LOGIC IS THE STUDY OF A HUMAN ACTIVITY

1. ILLOCUTIONARY LOGIC In the past few years I have been trying to act as an apostle or evangelist for what I call Illocutionary logic. My colleague John Corcoran prefers the name 'speech act logic.' This logic is developed from the point of view that speech acts, or linguistic acts, are the fundamental linguistic reality. A speech act is a meaningful act performed by using an expression. A person who speaks or writes or thinks with words performs speech acts/linguistic acts. So does the person who reads or who listens with understanding. A language is constituted by actual speech acts, together with the appropriate skills and dispositions of the language-using community.

Speech acts are the primary bearers of such semantic properties as meaning and truth. Expressions are the owners of syntactic features. Although expressions are not, strictly, endowed with meaning, certain expressions are conventionally used to perform acts with specified meanings, and these meanings are commonly attributed to the expressions themselves.

For logic, speech acts/linguistic acts performed with sentences are particularly important. A *sentential act* which can appropriately be evaluated in terms of truth and falsity is a *propositional act*, and these have received more logical attention than other sorts of sentential act. I will use the word 'statement' as a synonym for 'propositional act.' This is a stipulative use for the word, because ordinarily a statement is understood to be an assertion. Some statements are used with a certain *illocutionary force*. A statement can be accepted/asserted, it can be rejected/denied, or it can be supposed true or supposed false, among other things. Not all statements have illocutionary force.

A standard system of logic, or logical theory, contains three components: an artificial language, a semantic account which ordinarily gives truth conditions of sentences in the language, and a deductive system which codifies logically distinguished items such as logically true sentences or logically valid argument sequences. A system of illocutionary logic is obtained from a standard system by making three changes:

(i) Illocutionary force indicating expressions, or, simply, *illocutionary operators*, are added to the artificial language;

(ii) The account of truth conditions, the truth-conditional semantics for the artificial language, is supplemented by an account of commitment conditions; these determine what statements a person is committed to accept or reject once she accepts and rejects some to begin with;

(iii) The deductive system is modified to take account of, and accommodate, illocutionary operators.

Artificial logical languages are not used to perform speech acts/linguistic acts. We don't communicate or think with sentences of these languages. Sentences in artificial languages are best construed as representations of natural-language statements. The truth conditions and commitment conditions provided for artificial languages are really for the statements represented by these languages.

An argument conceived as a speech act is an act of reasoning from premiss acts which are assertions, denials, or suppositions to a conclusion which is also an illocutionary act and which is thought to be supported by the premiss acts. Arguments are simple or complex. An argument conceived as a speech act is not appropriately regarded as valid or invalid--it is instead *deductively correct* or not. A simple argument is deductively correct if performing the premiss acts commits a person to performing the conclusion act. A complex argument is deductively correct if the component arguments are deductively correct and performing the initial premiss acts commits a person to performing the final conclusion act. Proofs in a natural deduction system can serve as perspicuous representations of deductively correct speech-act arguments.

From the present perspective, a logical theory is an empirical theory about a certain kind of human activity, which the theory aims at capturing. The activity in question is a normative one, for there are correct and incorrect ways to speak or to argue. Differing systems of logic will not always be in competition with one another; they may simply be attempts to capture different activities, or different aspects of a single activity.

2. A SYSTEM OF ILLOCUTIONARY LOGIC I will sketch a very simple system of illocutionary logic to illustrate what I have been describing. The language *L* is a language of propositional logic. It contains atomic sentences and sentences formed from these with the following connectives: ~, *v*, *&*. The horseshoe ('⊃ ') of material implication is a defined symbol. The atomic sentences and the sentences formed from them with the connectives are the *plain sentences* of *L*.

The logical language also contains the following four illocutionary operators:

⊢ – the sign for asserting, or accepting, a statement
⊣ – the sign fo denying, or rejecting, a statement
⌞ – the sign for supposing a statement (to be) true
⌐ – the sign for supposing a statement to be false

Accepting a statement is accepting that statement as the truth, or as saying how things are. I am understanding assertions to be acts of accepting statements, whether or not the language user is addressing an audience. (This is a stipulated meaning for 'assertion.') Rejecting a statement is rejecting it as being false. I understand denials to be acts of rejecting statements. If a plain sentence of L is prefixed with an illocutionary operator, the result is a *completed sentence* of L.

In arguments stated in English, we usually say "Suppose" this or that at the beginning of the argument. When we infer a conclusion from our supposed statements, we no longer say "suppose." But the conclusion derived from suppositions has the force of a supposition, and I mark such conclusions with a sign for supposition. I am using ‘supposition’ for a broader class of speech acts than is normal–I prefer doing this to making up a new word.

