AN ILLOCUTIONARY CONCEPTION OF SYNTAX, SEMANTICS, AND PRAGMATICS,

1. TWO-LEVEL LOGICAL SYSTEMS Illocutionary logic is the logic of speech acts, or language acts. The study of illocutionary logic was introduced by John Searle and Daniel Vanderveken, but I have a quite different "take" on this subject than they do, and my work in illocutionary logic is quite different from theirs. (Some of my recent papers are listed in the references.) In this paper, I will present my conception of illocutionary logic.

A speech act, or language act (I use these two expressions interchangeably), is a meaningful act performed by using expressions of a language. A person can perform a language act by speaking or writing, but she can also perform one by signing or by thinking with words. The person who reads or who listens with understanding is also performing language acts, although we commonly focus on those acts performed by the person who produces the expressions that are used.

I understand language acts to be the primary bearers of semantic features. Expressions, whether spoken or written (or signed or thought) are the bearers of syntactic features, and can themselves be regarded as syntactic objects. The meaning of a language act is the meaning that the language user intends. Expressions are conventionally used to perform acts with certain meanings, and it is common for a language user to intend meanings conventionally associated with the expressions that she uses. But a person can by mis-speaking produce the wrong expression for the act she performs–her act has the meaning she intends, although the expression she uses may mislead her addressees. She can also misunderstand the meaning conventionally associated with an expression, and use that expression to perform acts with the meaning that she mistakenly associates with the expression. In such a case, there are not two meanings, the linguistic meaning and the speaker's meaning. The speaker's meaning is the only meaning that her acts possess.

A *sentential act* is a language act performed by using a sentence. A (*factual*) *statement* is a sentential act that is true or false. This is a stipulated meaning for (my use of) the word, because statements are often understood to be something like assertions. A sentential act can be performed with a certain *illocutionary force*, like the force of a promise or a request, of an apology or a threat. A sentential act performed with a certain illocutionary force constitutes an *illocutionary act*. Statements themselves can be performed with a variety of illocutionary forces. For example, a single statement can be asserted or denied. A statement performed with a certain illocutionary force constitutes an illocutionary act, but in talking about *statements*, we abstract away from whatever forces they might have.

A *speech-act argument*, which is the kind of argument that people actually make, contains illocutionary acts as premisses and conclusions. A simple argument consists of one or more premiss acts and a conclusion inferred from them, and a complex argument contains (other) arguments as components. Our considering simple and complex arguments makes it inappropriate to characterize deductive arguments as valid or invalid, for the customary understanding of validity would apply only to simple arguments. For us, arguments are either *deductively correct* or not.

Logic as a discipline or subject matter is concerned, among other things, with language, with certain semantic features like truth, implication, and incompatibility, and with arguments. Let us consider how a focus on language acts impacts the study of logic, and how illocutionary logic is related to standard logic. It is now customary to carry out research in logic by developing *logical systems*, or *logical theories.* Such a theory consists of (1) a formal language, usually artificial, (2) a semantic account for that language, and (3) a deductive system for establishing one or another result involving expressions of the language. Since people don't normally use expressions of formal languages to write, say, or think things, there is a sense in which these are not genuine languages. (Expressions of genuine languages are "scripts" for performing language acts.) I will continue to speak of *logical languages*, but I regard sentences of these languages as *representations* of language acts that people either do perform or might perform. The semantic account is then for the language acts that are represented, and the deductive system codifies certain "logically distinguished" expressions of the formal language.

In a standard system of logic, the sentences of the logical language represent statements, and the semantic account gives truth conditions of these statements. The deductive systems focus on tracing truth-conditional logical consequence in one way or another. Standard systems make no provision for illocutionary force. To incorporate the illocutionary dimension, we can add things to a standard system of logic. To obtain a theory/system of illocutionary logic, (1) illocutionary-force indicating expressions, or *illocutionary operators*, are added to the formal language; (2) the account of truth conditions of statements is supplemented with an account of semantic features of illocutionary acts; (3) the deductive system is modified to accommodate illocutionary operators and illocutionary force.

In a system of illocutionary logic, the formal language and semantic account have two levels: the first level is ontological, or *ontic*, and the second level is *epistemic*. The ontic level treats the formal language without illocutionary operators, and provides a (familiar) account of the truth conditions of statements represented by sentences of this language. It is also possible to develop an ontic-level deductive system which traces truth-conditional features in abstraction from illocutionary force. A standard system of logic is a first-level system of illocutionary logic.

The second-level (or full) system deals with illocutionary acts. In the first-level system, there is no special interest in who it is that makes the statements being considered. Different people can make essentially the same statement (they can make essentially similar statements), and the logically important features of a statement are independent of whoever it is that makes the statement. A first-level logical system is a "third person" system. It is different with illocutionary acts. Two people cannot, for example, make essentially the same assertion. For Jones' assertion commits Jones to make further assertions and denials, but places no constraints on Smith, while Smith's assertion commits Smith but not Jones. Her commitments underlie the deductively correct (speech-act) arguments that a person makes. It is essential to an assertion, and is also logically important, just whose assertion it is.

