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HORN, Laurence Robert, 1945-
ON THE SEMANTIC PROPERTIES OF LOGICAL
OPERATORS IN ENGLISH.

University of California, Los Angeles, Ph.D.,
1972
Language and Literature, linguistics

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Los Angeles

ON THE SEMANTIC PROPERTIES OF LOGICAL OPERATORS IN ENGLISH

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy in Linguistics

by

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1972

The dissertation of Laurence Robert Horn is approved, and

it is acceptable in quality for publication on microfilm.

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University of California, Los Angeles

1972

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This is dedicated to the ones I love:

To J. St.-D.

and to M. O. E.,

without whom ◊ -

and to all my friends, past and present, with and without upper-bounding implicature, without whose help and understanding this dissertation might have been completed sooner, if at all.

...a disappointment to be sure, but it reminds us that the sentence itself is a man-made object, not the one we wanted of course, but still a construction of man, a structure to be treasured for its weakness, as opposed to the strength of stones.

--D. Barthelme, "The Sentence" (in City Life)

Not in this consciousness
Can I resolve the confusion of Syntax

--A. Ginsberg, "Airplane Dreams"

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ACKNOWLEDGMENTS

I would like first of all to express my gratitude to my chairman and mentor, Barbara Hall Partee, for much valuable discussion of the material to follow, much valuable criticism of it, and some valuable disagreements over it, disagreements which have led to a refinement of what I had intended to express, if not to an elimination of those disagreements themselves. Even more importantly, I am grateful to Prof. Partee for getting me started in linguistics in the first place (with what results may be discovered below).

Other members of my committee, David Kaplan and Talmy Givón, as well as Paul Schachter, were helpful to me in their criticisms of an earlier version of some of the material in Chapters 2 and 4, presented at a U.C.L.A. colloquium, and/or in helping give shape to the art of studying linguistics at U.C.L.A. I am also in the debt of several other participants at the colloquium and in later discussion, including Steve Smith and Frank Heny.

I must also thank the System Development Corporation and the U.S. Air Force for supporting me through two summers of research which were surely more helpful to me than to those organizations.

During my wanderings of the last several years (cf. vita), I have had the opportunity to pass many good hours with many good people, hours which are reflected, directly or indirectly, in the text. Among the too numerous to mention, I must single out Georgia Green, Robin Lakoff, Jim McCawley, Jerry Morgan, and Paul Neubauer during my year at Ann Arbor; Barbara Abbott, Dick Carter, Hans Herzberger, Polly Jacobson, John Lawler, and Dick Stanley at Berkeley and/or Santa Cruz, and--among countless other members of the M.I.T. linguistic community whose presence I profited from during the would-be "post-doctoral" year during which most of the concrete underpinnings of the dissertation were actually assembled--E. Wayles Browne, Jorge Hankamer, Howard Lasnik, Will Leben (who I hereby appreciate for his comments on an earlier version of this material), Emily Pope, Dave Perlmutter, and of course Haj Ross.

Additional gratitude is due to Dr. Pope for her invaluble assistance in preparing the final typed copy, to Dr. Stanley for the use of his typewriter, and to my parents, Robert and Maxine Horn, for the use of their tangible as well as their intangible support in helping the project along. I cannot speak too highly, either, of the assistance provided by my trusty Uralic informant, P. Ité.

My greatest inspiratory debt may well be assignable to George Lakoff and Lauri Karttunen who, by their work as well as their persons, helped me find the initiative I needed to undertake this study. The nature of this debt will become clear from the character of the questions which the research presented here asks and seeks to answer.

Needless to add, neither of these scholars, nor anyone else cited or omitted above is likely to approve most of what will follow, or to agree with my conclusions (or lack of same). And, in the words of the traditional disclaimer, I am not responsible for any remaining errors; all mistakes are due to someone else.

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PUBLICATIONS

HORN, LAURENCE R.

"A Presuppositional Analysis of only and even", in Binnick (et al.), eds., Papers from the Fifth Regional Meeting, Chicago Linguistic Society, Chicago, 1969.

"Ain't it hard (anymore)", in Papers from the Sixth Regional Meeting, Chicago Linguistic Society, Chicago, 1970.

"Negative Transportation: Unsafe at any speed?", in Papers from the Seventh Regional Meeting, Chicago Linguistic Society, Chicago, 1971.

ABSTRACT OF THE DISSERTATION

On the Semantic Properties of Logical Operators in English

by

Laurence Robert Horn

Doctor of Philosophy in Linguistics

University of California, Los Angeles, 1972

Professor Barbara H. Partee, Chairman

In this dissertation we attempt to define and explore the characteristics of a class of logical and sub-logical (conversational) relations which are associated with predicates and propositions of natural language.

We begin by investigating the nature of presupposition, entailment, and scalar predication, concentrating our attention on the role of conversational implicature in determining an upper bound on scalar predicates, including quantifiers, binary connectives, and modals. The methods by which presuppositions and implicatures may be suspended, and the circumstances under which such suspensions may occur, are also studied in some detail.

The similarities as well as the differences between logical and sub-logical relations are investigated, as is the relationship between implicature and "invited inference". A new category of "forced inference" is proposed to account for intuitions about degrees of infelicity of understatement.

An excursion into the history of modal logic in Chapter 2 reveals that Aristotle anticipated, to some degree, the logical and conventional treatment of the semantic properties of modals developed here, as is

the case for much of Jespersen's research into the "natural logic", as Lakoff would have it, of quantification and modality.

The intimate relationships between corresponding elements of the quantificational, modal, and deontic scales are exemplified by specific details of pattern similarities between the weak scalar values some and possible (and permitted), and between the strong scalar values all and necessary (and obligatory).

The translation of 'any' as a universal quantifier with wide scope is defended and extended in Chapter 3 to characterize the relation between any and its trigger. The two operators capable of triggering any, negation and possibility, are seen to form a class in connection with other crucial and lexical processes.

A set of constraints on contraction of modal/negative sequences is seen in Chapter 4 to be related to a general property which determines the possibility of incorporating a negative into a logical operator. A systematic asymmetry is demonstrated to hold among modal and quantificational formulae, on the basis of conversational postulates associated with the relevant operator. This asymmetry, exemplified by a wide range of data from English and other languages, is shown to result in the establishment of the tripartition, to borrow Jespersen's term, and the rejection of the quadripartite logical square as the basic geometry for modelling scalar oppositions.

CHAPTER 0

INTRODUCTION

The reader is hereby warned of possible dangers which may lurk ahead. As is gleanable from the abstract, we will be treading into certain domains to which the entrances are more clearly marked than the exits. It is to be hoped that the faithful reader, although he may balk at the unusually high ratio of facts to hypotheses, will feel compensated for his efforts the more he advances in the text. He will perhaps regard the concreteness and falsifiability of the proposals in Chapter 4 as a justified rabbit/carrot/stick model of reinforcement for his earlier efforts which culminate therein.

As is already clear, the syntax of the exposition speaks for itself, unfortunately, and can be regarded as additional confirmation, if any were needed, for the claim by an Iris Murdoch character that linguists usually cna't even write in the native language of their choice. The parable of the linguist who was (/) sentenced to death is all-too-apposite as a suggestion for an apt punishment for some of the crimes against language committed below.

The informal style characterizing much of the presentation is an attempt to fit the form to the content, which is--as we shall see--rather informal itself, and necessarily so. While much of the material is, as has been admitted, not conclusive as it stands, one can hope that the juxtaposition of trends of thought represented by as diverse figures as Aristotle, Sir William Hamilton of Edinburgh, Jespersen, Carnap, Hintikka, von Wright, and Grice should prove novel, if not instructive.

And now, the caveat lector dispensed with, let us begin. First, a key to some of the less familiar notational conventions employed hereunder:

$\forall$: universal quantifier ('All...')

$\exists$: existential quantifier ('Some....')

$\Diamond$: 'possible' (sometimes, 'able', 'permitted')

$\Box$: 'necessary' (or 'obligatory')

%S: 'S is grammatical/acceptable in some (and only some) dialects'

αS: 'S is ambiguous'

$-\alpha$S: 'S is unambiguous'

*S: 'S is ungrammatical/unacceptable'

?S: same as immediately above, but not as severe

NEG, ~: general negation markers

P & Q: 'P and Q'

P v Q: 'P or Q'

$P \vdash Q$: 'P (semantically) entails Q'

$P \gg Q$: 'P presupposes Q'

X/Y; $\left\{\begin{matrix} X \\ Y \end{matrix}\right\}$: either X or Y (can be inserted in the frame)

X *(Y) Z 'The string X Y Z is acceptable, but not the string X Z'

X (*Y) Z 'The string X Z is acceptable, but not the string X Y Z'

Onward to the jungles!

CHAPTER 1

SCALARITY AND SUSPENSION

(or, When do presuppositions bear suspenders,
...if indeed they do?)

§1.1 Presupposition

§1.11 Three-valued logics and the notion of presupposition

The origin of modern three-valued logics can be attributed to the dissatisfaction felt by many philosophers with Russell's Theory of Descriptions as a model for natural language. Russell (1905) was concerned with the occurrence of apparently denoting definite NPs, such as 'the present King of France', in contexts where the denotation "appears to be absent", e.g. in the context of 1905.

If (1.1)

(1.1) a. The present King of France is bald.
b. The present King of France is not bald.

is "about" the French King, and there is no such object for it to be about, we are enmeshed in a paradox. Assuming, as Russell does, that every sentence must be either true or false, he finds (1.1a) not nonsensical but "certainly false", in its embodiment of meaning without denotation. In fact, under this interpretation, all sentences of the form (1.2)

(1.2) C has the property θ $[= \theta(\text{the } x\text{: } Fx)]$

--where C denotes F--have the meaning of (1.3)

(1.3) One and only one term has the property F, and that one has the property θ

In this case, the meaning of (1.1a) is decomposable by the algorithm into an existentially quantified conjunction of the meanings of (1.4b,c,d), i.e. (1.4e):

(1.4) a. There is an entity x such that

b. & { x is (a) King of France,

c. There is no other entity y ($y \neq x$) which is King of France,

d. x is bald. }

e. $(\exists x)(Kx \ \& \ \sim(\exists y)(y \neq x \ \& \ Ky) \ \& \ Bx)$

The logical structure of the formula (1.4e) assures that the falsity of $(\exists x)(Kx)$ is sufficient to assign the F (false) value to the existentially quantified conjunction, and Russell's intuitions are guaranteed.

Now what of the negation of (1.1a), namely (1.1b)? This, claims Russell, is ambiguous, depending on the scope of negation. Interpreting the negation with narrow or wide scope, (1.1b) will be equivalent to (1.5a) or (1.5b), respectively:

(1.5) a. There is a unique entity which is now King of France and is not bald.

b. It is false that there is an entity which is now King of France and is bald.

(1.6) a. For some value of x, (1.4b) & (1.4c) & ~(1.4d)

b. ~(For some value of x, (1.4b) & (1.4c) & (1.4c)) ≡ For every value of x, ~(1.4b) v ~(1.4c) v ~(1.4d)

In the former case, represented by the formula in (1.6a), the sentence will be false; in the latter case, that of (1.6b), it will be true, in the semantics correponding to the actual world of 1905 (or 1972).

Reichenbach (1948), sympathetic to Russell's intuitions but altering the analysis by adopting the iota-operator for definite descriptions, comments that his solution

> has the advantage that such statements as 'the present King of France is forty years old' need not be regarded as meaningless, but are simply false, and that they can even be made true by the addition of a negation outside the scope. (p. 263)

This assessment of the "certain", "simple" falsity of (1.1a), attested by Russell in 1905 and reaffirmed by Reichenbach forty-three years later, has been rejected by a group of Oxford philosophers in the last couple of decades. Strawson (1950) agrees with Russell that (1.1a) is meaningful, but rejects the purported dichotomy resulting in every use of a meaningful sentence having to be either true or false. (1.1a) can be, and in 1905 was, used to make a statement (or assertion) which contains a reference to a non-existent individual, rendering the statement neither true nor false. Meaning is then a property of the sentence; reference and truth-value are properties of the statement the sentence is used to make. (1.1a)--or, more exactly, the sentence 'The King of France is wise.'[1]--is, for Strawson, a simple subject-predicate sentence, as its surface form indicates. (1.1a) does not assert (1.4a,b), as Russell claims, nor does it entail, in the normal sense, a uniquely existential proposition. To say (1.1a) is , however, to imply (1.4a) in "some sense of imply", a sense which constitutes a new logical relation that has since become known as presupposition. To deny the existence of the French sovereign--i.e., to negate (1.4a,b)--is, Strawson maintains, not to contradict (1.1a), but to point out that, and why, the question of its being assigned a standard truth value fails to arise.

An apparent consequence of Strawson's theory of descriptions is that a sentence like (1.7)

(1.7) The round square is round.

which Meinong considered a true proposition and Russell a false one (Russell 1905, p. 310) must now be evaluated as a sentence which, due to its analytically non-denoting description, can never be used to assert <u>either</u> a true or a false statement.

Strawson's insistence on the informality of the account of presupposition, indeed on the inadequacy of any rigorous account of the interesting phenomena of ordinary language is reflected somewhat tangentially in the writings of his collaborator and fellow Oxonian J. L. Austin. In the latter's view, it is not the speaker of an utterance like (1.8a) who 'implies' (read <u>presupposes</u>) that (1.8b) is the case, it is the proposition itself.

(1.8) a. All John's children are asleep.
a'. All John's children are not asleep. (=Not all are)
b. John has children.
b'. John does not have children.
c. Some of John's children are asleep.
c'. None of John's children are asleep.

For Austin, presupposition is a relation between propositions (Austin 1955) or between a proposition and a state of the world (Austin 1958), rather than between speaker and statement.

Presupposition differs from the classical Russellian notion of entailment, Strawson and Austin warn us, in two crucial ways. First, the contrapositive relation which holds for entailment ($p \supset q \equiv -q \supset -p$) does not hold for presupposition. In this case, (1.8a) entails (1.8c) and therefore the negation of the latter, (1.8c'), entails the negation of the former, (1.8a').[2] (1.8a) presupposes (1.8b) and, as is obvious, their negative counterparts do not bear the contrapositive relation: John's being childless does not presuppose that his non-existent children are awake. On the other hand, the negation of a sentence presupposes whatever the original sentence presupposes, but need not entail whatever the original sentence entails. (1.8a'), then, does presuppose (1.8b), but does not entail (1.8c).

If the Oxford approach to definite descriptions and their introduction of the presupposition relation conform more closely to the facts of natural language than does Russell's more elegant theory, the task remains to incorporate this approach into a formalized symbolic logic. Austin, Strawson, and their Oxford colleagues being intrinsically unsympathetic to such an endeavor constitutes an additional difficulty. As Strawson warns us, "Neither Aristotelian nor Russellian rules give the exact logic of any expression of ordinary language, for ordinary language has no exact logic."[3]

The key to the matter resides in the character of negation. It is instuctive in this light to note that Frege held the position, over a half-century earlier, that the presupposition of unique existence held for objects designated by proper names both in a sentence and its actual negation. In

Frege's example,[4]

(1.9) a. Kepler died in misery.

b. Kepler did not die in misery.

c. Kepler did not die in misery, or the name 'Kepler' has no reference.

