever since I first started believing in him."
	<b>(13) Motivation</b>	Something is deemed false because the person asserting it has questionable motives. This also works positively: a person has good intentions/ motivations therefore his/her assertion is deemed true. This may also be thought of as a brand of circumstantial <i>ad hominem</i>	"These people intend to make abortion illegal, therefore we cannot believe their video and testimony about the corrupt Planned Parenthood worker."—the problem is that regardless of their intentions, the video and testimony may still be true.
	<b>14) Clarification</b>	Something is deemed false because it does not achieve some unreasonable or irrelevant degree of clarity. This also works positively: something is deemed true because it is clear. This fallacy hinges on the fact that any theory, true or false, has some aspects that are unclear, complicated, or hard to understand. If true theories were altogether clear, then no theory would be true.	"Rational people cannot believe in morality since so many people disagree over it and it has so many gray areas."—The problem with this line of thinking is that true things may still be complicated, difficult to understand, or still have "rough" edges that need to be smoothed out.
<b>(C) Inappropriate Authority</b>	<b>(15) Argument from Ignorance</b> ( <i>Argument ad Ignorantiam</i> )	Something should be believed until it is shown to be false	"Ghosts must exist because because no one has disproven them."
	<b>(16) Argument from Pity</b> ( <i>Argument ad Misericordiam</i> )	Lit. "argument from pity," an appeal to pity or emotions irrelevant to the point at hand.	"This man should not die for his crime. Who will take care of his wife and kids?"
	<b>(17) Popular Appeal</b> ( <i>Argument ad Populum</i> )	Lit. "Argument from Popularity," a popular appeal irrelevant to the issue.	"Abortion is a contentious issue so we should stop addressing it in congress."
	<b>(18) Majority Appeal</b> ( <i>Consensus Gentium</i> )	Appeal to the majority opinion	"Slavery was good in 1840 because most American's polled were in favor of it." "You should take up smoking because most of your friends do."
	<b>(19) Appeal to Authority</b> ( <i>Argument ad Vericundium</i> )	Lit. "to authority." Appeal based entirely or unjustifiably on authority.	"My mom says I'm the coolest person in the world."
	<b>(19a) Irrelevant authority</b>	Employing an authority outside of his field	"Drink Coke because Michael Jordan does."
	<b>(19b) Proof-Texting</b>	Referencing an authority in that field but who is/was not speaking to the issue at hand	"Jesus says, 'where 2 or 3 are gathered in my name, there I am in there midst' (Mt 16:20) so he is present here in our prayer meeting!"
	<b>(19c) Self-Authority</b>	Presuming one's own authority when he or she is not an authority or not a credible authority	"Peggy: What if I'm not as smart as I always thought. What if I'm... average? Hank: Peggy, you have an IQ of 175. You said so yourself." Peggy: Well, there could be a margin of error since it's my own estimate."
	<b>(19d) Authority-Only</b>	Relying too much on authorities	"I know this book is true because my spiritual leader says so, my parents say so, I can feel it true in my heart. "God doesn't exist because Dawkins says so."
		<b>(20) Argument Because of Age</b> ( <i>Argumentum ad Annis</i> )	Lit. "To the year," dismissal of an idea because it is old. Also called, "Chronological Snobbery"
	<b>(21) Argument to the Future</b> ( <i>Argumentum ad Futuris</i> )	Lit. "To the future," something should be believed because it will (or might) be proven in the future.	"Embryonic stem cell research should be government funded because it may one day cure cancer."