An epistemic-level system of illocutionary logic is a first-person system. It is developed for, and from the perspective of, a particular person. I generally consider an idealized person whom I call the *designated subject*, for whom I use feminine pronouns. The illocutionary acts that are represented by expressions in the epistemic-level logical language are the designated subject's acts. They could also be our own acts, if we use the language to represent them. The epistemic-level semantic account is concerned with the *rational commitments* of illocutionary acts performed by the designated subject.

But how am I understanding rational commitment? Making a decision to do or not do something rationally commits the agent to do or not do it. Performing some intentional acts can rationally commit a person to do others. Some commitments are unconditional–before I leave home for work, deciding to stop at the bank on the way to work establishes such a commitment for me. Other commitments are conditional, like my commitment to close the upstairs windows if it rains while I am at home. Accepting, or asserting, a certain statement as true commits me to accept other statements, but this is a conditional commitment. I am committed to act only if I have some interest in the matter and give it some thought. It is irrational, for example, to accept *[A v B]* and *~A*, but refuse to accept *B*; however, I am not rationally required to even consider whether *B* is true or not. (And I can lose my commitment if I give up one of the initial assertions.)

Coming to accept a statement is performing an act. But once I have accepted a statement, I continue to accept it unless I forget, or change my mind. Continuing to accept a statement is not an act, it is a state. As well as being committed to do or not do something, I can also be committed to continue in a certain state, like the state of accepting a given statement.

Rational commitment underlies deductive arguments. It may help to understand this if we consider the topic of natural deduction. I think that certain deductive systems were first called *natural* to contrast them with axiomatic deductive systems, either with or without a rule of substitution. The axiomatic systems were designed to establish results that were single formulas, or single sentences, and these "logical laws" were inferred directly from other logical laws. Systems of natural deduction, in contrast, have arguments, or deductions, or proofs which begin with *hypotheses*, and infer consequences of these hypotheses. A system of natural deduction might establish results linking sets of premisses to conclusions; these would not be single-formula or single-sentence results. However, systems of natural deduction typically employ rules (inference principles) which *discharge*, or *cancel* hypotheses. A system of natural deduction can establish single-formula or single-sentence results. A particular system might establish only single-formula or single-sentence results.

It is essential to a system of natural deduction that it contain proofs, or arguments, from hypotheses which need not themselves be logical laws. It is also essential, if the system is to reflect our ordinary forms of deductive reasoning, that it contain rules which discharge hypotheses. In order to obtain a result *A* by *~ Elimination*, for example, we might begin with a hypothesis *~A* and infer a suitable contradiction, which then allows us to discharge, or cancel, *~A*, and infer *A*. Or we might reason from a hypothesis *A* to a conclusion *B*, and then infer *[A ⊃ B]*, canceling *A*. When we make an inference which discharges a hypothesis, we are actually using a whole (sub-)argument as a premiss.

Natural-deduction systems typically employ introduction and elimination rules which involve occurrences of a single operator. There might be a rule ⊃ *Elimination*, or *Modus Ponens*, which infers a conclusion *B* from premisses *A, [A ⊃ B]*, or a rule *v Introduction*, which infers *[A v B]* from either *A* or *B*. From this perspective, *Modus Tollens*, which moves from premisses *[A ⊃ B], ~B* to a conclusion *~A* would not be a suitable rule, because it "involves" two connectives rather than just one. However, it doesn't seem essential for a system of natural deduction to employ one-operator introduction and elimination rules. A system of natural deduction might, after all, have *Modus Tollens* as one of its rules.

Arguments, or deductions, in a system of natural deduction have a certain resemblance to deductive arguments or proofs in fields such as science or mathematics. To establish that if *A*, then *B,* we might begin by supposing *A*, and then, by a deduction employing one or more steps, reason to the conclusion *B*. This would normally be taken as sufficient to establish the conditional result. The arguer isn't required to finish her deduction by saying, "Hence, if *A*, then *B*." What she isn't required to say is nevertheless tacitly understood. The supposition of *A* is discharged when it is established that if *A*, then *B*.

Someone who begins an argument (proof) by supposing that √*2* is a rational number, and then deduces a contradiction, would typically conclude by saying, "So √*2* isn't a rational number," which cancels the initial supposition. But this isn't the case with all arguments that discharge hypotheses. When establishing a conditional, or a universal claim, or even the consequence of a disjunction, once the argument from hypotheses which need to be discharged is completed, it is taken to be evident that the appropriate result has been established, and this is often, or even usually, not stated explicitly. If a person begins by letting *ABC* be a triangle, and eventually concludes that the sum of the interior angles of this triangle is equal to two right angles, she can simply stop, and her audience will know that her result holds for all (Euclidean) triangles.

We commonly do carry out deductive reasoning from hypotheses in natural languages, where the hypotheses must be discharged before the results are established. We find this natural. People reasoned in this way long before the development of formal logical theories. Although it is widely recognized that arguments from hypotheses are a natural form of reasoning, certain features of these arguments are ordinarily not recognized. We commonly mark a hypothesis in an argument by using either the word 'suppose' or the word 'let' (as in "Let *ABC* be a triangle"). These hypotheses are *suppositions*; they are *initial suppositions* of deductive arguments.