(1.9b), like (1.9a), presupposes (in the Geach-Black translation) that Kepler existed; for this not to be the case, the presupposition-free negation of (1.9a) would have to have the disjoint form of (1.9c), rather than the simple form of (1.9b).

Strawson and Austin, like Frege, are indeed correct in insisting that negating a sentence maintains its presuppositions--under one definition of negation. But Russell too is correct, in determining that negation is ambiguous in scope (although this ambiguity may not emerge as such on the surface, as the expression of the two readings varies dialectally). To take the original case, on what we shall call the internal negation reading,[5] the presuppositions are maintained, and (1.1b) is equivalent to (1.10a):

(1.1b) The King of France is not bald.

(1.10) a. The King of France is hirsute. $(=\sim B(k))$

b. It is not true that the King of France is bald. $(=\overline{B(k)})$

We thus follow Strawson in recognizing that the internal negation of (1.1a), in a world in which France is a republic, is void of a truth value rather than, as for Russell and Reichenbach, "certainly false". On the external reading of the negation, however, Russell and Reichenbach are correct: if and when (1.1b) signifies (1.10b)--and it cannot do so for many speakers of English[6]--it is true under those same conditions.

Constructing a truth table to match these intuitions for the two forms of negation, we find the following:

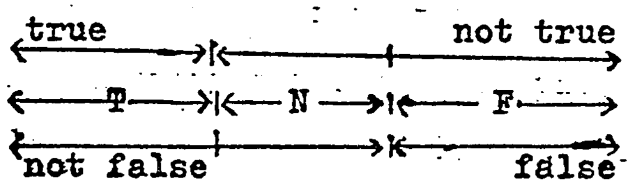
(1.11)

S	~S	$\overline{S}$
T	F	F
F	T	T
N	N	T

The external negation of any sentence S (third column) is always bivalent (either true or false); its internal negation (second column) is bivalent just in case S itself is bivalent. The third value N (for nonbivalent or neutral) corresponds to those cases in which Strawson argues that the question of truth or falsity does not arise. It will be noted that in the Aristotelian sense (to be discussed in detail in Chapter 2), internal negation is <u>contrary</u>--S and ~S can both be non-true, although they cannot both be true --while external negation is <u>contradictory</u>--$\overline{S}$ is true just in case S is not true.

We can now turn to the crucial distinction between the values <u>not true</u> (e.g. in (1.10b)) and <u>false</u> (e.g. in (1.5b)). For Strawson, working within an implicitly three-valued framework, falsity is the contrary negation of truth. The values thus correspond to the following schema:

(1.12)



Russell, in his reply to Strawson, explicitly rejects this view on the grounds that it is "more convenient to define the word "false" so that every significant sentence is either true or false",[7] i.e. by virtue of treating *true* and *false* as contradictories rather than contraries. For the linguist, this convenience is overshadowed by what Russell dismisses as the "purely verbal question".[8]

There is a further consideration: if, as seems likely for most speakers, the external negation reading is possible only under unusual stress, or when the sentence is embedded under *it is not true that* or *it is not the case that*, then we can introduce a unary logical connective *t* (for *true*) and define external negation as a secondary connective. Expanding the truth table in (1.11), we get

(1.13)

S	~S	t(S)	~t(S)	t(~S)
T	F	T	F	F
F	T	F	T	T
N	N	F	T	F

The possibility of nonbivalence is now eliminated by the connective *t*, and external negation can now be defined as

(1.14) $\bar{S} =_{df} \sim t(S)$

Note that it is also possible to define a parallel connective for falsity, based on the truth of the internal negation:

(1.14') $f(S) =_{df} t(\sim S)$

The opposition between internal and external negation can be matched by the binary connectives. Let us assume, with Frege and Bochvar (Bochvar 1938) that any sentence containing one or more variables to which a nonbivalent value has been assigned must itself receive the nonbivalent value. The table for internal disjunction, under this view of contagious nonbivalence, will then be

(1.15)

$P \vee Q$		Q: T	Q: F	Q: N
P	T	T	T	N
	F	T	F	N
	N	N	N	N

We can then define a set of secondary, external connectives as follows (cf. Smiley 1960):

(1.16) $P \mathbin{\bar{\vee}} Q =_{df} t(P) \vee t(Q)$

$P \mathbin{\bar{\&}} Q =_{df} t(P) \mathbin{\&} t(Q)$

$P \mathbin{\bar{\supset}} Q =_{df} t(P) \supset t(Q)$

It is this set of connectives which basically corresponds to the bivalent propositional logic of Russell-Whitehead's Principia since, as Smiley points out, "a sentence whose only connectives are secondary never lacks a bivalent truth value".[9]

Let us furthermore define a semantic relation, semantic entailment,[10] in the following manner:

(1.17) $P \vdash Q =_{df}$ Q is true under every assignment of truth values (i.e., in every possible world) under which P is true

Note the distinction between semantic entailment, so defined, and the secondary (external) conditional as in (1.16) above: semantic entailment refers to possible worlds and therefore fails to hold in cases like the following, due to Lauri Karttunen.

(1.18) P: Austin is not in Texas.
Q: Finns like vodka.

$$t(P) \supset t(Q) \text{ and therefore } P \ \overline{\supset}\ Q, \text{ but } {\sim}(P \vdash Q)$$

If we assign F to P and T to Q, the external condition relation is satisfied; but since these values are not so assigned in every domain (the truths in (1.18) being presumably non-analytic), P will not semantically entail Q.[11]

Contraposition fails to hold for either the secondary conditional or for semantic entailment, given that our logic is three-valued. As Smiley points out,[12]

> from the fact that $A \vdash B$ it does not follow that ${\sim}B \vdash {\sim}A$ (because A's having no truth-value [read: no bivalent truth-value] is compatible with $A \vdash B$ but not with ${\sim}B \vdash {\sim}A$).

Similarly, while the analogue of the propositional calculus inferential law of modus ponens will carry over to semantic entailment--given $P \vdash Q$ and the truth of P, we can deduce the truth of Q--its counterpart modus tollens does not--given $P \vdash Q$ and the falsity of Q, we can validly conclude only that P is not true, not that it is false.

But this is precisely the desired result. We can now define presupposition in terms of semantic entailment and internal negation:

(1.19) $P \gg Q =_{df} P \vdash Q \ \& \ {-P} \vdash Q$

The effect of a speaker's use of internal negation, then, will be to concur in the presuppositions of the sentence in question, while external negation--serving as it does to cancel all outstanding presuppositions[13]--is employed, in Smiley's happy phrase, "by someone who wishes not so much to contradict a particular assertion as to reject the ontology behind it".[14]

Presupposition, as we shall employ the term, is then a formal semantic relation between sentences (or propositions) in a three-valued logic. It is notoriously true, however, that this term has appeared in other contexts, with other senses, not only in the philosophical literature, but especially by linguists. Thus in the Kiparskys' seminal treatment of factives (Kiparsky & Kiparsky 1968), verbs like _know_ and _realize_ are claimed to "presuppose the truth of their complement". In both (1.20) and (1.21)

(1.20) John realizes that his beard has ignited.

(1.21) John doesn't realize that his beard has ignited.

the verb _realize_ would presuppose the truth of its complement, (1.22).

(1.22) John's beard has ignited.

Rather than introduce a new definition in order to countenance verbs or other predicates presupposing truth values, we shall assume this to be an informal shorthand of the usage already established. More exactly, then, (1.20) and (1.21) _presuppose_ (1.22), and that is that.

A more difficult case is the usage of linguists who, following the Strawsonian footsteps traced above, discuss presuppositions of the _speaker_ (or _hearer_) of the sentence, or of its _subject_ (or _object_)--cf., for example, Lakoff (1970a, passim). These 'presuppositions', generally concerned with the specific context of the speech act, correspond to Keenan's _pragmatic_ presuppositions (Keenan 1969). To expedite matters, we shall assume that Grice (1968) and Gordon & Lakoff (1971) are correct in treating this relation, which we can symbolize with the binary relation assume (a,S), by means of conversational rather than strictly logical postulates.

We have, to this point, refrained from discussing the notion presupposition of a question. This is, in the words of Katz & Postal (1964), "a condition that the asker of a question assumes will be accepted by anyone who tries to answer it". The matter of whether to classify such presuppositions as pragmatic will be circumvented here; we shall assume that we are dealing with a subspecies of logical (i.e. semantic) presupposition. In (1.23)

(1.23)	a.	Who saw Harry?	Someone saw Harry.
	b.	Where did Harry go?	Harry went somewhere.
	c.	When did Harry go?	Harry went at some time.
	d.	Why did Harry go?	Harry went for some reason.

each of the propositions on the right, presupposed by the question to their left, contains an indefinite adverbial expression corresponding to the question word in the question. The set of possible or appropriate responses to each of the questions in the pairs of (1.23) can then be defined as the set of permissible existential instantiations of its presupposition. A typical instantiation in the case of (1.23a) would be John saw Harry; in (1.23d), John went because he forgot his trousers.

§I.12 Suspension

Let us turn to the question of the circumstances and manner in which presuppositions may be suspended.

(1.24) a. Does the Marquis beat his wife anymore?

b. No, he doesn't beat her anymore,

{ if indeed he ever did.
 and I doubt he ever did.
 and maybe he never did.
 *and he never did. }

c. (No,) not anymore, *if indeed he ever did.

As indicated in (Horn 1970), (1.24a) presupposes the proposition expressing that the Marquis has been beating his wife in a period of time anterior to that referred to in the speech act. A simple *yes* or *no* answer to this question --stating that he is still beating her or isn't anymore-- would maintain this presupposition, while deciding the matter of whether this state of affairs has persisted into the present.

The unstarred responses in (1.24b), on the other hand, have the effect of *suspending* the presupposition, rendering it inapplicable. That this suspension differs from simple denial of presupposition is illustrated by the unacceptable continuation in (1.24b): to conjoin a sentence which presupposes S' to the straightforward (internal) negation of S' results in anomaly. If, however, we replace ...*and he never did* by the modal expression ...*and it's possible that he never did*, the acceptability of the presuppositionless sentence is redeemed.

As shown in (1.24c), to negate the adverb directly seems to reinforce the presupposition and render it immune from later suspension. This phenomenon will be discussed in greater detail in a later chapter. The facts we have observed in (1.24) hold not only for the presupposition of *anymore* sentences, but for all other adverbials (e.g. *yet*) with similar semantic structure--*mutatis* (if any) *mutandis*.

Now consider the following pair of sentences:

(1.25) a. The milk train doesn't stop here anymore, $\left\{\begin{array}{l}\text{if (indeed) it ever did.}\\ \text{and it may never have.}\end{array}\right\}$

b. *The milk train still stops here, $\left\{\begin{array}{l}\text{if (indeed) it ever did.}\\ \text{but it may have just begun.}\end{array}\right\}$

While substituting *still* in a positive sentence for its negative-polarity counterpart *anymore* leaves the presupposition constant—in this case *the milk train used to stop here*—this presupposition is suspendible only in the negative case. The same is true for the pair *already/yet*, as inspection will show (cf. Horn 1970).

This positive/negative patterning is misleading, however, for the facts are more complex. There is a dialect in which *anymore* can occur in non-polarity contexts where it is roughly equivalent to *nowadays* (although covering shorter timespans), signifying that what is asserted to be the case at present is presupposed not to have been the case at an earlier time. Speakers of this dialect range socially and geographically from Betty Grable ("Every time I smile at a man anymore the papers have me practically married to him," cited in Webster III) to D. H. Lawrence's Birkin in *Women in Love* ("Suffering bores me any more."). For discussion of this dialect, cf. Horn (1970).

Sentences with non-polarity *anymore*, and those with standard *nowadays*, will always permit suspension of their presupposition:

(1.26) a. They don't make 'em like that {anymore / nowadays}, if they ever did.

b. They always make 'em like that {%anymore / nowadays}, if there was ever a time they didn't.

c. ??They don't make 'em like they used to anymore, if they ever did.

A caveat on the above generalization is in order for cases like (1.26c), where the suspender itself is ill-formed: if, as is claimed below, the logical form of suspenders contains the (epistemic) possibility modal, then this suspender will entail the logical absurdity that -P = P is possible.

What, then, are the rules which govern the suspension of presuppositions? Let us diagram the semantic effect of suspension in the sentences (1.25a,b).

(1.27)

STILL (1.25b)	ASSERTION[15] S at t_o	PRESUPPOSITION S at t_k: $k<0$
before suspension	+	+
after suspension	+	$\propto$
ANYMORE (1.25a)		
before suspension	-	+
after suspension	-	$\propto$

The effect of the uncertainty of whether S (i.e. <u>The milk stops here</u>) holds at t_k induced by lifting the presupposition of (1.25b) and (1.25a) is, in the former case, to introduce a hedge which opens the possibility of the truth value of the statement of S at t_k (the reference time of the presupposition) and the statement of S at t_o (the reference time of the assertion) <u>differing</u> in polarity; in the latter case, it is to introduce the possibility of these truth values becoming <u>identical</u> in polarity. As the truth value of the presupposition of nowadays sentences (or minority-dialect any-more sentences) is always the reverse in polarity from that of the sentence as a whole (or, strictly speaking, from the assertion), suspension of this presupposition will always lead to a lessened disparity of values and is hence permissible, as in (1.26a,b).

Consider some further examples:

(1.28) a. Only John loves Arthur, { if even he does. / *and even he doesn't. / and even he may not. }

a'. I have only three friends, { if (I even have) that many. / if that. / *and I don't even have that many. / and maybe not even that many. }

b. *Even John loves Arthur, { if only he does. / but he may be the only one. }

c. *John is here { too, / as well, } { if anybody else is. / but he may be the only one. }

d. John didn't do it again, if he ever did it { in the first place. / at all. }

e. *John did it again, { if he ever did it before. / but it may have been the first time. }

f. Nobody but Nixon is worthy of contempt, and possibly even he isn't, either.

g. Everybody but Nixon is worthy of salvation, and possibly even he is, too.

To handle these cases, let us begin with the proposal that, when dealing with presuppositions involving quantifiers, a presupposition may be suspended only if the resulting sentence may be true in a wider range of cases than is the initial sentence with its presupposition intact. Presuppositions, in other words, are suspended only in the direction of increased universality, not in the direction of an increased hedge. Thus the negative sentences in (1.24a), (1.25a), and (1.26a) may become absolute negatives by suspension of their positive presuppositions, while the positive (1.26b) becomes more positive by the suspension of its negative presupposition.

This principle clearly extends to the but cases of (1.28f,g): if the but clause constitutes a presupposed exception to an asserted universal statement--as the medieval logician Peter of Spain puts it, "Every exception occurs in relation to a quantitative whole or in relation to a term with a universal sign attached"[16]--then the withdrawal of this presupposition would reinforce the universality, and is hence allowed, as with nowadays.

A familiar illustration of this "possible exception" suspension is in the epigram in (1.29a), whose earliest attested version, which Bartlett attributes to "an unidentified Quaker speaking to his wife", is given in (1.29b):

(1.29) a. Everybody's crazy except me and you, and sometimes I wonder about you.

b. All the world is queer save me and thee, and sometimes I think thee is a little queer.