	<b>(22) Prestige Jargon</b>	Attempting to prove the correctness of an idea on the basis of impressive jargon.	"Folk psychology must give way to inevitable and comprehensive advance of positivistic materialism."
(D) Presumption	<b>(23) Begging the Question</b> <i>(Petitio Principii)</i>	A circular argument. The conclusion is snuck into the premises.	"You know that I am telling the truth because I never lie."
	<b>(24) Straw Man</b>	An argument based on misrepresentation of the opposing view.	"Democrats punch babies and crucify old people, so vote republican." "Philosophy is just pointless arguments, so study business instead."
	<b>(25) Special Pleading/ Cherry Picking</b>	Only the supporting evidence is cited. Also called <b>Confirmation Bias</b> .	"The holocaust proves there is no God."
	<b>(26) Hypothesis Contrary to Fact</b>	Assuming what "might-have-been" to prove what is. Falsely speculative argumentation	"If we could only remember our past lives then we would all realize that we are eternal divine beings."
	<b>(27) Argument from Silence</b>	A non-statement amounts to an implicit claim. One's silence is interpreted to be saying something when no such claim need be expected of him or her.	"Governor Jimburn did not vote on the Iraq war, proving his opposition to the American involvement in Iraq."
(E) Fallacies of Cause	<b>(28) False Cause</b>	Attributing the wrong cause or an undemonstrated cause to a given effect.	"You are a sociable outgoing person because you are a Pisces."
	<b>(29) Texas Sharpshooter Fallacy/Reverse Cause</b> <i>(Non-causa pro-causa)</i>	Lit. "no cause for cause." Mistaking the effect for the cause and the cause for the effect. The "texas sharpshooter," as the story goes, fires at random and then paints a bulls eye around wherever that shot lands.	"The plane crashed in Lake Michigan because the pilots had died of drowning."
	<b>(30) Complex Cause</b>	Attributing many causal factors where there are only one or a few relevant causes.	"The leading cause of traffic fatalities isn't drunk driving, it is actually automobile accidents themselves with concurrent blunt force trauma or cardiac failure."
	<b>(31) Correlational Fallacy</b>	Presumptuously interpreting a correlation as if it were a particular causal relation. I.E., because A and B are always found together, A causes B.	"Religion birth science. All the founders of modern science were religious."
	<b>(31a) Cum hoc ergo propter hoc</b>	Lit. ("with this, therefore that"): presumes two correlated things are causally related.	"Ice cream causes rape. Ice cream sales and rape reports increase at the same time."
	<b>(31b) Post hoc ergo propter hoc</b>	Lit. ("after this, therefore that"): presumes a thing which consistently follows after another is its effect.	"There must be some kind of magic built into street lights, because their red lights make almost every car stop."
	<b>(32) Simple Cause</b>	Attributing only one or a few causal factors where there are many relevant causes.	"The internet is the downfall of America!"
(F) Diversion	<b>(33) Ad Hoc Reasoning</b>	Lit. "for this," extraneous after-the-fact explanations, or causes proposed to help keep a theory from being falsified. Ad hoc reasoning is not proposed for its internal plausibility or truth status, but instrumentally, just to rescue an idea or theory. It can still work just fine, and turn out to be true and valid, but it sacrifices credibility because it is biased and "tacked on."	"Perhaps my client is innocent because his letter of confession was signed under low-light, after 2 hours of questioning. He could not have possibly known what he was writing."
	<b>(34) Non-Sequitur/ Irrelevant Conclusion</b>	Lit. "does not follow." An idea is considered true because of a tangential truth barely related to it. A.K.A. <i>ignoratio elenchi</i> (lit. "irrelevant conclusion")	"Supernaturalism is false since science has made great technological advances."
	<b>(35) Red Herring</b>	A diversion from the issue. Differs from the fallacy of irrelevant conclusion in that red herring conclusions are totally unrelated to the premises, whereas the Non-Sequitur is only slightly related to the premises.	"Obama is the better candidate, just look at his suit!" "This candidate must really love America since he's wearing the flag pin."
	<b>(36) To Quoque/ Hypocrisy Fallacy</b>	Lit. "You too," blends <i>ad hominem</i> and distraction in an accusation of hypocrisy. Instead of addressing the argument it faults the person for doing the same kind of thing they are criticizing.	"Who is Senator Nugent to prohibit topless bars within 1 mile of a school zone, he once visited the Playboy mansion!"
	<b>(37) Pragmatic Fallacy</b>	A diversion centering on the functionality or dysfunction of something as a test for truth. Functionality is a falsification test, but not a verification test. That is, what is true works, but what works might not be true. Something's functionality only tells us that it works, not that it is true.	"If your religion makes you happy, then it's true for you"