Suppositions belong to the same general category as assertions, or judgments, and denials. But assertions and denials are *illocutionary acts*. An assertion is an act of making, and accepting, a statement as representing things as they are, or an act reaffirming one's acceptance of the statement. Although assertions are typically directed by a language user to an addressee, I am using this word to cover acts of producing a statement, and accepting it or reaffirming one's acceptance, whether or not there is an audience. An assertion can involve a spoken statement, or a written statement, or even a statement which is merely thought. A denial is an act of rejecting a statement as one not suitable for being asserted, or an act of indicating one's continued rejection of the statement. A statement can be asserted or denied, it can also be (positively) supposed to be the case–this is to accept it temporarily, or provisionally. A statement can also be temporarily or provisionally rejected. On this understanding, if we make a supposition, and infer a consequence of the supposition, our conclusion also has the status of a supposition, and will be called (by me) a supposition. Like assertions and denials, *suppositions are illocutionary acts*.

A genuine deductive argument is a speech act, and its basic components are illocutionary acts. To understand, investigate, and evaluate speech-act arguments, we must pay attention both to truth conditions of statements and to the illocutionary force with which statements are made. Standard logical systems, or logical theories, fail to do this. Standard deductive systems do not "provide" for making, or representing, genuine arguments. Instead, they provide what I have called *deductive derivations* which are concerned solely to investigate truth conditions, and to trace truth-conditional "connections" among statements. It is easiest to see this in an axiomatic deductive system where both axioms and theorems are logical laws or (if they are sentences) logical truths.

But even standard systems of natural deduction, though their deductions mimic natural arguments to a certain extent, are exclusively focused on truth-conditional connections, and explore these by means of deductive derivations. In contrast, an illocutionary deductive system is suited to display, and to investigate, deductive arguments that truly capture (or represent) our natural practice.

A group of statements either implies (or entails) a further statement or not. If there is implication, there is no distinction between immediate and mediate (or remote) implication. But some commitments are immediate while others aren't. If accepting *A* immediately commits me to accept *B*, and accepting *B* immediately commits me to accept *C*, accepting *A* may commit me only *mediately* to accept *C*. It is immediate commitment which motivates a person to act. In carrying out a complex deduction, the reasoner follows a chain of immediate commitment from the initial illocutionary acts to the concluding act. In an epistemic-level illocutionary theory, the deductive system is a first-person system for the designated subject to use in tracing the commitment consequences of her own illocutionary acts.

2. AN ACTUAL SYSTEM OF ILLOCUTIONARY LOGIC The language *L* has indefinitely many atomic sentences, and compound sentences formed with the connectives '~,' '*v*,' and '&.' (The horseshoe of material implication is a defined symbol.) The atomic and compound sentences are the *plain sentences* of *L*. In addition, *L* has these illocutionary operators:

$\vdash$ – the sign of assertion $\dashv$ – the sign of denial

$\llcorner$ – the sign of supposing true $\neg$ – the sign of supposing false

Assertions and denials don't require an audience, and all assertions and denials are sincere.

If *A* is a plain sentence of *L*, then the following:

$$\vdash A,\ \dashv A,\ \llcorner A,\ \neg A$$

are *completed sentences* of *L*. There are no other completed sentences. So all completed sentences begin with an illocutionary operator. Illocutionary operators cannot be iterated, and a completed sentence cannot occur as a component of a larger sentence.

The ordinary connectives represent something a person says in making a statement, but the illocutionary operators represent what a person *does* in making a statement. It often happens that a person doesn't *say* anything to indicate what she is doing. (We don't usually say "I assert that" when making an assertion.) Completed sentences are not used by us to say what the designated subject does, they are for the designated subject to use to make explicit the force of her own assertions, denials, and suppositions. We can also use them to do this for our own illocutionary acts. (Of course, sentences in the logical language, and proofs in the deductive system, are *representations* of acts performed by the designated subject, but they aren't representing statements *about* the designated subject.)

An epistemic-level deductive system should employ constructions which represent genuine (language act) arguments, whose premisses and conclusions are illocutionary acts. We shall outline the system *S*, which is a natural deduction system using tree proofs. Every step in one of these proofs is a completed sentence. An initial step in a tree proof is an assertion $\vdash A$, a denial $\dashv A$, a positive supposition $\llcorner A$, or a negative supposition $\neg A$. An initial assertion or denial is not a hypothesis of the proof. Instead, an initial assertion should express knowledge or justified belief of the arguer, and an initial denial should indicate that the arguer knows or justifiably believes that the statement is false. Not every sentence $\vdash A$ is eligible to be an initial assertion in a proof constructed by a given person. In contrast, any supposition can be an initial supposition. Initial suppositions are hypotheses of the proof.

With respect to a logical theory, or system, rational commitment is best explained, and captured, by a deductive system. Truth conditions of connectives are most clearly presented by truth-tables, or interpreting functions and valuations, and truth conditions of quantifiers are most clearly presented by interpreting functions and valuations. But the very idea of rational commitment involves moves from some illocutionary acts to others, and this is most perspicuously explained in terms of inference principles and deductions. The rules of an illocutionary deductive system should be evidently correct.