How, then, to explain the fact of the only, even, and too sentences of (1.28a,b,c)? From what aspect of the logical structure of these surface adverbs does it follow that the suspensions in the only sentences, and only those, are permitted?

The analysis of only sentences as originating in conjunctions (so that Only John loves Arthur would derive semantically from--or be interpreted as--John loves Arthur and nothing (i.e. nobody) that isn't John loves Arthur), a position adopted by Kuroda (1966), Lakoff (1968), and other linguists, can be traced back at least as far as to Peter of Spain. In his Summulae Logicales, Peter proposes "expounding" such "exclusive signs" as only, merely, and their synonyms into

> an affirmative...proposition whose first part is that to which the exclusive sign was prefixed, and whose second part is a negative proposition denying the predicate of all others apart from the subject; thus "Only man is rational" is equivalent to "Man is rational and nothing other than man is rational."[17]

By the same token, the contradictory negation of only sentences is avowed to be the corresponding affirmative disjunction, so that "Not only man is rational" is equivalent to "Man is not rational or another than man is rational." The problem with Peter's solution is intuitively obvious, as was the case with the Russellian pre-presuppositional theory of descriptions: the conjunction analysis misrepresents the facts of natural language. The negation of "Only man is rational"--unless taken externally, which is a difficult prescription to fill when the negative marker attaches directly onto the "exponible", as in Peter's example--is associated only with the "second part" of Peter's conjunctive source. "Not only man is rational" denies not the rationality of man, but the exclusiveness of this attribution, asserting not that "man is not rational" but that "another than man is".

The same criticism applies to Peter's treatment of the synonymous "nothing but" and to the related exceptive constructions. Peter expounds <u>Every animal except man is irrational</u> into the three propositions

(1.30) a. Every animal other than man is irrational.
b. Man is an animal.
c. Man is not irrational.

It is clear that while the three propositions in (1.30) constitute the sense of the exceptive proposition as a whole, the three do not have equal status in contributing to this meaning, any more than Russell's three conjuncts which compose the sense of definite descriptions.

We shall assume the correctness of the analysis in Horn (1969), under which the proposition which reverses its polarity under internal negation, the negative proposition in the case of <u>only</u> sentences (or the universal in (1.30)), is <u>asserted</u>, and the proposition which is unaffected by internal negation (although it may be cancelled by external negation: "It's not true that only man is rational--he isn't!"), the positive conjunct of the <u>only</u> decomposition, is <u>presupposed</u>.

The presupposition cannot be directly denied, as seen in the starred version of (1.28a) and (1.28a'), or in (1.30'a) below, while the assertion cannot be either denied (as in (1.30'b)) or suspended (as in (1.30'c)), even if the result would conform to the principle of increased universality.[18]

(1.30') a. *Only Ted left, and he didn't.
b. *Only Ted left, and/but somebody else did.
c. *Only Ted left, {if indeed nobody else did. / but somebody else may have.}

The presupposition associated with _only_, differing as it does in polarity from the corresponding assertion, may however be suspended, as illustrated in (1.28a,a') or in

(1.31) Only Ted left, {if indeed he did. / and it's possible that even he didn't.}

It should be noted that sentences like

(1.32) a. (Only) Ted left, or did he?

b. Only Ted left, but (then), come to think of it, even he didn't.

should not be thought of as genuine counterexamples to the principle of immunity of assertions and presuppositions from direct denial (with no resultant inconsistency). They represent an intuitively different matter, the ability of the speaker to change his mind amidsentence, and must be considered formally as logical contradictions.

The positive presupposition of _only_ can, we have seen, be suspended in line with the universality hypothesis; the positive presupposition of _even_ and _also_ sentences (equivalent to the negation of the corresponding _only_ clause, thereby presupposing _non_uniqueness of the relevant property, as discussed in Horn 1969, 1971) cannot be suspended without _decreasing_ the cases in which, for example, _x loves Arthur_ holds, by limiting the values assignable to _x_. As shown by the judgments in (1.28), suspension is indeed impossible in these cases.

As we would expect, to negate an _only_ sentence, and to thereby reverse the polarity of the assertion, is to render the presupposition unsuspendible: *_Not only John loves_

Arthur, if even he does. Summarizing these results, we find the following configuration:

(1.33)	ASSERTION $f(x)$ is true for some $x \neq$ Ted	PRESUPPOSITION $f(x)$ is true for $x =$ Ted
ONLY Ted left (ONLY b.s.)	−	+
ONLY Ted left, if even he did (ONLY a.s.)	−	α
NOT ONLY Ted left (~ONLY b.s.)	+	+
*NOT ONLY Ted left, if even he did (~ONLY a.s.)	+	α

	ASSERTION $f(x)$ is true for $x =$ Ted	PRESUPPOSITION $f(x)$ is true for some $x \neq$ Ted
{EVEN Ted left / Ted left TOO} (EVEN/ALSO b.s.)	+	+
*{EVEN Ted left, / Ted left too,} but he may have been the only one (EVEN/ALSO a.s.)	+	α

The notion of greater universality is more problematical when we turn to the suspension of factive presuppositions, and yet the results are intuitively parallel:

(1.34) a. John doesn't realize that Sue loves him,
{if (indeed) she does.
and (in fact) she {may not. / *doesn't.}}

b. John realizes that Sue loves him,
{?if indeed she does.
*but in fact she may not.}

Assuming that the assertion of <u>realize</u> sentences is <u>be sure of</u>, we find the following chart to apply:

(1.35)	ASSERTION John is sure that Sue left	PRESUPPOSITION Sue left
REALIZE b.s.	+	+
REALIZE a.s.	+	∝
~REALIZE b.s.	-	+
~REALIZE a.s.	-	∝

Again, we see that the presupposition is suspendible just in case its suspension transforms a non-correspondence in polarity between "stripped" assertion and presupposition into a possible correspondence. This seems to be the appropriate consideration.

To concede and justify an apparent fudge: the assertion of Only Ted left was given above as a minus value for [someone other than Ted left] rather than a plus value for [no one other than Ted left]. This is a necessary concession to assure the correct result, which will ensue provided that the "assertion" and the "presupposition" being assigned values in these tables agree in the polarity of their initial logical forms. Since only, as expounded in Horn (1969), is actually a composite predicate which can be decomposed into two elements, one of which being the internal negation connective and the other an existential proposition--i.e., Only Ted left = ~[Someone in addition to Ted left]--no circularity ensues. With positive-asserting predicates like realize, no such complications are involved.

It will prove useful at this point to look at these questions from a slightly different perspective. Temporarily confining our attention to the two cases just discussed, we observe the following relationship between the truth value of a sentence and of its presupposition (S and P respectively):

(1.36) a.

	S: John realizes that Sue left		P: Sue left	
REALIZE	t(S)	&	t(P)	
~REALIZE (b.s)	~t(S)	&	t(P)	$\equiv$ t(~S)
~REALIZE (a.s)	~t(S)	&	$\Diamond$~t(P)	

b.

	S: Someone in addition to Ted left		P: Ted left	
~ONLY	t(S)	&	t(P)	
ONLY (b.s.)	~t(S)	&	t(P)	$\equiv$ t(~S)
ONLY (a.s.)	~t(S)	&	$\Diamond$~t(P)	

Note that after suspension the sentence negation must be an <u>external</u> negation, since an internal negation would allow for the logically impossible possibility of the sentence being <u>false</u> (as opposed to merely <u>not true</u>) while its presupposition is false and hence bivalent.

The following, then, is the effect of suspending a positive presupposition (as in (1.37a)) or a negative one (as in (1.37b)), where suspension is indicated by the arrow:

(1.37) a. ~t(S) & t(P) $\rightsquigarrow$ ~t(S) & $\Diamond$~t(P)

'Not only does such-and-such not hold in the assertion, but (indeed) it may not (even) hold in the presupposition.'

b. t(S) & ~t(P) $\rightsquigarrow$ t(S) & $\Diamond$t(P)

'Not only does such-and-such hold in the assertion, but (indeed) it may (even) hold in the presupposition, too.'

As the glosses indicate, we have merely formalized one sense of "in the direction of greater universality". <u>An</u> alternate reading to "not only x but possibly even y" is "at least x and possibly even y". These translations of the presupposition suspending paradigm hint at a related area of inquiry to be discussed below: the question of scalar predicates.

§1.13 Existential presuppositions and suspendibility

There is a difficulty quickly encountered upon trying to adjust the pattern we have defined to the granddaddy of all presuppositions, the "existential uniqueness", as Strawson would have it, of definite descriptions. To begin with, it is not clear how the assertion of sentences like (1.1a) is to be represented, i.e. as a negative or positive assertion.

(1.1a) The King of France is bald.

(1.38) P_1: $(\exists x)(Kx)$
P_2: $(\exists x)(\exists y)(Kx \;\&\; Ky \supset x{=}y)$
A: $(\forall x)(Kx \supset Bx)$ or $-(\exists x)(Kx \;\&\; -Bx)$

Depending on our representation, the suspension of the positive existential presupposition P_1 would be predicted to occur more freely in either the negative or affirmative version of (1.1a), whichever led to greater universality in the sense discussed. In neither case, however, does it seem that suspension would increase the universality of the assertion, in any straightforward sense. As it turns out, both versions appear (at least to me) equally weak in ability to suspend:

(1.39) a. The King of France is bald, $\left\{\begin{array}{l}\text{?if indeed there is one.}\\ \text{*but there may not be one.}\end{array}\right\}$

b. The King of France isn't bald, $\left\{\begin{array}{l}\text{?if indeed there is one.}\\ \text{*but there may not be one.}\end{array}\right\}$

The presupposition of existence is not suspendible with a

(&$\Diamond$-) clause; the different judgment with respect to the *if*-clause is due to factors to be discussed below.

An equally interesting case is that of the uniqueness presupposition P_2 (or, more strictly, the *at most 1* presupposition, uniqueness being determined by the conjunction of P_1 and P_2). This presupposition is even more clearly unsuspendible:

(1.40) a. *The King of France is bald, $\left\{\begin{array}{l}\text{if indeed there is only one.}\\ \text{but there may be several.}\end{array}\right\}$

b. *The King of France isn't bald, $\left\{\begin{array}{l}\text{if indeed there is only one.}\\ \text{but there may be several.}\end{array}\right\}$

Furthermore, P_1 and P_2 behave differently with respect to cancellation under the *t* connective. Consider the following:

(1.41) a. It is true that the King of America is a fascist.

b. It is not true that the King of America is a fascist.

c. ...America is a republic.
...there is no such entity.

d. *It is not true that the Senator of America is a fascist; there are 100 of them.

e. The King of America is a fascist.

(1.41a) does not directly presuppose the existence of an American king; it does *entail* (1.41e), which in turn presupposes the existence of such an entity. It can be shown that if $P \vdash Q$ and $Q \gg R$, then, by a relation we can call secondary presupposition, $P \gg R$. (1.41a), then, secondarily presupposes that an American king exists. The entailment, of course, does not hold for (1.41b), and thus no presupposition whatever holds between (1.41b) and this existential. (1.41b) can therefore by followed by the indirect or direct denial of the existential, as in (1.41c): this is due, we have seen, to the fact that (1.41b) constitutes the external negation of (1.41e) and hence does not share the latter's presuppositions.

But for some reason (1.41b) does share the upper-boundedness of (1.41e), if not its lower-. The external negation is not consistent with the negation of this presupposition, as shown by the anomalous (1.41d). The factors rendering this presupposition less susceptible than the existential to both suspension (1.40) and cancellation by external negation (1.41) defy my powers of explication.

There is an additional difficulty with existential presuppositions in that they can be suspended obliquely in positive sentences by denying a presupposition of selection or assumed coreference, as in (1.42) and (1.43).

(1.42) a. I {*saw / didn't see} the inhabitants of this planet, if indeed there are any.

b. I saw the inhabitants of this planet, if those rock-like things were really alive.

(1.43) a. I've {*met / never met} your brother, if indeed you have one.

b. I've met your brother, if that fellow who just left was not an impostor.

Both direct and indirect WH-questions presuppose corresponding existentially quantified propositions. Presupposition, however, may be too strong a notion for this relation, at least in the dialect of some speakers: if nobody and nothing are considered valid rather than question-begging answers to Who left? and What did you do? (as is claimed in

Pope (1972)), then it might be more profitable to view these questions as inviting an inference (in the sense discussed below), rather than presupposing, that the existential holds. Let us assume, with Katz & Postal (1964), that the presuppositional account is correct; as we shall have cause to observe, suspendibility will not be affected by the nature of the relevant relation.

The existential proposition is suspendible under negated higher verbs, whether performative (*say*, *tell*) or epistemic (*know*, *remember*), but apparently not suspendible if the higher verb is affirmative. That is to say, the existential presupposition (or inference) may be suspended just in those environments where *the hell* (and its synonyms) may occur after question words:

(1.44) a. Who $\left\{\begin{matrix}\text{the hell}\\ \text{if anyone}\end{matrix}\right\}$ left?

b. John doesn't realize what $\left\{\begin{matrix}\text{the hell}\\ \text{if anything}\end{matrix}\right\}$ is going on.

c. *John realizes what $\left\{\begin{matrix}\text{the hell}\\ \text{if anything}\end{matrix}\right\}$ is going on.

But, as with the WHell construction, suspension is not limited to overtly negative contexts, but rather to contexts in which the higher verb asserts or presupposes lack of positive knowledge, as illustrated by the following cases:

(1.45) a. I wonder who $\left\{\begin{matrix}\text{the hell}\\ \text{if anyone}\end{matrix}\right\}$ will accept your invitation.

b. I *(don't) remember who $\left\{\begin{matrix}\text{the hell}\\ \text{if anyone}\end{matrix}\right\}$ came.

c. I have(*n't) forgotten who $\left\{\begin{matrix}\text{the hell}\\ \text{if anyone}\end{matrix}\right\}$ came.

d. Jeremy $\left\{\begin{matrix}\text{*told}\\ \text{asked}\end{matrix}\right\}$ me who if anyone was coming.

e. It is $\left\{\begin{array}{l}\text{unknown}\\ \text{*significant}\end{array}\right\}$ who if anyone is coming.

f. What if anything Doris and Seymour were doing is a $\left\{\begin{array}{l}\text{mystery.}\\ \text{*surprise.}\end{array}\right\}$

It will have been observed that there is a peculiarity in these *if*-constructions. The *if* suspenders in (1.44) and (1.45) are marked by a high degree of ellipsis and by their appearance *within* the presupposition they suspend, rather than either following it or preceding the entire proposition. The characteristic of allowing such ellipsis and positioning is restricted to suspender *if*-clauses.

(1.46) a. When if ever is the iceman coming?
He's coming now $\left\{\begin{array}{l}\text{if he ever does.}\\ \text{*if ever.}\end{array}\right\}$

b. Who if anyone came?
If anyone came, John did.
*If anyone, John came.
John came, if anyone *(did).
*John if anyone came.

Evidently, normal non-suspending *if*-clauses are comparatively free in position, occurring initially or finally, but not medially within indirect questions. The verbs in these clauses are subject to replacement by the proform DO, but not to total deletion. This deletion is possible only within suspender *if*-clauses.