	<b>(38) Loaded Word</b>	A word/phrase is “loaded” w/ evaluative/secondary/ or connotative significance (i.e., “baggage”) while its intended or normal (descriptive) meaning might be apt. Like the Equivocation fallacy, but with the Loaded Word fal. the word can have multiple senses (such as its normal meaning and its cultural connotation) operating <i>at the same time</i> and the error is over an undue or unfair connotation.	“You should go out with her. She has a huge appetite for life, and a great personality.” “This mechanics hiring practices are immoral, he’s discriminating against applicants with a criminal record.”
	<b>(39) Propaganda</b>	Especially biased, misleading, or stilted information intended to persuade allegiance to a particular party. The diversion regards party allegiance such that any given claim is used instrumentally to incite loyalty to the party. Often overlaps with Loaded Word, Straw Man, and other fallacies. In many cases, this can be thought of as an extreme form of Loaded Word fallacy.	“Republicans are waging a war on women. So fight back! And let’s preserve their reproductive rights.”
	<b>(40) Novel Word</b>	Creating a new word or phrase to describe a thing in such a way as to distort it, wrongly affiliate it with something else, or discredit it. This can overlap with loaded word and propaganda.	“Atheists deny all gods, so they can be called ‘general atheists.’ Theists affirm one God, and are atheistic about others. They are ‘narrow atheists’ for denying most but not all gods.”
(G) Generalization	<b>(41) Accident/General Rule (Dicto Simpliciter)</b>	Lit. “simple maxim/saying.” Generalization from general to particular (i.e., most X therefore all x).	“A wise son always obeys his Father.”
	<b>(42) Hasty Generalization</b>	some to every/most, particular to general/absolute. Generalization from the particular to the general (i.e., some X therefore all X)	“Women are bad drivers.”
	<b>(43) Particularity</b>	Presuming radical particularity where a sufficiently qualified generalization is adequate.	“We can’t say men tend to be physically stronger than women since there are some strong women and weak men out there who defy that stereotype.”
	<b>(44) Cliché Fallacy</b>	Something is true because it aligns with a popular axiom or is itself proverbial.	“We should not buy a new car since, ‘A penny saved is a penny earned.’”
	<b>(45) Guilt by Association</b>	To judge something on the status of its associate/s	“Obama is a Islamo-communist because he once had dinner with card-carrying communist, and he once shook hands with a Muslim leader.”
	<b>(46) Anecdotal Fallacy/Volvo Fallacy</b>	Where an anecdote or personal story is weighed more heavily than overwhelming evidence to the contrary. The “Volvo Fallacy” refers to a story about man who studies and finds that a Volvo would be the best car for him to buy, but he decides not to on the basis of one friend’s story about a bad Volvo he once owned.”	“I’ll never fly on a plane because my friend once went through a crash landing, and I don’t think I can handle that.”
	<b>(47) No True Scotsman Fallacy</b>	Drawn from an anecdote given by Antony Flew ( <i>Thinking about Thinking</i> (Collins Fontana, 1975), 47. A Scotsman who is reluctant to admit that any great evil could be done by a fellow Scotsman. Despite all the evidence to the contrary he repeats, “No <i>true</i> Scotsman would do such a thing.” This fallacy shifts standards to suit one’s foregone conclusions. Blends several fallacies including <i>ad hoc</i> reasoning, fallacy of the accident, wishful thinking, non-sequitur, and special pleading.	“I Don’t believe that Jeffrey Dahmer was really an atheist when he committed all those crimes, no <i>true</i> atheist would have done such a thing.”
(H) Reduction	<b>(48) Nothing Buttery/Reductionism</b>	Something is “nothing-but” some aspect of it. The error is one of oversimplification, and assuming that a given thing is <i>entirely</i> explainable in terms of some single element.	“Religion is just an opiate of the masses” “The mind is nothing but the brain.”
	<b>(49) Genetic Fallacy</b>	Something should be rejected because it comes from a problematic source.	“His politics cannot be trusted because he graduated from OU.”
	<b>(50) Complex Question</b>	A single question which asks (or assumes) more than one question.	“When did you stop beating your wife?”
	<b>(51) Category Mistake</b>	Assumes a faulty parallel between two (or more things). Two distinct categories are treated as if they were the same. One example of this fallacy is the <b>Naturalistic Fallacy</b> (“ <b>Is-Ought</b> ” Fallacy) which is a fallacy in ethics where one derives prescription from descriptive data. That is, trying to extract a moral “ought” from the “is” of nature.	“I don’t believe in blue because I can’t taste it.” “Minds don’t exist since they can’t be seen through a microscope. There is only brain and body.”