The following rules of inference of *S* are *elementary:*

& Introduction

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

& Elimination

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

v Introduction

$$\frac{\vdash/\llcorner A}{\vdash/\llcorner [A \vee B]} \qquad \frac{\vdash/\llcorner B}{\vdash/\llcorner [A \vee B]}$$

The symbol '$\vdash/\llcorner$' is used to indicate that the rule holds for both assertions and positive suppositions. In an instance of these rules, the conclusion is an assertion only if all premisses are assertions; otherwise the conclusion is a positive supposition.

The derived rule: *Modus Ponens*

$$\frac{\vdash/\llcorner A \qquad \vdash/\llcorner [A \supset B]}{\vdash/\llcorner B}$$

The conclusion is an assertion only if both premisses are assertions

is also elementary.

The following arguments are correct:

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

But even though they are truth preserving, these arguments are not correct:

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

Supposing the premisses commits us to supposing the conclusion, but suppositions do not authorize us to assert the conclusion.

Someone might wonder how we are to construe the results established by tree proofs/deductions. What does a tree proof prove? A proof from initial sentences $A_1, \ldots, A_n$ to conclusion B, where $A_1, \ldots, A_n$, B are completed sentences, establishes that whoever performs acts $A_1, \ldots, A_n$ is committed to perform B. Since we develop the epistemic level of our semantic account from the perspective of an idealized person whom we call the designated subject, we can also regard our proofs or deductions as arguments made by the designated subject. But each of us can imagine herself or himself in the position of the designated subject.

An actual argument must be made by a real person, who begins by asserting statements or denying statements or supposing statements. A serious argument requires real illocutionary acts performed using sentences of some genuine language. In our dealings with *S*, and the proofs/deductions we construct, we use schematic letters, not words and sentences of some natural language. These deductions are themselves schematic, in that they present the outlines of genuine arguments, and can be regarded as representations of genuine arguments. Arguments are epistemic devices for enlarging what we know or believe, and for persuading other people to add to their knowledge/belief. In an illocutionary logical theory, the deductive system is not intended simply to codify logically true sentences/statements, or valid argument sequences. Arguments are objects of study, and deductive systems in illocutionary logic should provide perspicuous representations of genuine arguments. A natural-deduction system which yields schematic arguments having tree structures, and which employs completed sentences prefixed with illocutionary operators, accomplishes this very nicely.

The following proof/deduction:

```
⌙[A & B]
----------- &E
   ⌙B
----------- vI
⌙[A v B]
```

establishes that performing an act represented by '⌙*[A & B]*' commits a person to performing the act represented by '⌙*[A v B]*'. (The various moves made in this proof are "tagged" with abbreviations of the names of the rules employed.)

The following is also an elementary rule:

Weakening

```
  ⊢A         ⊣A
 ------      -----
  ⌙A         ¬A
```

The person who accepts/asserts a statement intends for this to be permanent. But supposing a statement is like accepting it for a time. The force of an assertion "goes beyond" that of a supposition, but "includes" the suppositional force. Similar remarks apply to denials and acts of supposing a statement to be false.

A *non-elementary* rule of *S* is one for which at least one premiss is a sub-proof or deduction, and the rule *cancels*, or *discharges*, a hypothesis of this sub-proof. In illustrating these rules, the hypothesis which is canceled is enclosed in braces, and is written over the conclusion of the sub-proof. The non-elementary rules are below (the rule ⊃ *Introduction* is a derived rule):

v Elimination

$$\frac{\vdash/\llcorner[A \text{ v } B] \qquad \begin{matrix}\{\llcorner A\}\\[1ex] \llcorner C\end{matrix} \qquad \begin{matrix}\{\llcorner B\}\\[1ex] \llcorner C\end{matrix}}{\vdash/\llcorner C}$$

⊃ Introduction

$$\frac{\begin{matrix}\{\llcorner A\}\\[1ex] \llcorner B\end{matrix}}{\vdash/\llcorner[A \supset B]}$$

If the only hypotheses for these inference figures are those shown in braces, then the conclusion is an assertion; otherwise, it is a supposition.

The following proof:

$$\dfrac{\dfrac{\dfrac{\overset{x}{\llcorner A} \quad \llcorner B}{\llcorner[A \,\&\, B]}\ \&I}{\llcorner B}\ \&E}{\llcorner[A \supset B]}\ \supset I, \textit{ cancel `}\llcorner A\textit{'}$$

establishes that supposing *B* to be true will commit a person (commits the designated subject) to supposing ‘*[A ⊃ B]*’ to be true. An ‘*x*’ is placed above cancelled hypotheses. In this proof:

$$\dfrac{\dfrac{\dfrac{\overset{x}{\llcorner A} \quad \vdash B}{\llcorner[A \,\&\, B]}\ \&I}{\llcorner B}\ \&E}{\vdash[A \supset B]}\ \supset I, \textit{ cancel `}\llcorner A\textit{'}$$

the conclusion is an assertion, because all hypotheses in the sub-proof leading to ‘$\llcorner B$’ are cancelled.