Notice that definite pronominalization, requiring an existence presupposition, is impossible if this presupposition has been suspended, either in direct or indirect questions:

(1.46') a. Who left, and why did he leave?
I wonder who killed Judge Crater, and why (he did so).

b. ??Who if anyone left, and why did he leave?
??I wonder who if anyone killed Judge Crater, and why (he did so).

As we would predict, those speakers for whom the questions in (1.46'a) do not carry existential presuppositions in the first place have trouble with the definite pronominalization in these sentences, even before suspension.[19]

The paradigm for the indirect question cases such as those in (1.45) must be stated along epistemic lines:

(1.47) Not only is it *(not) true that I know who is coming, it's (even) possible that no one is.

--or, more generally,

(1.47') Not only don't I know the value for x such that ...x..., there may not even be any such x.

This formula, _mutatis mutandis_, extends to the _forget_, _wonder_, and _ask_ cases, as well as to direct questions (assuming a performative analysis, or granting the sincerity condition stipulated in Gordon & Lakoff (1971) that the asker of a question be ignorant of the answer before he gets it--cf. Grice (1968)), and to sentences containing overtly negated epistemic verbs.

The recourse that we had to the epistemic in (1.47) is quite revealing, for the possibility modal appearing in the suspension paradigms is itself an epistemic rather than a strictly modal notion. By _it is possible that X_ or _it may even be the case that X_ we mean 'for all we know, X', or 'X is consistent with what we know': Hintikka's _possible_ rather than Lewis'.[20] What is possible, in this sense, is what is compatible with our knowledge (or with our uncertainty).

We see now why _if_-clauses are not always the most reliable guide to whether a presupposition can be suspended:

not all *if*-clauses have this function. There are, however, several procedures for determining whether a given *if*-clause is a suspender and can be expected to follow the principles we have outlined. Not only are position of the *if*-clause and deletability of material within it clues, as discussed, but in addition suspender *if*-clauses, unlike true antecedent-of-conditional clauses, demand negative-polarity adverbs and quantifiers:

(1.48) a. If $\left\{\begin{array}{l}\text{anyone}\\ \text{someone}\end{array}\right\}$ left, who did?

b. Who if $\left\{\begin{array}{l}\text{anyone}\\ \text{*someone}\end{array}\right\}$ left?

c. The milk train still stops here, if it $\left\{\begin{array}{l}\text{ever}\\ \text{sometimes}\end{array}\right\}$ did in the past.

d. The milk train doesn't stop here anymore, if it $\left\{\begin{array}{l}\text{ever}\\ \text{*sometimes}\end{array}\right\}$ did in the past.

Note that the positive-polarity *someone* is acceptable in the non-suspending *if*-clause of (1.48a) but not in the suspending *if*-clause of (1.48b). The *if*-clause of (1.48c) cannot suspend the presupposition associated with *still*, in line with the generality principle we have discussed; that it indeed fails to do so can be demonstrated by the fact that it cannot be replaced by the clause *and it's possible that it never did*, and by its ability to prepose (although the pronominalization must be adjusted). The parallel clause in (1.48d), however, can serve to suspend the same presupposition, in which case it is replaceable by the modal clause and is unpreposable. As we would expect, the positive-polarity adverbial *sometimes* is permissible only in the former structure.

§1.14 Entailment and suspendibility

As we have seen, suspension of presupposition is a complex matter, yet largely predictable on the basis of the principles we have defended. But what of entailment? If logical presupposition in our usage is merely two-sided semantic entailment, then one-sided, simple entailments should be suspendible under the same conditions as those governing presuppositions. Karttunen (1970a,b) has insightfully investigated several interesting classes of predicates involving various logical relations between assertion and entailment. Some members of these classes and the relations that govern them are as follows:

(1.49)

		T(matrix S)	T(complement S)
a.	IF verb (*cause*, *force*)	+	+
		-	α
b.	ONLY-IF verb (*be able*, *can*, *be possible*)	+	α
		-	-
c.	IMPLICATIVE verb (*manage*, *happen*, *bother*)	+	+
		-	-

As can be determined from the chart, any entailment of these predicates will share the polarity of the matrix sentence itself; consequently, suspension of this entailment will always result in admitting a possible *non*-agreement of these polarities, and should therefore be ruled out. This is indeed the case:

(1.50) a. *John managed to leave, but he may not have left.
*John forced Mary to come, but it's possible that she didn't.

(1.50) b. John didn't {bother / manage} to call me, but he may have done so.
John wasn't able to survive, but it's possible that he did.

The sentences of (1.50) are all contradictions, which is as it should be if our hypothesis on the form of suspensions is correct.

The classes of negative-asserting predicates corresponding to the ONLY IF and IF and ONLY IF classifications bear negative entailments which similarly cannot be suspended, as such a suspension would involve eliminating the polar identity of assertion and entailment:

(1.50') a. *John prevented Mary from leaving, {if indeed she didn't leave. / but she may have left.}
*Mary {failed / neglected} to leave, but it's possible that she left.
b. Mary didn't fail to leave, if indeed she left.

Note the difference in suspendibility between the complements of negated factive remember that (with a positive presupposition) and negated implicative remember to (with a negated entailment):

(1.51) a. I didn't remember that I had seen you, {if indeed I had. / and indeed I may not have.}
b. I didn't remember to see you, {*if indeed I {saw / didn't see} you. / ?but I may have seen you anyway.}

Substitution of forget for not remember in (1.51) leaves the judgments unaltered. It will be observed that there is, despite the divergent reults of suspension, a semantic relation between the two remembers of (1.51a,b), and that the phonological identity of these forms is not coincidental.

Specifically, propositions with remember (or forget) that presuppose a prior knowledge of the complement on the part of the subject; those with remember (or forget) to presuppose that the subject knew (s)he was supposed to perform the action referred to in the complement. Schematically, the logical relations are:

(1.52)

		Presupposition
remember_{t_i} that (x,S)	S	$\text{know}_{t_j}(x,S)$: $j < i$
forget_{t_i} that (x,S)	S	
remember_{t_i} to (x,S)	S	$\text{know}_{t_j}(x, \square(x,S,t_i))$: $j < i$
forget_{t_i} to (x,S)	~S	

$\square(x,S,t)$ in this chart indicates not strictly logical necessity but roughly that *x* is under some form of obligation at time *t* to do *S*. The parallel presuppositions of prior knowledge in (1.52) are positive in form and thus suspendible under negation of remember (or under non-negated forget) with either complementizer:

(1.53) a. Sheila {*remembered / didn't remember / forgot / *didn't forget} that she had turned out the lights, if indeed she ever knew it in the first place.

b. Sheila {*remembered / didn't remember / forgot / *didn't forget} to turn out the lights, if indeed she ever knew she was supposed to do it.

That forget does indeed make a negative assertion, like its mates in (1.50'), can be seen by its capacity to trigger negative-polarity items, as in (1.53'):

(1.53') Sheila {forgot / failed / neglected / *remembered / *wanted} to do {anything / a thing} to help Max.

Many adverbs, when asserted in a sentence, have the effect of forcing the entailment of that sentence. Thus:

(1.54) a. Millicent speaks quietly.

b. Millicent doesn't speak quietly.

c. Millicent speaks.

d. Millicent speaks {quietly / *loudly} if (she speaks) at all.

e. Millicent doesn't speak {*quietly / loudly} if (she speaks) at all.

(1.54a) semantically entails (1.54c). (1.54b) would be true, albeit misleading, in the event that Millicent is mute. The logical consistency of

(1.54') Millicent doesn't speak {quietly / loudly}; in fact she doesn't speak at all.

differentiates these adverbs from those which do involve presupposition, as in the case of <u>still</u>/<u>anymore</u>: as we have seen, presuppositions may be suspended (under appropriate conditions), but never contradicted within a consistent sentence, à la (1.54').

Taken in the light of our description of suspension, the facts of (1.54d,e) suggest that <u>quiet(ly)</u> is negative in some unexplained sense (but cf. the discussion of markedness in §2.12 below), while <u>loud(ly)</u> is not. In other words, to <u>speak quietly</u> is understood as implicitly containing an <u>only</u> or <u>barely</u> which can be deleted (or filled in) before <u>quietly</u>, but that no <u>only</u> appears before <u>loudly</u>. It is this implicit negation which permits the suspension in (1.54d), a suspension which will then resemble the classic case of <u>only</u>/<u>barely</u> <u>X</u>, <u>if</u> <u>at</u> <u>all</u>. The additional, overt negation in (1.54e) accounts for the reversal of suspension possibilities therein; cf. (*not) only...if even...

A similar paradigm is described by manner adverbials, as in (1.55) and by the if at all suspensions of the negative entailments of unlooked for in (1.56a), due to Alexander Pope, and of slowly in (1.56b), due to Samuel Johnson:

(1.55) a. Hercules will lift the rock with the greatest {*ease / difficulty} if at all.

b. Hercules will not lift the rock with {ease / *difficulty} if (he lifts it) at all.

(1.56) a. Nor fame I slight, nor for her favours call;
She comes unlooked for, if she comes at all.

b. Mere unassisted merit advances slowly, if--
what is not very common--it advances at all.

§1.2 Scalar Predicates

§1.21 Cardinal numbers

The context of these last remarks anticipates a much wider question, one to which we are now ready to address ourselves: the analysis of conversational implicature and its relevance to scalar predicates, and the relationship of these notions to the facts of suspension. We shall begin by observing the possibility of suspender clauses in the following pairs of sentences:

(1.57) a. Only 60% if not {*more / less} of the electorate will be fooled.

b. 60% if not {more / *less} of the electorate will be fooled.

(1.58) a. John has only 3 children,
{and possibly even / and indeed he may have / if not} {*more. / fewer.}

b. John has 3 children,

{and possibly even / and indeed he may have / if not} {more. / *fewer.}

The facts in (1.57) and (1.58) have a ready explanation insofar as the (a) sentences are concerned: the positive presupposition of negative-asserting *only* sentences is suspendible just in case the suspension results in admitting the possible application of an even stronger negative assertion. The (b) sentences, however, contain no corresponding item with a negative (or upper-bounding) presupposition and positive (or lower-bounding) assertion--except, perhaps, for the cardinal number itself. We can hypothesize that a cardinal number *n* determines the *assertion* of *at least n* and the *presupposition* of *at most n*. This proposal has the unfortunate disadvantage of being manifestly incorrect, however, as shown by the following:

(1.59) a. John has 3 children.
b. John doesn't have 3 children.
c. Does John have 3 children?

Given any sentence with a cardinal number, such as (1.59a), neither its negation nor its corresponding interrogative form, (1.59b,c) respectively, share the putative "presupposition" of upper-boundedness. The relationship between cardinal numbers and upper-boundedness cannot even be characterized as semantic entailment, as indicated by the logical consistency of (1.60a), as compared with the contradictory status of (1.60b):

(1.60) a. I have 3 children: in fact I have (even) more.
b. *I have only 3 children: in fact I don't (even) have that many.

Steve Smith, in observing these facts, claims an ambiguity in cardinal numbers between the senses of _at least n_ and _exactly n_ in sentences like (1.61a):[21]

(1.61) a. John has $175.
b. John has $200.
c. John doesn't have $175.

If _175_ is taken in _exactly n_ reading, (1.61a) is inconsistent with the state of the world described by (1.61b), i.e. is false if the latter is true; if it is taken in the _at least n_ reading, the two are consistent. The negation of the (a) sentence, (1.61c), is normally understood as negating the _at least_ reading, so that this negation is inconsistent with (1.61b). If the cardinal number is stressed, however, the negation in (1.61c) can be taken as external, in which case the _exactly n_ reading is possible, if not preferred. The external reading of the negation in (1.61c) is, of course, perfectly consistent with (1.61b).

The interpretation of the negation of cardinal numbers is actually a sub-case of the general interpretation of negation, as recognized by Jespersen:[22]

> _not_ means 'less than', or in other words 'between the term qualified and nothing'. Thus _not good_ means 'inferior', but does not comprise 'excellent' ...This is especially obvious if we consider the ordinary meaning of negatived numerals: He does not read three books in a year | the hill is not two hundred feet high | his income is not £200 a year...— all these expressions mean less than three, etc.
> But the same expressions may also exceptionally mean 'more than', only the word following _not_ then has to be strongly stressed..., and then the whole combination has generally to be followed by a more exact indication: his income is not _two_ hundred a year, but at least three hundred | not _once_, but two or three times, etc.

Much of the remainder of this dissertation will, in a sense, be devoted to seeking an explanation for this insight of Jespersen's into the fact that negation in general contradicts the lower bound, but not the upper bound, of numerals in particular and scalar predicates in general.

Rather than concluding, with Smith, that the two interpretations of cardinal numbers constitute a purely linguistic ambiguity, given the relevance of contextual information in deciding between the two possible interpretations and the relatedness of the phenomenon of "ambiguity" of cardinal numbers to the wider pheonomenon we shall explore, we shall attempt to explain the two interpretations in terms of rules of conversation. Grice (1968) has suggested that conversation is governed by (among others) the following two conventional maxims:

(1.62) i. Make your contribution as informative as is required.

ii. Do not make your contribution more informative than is required.

These maxims are to be taken in conjunction with the rule that transgressions of the first maxim are apt to be more consequential than transgressions of the second.[23]

In introducing John to Bill by "This is my friend John", Mary implicitly suggests--or, in Grican language, conversationally implicates--that John is not her lover (or husband). This is in keeping with (1.62i). This maxim may be overridden by (1.62ii), however, if the context does not demand that Bill know any additional information to what Mary has already provided. Indeed, it is often appropriate in a conversational situation to employ such understatement. Whether or not understatement, i.e. violation of maxim (i), constitutes an instance of misleading the listener can only be determined by the context of the conversation, extra-linguistic as well as linguistic.

Let us assume that these conversational postulates govern the interpretation of given occurrences of a cardinal number. Numbers, then, or rather sentences containing them, assert lower-boundedness--<u>at least n</u>--and given tokens of utterances containing cardinal numbers may, depending on the context, implicate upper-boundedness--<u>at most n</u>--so that the number may be interpreted as denoting an exact quantity.

Questions like (1.59c)=(1.63a) may receive two answers, apparently contradictory, depending on whether a given token of the question is or is not taken to have implicated an upper bound:

(1.63) a. Does John have three children?
b. Yes, (in fact) he has four.
c. No, he has four.

The choice between responses (1.63b) and (1.63c) is determined in accordance with contextual clues available to the respondent.

The quantitative implicature is characteristically reversed in the case of ordinal numbers, and will accordingly resemble lower-boundedness (with upper-boundedness asserted), provided that the ordinal refers to ranking rather than to number of instances. Hence the contrast between the scales implicitly referred to in (1.64a,b,c) on the one hand

and in (1.64d) on the other:

(1.64) a. Little Herbie finished $\left\{\begin{array}{l} \text{at least} \left\{\begin{array}{l}\text{third}\\ \text{no. 3}\end{array}\right\} \\ \text{third if not} \left\{\begin{array}{l}\text{second}\\ \text{*fourth}\end{array}\right\}\end{array}\right\}$ out of two hundred entries.

b. Chuck Dobson was expected to be at least the Athletics' No. 4 starter this year.
(i.e. if not No. 3; courtesy of the <u>Boston Globe</u>)

c. Dubuque is (at least) the 734th largest city in America (and it may even be the $\left\{\begin{array}{l}\text{733rd}\\ \text{*735th}\end{array}\right\}$).

d. That's (at least) the 734th time I've told you not to slam the door (and it may even be the $\left\{\begin{array}{l}\text{735th}\\ \text{*733rd}\end{array}\right\}$).