	<b>(52) Faulty Analogy</b>	An overly simplistic analogy or otherwise misrepresentative analogy.	“Believing in Allah is like believing in the Tooth Fairy”
	<b>(53) Argument of the Beard</b>	Drawing on the illustration of, "When does scruff become a beard?" and thereby supposes that because some distinctions are hard to make, they do not exist.	"Hitler is no different, morally, than Mother Theresa because cultures disagree on morality."
	<b>(54) False Dichotomy/ Faulty Dilemma</b>	Presumed dilemma (“either/or” choice) when no such dilemma actually exists.	“Either God exists, or evil exists.”
	<b>(55) Slippery Slope</b>	The domino theory of argumentation. Assumes that B, C, and D . . . necessarily follow from A when only B is likely/known to follow. The causal connection between A and C, D has not been established.	“If they take away our right to bear arms, what’s next? Our Bibles?!”
	(I) Composition	<b>(56) Fallacy of Division</b>	What is true of the whole is true of the parts
<b>(57) Wholistic Fallacy</b>		What is true of the parts is true of the whole	“Granite must not be hard matter since its atoms are not themselves hard matter.”
(J) Definition	<b>(58) Etymological Fallacy</b>	A word is presumed to be defined by its root words or word history.	"Faggot simply means a bundle of sticks. So quit laughing you perverts!"
	<b>(59) Circular Definition</b>	The definition includes the word it defines.	"Loiter: the act or state of loitering."
	<b>(60) Standard Definition</b>	Using a standard or common definition where a non-standard/less common definition is at work.	"She slapped me after doing bench press when all I said was, 'Nice form!'"
	<b>(61) Non-standard Definition</b>	Employing a non-standard/uncommon definition where a standard/common definition is at work.	"She complimented me on my knowledge of Plato when I told her she has 'Perfect Form.'"
	<b>(62) Hollow Word Fallacy</b>	A word, phrase or sentence is used in a context wherein it is rendered uninformative and vacuous.	“Our beer is a premium taste sensation, it goes down smooth and refreshing. It is satisfying to the last drop. More beer professionals choose our beer.”
	<b>(63) Illicit Totality Transfer</b>	Interpreting a word to mean most or all of its senses at once.	“In the Greek this word means ‘righteous,’ but is also used to signify correct alignment as well as justice. Here, this verse is saying we should be righteous, correctly aligned, and administering justice.”

## KEY SOURCES

Carson, D.A. *Exegetical Fallacies*. 2d. ed. Grand Rapids, MI: Baker, 1996.

Copi, Irving and Carl Cohen, *Introduction to Logic*. 13<sup>th</sup> ed. Upper Saddle River, NJ: Pearson/Prentice Hall, 2008.

\_\_\_\_\_. *Introduction to Logic*. 14<sup>th</sup> ed. Upper Saddle River, NJ: Pearson/Prentice Hall, 2010.

Curtis, Gary N. *FallacyFiles.org* [Webpage], N.P., www.FallacyFiles.org, © 2001-2014. Accessed 11 June 2014. Available from: <http://www.fallacyfiles.org/scopefal.html> [Internet].

Fisher, David H. *Historian's Fallacies: Toward a Logic of Historical Thought*. New York: Touchstone, 1970.

Geisler, Norman L. and Ronald M. Brooks, *Come Let Us Reason: An Introduction to Logical Thinking*. Grand Rapids: Baker, 2001.

Hurley, Patrick J. *A Concise Introduction to Logic*. 11<sup>th</sup> ed. Boston, MA: Wadsworth-Cengage, 2012.