There are so far no rules involving either the negative force operators or the negation sign. I regard denial, and negative supposition, as more fundamental than, and logically prior to, negation. So I will first provide rules that characterize the negative illocutionary operators, and then base rules for negation on the illocutionary operators. We understand an explicit contradiction to involve two sentences *A*, *~A* (or the statements that they represent), and most systems of standard logic with rules *~ Introduction* or *~ Elimination* require explicit contradictions in order to “take back” the hypothesis of a sub-proof. In a system of illocutionary logic, positive and negative illocutionary acts are “at odds” with one another, and these will provide the basis for "taking back" a hypothesis. The rules for negative force operators are the following:

Negative Force Introduction

$$\dfrac{\begin{array}{cc}\{\llcorner A\} & \\ \llcorner B & \dashv/\neg\, B\end{array}}{\dashv/\neg\, A} \qquad \dfrac{\begin{array}{cc} & \{\llcorner A\} \\ \vdash/\llcorner\, B & \neg B\end{array}}{\dashv/\neg\, A} \qquad \dfrac{\begin{array}{cc}\{\llcorner A\} & \{\llcorner A\} \\ \llcorner B & \neg B\end{array}}{\dashv/\neg\, A}$$

The conclusion is a denial if the only uncanceled hypothesis above the line is the hypothesis in braces; otherwise, the conclusion is a supposition.

¬ Elimination

$$\dfrac{\begin{array}{cc}\{\neg A\} & \\ \llcorner B & \dashv/\neg\, B\end{array}}{\vdash/\llcorner\, A} \qquad \dfrac{\begin{array}{cc} & \{\neg A\} \\ \vdash/\llcorner\, B & \neg B\end{array}}{\vdash/\llcorner\, A} \qquad \dfrac{\begin{array}{cc}\{\neg A\} & \{\neg A\} \\ \llcorner B & \neg B\end{array}}{\vdash/\llcorner\, A}$$

The conclusion is an assertion if the only uncanceled hypothesis above the line is the hypothesis in braces; otherwise, the conclusion is a supposition.

The principle ¬ *Elimination* is understood in such a way that the following is an instance of the principle:

$$\dfrac{\neg A \qquad \vdash/\llcorner\, B \qquad \dashv/\neg B}{\vdash/\llcorner A}$$

The rules linking the negation sign to the negative force operators have a definitional character, for these rules provide a complete inferential characterization of negation.

~ Elimination

$$\dfrac{\vdash/\llcorner{\sim}A}{\dashv/\neg A}$$

The conclusion is a denial iff the premiss is an assertion

~ Introduction

$$\dfrac{\dashv/\neg A}{\vdash/\llcorner{\sim}A}$$

The conclusion is an assertion iff the premiss is a denial

The following proof illustrates some of these rules.

```
                                          x
                                         ¬A
                                       -------- ~I
                      ¬~A              ⌞~A
                    ------------------------ ¬E, cancel '¬A'
                                ⌞A
                          ------------- vI                    x
                          ⌞[A v ~A]                      ¬[A v ~A]
                    ------------------------------------------------- ¬E, cancel '¬~A'
                                        ⌞~A
          x                         ------------- vI
¬[A v ~A]                          ⌞[A v ~A]
------------------------------------------ ¬E, cancel '¬[A v ~A]'
                    ⊦[A v ~A]
```

The conclusion is an assertion, because all hypotheses are cancelled. In the last move in this proof, two occurrences of the hypothesis '*¬[A v ~A]*' are cancelled.

The system *S* is a pretty standard system of propositional logic, except for the illocutionary force operators. This system helps make clear how considerations of force affect the correctness of arguments. Arguments are correct or not, in senses that will be explained below. Its being truth preserving won't guarantee the correctness of an argument; for the force of the conclusion must not exceed what the premiss acts authorize.

It is important to understand that proofs in the deductive system are to be made by the designated subject–we are merely onlookers. Although it is actually us who are constructing the proofs, we are doing this "on her behalf." (On the other hand, we can place ourselves in the role of the designated subject, and construct arguments for ourselves.)

3. TWO SEMANTIC LEVELS   It is to some extent arbitrary where we draw the line around the field to be called *semantics*. Semantics might, for example, be limited to the truth conditions of statements, or it might be the study of the meanings conventionally associated with expressions. I conceive semantics more broadly, although as I conceive it, semantics includes the study of the truth conditions of statements, and also the study of meanings conventionally associated with expressions.

My goal is to understand language and our use of language, so that I can understand what topics and issues belong together, and can further understand how they fit together. To this end, I am trying to develop and deploy concepts that "carve nature at its joints," and to use these concepts in investigating illocutionary logic. With topics that fit together, we can use similar techniques to explore them. The two semantic levels associated with an illocutionary system of logic are both concerned with meanings intended by language users, and in studying these levels we can employ functions that assign things to expressions in the logical language.

In developing a semantic account for the logical language, we think of the sentences in L as representing specific statements of some natural language (they represent statement kinds, or types, that can be repeated, and can be made by different people). The meanings of these statements, together with the way the world is, determine which statements are true and which are false. The semantic functions that we employ don't give the meanings of statements (or sentences), but reflect the way things might turn out, given the actual meanings of statements in the language.

The first-level semantic treatment of the language L is entirely familiar. *Interpreting functions* assign truth and falsity to atomic plain sentences of the language, and each of these functions determines a valuation of the plain sentences of L in a standard way. A set X of plain sentences of L *implies* a plain sentence A iff there is no interpreting function of L for which all sentences in X are true but A is false. A set X of plain sentences is (*semantically*) *consistent* iff there is an interpreting function of L for which all sentences in X are true.