As we would predict from its negative-asserting status, insertion of <u>only</u> reverses the judgments:

(1.65) The Socialist Worker candidate is expected to finish only sixth if not $\left\{\begin{array}{l}\text{lower}\\ \text{*higher}\end{array}\right\}$ and possibly even $\left\{\begin{array}{l}\text{lower.}\\ \text{*higher.}\end{array}\right\}$

While ordinals denoting rank account for the scale reversal we observe in the above sentences, and the resultant reversal in the acceptability of the suspension of upper-bounding implicatures, we find certain instances of a similar scale reversal among cardinal values themselves, even in the absence of an overt <u>only</u>-class upper-bounding qualifier.

Such instances of scale reversal generally involve implicit (if not explicit) reference to circumstances under which the normal entailment relations of sentences with cardinal numbers are permuted, and their implicatures adjusted accordingly. Thus consider:

(1.66) a. Arnie is capable of breaking 70 on this course, if not $\left\{\begin{array}{l}65.\\ *75.\end{array}\right\}$

b. U.S. troop strength in Vietnam was down to 66,300, thus exceeding Mr. Nixon's pledge of 69,000. (L.A. Times, cited by B.H. Partee; italics mine)

c. Nixon pledged to reduce the troop strength (or ceiling) to 30,000 if not (to) $\left\{\begin{array}{l}25{,}000\\ *35{,}000\end{array}\right\}$ by January 1984.

d. Mary can live on £15 a month--and in fact she can live on (even) $\left\{\begin{array}{l}\text{less.}\\ *\text{more.}\end{array}\right\}$

e. Kipchoge can run a mile in 4 minutes, if not $\left\{\begin{array}{l}3{:}58.\\ *4{:}02.\end{array}\right\}$

These sentences feature an asserted upper bound and implicated lower bound, at least when viewed from a normal, positive-scale perspective. Alternatively, and more accurately, their asserted lower bound is a lower bound on the corresponding negative scale of quantifiers, just as is the case with only n, at most n, etc.

In any case, notice that all of these sentences involve the following paradigm of entailments:

(1.67) $\left.\begin{array}{ll}\text{a.} & F(n) \supset F(n-m)\\ \text{b.} & F(n) \not\supset F(n+m)\end{array}\right\}$ where n,m are cardinals > 0

This situation is, of course, the reverse of the normal one for cardinals: if John has three children, then it is true that he has two (although to assert the latter would mislead one's listener by virtue of the implicature violation); but if Arnold can break 70, it by no means follows that he can necessarily break 65, while it does follow that he can break 75. This is attributable to the scoring of golf, just as the scale reversal in the other examples in (1.66) is conditioned by the reference to upper-bounding implicit in <u>reduce</u>--or explicit in <u>down to</u> and <u>ceiling</u>--and by the behavior of the modal in (d) and (e). The <u>can</u>...<u>within</u> <u>n</u> construction serves to establish an upper bound, in accordance with the entailment facts: whatever you can do on £15 (or in 4 minutes) you can presumably do a little more easily given a few more shillings (or seconds), but the reverse need not hold.

Notice also that such scale-involving expressions as <u>at least</u> are interpreted in accordance with the direction of the scale:

(1.68) a. That bowler is capable of at least a 250 game. (i.e. $\Diamond$ 251)

a'. That golfer is capable of at least a round of 70. (i.e. $\Diamond$ 69)

b. Troop strength will be reduced at least by 5,000. (i.e. $\Diamond$10,000)

b'. Troop strength will be reduced at least to 30,000. (i.e. $\Diamond$ 25,000)

c. He can run at least a 5-minute mile. (i.e. $\Diamond$4:59)

c'. He can run at least a mile in 5 minutes. (i.e. $\Diamond$1.1 miles)

Observing the interrelationship of the positive vs. negative scale determination and the scope of the item which establishes the upper bound, we see that in (c), the time (but not the distance) reference is within the logical scope of the im-(or ex-)plicit <u>in</u> (=<u>within</u>); in (b), the greater the reduction (the more something is reduced <u>by</u>), the smaller the result (the less it is reduced <u>to</u>). Needless to admit, we shall refrain from pursuing the many important and fascinating (if complex) byways of these avenues of inquiry.

Returning to the question of the upper-bound implicature of cardinal numbers on positive scales, a proviso is needed to assure that the implicature will be characteristically weaker, easier to countermand, if the cardinal is "round", i.e. if the number is one which occurs freely in such approximating contexts as <u>about</u> <u>n</u>, <u>roughly</u> <u>n</u>, and the like. Thus (1.61b), with the figure <u>$200</u>, is far less likely to be taken as implicating an upper bound, <u>at</u> <u>most</u> <u>$200</u>, than would be the case if we substituted <u>$201.37</u>, just as <u>about</u> <u>200</u> is a more conventional approximation than ?<u>about</u> <u>201.37</u>. What may serve to explain this divergence is the Gricean notion of quantity as expressed by the maxims in (1.62), in particular the notion of relevancy of information suggested by these maxims.

The figure 201.37, with five significant decimal places, clearly conveys more information than does the figure 200, with only one. The provision of this additional information is presumably relevant, if the speaker is acting in good faith and violating no conventional rules. Thus, we observe the general phenomenon that the more specific and detailed the information is, the greater confidence we can have in assuming the implicature.

Another illustration of this principle is given by the following two sentences:

(1.69) a. 2 of my 5 children go to elementary school.
b. I have 2 children in elementary school.

(1.69a), as Chomsky points out,[24] implicates quite strongly an upper bound; in Chomsky's words, "one is entitled to assume that three of my children are not in elementary school". But notice that the listener in the case of (1.69b) is not equally entitled to conclude that the number of grade-school offspring of the speaker is limited to two. The addition of the upper bound or superset of the number of the speaker's children in (1.69a) must be assumed to be relevant, and thus the implicature is safer in the former case.

In general, lexicalization--or morphemicization--of cardinals strengthens their implicature. Thus, consider the following words, with incorporated number reference underlined:

(1.70) a. monochord, monologue, mononucleosis,...
unicycle, unicameral,....
two-faced, two-time(r), two-base-hit
double, double play
ambidextrous
bicycle, bilateral, bicameral, tricycle, trilateral, ...
digraph, trigraph
duo, trio, quartet, quintet,...
triple(t), quadruple(t), quintuple(t),...

b. two-name (banking term: 'bearing at least two names")
duplicate, duplicity
ambiguous
deuterocanonical ('belonging to a second or later canon')
deuterogamy ('marriage after the death of the first spouse')

The items in the (a) group reflect the general tendency and bear the sense of exactly n, n and only n: there is no overlap between doubles and triples, twin births are disjoint from triplets (if not always from each other), and a bicycle doesn't have two _or_ _more_ wheels, just two. The list of batters with two base hits in a game includes those with three; the list of batters with two-base-hits (doubles) does _not_ include those who had tripled or homered.

Exceptions to this tendency appear to be restricted to cases in which a morpheme originally meaning _two_ or _second_ is incorporated into a lexical item which is lower- but not upper-bounded. Among these exceptions are--for Webster's dialect--the entries in (1.70b). A _duplicate_ is a second _or later_ copy, an _ambiguous_ term can have more than two interpretations, and the ordinal prefix _deutero-_ appears to permit no implicature of _at most second_. The distinction between (a) and (b) classes, at least for the items with the senses of 'two' and 'second', seems largely arbitrary and must be marked for the individual exceptions.

§1.22 _Conversational implicatures and suspendibility_

Cardinal numbers are by no means the only elements which convey quantitative conversational implicatures, but are representative of scalar predicates in the larger sense. Consider the following pairs of predicates:

(1.71)	pretty--beautiful	good--excellent
	warm--hot	happy--ecstatic
	cool--cold	like--love
	intelligent--brilliant	dislike--hate

The second item of each of the above pairs somehow includes the first; as Smith (1970) points out, we can say that *beautiful* entails *at least pretty*, *hot* entails *at least warm*, and so on. But it is generally inappropriate to employ the "weaker" term from the left when the "stronger" term from the right applies as well, or--more exactly--when we *know* that the stronger applies. The use of *pretty* to describe someone, then, conversationally implicates the inappropriateness of every stronger element on the same scale, such as *beautiful*. By appending an *if*-*not* clause, as in *pretty if not beautiful*, we admit the possibility that something stronger (in the same direction) *does* hold, and the implicature, like entailments and presuppositions, can be banished to a state of animated suspension.

Note that if there were a single temperature scale ranging along the continuum *cold*-*cool*-(*lukewarm*)-*warm*-*hot*, we should expect *cool* to implicate *not warm*, just as *warm* implicates *not hot*. But this is in fact not the case, as illustrated by the paradigm of denial and suspension of the relevant implicatures:

(1.72) a. It's warm; in fact, it's hot.
It's not only warm, it's hot.
It's warm, if not hot.

b. It's cool; in fact, it's $\left\{\begin{array}{l}\text{*warm.}\\ \text{cold.}\end{array}\right\}$

It's not only cool, it's $\left\{\begin{array}{l}\text{*warm.}\\ \text{cold.}\end{array}\right\}$

It's cool, if not $\left\{\begin{array}{l}\text{*warm.}\\ \text{cold.}\end{array}\right\}$

We can say that *cold* is stronger than *cool*, and *hot* stronger than *warm*, but it is impossible to rank *cool* and *warm* on the same scale, since this single scale does not exist. *Cool* in fact asserts the negation of warm, and vice versa; like other assertions, this one is immune from suspension.

While context will usually determine the application of the upper-bound implicature of scalar predicates, several constructions have the function of either making the implicature explicit (by asserting it) or eliminating it (by contradiction or suspension). Among these constructions are the following, where P_i is relatively weaker than P_j on some scale P, so that $P_j(x)$ unidirectionally entails $P_i(x)$:

(1.73) a. (asserting the implicature)

$P_i(x)$ but not $P_j(x)$

$\left\{\begin{matrix}\text{just}\\\text{only}\end{matrix}\right\}$ $P_i(x)$ (hence, $\sim P_j(x)$ for any $P_j > P_i$)

b. (contradicting the implicature)

not $\left\{\begin{matrix}\text{just}\\\text{only}\end{matrix}\right\}$ $P_i(x)$, but $P_j(x)$ (as well)

(N.B. the but of contradiction)

$P_i(x)$ and $\left\{\begin{matrix}\text{what's more}\\\text{moreover}\\\text{in fact}\end{matrix}\right\}$ $P_j(x)$

c. (suspending the implicature)

$P_i(x)$ if not $P_j(x)$

$P_i(x)$, or even $P_j(x)$

at least $P_i(x)$ (and possibly even $P_j(x)$)

Note that P_j in these formulae must always be stronger than P_i, i.e. it must be the case that P_j semantically entails P_i but not the reverse. No suspension of the lower bound asserted by scalar predicates is ever possible (let alone cancellation, as in (1.73b)): *hot if not warm, *beautiful if not pretty, etc., despite the logical equivalence in ordinary if-not structures of P if not Q ≡

Q *if* *not* P.

The quantitative scalar relations are often signalled overtly by the morphology of these expressions:

(1.74) a. Hubert is happy; what's *more*, he's ecstatic.
       b. Eeyore isn't even happy, much *less* ecstatic.

It will be recalled that *only*, like the semantically equivalent *no more than*, can either exclude *any* other predicate (or term), or merely exclude stronger predicates on the same scale, as discussed in Horn (1969) and Smith (1970). Thus there are two possible interpretations of (1.75a):

(1.75) a. Dolores is only pretty.
       b. ....she isn't beautiful.
       c. ....she isn't intelligent.

In the absence of a relativizing context, (1.75a) is interpretable as excluding stronger predicates on the scale of *pretty*, as is indicated by the implicit continuation in (1.75b). Under some circumstances, if the relevant predicate to be excluded is recoverable from the context, either linguistic or extralinguistic, (1.75a) can be used to signify such content as that expressed by the continuation in (1.75c). The range of this intended predicate is restricted so as to prevent any weaker element of the scale (in this case, e.g. *attractive*), which is entailed by the original predicate, from being excluded.

The two senses of only--*no other than* and *no greater than*--follow from the two corresponding senses of *more*, as in *no more than* (=*only*): *other* and *greater*. Equatives, too, are susceptible of interpretation either with or without implicature. Only in the latter case can equatives trigger negative-polarity items:

(1.76) a. αJohn is as tall as Bill.

b. – αJohn is as tall as $\left\{\begin{array}{l}\text{any of his friends.}\\ \text{anyone.}\\ \text{he ever was.}\end{array}\right\}$

c. John is $\left\{\begin{array}{l}\text{at least}\\ \text{exactly}\\ \text{just}\end{array}\right\}$ as tall as Bill.

d. John is $\left\{\begin{array}{l}\text{at least}\\ {}^{*}\text{exactly}\\ {}^{*}\text{just}\end{array}\right\}$ as tall as $\left\{\begin{array}{l}\text{any of his friends.}\\ \text{anyone.}\\ \text{he ever was.}\end{array}\right\}$

While the equative in (1.76a) can be taken in either sense, with or without upper bound, the equative in (1.76b), which contains polarity items, must be read without implicature, as an equivalent to *no shorter than*. The same is true when equatives are disambiguated, as in (1.76c,d): when *as X as* is interpreted or qualified as *at least as X as*, it can command negative-polarity items; when it is interpreted or qualified as *exactly* (*just*) *as X as*, it cannot. To this extent, the presence or absence of a pragmatic feature, conversational implicature, conditions a presumably grammatical fact, the patterning of (polarity) morphemes.

It should be noted that *as X as* constructions are subsumed under the rubric of scalar predicates, as a weaker element than comparatives which are in turn weaker than superlatives:

(1.77) a. John is taller than Bill. $\Vdash$ John is (at least) as tall as Bill.

b. John is as tall as, if not taller than, Bill.

c. John is taller than Bill, and he may be $\left\{\begin{array}{l}\text{taller than any of my other friends.}\\ \text{my tallest friend.}\end{array}\right\}$

d. Not only is John as tall as Bill, he's (even) taller.

It would appear extremely unlikely that the conversational and logical phenomena relating to scalar predicates are restricted to English; indeed, we can propose a universal rule that no language contains a lexical item which can signify either *no other than* or *no lesser than*, just as no language has cardinal numbers $\{n\}$ denoting either *exactly n* or *at least n* in their general us-. In other words, it is a general fact of natural language that scalar predicates are lower-bounded by assertion and upper-bounded by implicature (if not presupposition).