The semantic account for *L* is given for the plain sentences rather than for the completed sentences. The completed sentences, and their illocutionary forces, figure in arguments. The truth-conditional semantic account for *L* is entirely standard. Interpreting functions assign truth and falsity to the atomic sentences of *L*, and these functions determine valuations of all the plain sentences by means of the familiar truth-tables.

In addition to truth conditions, the sentences of *L* have *commitment conditions*. The commitment that I intend here is what I call *rational* commitment. This is to be distinguished from moral or ethical commitment, and also from a great variety of other kinds of commitment, or senses of the word ‘commitment.’ Rational commitment is always a commitment to perform or not perform a certain action. Deciding to do something rationally commits a person to doing it, but there need be nothing immoral happening if a person fails to carry out such a commitment, because, say, she forgot about it or else changed her mind. A rational commitment is either “absolute” or conditional. We can be committed to perform an action *come what may*, or we can be committed to do it if certain conditions are satisfied. Accepting some statements and rejecting others will commit a person to accepting and rejecting further statements. These commitments are conditional, the person is committed if the matter comes up and she chooses to think about it. And the person is committed only so long as she doesn’t forget or change her mind about the original assertions and denials.

What makes commitment logically important is that it provides the “motive power” propelling a person from the premisses to the conclusion of an argument. No matter how the truth conditions of the premisses are related to those of the conclusion, a person will correctly accept or suppose the conclusion of an argument only after she recognizes that she is committed to do this by her accepting or supposing the premisses. Unlike truth and falsity, commitment is relative to a person. It is this person or that person who is committed or not. And the commitments of one person will be different from those of another. The semantic account for L is developed for an idealized person known as the *designated subject*.

There are three *commitment values*. The value + is for statements that the designated subject accepts or is committed to accept; the value - is for those she is committed to reject; *n* is for statements to which she is committed “in neither direction.” The following matrices provide a partial characterization of *commitment valuations*:

A	*B*	*~A*	*[A & B]*	*[A v B]*	*[A ⊃ B]*
+	+	-	+	+	+
+	*n*	-	*n*	+	*n*
+	-	-	-	+	-
n	+	*n*	*n*	+	+
n	*n*	*n*	*n*,-	+,*n*	+,*n*
n	-	*n*	-	*n*	*n*
-	+	+	-	+	+
-	*n*	+	-	*n*	+
-	-	+	-	-	+

In some cases, the commitment values of component sentences are not sufficient to completely determine the commitment value of a compound sentence. The matrices must be supplemented in order to characterize a commitment valuation.

We need these definitions:

A *commitment valuation* of *L* assigns a commitment value to each sentence of *L*. Such a valuation is *minimally acceptable* iff it satisfies the matrices.

If *f* is a (truth conditional) interpreting function of *L*, a commitment valuation *V* is *based on f* iff *V* assigns + only to sentences true for *f* and assigns - only to sentences false for *f*. A commitment valuation is *coherent* iff it is based on an interpreting function. A coherent commitment valuation indicates the commitments of a person whose beliefs might all be true and whose disbeliefs all false. We consider a designated subject with true beliefs and false disbeliefs, because we want to determine which arguments will preserve truth (for beliefs) and falsity (for disbeliefs) on the presumption that her beliefs and disbeliefs are correct to begin with.

A coherent commitment valuation V_0, might indicate the designated subject's explicit beliefs and disbeliefs at a given time (these are the beliefs and disbeliefs she has actually thought about), but there is a different commitment valuation that indicates the statements she is committed to accept and those she is committed to reject at that time. Given the coherent V_0, the commitment valuation *V determined by* V_0 is the valuation such that

(i) $V(A)$ = + iff $f(A)$ = T for every interpreting function *f* on which V_0 is based;
(ii) $V(A)$ = - iff $f(A)$ = F for every interpreting function *f* on which V_0 is based;
(iii) $V($A) = *n* otherwise.

If V_0 is a coherent commitment valuation based on interpreting function *f*, the commitment valuation determined by V_0 is based on *f*, is minimally acceptable, and is also the commitment valuation determined by itself. A commitment valuation is (fully) *acceptable* iff it is determined by a coherent commitment valuation.

3. ARGUMENTS In dealing with arguments in standard logic, the emphasis is on statements considered apart from illocutionary acts and illocutionary force. We understand a *plain argument sequence* to be a sequence of plain sentences '$A_1,..., A_n / B$' in which $A_1,..., A_n$ are premisses and B is the conclusion.