The second-level semantic account is for completed sentences of L, and should deal with semantic features of these sentences in a way analogous to that in which the first-level account deals with truth and truth conditions. An assertion or a denial or a supposition isn't true or false, except in some derivative sense. But the designated subject, or any of us, will be *committed* at a time to accept or reject certain statements, or to suppose them true or suppose them false. We can develop the second-level account for the designated subject at some particular time. It is convenient to focus on either knowledge or (justified) belief. At the time in question, there are some statements that the designated subject has actually considered and accepted, which she continues to accept, and some statements she has considered and rejected, which she continues to reject. If she has accepted the statements with the force of knowledge claims and rejected them with an analogous force, her acceptings and rejectings constitute her *explicit knowledge*; otherwise they are her *explicit beliefs* and *disbeliefs.* These acts commit her at that time to accept some further statements and to reject still others.

If the designated subject has already accepted A, and hasn't forgotten or changed her mind, she is committed to perform: $\vdash A$, and if she hasn't yet accepted A but is committed to do so, then she is also committed to perform '$\vdash A$.' If we use the symbol '+' for the value of assertions and denials (completed sentences '$\vdash A$' and '$\dashv B$') which the designated subject is committed at that time to "perform," then a *commitment valuation* will be a function which assigns + to some assertions and denials of L.

Commitment and truth have important relations to one another. A commitment valuation V is *based on* an interpreting function f iff the function makes true those statements whose assertions have value +, and makes false those statements whose denials have value +. That is,

(i) if $V(\vdash A) = +$, then $f(A) = T$, and (ii) if $V(\dashv A) = +$, then $f(A) = F$. If V registers the knowledge (or the belief) of the designated subject at a time, and V is based on f, then f is one way the world might be, given what the designated subject knows, or believes.

A *coherent* commitment valuation is one based on an interpreting function. If commitment valuation V is based on interpreting function f, then $<f, V>$ is a *coherent pair*.

Since sentences of L represent specific statements, the meanings of those statements, or some aspects of their meanings, may determine that some interpreting functions aren't appropriate. For example, if distinct sentences A, B represent statements with the same meaning, then an interpreting function which assigns T to A and F to B won't be appropriate. So we might limit our attention to a class W of *admissible* interpreting functions. It isn't helpful to think of admissible interpreting functions as being, or determining, possible worlds. For an interpreting function which would count as the actual world plays no role in our semantic treatment. Admissible interpreting functions are different ways that the actual world might turn out to be, given the meanings of statements in the language. (An analytic statement is one true for every admissible interpreting function.)

If a coherent valuation V_0 registers the designated subject's explicit knowledge or belief at a time, there will be some sentences that are true for every (admissible) interpreting function on which V_0 is based, and others which are false for every such function. We anticipate that the designated subject will be committed to accept those statements that always come out true, and to reject the ones that must be false. We will say that the valuation V which assigns + to all the assertions and denials which the designated subject is committed to perform is the *completion* of V_0.

The "idea" of rational commitment is better conveyed by our deductive system than by commitment valuations. In fact, our treatment of commitment valuations involves what is initially a conjecture: that, given her explicit knowledge (or belief) at a given moment, the designated subject is committed to accept those statements which always come out true for the interpreting functions upon which her explicit knowledge is based, and is committed to reject those which always come out false. We need to establish a completeness result for our deductive system to support this conjecture. There is no requirement that a semantic account deliver the intuitive meaning of a concept like rational commitment. It is sufficient that the account employ functions with respect to which we can show our evidently correct deductive practice to be both sound and complete.

Commitment valuations don't award values to suppositions, because suppositions come and go too quickly. We often introduce a supposition in the course of an argument and discharge that supposition before the argument is finished. Assertions and denials, at least for an idealized person, have more permanence. To explain second-level counterparts to implication and (semantic) consistency, we introduce a concept of *satisfaction*. Satisfaction involves both truth and commitment, although commitment itself respects truth conditions.

A coherent commitment valuation *satisfies* those assertions and denials which have value + for its completion. An interpreting function f *satisfies* a positive supposition $\llcorner A$ iff A is true for the valuation determined by f, and it *satisfies* a negative supposition $\neg A$ iff A is false for that valuation. Finally, a coherent pair $<f, V>$ *satisfies a completed sentence* B iff (i) B is an assertion or denial, and V satisfies B, or (ii) B is a supposition, and f satisfies B.

With this conceptual apparatus, we can define illocutionary counterparts to implication and (semantic) consistency:

Let X be a set of completed sentences of L and A be a completed sentence of L. Then X *logically requires* A and A is a *commitment consequence of* X iff (i) A is an assertion or denial and every coherent pair that satisfies the assertions and denials in X also satisfies A, or (ii) A is a supposition and every coherent pair that satisfies all the sentences in X also satisfies A.

A set X of completed sentences is *coherent* iff there is a coherent pair which satisfies every sentence in X.

The definition of logical requiring has two clauses, because suppositions make no demands on assertions and denials. The set $X = \{\llcorner A, \neg A, \dashv B\}$ logically requires the positive and the negative supposition of every plain sentence, but it is only the denial of B which leads to further assertions and denials.