While the application or not of upper-bound implicatures cannot, as we have seen, be determined from the appearance of *only* in the absence of a defining context, it is controlled in part by the position of *at least*:

(1.78) a. Dolores is at least pretty (even if she isn't $\left\{\begin{array}{l}\text{beautiful}\\ \text{*intelligent}\end{array}\right\}$).

b. At least Dolores is pretty (even if she isn't intelligent).

When *at least* immediately precedes the predicate as in (1.78a), only the scalar sense is possible: *at least* $P_i(x)$ on the scale containing P_i. If, on the other hand, *at least* is at the head of the entire proposition, as in (1.78b), and is associated with the scalar (*pretty* in (1.78b) as opposed to *Dolores*), the scalar interpretation is no longer forced, or indeed even appropriate.

To delete the subject and verb of the (superficial) protasis in *ADJ*$_1$ *if not ADJ*$_2$ constructions, the tenses in both clauses must be semantically (i.e., referentially rather than formally) identical and the *if* non-counterfactual. Deletion is therefore impossible in the following cases:

(1.79) a. Nixon will be unhappy {if he isn't victorious / *if not victorious.}

b. Nixon is always disappointed if {he isn't / *not} victorious.

c. Dolores would be desirable if {she weren't / *not} bucktoothed.

Note that in (1.79b), where the tenses are formally identical but referentially distinct, no deletion can occur.

Although *if-not* clauses cannot be understood as counterfactual, as shown by the impossibility of deletion in (1.79c), a superficially similar construction exists in which a deleted counterfactual must be understood: strings of the form *if not for NP*. Inspection shows that *if not for NP* clauses, unlike suspenders, can be preposed. The deleted subject of *if not for* clauses is not, as with both suspenders and concessives (cf. below), identical to that of the main clause, but corresponds instead to the impersonal *it* in the (b) sentences of the following pairs:

(1.80) a. Dolores {would be / *is} desirable if not for her {being bucktoothed. / buckteeth.}

b. Dolores would be desirable if it {weren't / *isn't} for her buckteeth.

(1.81) a. If not for you, I couldn't hear the robins sing.

b. {If it weren't / Were it not} for you, I couldn't hear the robins sing.

To the *if not for NP* construction in (1.81a), due to R. Zimmerman, corresponds the fuller, albeit less metrical, protases in (1.81b). It should be observed, in passing, that the NP object of subjunctive *if not for* must be either abstract (commanding or nominalizing a sentence in an $\overset{\text{NP}}{\underset{\text{S}}{|}}$ configuration) or interpretable with reference to the existence of the object it denotes: *if not for you* is understood in the same way as *if you didn't exist*. In Slavic, E. Wayles Browne has informed me, the standard locution for the *if not for* semantics is literally 'if (you) weren't'.

Even when the subject and tense of the protasis are identical to those in the apodosis, and no presupposition of counterfactuality is present, not all reduced $\underline{P_1}$ *if not* $\underline{P_2}$ strings have the function of suspending the presupposition, entailment, or implicature of P_1. This becomes clear when we contrast such pairs of sentences as (1.82a,b):

(1.82) a. Dolores is pretty, if not beautiful.

b. Dolores is pretty, if not intelligent.

c. Dolores is pretty, even if she isn't intelligent.

d. Dolores is pretty, $\left\{\begin{matrix}\text{although}\\ \text{albeit}\end{matrix}\right\}$ not intelligent.

The characteristic falling intonation on intelligent (or, more accurately, the accent on its primary-stressed syllable) in (1.82b) is obligatory in concessive clauses, including those of (1.82c,d). Suspending, non-concessive clauses bear a rising intonation on P_2, as sketched in (1.82a), evidently because the information in the protasis or second clause of such constructions, unlike that in the case of concessive clauses, represents new information and is therefore not subject to the quasi-anaphoric destressing old information receives.[25]

Like suspension _if-not_ clauses, concessive _if-not_ clauses have no paraphrase with _unless_. If

(1.83) Dolores is pretty unless she's intelligent.

manages to escape anomaly at all, it certainly fails to be equivalent to (1.82b). If such reduced concessive clauses are derived from a source in _even if_, as (1.82c), this fact will follow from the nonoccurrence of _even unless_.[26] By the same token, the concessives of (1.82d) can be regarded as similar reductions of (1.82c).

As observed in the examples of (1.48), suspending _if_ clauses accept negative-polarity items within their scope, and exclude positive-polarity items (cf. Baker (1970) for a listing of such items). The reverse is true, as we would expect by the law of double negation, in the event that the suspender contains an overt negative:

(1.84) a. He will eat the daisies soon,
b. ....if indeed he hasn't already eaten some (of them).
c. ....if indeed he hasn't eaten any (of them) yet.

Although both continuations of (1.84a) are possible, only that of (1.84b), with positive-polarity _some_ and _already_, is compatible with the reading in which the implicature of (1.84a)--_soon_ conveying the implicature _not yet_--is suspended. In the same manner, the positive-polarity adverb _downright_ appears only in suspending _if_-_not_ clauses, thus serving to disambiguate _if_-_not_ sequences. _Downright_ can therefore occur in the rising-pitch suspension of (1.82a) but not in the falling-pitch concession of (1.82b), as illustrated below:

(1.84') a. -αDolores is pretty, if not downright beáutiful.
b. *Dolores is pretty, if not downright intelligent.

Negative-polarity items have the reverse effect: _exactly_ is negatively polar in the pre-adjectival position and consequently forces the concessive reading and excludes suspension:

(1.85) a. -αDolores is pretty if not downright beautiful. (=suspension)
b. -αDolores is pretty if not exactly beautiful. (=concession)
c. Dolores is (*not) downright beautiful.
d. Dolores is *(not) exactly beautiful.

These coöccurrence facts, relating the interpretation of (1.85a,b) to the behavior of the adverbs _downright_ and _exactly_ under negation in simple sentences as shown in (1.85c,d), are not exactly arbitrary, any more than the diambiguation provided by the differing intonation contours in (1.82a,b), but are bound up with the semantics of suspension and concession.

Suspension allows for the possibility of something "stronger" holding. Specifically, (1.85a) explicitly admits the possibility that (for all we know) Dolores _may_ be beautiful (as well as asserting that she is pretty). A positive-polarity modifier is thus appropriate.

Concessives allow for the reverse possibility: they concede at least the possibility (if not the fact) that nothing "stronger" does hold. (1.85b) suggests that Dolores may <u>not</u> be beautiful (while asserting, like (1.85a), that she is pretty). A negative-polarity modifier is correspondingly appropriate.

A further distinction between the two types of <u>if-not</u> clauses reflected in grammatical patterning is that concessives, unlike suspenders, can prepose:

(1.86) a. {If not beautiful,
b. (Even) if she isn't beautiful,}

Dolores is (nevertheless) happy.

While the range of the predicate P_2 which (or the negation of which) is being conceded is freer than the range of the corresponding predicate in a suspension clause (in which case P_2 is restricted to predicates which entail P_1, as <u>beautiful</u> entails <u>pretty</u>), this relative freedom is not without its limits. These limits are imposed, however, not by the facts of logical entailment, but by conversational factors, including the assumptions and beliefs of the speaker and hearer. It is the correlation of beauty with happiness, intelligence, and neatness as good (if not causally related) qualities which renders the concessives in (1.87a) rather normal and those of (1.87b) rather bizarre:

(1.87) a. She is beautiful, if not exactly {happy. / intelligent. / neat.}

b. ?She is beautiful, if not exactly {miserable. / stupid. / sloppy.}

Intuitively, concessive <u>if-not</u> clauses seem to have a constituent structure similar to that of genuine conditionals:

X if (not-Y) , where Y can contain negative polarity items within the scope of the negation. The negation itself is in fact incorporable into the lexical item Y:

(1.88) a. Sam is {intelligent, if not attractive. / attractive, if not intelligent.}

b. Sam is {intelligent, if unattractive. / attractive, if unintelligent.}

The lexicalization of the negative in the (b) sentences leaves the concessive force of the protasis unaffected.

The *if-not* of suspenders, however, if indeed derived from as well as semantically equivalent to the epistemic formula *and it is even possible that*, will be seen to form a unit unto itself: X (if-not) Y , a unit which significantly is replaceable by *or even* (e.g. *pretty or even beautiful*). Polarity items needing a commanding NEG are thus excluded from Y. Furthermore, since lexical incorporation of the negative requires an available constituent (not-Y), such incorporation is impossible within suspenders.

(1.89) a. αexcellent if not perfect
αpossible if not probable
αacceptable if not attractive
αsome...if not many

b. $-\alpha$excellent if imperfect
$-\alpha$possible if improbable
$-\alpha$acceptable if unattractive
$-\alpha$some...if few

The (a) examples in (1.89) are fully ambiguous (in written form) between concession and suspension readings, with only intonation as a distinguishing clue. Those of (1.89b), on the other hand, in which negative incorporation has applied, are interpretable only as concessives.

The following random sampler of scalar predicates with suspended implicatures has been gleaned from the mass media:

(1.90) (George Jackson's) jailers condone racial prejudice, if they don't promote it.

...glossed over if not entirely overlooked...

...satisfied, if not pleased...

...unusual, if not unprecedented...

...lukewarm if not downright unsympathetic...

The last example seems to provide evidence for positioning *lukewarm* as a weak element on the scale of *cool*-*cold* rather than on that of *warm*-*hot*. We notice, for example, that a parallel attempt to suspend a *warm*-scale implicature of *lukewarm* fails utterly: **lukewarm if not* (*downright*) *friendly*.

Further verification for this hypothesis is possible. To modify a scalar predicate P by *too* does not permit the assumption that P(x) itself holds: *too* $P(x) \nvdash P(x)$. We can say without any inconsistency "It's cold out but it's too warm for skiing." But *too* *P(x)* does stipulate that a weaker point on the relevant scale should hold for argument *x* than actually does. If it is too warm out, it *should* (for some purpose specified or deducible from the context) be less warm. Furthermore, it follows from it being too warm out that, *a fortiori*, it is too hot out. The difference between *too warm* and *too hot* is indeed marginal, if any.

In this light, consider the interpretation of

(1.91) a. Bill's greeting was too lukewarm.
b. The water was too lukewarm.

If *too lukewarm* means too far along the scale on which *lukewarm* appears, then *lukewarm* must be on the scale of *cool*-*cold*, since *too lukewarm* in both its figurative (1.91a) and literal

(1.91b) senses corresponds to <u>too cool</u> and not to <u>too warm</u>. The following correlations can be established:

(1.92) too {cool / lukewarm}	≃	not warm enough	
too warm	≃	not cool enough	
{cool / lukewarm} enough	≃	not too warm	(where <u>too</u> = <u>excessively</u> and is not a negative-polarity item)
warm enough	≃	not too cool	

<u>Too</u> $\underline{P_i(x)}$ never has the sense of <u>not</u> $\underline{P_j(x)}$ <u>enough</u>, where $P_j(x) \vdash P_i(x)$.

These observations hold for what appears to be the majority dialect of English speakers, but there does exist a significant dialect in which <u>too lukewarm</u> can also signify <u>not cool enough</u>, as in "The water is too lukewarm to drink." For this class of speakers, <u>lukewarm</u> apparently figures as a weak element on the <u>warm-hot</u> scale as well as on the complementary scale. The above discussion applies directly, needless to say, to the semantically identical <u>tepid</u>.

§1.23 <u>Temporal scales</u>

Not only adjectives and verbs form predicate scales with the characteristics of suspension and entailment we have observed, but adverbs as well. There is, for example, a set of entailments defining degree of woundedness, and a corresponding set of suspendible implicatures:

(1.93) {mortally / fatally} wounded $\vdash$ (at least) critically wounded $\vdash$ (at least) seriously wounded

seriously if not critically wounded
critically if not fatally/mortally wounded
*critically if not seriously wounded

Turning to the more complex question of the implicatures of time adverbials, we observe the following array of possible and impossible suspensions:

(1.94) a. Santa Claus won't get here until midnight,
{ if not { *earlier. / later. } / if (he'll get here) then. / and he may not even get here then. }

b. Santa Claus will be here by midnight,
{ if not earlier. / *later. / *if (he'll get here) then. / and possibly earlier. }

Sentences with negative-polarity *until* share the assertion of *before*-clauses that a given state of affairs S_i did not hold prior to a given time t_i: (1.94a) asserts the non-arrival of St. Nick prior to midnight. Unlike *before*-clauses, *until*-clauses entail that S_i *does* hold *at* t_i: (1.94a), in unsuspended form, entails the arrival of Santa at midnight.[27]

For some speakers, this claim needs to be modified; for this dialect, entailment is too strong a characterization of the relevant relation and should be replaced by implicature. This is especially true in the case of *until S*, as opposed to *until NP*, constructions: "He didn't say another word until he died" will be compatible for these speakers with the state of affairs in which "he never spoke again" is true. *Until*-clauses, then, like *before*-clauses, assert an "early" bound which cannot be suspended; unlike *before*-clauses, they strongly implicate (if not entail (if not presuppose)) a "late" bound which can be suspended, as in (1.94a).

Even speakers who associate no entailment with *until*, upon confronting pairs of sentences like (1.95)

(1.95) a. John didn't leave { before } Sally did.
b. { until }

will bear witness that the implicature that John *did* leave when Sally did is far stronger in the (b) case than is the corresponding implicature, if any, associated with *before* in the (a) case of (1.95). *Mutatis mutandis*, the same remarks about strength of implicature differentiate *since* (≃*until*) from *after* (≃*before*)/

Positive *by* clauses, such as that in (1.94b), are characterized by a diametrically opposite semantics from what we have just described: they *assert* a "late" bound, which cannot be suspended, and *implicate* an "early" bound, which can.

Suspension provides some evidence for unary treatment of the two *untils*, the negative-polarity item we have been discussing, and the *until* occurring in positive contexts as well as negative but with durative predicates only. (These "two *untils*" are discussed in Horn (1970), and more fully in Smith (1970), where a unary treatment is defended.) Observe that the durative *until* also asserts an early bound and implicates (if not entails) a late one:

(1.96) Nixon will retain his office until January 1973, if not {*earlier. / later.}

Notice in addition that both uses of *until* can have their implicatures cancelled by *at least*:

(1.97) a. Santa Claus won't arrive until {at least midnight. / midnight at the {earliest. / *latest.}}

b. Santa Claus will stay until {at least 2 A.M. / *2 A.M. at the earliest.}

While *until* *at* *least* *t_i* is possible in both (1.97a,b), only the former, with its non-durative verb, permits *until* *t_i* *at* *the* *earliest*.

In not all cases of temporal scales do the facts conform to our expectations. In particular, it can occur that suspension defines a scale but that no entailment relations can be established among the members of that scale. Thus, the following suspensions are permitted:

(1.98) a. (at least) sick, if not dying

b. $\left\{\begin{array}{l}\text{moribund}\\ \text{dying}\end{array}\right\}$ if not (already) dead

c. *dead if not $\left\{\begin{array}{l}\text{dying}\\ \text{sick}\end{array}\right\}$

d. John is $\left\{\begin{array}{l}\text{gravely ill}\\ \text{?healthy}\end{array}\right\}$ if indeed he's alive at all.