A plain argument sequence is *truth-conditionally valid* iff it is impossible to satisfy the truth conditions of the premisses without satisfying those of the conclusion; the premisses *truth-conditionally imply* the conclusion. An argument sequence is *basically valid* iff accepting the premisses commits a person to accepting the conclusion–in the language *L*, it is basically valid iff every acceptable commitment valuation which assigns + to all the premisses also assigns + to the conclusion. If the argument sequence is basically valid, its premisses *basically imply* the conclusion. And a sequence is *suppositionally valid*, and its premisses *suppositionally imply* the conclusion, iff supposing the premisses true commits a person to supposing the conclusion true.

In the language *L*, these three concepts coincide, but they will no longer coincide once *L* is extended with an '*I believe that*' operator. For the plain argument sequence '*A / I believe that A*' is basically valid but not truth-conditionally valid.

Standard logic is not convenient for dealing with arguments from premisses which are a mixture of assertions, denials, and suppositions to conclusions of the same types. If $A_1,..., A_n, B$ are completed sentences of *L* (i.e., they begin with illocutionary operators), then I will understand '$A_1,..., A_n \rightarrow B$' to be an illocutionary (argument) sequence from premisses $A_1,..., A_n$ to conclusion *B*.

An illocutionary sequence is neither valid nor invalid, so I will introduce a different word to characterize correct sequences. An illocutionary sequence is *logically connected* iff performing the premiss acts commits a person to performing the conclusion act. We will also say that the premisses of a logically connected arggument sequence *logically require* the conclusion. The deductive system *S* is a natural-deduction system using tree proofs. Steps in a proof are completed sentences, and the rules take account of illocutionary force. For example, this instance of *& Introduction* is correct:

$$\frac{\vdash A \qquad \vdash B}{\vdash [A \,\&\, B]}$$

but this is not:

$$\frac{\vdash A \qquad \llcorner B}{\vdash [A \,\&\, B]}$$

We are not justified in asserting the conclusion when one premiss is merely supposed. When one or both premisses are supposed true, the conclusion must also have the force of a supposition, as:

⊢*A*   ⌞*B*
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⌞*A & B]*

The deductive system *S* is a standard system adapted to account for illocutionary force: an elementary rule must be truth preserving and commitment preserving, and must accommodate force so that an asserted conclusion requires asserted premisses, and a supposed premiss requires a supposed conclusion. A non-elementary rule, which cancels a supposition, such as ⊃ *Introduction*, needs a slightly different formulation:

{⌞*A*}

{⌞*B*}
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?[A ⊃ B]

The conclusion is an assertion if the only (uncancelled) hypothesis in the subproof leading to *B* is the one in braces (this is the hypothesis that is cancelled, or discharged, by the inference); otherwise the conclusion is a supposition.

A branch in a tree proof either begins with an assertion ⊢*A*, a denial ⊣*B*, or with a supposition ⌞*C* or ¬*D*. An *initial assertion* or *denial* is not a hypothesis. Initial assertion should be known or believed true, initial denials should be disbelieved (believed false). An *initial supposition* is a hypothesis of the proof/argument. An argument from initial assertions and denials to a conclusion which is also an assertion or denial extends the arguer's knowledge or belief (disbelief) to include the conclusion. An argument from initial assertions and denials together with some hypotheses to a conclusion which is a supposition establishes that there is a commitment from the initial illocutionary acts to the conclusion act, that the initial acts logically require the conclusion act.

It is customary, in dealing with logical systems, to establish soundness and completeness results for deductive systems. These proofs make connections between the deductive system and the semantic account of the logical system. It is commonly thought that a deductive system is a syntactic object, for the rules for constructing proofs take account of particular symbols and forms, while ignoring considerations of meaning and truth. Soundness and completeness results are taken to show that syntax is adequate for characterizing the logically important semantic features of sentences (statements) and arguments. This understanding of the metatheoretical results derives from the prior understanding that the distinction between syntax or logical form and semantics in an artificial logical language is a model or paradigm for understanding syntax and semantics in a natural language.

The idea that an artificial logical language is a kind of "scale model" of a natural language has been enormously influential. It has led both philosophers and linguists to think that syntax is or should be an adequate indicator of semantic features. This idea, together with soundness and completeness results, has led many to embrace a computational understanding of language and thought. Syntactic features are accessible to the senses and can be manipulated by computers. The accessibility and manipulability of syntactic features must account for our own cognitive abilities and practices. We calculate and reason by manipulating syntactic objects which happen to have interesting semantic properties.