A second-level deductive system in an illocutionary logical theory enables us to derive the commitment consequences of initial assertions, denials, and suppositions. It is a straightforward matter to develop these systems, and to establish that they are sound and complete in suitable senses. I will sketch soundness and completeness results without filling in many details.

To establish these results, we need some preliminary definitions.

An *inference figure* in the deductive system S is an instance of one of the rules.

The *rank* of a proof/deduction in the system S is the number of inference figures in that proof (this is the number of "moves" in the proof). The minimum rank is 0. (A completed sentence standing alone is a proof of rank 0; it is a proof of that sentence, either from no hypotheses if the sentence is an assertion or denial, or from itself, if the sentence is a supposition.)

Lemma 3.1 Let Γ be a proof in S from (uncanceled) initial sentences $A_1,\ldots, A_n$ to conclusion B. Let f be an interpreting function of L and V_0 be a commitment valuation based on f such that each initial sentence is satisfied by the coherent pair $< f, V_0 >$. Then B is satisfied by $< f, V_0 >$.

This is proved by induction on the rank of Γ.

Theorem 3.2 (Soundness) Let Γ be a proof in *S* from initial sentences $A_1,..., A_n$ to conclusion *B*. Then $A_1,..., A_n$ logically require *B*.

It was evident to begin with that the deductive system is correct. Establishing that the system is sound provides more support for the semantic account than for the deductive system.

To establish the completeness of *S*, we will consider sets of completed sentences of L.

In ordinary speech, 'consistent' is used for a semantic idea, and I am using it that way here. With respect to language acts, consistency concerns truth conditions independently of illocutionary force. Consistency characterizes (or doesn't) statements considered apart from illocutionary force, and characterizes plain sentences of L_1. The epistemic concept which is a counterpart to consistency is *coherence*. If *A* is inconsistent with *B*, then accepting *A* ($\vdash A$) and accepting *B* ($\vdash B$) are acts which are *incoherent* with each other. Accepting *A* ($\vdash A$) and supposing *B* ($\llcorner B$), or supposing both ($\llcorner A$, $\llcorner B$) are also incoherent. And acts which lead to incoherence are incoherent. Acts are *coherent* if they aren't incoherent. This usage of 'coherent' and 'incoherent' "fits" our definition of 'coherent commitment valuation.' If V_0 is a coherent commitment valuation, then it is coherent to accept the sentences (statements) assigned + by V_0.

It is never correct or appropriate to make incoherent assertions. If $\vdash A$ is incoherent with $\vdash B$, and a person finds herself committed to both $\vdash A$, $\vdash B$, then she needs to modify her beliefs so that she is no longer committed to accept both *A* and *B*. However, it is legitimate to make incoherent suppositions. That is the very "idea" behind the inference principles *Negative Force Introduction* and ¬ *Elimination*. (It is the idea behind *reductio ad absurdum*.)

To provide a completeness proof for *S*, we will introduce a concept of *deductive* coherence for sets of completed sentences of *L*.

Let *X* be a set of completed sentences of *L*. *X* is *deductively coherent with respect to S* iff there is no plain sentence *A* of *L* such that both $\llcorner A$ and $\neg A$ can be deduced in *S* from premisses in *X*.

We identify deductive coherence and incoherence with respect to suppositions. If we can deduce both $\vdash A$ and $\dashv A$ from a set of sentences, then we can also deduce $\llcorner A$ and $\neg A$ from that set. But if we can derive both $\llcorner B$ and $\neg B$ from a set of sentences, we may not be able to derive $\vdash B$ and $\dashv B$. Incoherent suppositions don't by themselves commit us to incoherent assertions.

Let *X* be a set of completed sentences of *L*. *X* is *maximally deductively coherent with respect to S* iff *X* is deductively coherent with respect to *S*, and for every plain sentence *A* of *L*, either $\llcorner A \in X$ or $X \cup \{\llcorner A\}$ is not deductively coherent with respect to *S*.

Theorem 3.3 Let X be a set of completed sentences of L that is deductively coherent with respect to S. Then X can be extended to a set Y that is maximally deductively coherent with respect to S.

Theorem 3.4 Let Y be a set of completed sentences of L that is maximally deductively coherent with respect to S. Let A, B be plain sentences of L. Then (a) $\llcorner{\sim}A \in Y$ iff $\llcorner A \notin Y$ iff $\neg A \in X$; (b) $\llcorner[A \,\&\, B] \in Y$ iff $\llcorner A \in Y$ and $\llcorner B \in Y$; (c) $\llcorner[A \vee B] \in Y$ iff either $\llcorner A \in Y$ or $\llcorner B \in Y$.

Let X be a set of completed sentences of L that is deductively coherent with respect to S. Let X be extended to a set Y that is maximally deductively coherent with respect to S.

Let f be a function which assigns T to every plain atomic sentence A of L such that $\llcorner A \in Y$, and assigns F to the remaining (plain) atomic sentences. Let V_0 be a function which assigns + to every assertion or denial A of L such that $A \in Y$.