The scale in (1.98), as signalled by the presence of *already* in (1.98b), involves temporal expectation. *Dead*, it should be noted, does not entail (*at* *least*) *dying*, nor does *dying* (or *moribund*) entail (*at* *least*) *sick*, but if an entity is dead at t_0, we can infer the existence of an earlier time $t_i : i < 0$ when the entity was dying.

Similarly, we find the following suspensions:

(1.99) a. childish if not infantile
(*infantile if not childish)

b. adolescent if not adult
(*adolescent* = (lit.) 'becoming adult')

c. middle-aged if not old

Just as with temperature, there appear to be two scales for measuring lifespan, with their respective end-points at the moment of birth (child→toddler→infant→newborn) and the moment of death (adolescent→$\underbrace{\text{young (wo)man}\rightarrow\text{middle-aged}\rightarrow\text{old}}_{\text{adult}}$).

Other species may have their own temporal scales. For example, consider the following terms (from Webster III) corresponding to crucial stages in the life of a young salmon:

(1.100) a. alevin: the newly hatched salmon when still attached to the yolk mass

b. parr: a young salmon in the stage between alevin and smolt when...it is actively feeding in fresh water

c. smolt: a salmon between the parr and grilse stages when it is about two years old and silvery and first descends to the sea

d. grilse: a young mature Atlantic salmon returning from the sea to spawn for the first time when between 3 and $3^1/_2$ years of age.

Given the terms for Growing Up in the Atlantic as defined in (1.100), we should expect the expressions in (1.101a) --but not those in (1.101b)--to crop up frequently in the speech of young salmon fanciers:

(1.101) a. Little Salmy here is only an alevin.

Salmy is a parr, if not a smolt.

Salmy is already a smolt, and he may even be a grilse.

Salmy isn't even a parr (yet), let alone a smolt.

b. ?Little Salmy here is at most an alevin. (suggesting the uninterpretable possibility of his being not even an alevin[28])

*Salmy is a smolt, if not a parr.

*Salmy is already a grilse, and he may even be a smolt.

*Salmy isn't even a smolt (yet), let alone a parr.

As a non-temporal example of a scale defined by suspension but not by entailment, notice that we can say

(1.102) Smoking marijuana is (at least) a misdemeanor if not a felony in every state of the union.

--although if one has committed a felony, one is not automatically guilty of having committed a misdemeanor. Felony, at least legally, does not entail misdemeanor. It is intuitively clear, however, that there is a scale of infractions ranging from torts to misdemeanors to felonies to capital crimes; suspensions like that in (1.102)--and the impossibility of reversing the relative positions of misdemeanor and felony--reflect this intuition.

There is no statable upper bound on the number of discrete elements in a scale; consider, for example, that defined by army rank:

(1.103) Bilko is now (*only) a $\left\{\begin{array}{l}\text{private if not a PFC} \\ \text{corporal if not a sargeant} \\ \text{lieutenant if not a captain} \\ \text{colonel if not a general} \\ \ldots\ldots\end{array}\right\}$

As well as finite but indefinitely large scales, there are infinite scales, both of the kind with which we began this discussion--the scale of natural numbers with a cardinality of $\aleph_0$--and of higher cardinality, as with the scale of real numbers. As long as a set can be (at least) partially ordered, it is possible to find evidence for aligning the members of that scale along a hierarchy defined by suspension of the upper-bound conversational implicature of each member.

This is in fact the case even when the ordering is cyclic, as with the days of the week:

(1.104) a. It's already $\left\{\begin{array}{l}\text{Saturday, if not Sunday.} \\ \text{Sunday, if not Monday.} \\ \ldots\ldots \\ \text{Friday, if not Saturday.}\end{array}\right\}$

b. I will be here until Tuesday, if not Wednesday.

c. It's not even {July yet, let alone August. / spring yet, much less summer.}

With these remarks on the properties of some temporal scalar predicates, we shall close off (at an admittedly arbitrary point) our investigation of scalar predication, implicature, and suspendibility. In this chapter, we have explored the nature of logical and conversational relations obtaining between propositions (i.e. entailments and presuppositions) and between proposition and speaker (conversational implicatures). We have concentrated on the mechanisms for suspending these relations, the distinctions between these mechanisms and other constructions which manifest formal similarities to them, and the basic epistemic principles governing when such suspensions are permitted.

We have seen the connection between entailment classes and upper-bound implicatures among scalar predicates, while avoiding the detailed analysis of the primary illustrations of predicate scales. This omission will be rectified in Chapter 2, when we address ourselves to the question of quantificational and modal scales. In so doing, we shall touch upon the principal similarities and differences obtaining between logical and non-logical relations, and between types of non-logical relations themselves. We shall have cause to develop the notion of implicature, not only in the next chapter, but in the two which follow, and to observe those properties of conventional rules directly relevant to the areas of quantification and modality.

1 The respective fixations of Messrs. Russell, Reichenbach, and Strawson on the hairlessness, age, and wisdom of the non-existent monarch will not be dwelt upon here.

2 Some difficulties with this claim are discussed below.

3 Strawson (1950), p. 157.

4 Frege (1892), p. 69.

5 Internal and external negation--the terms are due to Bochvar--are also known respectively as primary and secondary, narrow scope and wide scope, choice and exclusion, and weak and strong (Smiley 1960, Van Fraassen 1968, 1969). A disadvantage of the last pair of terms is that Keenan (1969), following von Wright (1959), employs them in the reverse sense from that familiar to many philosophers. For this observation, as for much valuable discussion of related matters during the course of the California Summer Program in Linguistics (Santa Cruz, 1971), I am indebted to Hans Herzberger.

6 In another dialect, external negation is completely impossible. This dialect is easier to describe, and will for this reason henceforth be ignored.

7 Russell (1957), p. 131.

8 *Ibid.*

9 Smiley (1960), p. 128.

10 Smiley (1960), Van Fraassen (1969). This binary connective is abbreviated $P \twoheadrightarrow Q$ and read as 'necessitates' by Van Fraassen. Similar approaches to the notion of semantic entailment or logical consequence have often been framed so as to include a set of sentences ($P_1, P_2, \ldots, P_n$) entailing some other sentence. Tarski (1935) formulates an earlier Carnapian definition of logical consequence in terms of the notion of contradiction: "The sentence X *follows logically* from the sentences of the class K if and only if the class consisting of all the sentences of K and the negation of X is contradictory." Tarski then goes on to suggest an alternative formulation of his own which avoids the troublesome notion of contradiction: "The sentence X *follows logically* from the sentences of the class K if and only if every model of the class K is also a model of the sentence X."

(Tarski (1935), p. 417)

11 Semantic entailment satisfies the stipulation of Katz (1964, p. 540) that entailment be considered "a relation holding between the antecedent and consequent of a

conditional when the latter follows from the former by virtue of a meaning relation between them," so that this conditional will be analytic. (cf. Katz & Postal (1964), p. 240)

12 Smiley (1960), p. 129; cf. Van Fraassen (1969).

13 Some exceptions to this generalization are discussed below.

14 Smiley (1960), p. 131.

15 The values on this chart, as on subsequent ones, must be read in the light of the following: '+' under ASSERTION indicates that the assertion of the sentence in question --in its basic, non-negated occurrences--is true, '-' that it is false, and 'α' that it can be either true or false; the same is true for the PRESUPPOSITION column. The minus value for the assertion of (1.27a), then, reveals that the truth value of the stripped assertion, "The milk train stops here now", is F in this sentence.

16 Mullally (1945), p. 109.

17 _Ibid._, p. 107

18 Notice the difficulty one encounters in attempting to decode the warning posted on the Detroit airport-Ann Arbor bus: "Cigarette smoking only--unless prohibited by law." This difficulty stems from the fact that the _unless_-clause qualifies not the assertion, as we might expect, but the presupposition. The sense is "...unless _even that_ is prohibited by law."

19 An analysis of indirect questions based on the facts in such a dialect is provided by a speaker of this dialect in Pope (1972).

20 Hintikka (1962); Lewis & Langford (1932)--cf. §2.2 for discussion.

21 Smith (1970).

22 Jespersen (1924), pp. 325-6; cf. Smith (1970) for additional discussion.

23 Grice (1968); cf. also Gordon & Lakoff (1971).

24 Chomsky (1972) refers to this relation as "a quite different sense of presupposition" from the (logical) one in which (1.69a) presupposes that the speaker has five children, and suggests recourse to the framework of Grice (Chomsky (1972), §7.1.3). This "quite different sense of presupposition" should indeed be regarded as Gricean implicature, but this is also true of the _few-some_ relation, as we shall observe, _pace_ Chomsky, who here includes the latter case as presupposition proper.

25 The complement in I _knew_ _you_ _would_ _come_ is presupposed to be true, and is correspondingly destressed, while the complement in _I_ _thought_ _you_ _would_ _come_ is destressed just in case the speaker pragmatically presupposes (i.e. assumes) it to be the case (that the listener came): _I_ _thought_ _you_ _would_ _come_ (and I was right) vs. _I_ _thought_ _you_ _would_ _come_ (and I was wrong). Cf. also the question _How_ _does_ _it_ _feel_ _to_ _be_ _a_ _beautiful_ _girl?_ --which, as J. Morgan and/or G. Green observed, has a destreesed complement just in case the listener is assumed to be a beautiful girl.

26 The ungrammaticality of _even_ _unless_ is discussed by Fraser (1969) in his examination of counterfactual conditionals. For a more detailed treatment of counterfactuals, cf. Schachter (1971).

27 Whether _until_ represents a case of presupposition as well as simple entailment is difficult to determine in the absence of corresponding positive and interrogative forms.

28 Unless salmon fanciers adopt a term from another sports community for "two under parr", viz. _eagle_.

CHAPTER 2

QUANTIFICATION AND MODALITY

(or, Why existentialism may be possible, but universalism must be necessary)

"De modalibus non gustabit asinus"
--slogan of medieval students of logic

§2.1 The Quantificational Scales

§2.11 Scalarity and quantification

We shall now turn to a classical illustration of the phenomenon of scalar predicates: the quantifier system. It will be observed that quantifiers (and the corresponding set of quantificational adverbs) participate in the same patterns as those which characterize the syntactically more conventional scalar predicates which we have discussed thus far, a fact which conforms to the view that quantifiers, if indeed they are not predicates themselves,[1] at least share significant cross-classifying semantic features with what McCawley refers to as "things that it is less unsettling to hear called predicates."[2]

Consider the following array of quantifier terms with their upper-bound implicatures suspended:

(2.1) a.

some if not many	(*many if not some)
some if not most	(*most if not some)
$\left\{\begin{matrix}\text{many}\\\text{much}\end{matrix}\right\}$ if not most	(*most if not $\left\{\begin{matrix}\text{many}\\\text{much}\end{matrix}\right\}$)
$\left\{\begin{matrix}\text{some}\\\text{many}\\\text{most}\end{matrix}\right\}$ if not all	(*all if not $\left\{\begin{matrix}\text{some}\\\text{many}\\\text{most}\end{matrix}\right\}$)
a plurality if not a majority	(*a majority if not a plurality)

b. sometimes if not $\left\{\begin{matrix}\text{often}\\\text{usually}\\\text{always}\end{matrix}\right\}$

often if not $\left\{\begin{array}{l}\text{*sometimes}\\ \text{usually}\\ \text{always}\end{array}\right\}$

usually if not $\left\{\begin{array}{l}\text{*sometimes}\\ \text{*often}\\ \text{always}\end{array}\right\}$

always if not $\left\{\begin{array}{l}\text{*sometimes}\\ \text{*often}\\ \text{*usually}\end{array}\right\}$

c. someone if not everyone

d. somewhere if not everywhere

e. $\left\{\begin{array}{l}\text{not all}\\ \text{not many}\\ \text{few}\\ \text{little}\end{array}\right\}$ if any $\qquad$ $\left\{\begin{array}{l}\text{not always}\\ \text{not often}\\ \text{seldom}\\ \text{rarely}\end{array}\right\}$ if ever

The forms in (2.1e), illustrating suspension of the implicatures of negative-scale quantifiers, are to be explained via double negation. An alternative possibility, however, to the if-not construction in these cases involves a surface disjunction. The two suspenders would be derived as follows:

(2.2) a. seldom and possibly not ever

if not

(D.N.)

∅

= seldom if ever

a'. seldom and possibly not ever

or (NEG. INCORP.)

never

= seldom or never

b. few and possibly not any

if not

∅

= few if any

b'. few and $\Diamond$ not any

or

none

= few or none

Propositional logic explains the equivalence (P if not Q $\equiv$ P or Q). But just as with the _if-not_ of suspension, so the _or_ of suspension differs from the classical logical disjunction in being asymmetric: _few or none_ $\neq$?_none or few_. We will not derive ?_none or few_ (or, likewise, *_no or little_, *_never or seldom_) directly, since its putative epistemic source does not occur: cf. *_none if many_, *_no if much_, *_never if often_.

We observed in Chapter 1 that suspender _if_ and _if-not_ clauses are differentiated syntactically in several ways from concessive and other conditionals. Similarly, disjunctive suspenders differ from true disjunctions in more than their asymmetry. As an illustration, consider the distribution of post-disjunctive _or both_:

(2.3) a. Desdemona loves Othello or Cassio, or both.

b. Desdemona is pretty or intelligent, or both.

c. Desdemona is pretty or (even) beautiful, *or both.

d. Desdemona had few friends or none (*or both). Othello trusted Desdemona seldom or never (*or both).

In the true disjunctions of (2.3a,b), _or both_ is possible, as a suspender of the exclusivity implicated by _or_ (cf. §4.23). In the suspender clauses of (2.3c), featuring the telltale scalarizer _even_, and of (2.3d), involving the construction we have just discussed, _or both_ cannot be appended.

As with cardinal numbers and other scalar predicates, the use of a quantifier q_i conversationally implicates that, as far as the speaker knows, no stronger quantifier q_j could be substituted for q_i, _salva veritate_. In other words, we never use q_i (e.g. _some_) when we can use q_j (e.g. _all_), where $(q_j x)(Fx) \supset (q_i x)(Fx)$, and consequently $q_j > q_i$ on scale Q. The result of violating this implicature, i.e. if the speaker is operating in bad faith, can be characterized as misleading the listener; specifically, leading the listener into drawing an invalid inference. Abraham Lincoln would have so been misleading his audience when he observed that "You can fool all of the people some of the time" and "...some of the people all of the time", had he intended _some_ in the sense _at least some_, _some if not all_. That he had no such intension is clear from the continuation in which the implicature is asserted (in accordance with (1.73a)): "...but you can't fool all of the people all the time."[3]

It was Sir William Hamilton of Edinburgh, Augustus de Morgan's adversary and the father, in a sense, of modern quantificational logic, who first developed a formal system in which the existential quantifier rendered not _at least one_, i.e. mere lower-bounded existence, but rather _some but not all_, an interpretation for which he has been taken to task by the generations of logicians who have succeeded him for the past century.[4]

But Sir William was in principle correct: through conversational implicature, although not through entailment, _some but not all_ is precisely what the existential quantifier of natural language connotes. Like other scalars, all quantifiers other than universals (for which the implicature would be vacuous) are upper-bounded by implicature.