The understanding that artificial logical languages, with the distinction they exemplify between syntax and semantics, are models of natural ones is a *mis*understanding. Instead of being a model, a logical language is a system of representations. Sentences in an artificial language represent the semantic structures of natural-language statements, but sentences in a natural language don't represent structure, they are *scripts* for performing speech acts. The typical natural-language sentence can be used to perform a variety of acts, having different semantic structures.

In a system of illocutionary logic we also want to establish soundness and completeness, linking the deductive system to the semantic account. But the semantic account includes both commitment conditions and truth conditions. A soundness proof can show that we have not made a careless error in formulating the logical system. Apart from this, it does little to establish confidence in the deductive system, for it should already be evident that our rules take us to conclusions that our premiss acts commit us to perform. If soundness failed, it is the semantics that would need changing. Soundness and completeness results show that the commitments we have identified with our rules are adequate for tracking truth conditions.

4. CONSISTENCY AND COHERENCE The distinction between truth conditions and commitment conditions is of great importance to our use of language, and the correctness of arguments and inferences. Recognizing the distinction also helps clear up certain misconceptions about language.

The distinction between truth conditions and commitment conditions underlies an important difference between consistency and coherence. I am understanding consistency to be a semantic concept, one based on truth conditions. Statements are consistent if their truth conditions (would) allow them to be simultaneously true. If statements are not consistent, accepting them would lead a person to accept a contradiction. Coherence is a feature of illocutionary acts, or of completed sentences (of L), rather than of (force-neutral) statements. Such acts are incoherent if accepting them commits a person to accept inconsistent statements. In L, plain sentences A, $\sim A$ are *inconsistent*, while completed sentences $\vdash A$, $\dashv A$ are *incoherent*. Just as one statement can basically imply a second without the first truth-conditionally implying the second:

$\vdash$*A*

$\vdash$*I believe that A*

so there are consistent statements which cannot coherently be accepted/asserted. The sentences (statements):

~A, I believe that A

are consistent, but

$\vdash$*A*, $\vdash$*~I believe that A*

are incoherent.

G.E. Moore raised a question about statements:

A (It is raining), ~I believe that A (I don't believe that it is raining)

He recognized that the statements are consistent, and also that there is something wrong with accepting both statements, but he was unable to say just what the trouble is. Moore also recognized a "sense of 'imply'" according to which *A* implies '*I believe that A*,' but he could not adequately characterize this sort of implication (basic implication). Our account of illocutionary logic resolves Moore's puzzle, by providing the concepts needed to characterize and conceive what is going on in his example.

If the designated subject is Smith, then this argument:

$\vdash$*A*

$\vdash$*Smith believes that A*

is deductively correct for Smith, but not for the rest of us. And the assertions:

$\vdash$*A*, $\vdash$*~Smith believes that A*

are incoherent for Smith but not the rest of us. It is surprising, and a little disconcerting, to realize that an argument can be correct for one person but not another, or that illocutionary acts can be incoherent for one person and not another. However, this is intelligible once we are equipped with the appropriate concepts. This is also the key to understanding what is going on in the surprise execution (or examination) puzzle. The judge causes the prisoner to have incoherent beliefs, but the beliefs which are incoherent for the prisoner are coherent for the rest of us. They are also true, so far as the story goes.

5. ILLOCUTIONARY LOGIC IS THE COMPREHENSIVE STUDY OF LOGIC Illocutionary logic incorporates standard logic, so it is not competing with standard logic. But commitment conditions, although related to truth conditions in important ways, are more important than truth conditions for determining which (deductive) arguments are correct or incorrect. Illocutionary logic possesses additional resources to those available in standard logic. This makes it possible to solve certain problems and explain certain phenomena that have proved to be unusually recalcitrant to treatment by the techniques available in standard logic.

Illocutionary logic makes clear how a denial differs from the assertion of a negative statement, and shows that denial might be prior to negation. In illocutionary logic, it is also possible to explore the differences between negation, denial, and acts of *declining* to perform such acts as assertion and supposition. Illocutionary logic provides the resources for making sense of conditional assertions, which are different from the assertion of (force-neutral) conditional statements. Conditional assertion is a distinctive illocutionary force, as is the force of a conditional command or a conditional promise. Using the resources of illocutionary logic, we can remove the puzzle from Moore's Paradox, as well as reach a satisfactory understanding of the Surprise Execution Paradox and the Liar Paradox.

In addition, illocutionary logic is a perspicuous study of certain human cognitive practices. It is relevant to cognitive science in a way that standard logic is not.

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