Lemma 3.5 The function f is an interpreting function of L such that for every plain sentence A of L, $\llcorner A \in Y$ iff $f(A) = \mathrm{T}$ (and $\neg A \in Y$ iff $f(A) = \mathrm{F}$).

Lemma 3.6 The function V_0 is a commitment valuation of L that is based on f.

Theorem 3.7 Let X be a set of completed sentences of L that is deductively coherent with respect to S. Then there is a coherent pair $< f, V_0 >$ for L which satisfies every sentence in X.

Theorem 3.8 (Completeness) Let X be a set of completed sentences of L and A be a completed sentence of L such that X logically requires A. Then there is a proof of A in S from premisses in X.

Proof If A is $\llcorner A_1$ (or $\neg A_1$), the argument is completely standard.

Suppose A is $\vdash A_1$. And suppose that A is not deducible in S from premisses in X. Let $|X|$ be the subset of X whose members are the assertions and denials in X. Then $|X|$ logically requires A.

Then $|X| \cup \{\neg A_1\}$ is deductively coherent with respect to S. For suppose it is not deductively coherent. Then there are assertions $\vdash B_1, \ldots, \vdash B_m$ in $|X|$ and a plain sentence C such that both $\llcorner C$, $\neg C$ are deducible in S from $\vdash B_1, \ldots, \vdash B_m, \neg A_1$. But then $\vdash A_1$ is deducible in S from $\vdash B_1, \ldots, \vdash B_m$. By hypothesis, there is no such deduction.

By *Theorem 3.7*, there is a coherent pair $< f, V_0 >$ which satisfies the sentences in $|X| \cup \{\neg A_1\}$. This pair satisfies $\neg A_1$, so it does not satisfy $\llcorner A_1$. But this pair cannot satisfy $\vdash A_1$, for V_0 is based on f, and so is the commitment valuation V which is the completion of V_0. This is impossible. Hence A is deducible in S from premisses in X.

That *S* is sound and complete shows, for this system, that the commitment associated with logical form adequately tracks or traces the truth-conditional consequences of knowledge, or of coherent beliefs and disbeliefs.

Systems of illocutionary logic are useful for representing, and understanding, what people are doing when they say things, and when they construct arguments or proofs. These systems provide the resources for solving, or resolving, a number of puzzles concerning language. For example, if '***B***' is a *belief* operator for the designated subject, so that '***B****(A)*' is true iff the designated subject (explicitly) believes *A* at this moment, then a sentence '*[A & ~**B**(A)]*' will be consistent, but its assertion '$\vdash$*[A & ~**B**(A)]*' will be incoherent for the designated subject to perform. This both explains, and dissolves, Moore's Paradox. And if '***K***' is a *knowledge* operator, so that '***K****(A)*' is true iff the designated subject knows *A* (at this moment), then a sentence '*[A & ~**K**(A)]*' can be true, but the designated subject can't know it (at this moment). The assertion '$\vdash$*[A & ~**K**(A)]*' is incoherent for the designated subject to perform with the force of a knowledge claim. This is sometimes regarded as a paradox, or puzzle, but there is nothing paradoxical about it.

4. RECONCEIVING STUDIES OF LANGUAGE A system of illocutionary logic is developed in order to help us understand and explain our practice of using language to perform a variety of illocutionary acts, and our practice of constructing deductive arguments. An adequate account of these practices must accommodate both truth and commitment, and systems of illocutionary logic are equipped to do this. These systems faithfully represent realistic arguments ("natural" deductions), provide the resources for distinguishing assertions and denials from suppositions, and help us better understand indirect arguments that introduce and discharge suppositions.

The study of illocutionary acts and illocutionary force is often thought to belong to pragmatics rather than semantics. In fact, our distinction between the ontic and the epistemic levels of a theory of illocutionary logic is sometimes taken to demarcate the semantic and pragmatic dimensions of language. But in systems of illocutionary logic, the treatment of commitment and completed sentences parallels the more familiar account of truth conditions and plain sentences. There are second-level counterparts of implication and consistency which can be explored by formal techniques similar to those used to investigate truth conditional ideas.

I think it is common to regard a language as a kind of "free standing" entity composed of expressions possessing syntactic and semantic features, where the semantic features are concerned with what might be called "descriptive content." The language user simply employs items in this structure, taking advantage of their semantic features, and sometimes contributing extra features to those that are already there. For example, the language user supplies illocutionary force, she exploits the meanings she finds to achieve new meanings in cases of irony or metaphor, and on occasion manages to do other things to achieve various conversational implicatures.

From our speech act perspective, matters of meaning and force which are intentionally supplied by a language user, especially by the language user who produces the expressions she uses, fall within the area of semantics. We can distinguish customary, conventional meanings from other sorts, and semantic studies commonly focus on conventional meanings (and forces). But there is no mystery about how a language producer manages to mean what she does mean, or about how she knows what she means–it is what she intends. What needs explaining is how her addressees are able to determine what she means. I think a third study of language (in addition to syntax and semantics), which might as well be called *pragmatics*, is appropriately concerned with how meaning (including illocutionary force) is communicated, with the cues and clues that addressees use to determine what the speaker/writer intends. Actually, pragmatics should be conceived more broadly as investigating how what one says and doesn't say (as in "damning with faint praise") can serve to communicate what a speaker intends.

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