One of the anti-Hamiltonian logicians was evidently J. N. Keynes, who Jespersen quotes as remarking that while it is customary for logicians to adopt a schema whereby "Some S is P" is not inconsistent with All S is P", it is nevertheless necessary to concede that many logicians "have not recognized the pitfalls surrounding the use of the word some. Many passages might be quoted in which they distinctly adopt the meaning--some, but not all."

To which Jespersen retorts, acting "in the name of common sense", by rhetorically inquiring: "Why do logicians dig such pitfalls for their fellow-logicians to tumble into by using ordinary words in abnormal meanings?"[5]

While Jespersen is of course unsympathetic to the goals of the logicians' representation of some which assures the preservation of the subaltern all-some entailment (leaving aside the matter of existential presupposition occasionally held to be absent from universals: we can assume a non-empty universe), it is not necessary for him to abandon this representation entirely, as he suggests. The relationship between some and not all need only be recognized as a case of implicature. Erring as he does on the side of the angels, however, Jespersen enables himself to become aware of many of the subtle relationships among the quantifiers and modals which we shall explore below.

We can now establish the positive and negative quantifier scales as follows:

(2.4) a. one — some, a few — several — many — half — most, a majority — all, every

b. not all — not half — a minority — not many — few — no, none

In Horn (1969) it was pointed out that if conjunction reduction is permitted to operate blindly in sentences with quantifiers, it will preserve cognitive synonymy just in case the quantifier is universal.[6] Corresponding to the bi-directional entailment (i.e. equivalence) relating the (a) and (a') sentences of (2.5), we observe a unidirectional entailment from (b) to (b') on the one hand, and from (c') to (c) on the other (ignoring, of course, implicatures):

(2.5) a. All girls are (both) clever and seductive.
b. Many girls are (both) clever and seductive.
c. Few girls are (both) clever and seductive.

a'. All girls are clever and all girls are seductive.
b'. Many girls are clever and many girls are seductive.
c'. Few girls are clever and few girls are seductive.

a". $(\forall x)(Fx \;\&\; Gx) \equiv (\forall x)Fx \;\&\; (\forall x)Gx$
b". $(\underline{M}x)(Fx \;\&\; Gx) \supset (\underline{M}x)Fx \;\&\; (\underline{M}x)Gx$
c". $(\underline{L}x)(Fx \;\&\; Gx) \subset (\underline{L}x)Fx \;\&\; (\underline{L}x)Gx$

It was stipulated that the class of positive quantifiers (with the exception of the universals _all_, _every_, and _each_) fall into the "super-quantifier" class _M_ with the entailment proceeding as in (2.5b"). We now see that _M_ includes all the positive quantifiers appearing on the scale (2.4a) above: _some_, _several_, _a few_, _many_, _half_ (= _at least half_), and _most_, as well as _at least n_ and _more than n_ for any cardinal _n_.

The negative-class quantifiers obeying the pattern of *L* in (2.5c") will similarly include the (2.4b)-scale entries *not all*, *not many/few*, and *no(ne)*, as well as *at most n*, *less than n*, and *only Q* (e.g. *only a few*), since the negative assertion of *only* will transfer such quantifiers to the negative scale--cf. *only on Saturdays*, *if at all*; *only Hercules*, *if anyone*.

Notice that any attempt to capture the relationship between *some* and *not all* in terms of anything stronger than a Gricean rule, in particular by logical presupposition rather than merely conversational implicature, is doomed to failure. If *some* presupposes *not all*, as suggested in Horn (1970), or--more properly--if a sentence with *some* presupposes the corresponding sentence with *not all*, then its contradictory negation, *none*, must also presuppose *not all*. But then every sentence with *none* must fail to have a bivalent truth value (must be neither true nor false) in case the negation of this alleged presupposition holds.

Since the negation of *not all* (*the boys left*) is *all* (*the boys left*), for *some* to presuppose *not all* would result in *None of the boys left* being assigned neither a true nor a false value in the event that all of them left. But the sentence with *none* is clearly false if the sentence with its contrary negation (*all*) is true. Needless to add, this contradiction does not arise if a proposition with *some* is taken to *implicate* the corresponding negative universal with *not all* (and vice versa!) rather than presuppose it.

The same argument holds with respect to the claim of

Chomsky (1972, §7.1.3) that _few_ (and, similarly, _not many_, as well as _little_ and _not much_) presupposes _some_: if he were correct, then _not many did_..._in fact none did_ should be equally anomalous to *_only one did_..._in fact none did_, in which a true logical presupposition is contradicted. (Incidentally, Chomsky asserts incorrectly in this section that presuppositions, unlike implicatures, cannot be "withdrawn", thereby ignoring the possibilities of presupposition-suspension we have discussed in Chapter 1; what _is_ the case is that presuppositions, while often _suspendible_ if the result strengthens the polarity of the assertion, cannot be overtly _denied_.) Furthermore, sentences with _many_ or _much_ are obviously _false_ (rather than nonbivalent, as Chomsky's analysis would predict) if the corresponding proposition with _none_ (i.e. ¬_some_) is true.

We can confirm this result by developing a semantic test to distinguish between presuppositions and entailments on the one hand and implicatures on the other, and by applying this test to the matter of quantifiers. The test we shall employ is that of redundancy of conjunctions.

While in general it is acceptable to conjoin a proposition to the _left_ of another proposition which presupposes it, the reverse order results in anomaly. Thus, to call someone a _bachelor_ (in the usual sense) is to assert that he has never been married and to presuppose that he is human, adult (or marriageable), and male. Correspondingly, we find the following opposition:

(2.6) a. John is a man and (he is) a bachelor.

b. ??John is a bachelor and (he is) a man.

The same left-to-right principle extends to other contexts, including copular sentences--

(2.7) a. That man is a bachelor.

b. ??That bachelor is a man.

--but we shall restrict our consideration to conjunctions.

The fact that propositions with <u>too</u> or <u>also</u> presuppose a corresponding propositional function with some other value assigned to the variable, and that definite sentences presuppose existence of the definitized NP, accounts for the asymmetry of the following conjunctions, due to Morgan (1969):

(2.8) a. John is here and Harry is here too.

a'. ??John is here too, and Harry is here.
(OK if someone else is stipulated to be here)

b. / b'. Mike has $\left\{\begin{matrix}\text{a}\\ \text{??the}\end{matrix}\right\}_1$ cat_i and $\left\{\begin{matrix}\text{the}\\ \text{??a}\end{matrix}\right\}_1$ cat_i is black.

b". ??The cat_i is black and Mike has a cat_i.

Similarly, our old royal friend manifests the same ordering constraint:

(2.9) a. There is $\left\{\begin{matrix}\text{a}\\ \text{only one}\end{matrix}\right\}$ King of France and he is bald.

b. ??The King of France is bald, and there is $\left\{\begin{matrix}\text{a}\\ \text{only one}\end{matrix}\right\}$ King of France.

--as do factive presuppositions:

(2.10) a. Mary left, and $\left\{\begin{matrix}\text{John} \left\{\begin{matrix}\text{believed}\\ \text{knew}\\ \text{regretted}\end{matrix}\right\}\\ \text{it's considered} \left\{\begin{matrix}\text{odd}\\ \text{likely}\end{matrix}\right\}\end{matrix}\right\}$ that she did.

b. John {believed / ??knew / ??regretted} / It's considered {??odd / likely} that Mary left, and (indeed) she did.

The ordering constraint can be extended naturally to cases in which the second conjunct is <u>asserted</u> or <u>entailed</u> by the first, and thus contributes no new information, as in the following:

(2.11) a. ??John$_i$ left, and {John$_i$ left. / he$_i$ did so. / he$_i$ was able to leave.}

b. John$_i$ {??managed / ??condescended / wanted / tried} to leave, and (indeed) he$_i$ left.

c. John$_i$ didn't {??bother / ??manage / wish} to leave, and so he$_i$ didn't.

d. {It is certain ??(to John) / ??I am certain} that Mary left, and (indeed) she did.

e. John {??killed / shot} Alvin, and Alvin died.

A hypothesis to govern the constraint on redundancy of second conjuncts of conjunctions can be formulated as follows:

(2.12) The second conjunct Q of a conjunction <u>P and Q</u> must assert some propositional content <u>which</u> does not logically follow from the first conjunct P (i.e. P & Q is anomalous if $P \vdash Q$ or, <u>a fortiori</u>, if $P \gg Q$).

More, however, needs to be said: the redundancy of the conjunctions in (2.11) strikes us as slightly different from that of the presupposition cases. Observe the following anomalies:

(2.13) a. Oedipus$_i$ accused himself of killing his father, and he$_i$ $\left\{\begin{array}{l}\text{??felt it was a bad thing to have done.}\\ \text{?held himself responsible for it.}\end{array}\right\}$

b. Oedipus$_i$ criticized himself for marrying his mom, and he$_i$ $\left\{\begin{array}{l}\text{?felt it was a bad thing to have done.}\\ \text{??held himself responsible for it.}\end{array}\right\}$

While either continuation is at least awkward, the redundancy of the felt...bad continuation is perhaps slightly more severe in the former case, and the held...responsible clause in the latter, both of which--as Fillmore (1971) has demonstrated--involve presupposition rather than assertion. Evidently, it is worse to repeat information that you presupposed your listener was aware of--to do which might be taken as insulting your listener's intelligence--than to assert something twice within the same sentence. The latter procedure, but not the former, might even be acceptable in certain contexts as an instance of the rhetorical device of pleonasm, as will be seen below.[7]

Let us consider the possibility of redundancy arising in only, also, and even constructions, under the analyses proposed in Horn (1969, 1971), as illustrated in the sentences below:

(2.14) a. Only John left.
P: John left.
A: Nobody who is not John left.

b. John left too/also/as well.
P: (At least) somebody who is not John left.
A: John left.

c. Even John left.
P: (At least) someone who is not John left, and one would not have expected John to leave (or one would have expected it less of John than of anyone else in the relevant universe).
A: John left.

Hypothesis (2.12), operating on these sentences, correctly predicts the following redundancies, in which the first conjunct presupposes the second:

(2.15) a. ??Only $John_i$ left, and he_i did.
??Only $John_i$ and $John_i$ left.

b. ??John left too, and someone else did.

c. ??Even John left, and $\left\{\begin{array}{l}\text{someone else did.}\\ \text{one wouldn't have expected it.}\end{array}\right\}$

Similarly, we observe the following anomalous instances of P & Q, where P asserts (and hence entails) Q rather than presupposing it, as in (2.15):

(2.16) a. ??Only John left, and nobody else did.

b. ??$John_i$ left too, and he_i did.

c. ??Even $John_i$ left, and he_i did.

As observed above, repetition of already asserted material results in a less severe degree of anomaly in the redundancy it produces than is true for already presupposed material; (2.16a) is not quite as bad as (2.15a), although both are far from impeccable. The disparity increases when the conjuncts appear in separate sentences, in which case—as I am indebted to Howard Lasnik for pointing out to me—the rhetorical device of repeating an assertion (but not a presupposition!) is perfectly at home:

(2.17) Only John left. $\left\{\begin{array}{l}\text{Nobody else left, I tell you!!}\\ \text{??He left, I tell you!!}\end{array}\right\}$

But now notice that, as contrasted with the severe anomaly of the Only NP_i and NP_i construction of (2.15a), and the somewhat less severely redundant (2.16a), we find that (2.18a) below is impeccable. (2.18b), on the other hand, is redundant, as the second conjunct does not <u>assert</u> material which does not already logically follow from the first (although it presupposes such information).[8]

(2.18) a. John_i and only John_i is leaving.

b.??John_i and even John_i is leaving.

c. Muriel and no one else $\left\{\begin{matrix}\text{is}\\ \text{*are}\end{matrix}\right\}$ voting for Hubert.

d. Muriel and $\left\{\begin{matrix}\text{someone else}\\ \text{Lyndon}\end{matrix}\right\}\left\{\begin{matrix}\text{*is}\\ \text{are}\end{matrix}\right\}$ voting for Hubert.

Notice that number agreement must be sensitive to the semantic information that such (reduced) conjunctions as those in (2.18a,c), whose second conjunct asserts a negative existential binding all "non-NP_i's" in the relevant universe, denotes a single individual, as opposed to the normal case, illustrated in (2.17d), in which at least two individuals are stipulated to belong to the relation in question, thus requiring plural agreement.[9]

While the first conjunct in (2.18a) and, more clearly, that in the (a) conjunctions below--

(2.19) a. If and only if...
Three and only three Lithuanians...
Two of my friends and only two...

b. ??Only if and if...
??Only three and three Lithuanians...
??Only two of my friends and two...

--may, depending on the context, <u>implicate</u> their <u>only</u> counterparts in the second conjunct (as e.g. <u>if</u> implicates <u>only if</u>), implicature is not a logical relation and is therefore not subject to the redundancy principle.

Notice that no mention is made in (2.12) of second conjuncts which "follow from" the first by virtue of conventional

(Gricean) rules rather than principles of logic. Indeed, P and Q--as we see in (2.18) and (2.19)--is not redundant if the utterance of P merely implicates (belief that) Q and does not entail or presuppose Q. In essence, implicated material is not logically established as true, and it is therefore not redundant to so establish it.

In Horn (1971) it was claimed that negative-polarity care (to), unlike bother (to), is not, pace Karttunen (1970b), an implicative verb. We can now adduce additional evidence for this claim:

(2.20) a. John didn't {??bother / care} to leave, and (so) he didn't.
b.

The complement of negated care (i.e. John left in the above example) is implicated to be false, and its negation can thus be conjoined to the care sentence, while in the bother case the corresponding negation is entailed, and is thus by (2.12) unconjoinable.

The exclusion of conversational implicatures from the principle in (2.12) is thus not coincidental. Indeed, this principle should be itself considered a subcase of a law which is conventional (non-logical) in its own right, namely:

(2.21) P and Q is redundant (and hence conversationally anomalous) if P & ~Q is contradictory.

To be more precise, if in (2.21) should be replaced by to the extent that. (2.22a) is thus redundant for a speaker (or listener) to the extent that (2.22b) constitutes a contradiction for that same individual:

(2.22) a. John didn't {%remember / a'. ??happen / a". want} to leave, and (so) he didn't.

b. John didn't {%remember / b'. *happen / b". want} to leave, but he did so {unconsciously. / anyway.}

It will similarly be predicted that for those speakers who share Karttunen's intuitions about the semantics of *care* (i.e. that *John didn't care to leave, but he left anyway* is a logical contradiction), (2.20b) is as odd as (2.20a).

The *manage*-*try* relation can be shown in the same manner to constitute an implicature, for most speakers, albeit a very strong implicature, rather than a *manage*≫*try* presupposition, at least under negation (it could still be the case that positive *manage* entails positive *try*):

(2.23) John didn't manage to leave, {but he tried. / and (in fact) he didn't even try.}

Now observe that--just as we can cancel the *not all* implicature of existentials in (2.24a), a cancellation which would violate the conditions of either the Hamilton-Jespersen analysis of *some* as entailing (or equivalent to) *not all* or the claim in Horn (1970) that *some* presupposes *not all*, the negative universal can be non-redundantly conjoined to the corresponding existential, as in (2.24b):

(2.24) a. Somebody left, in fact everyone did.
Not everyone left, in fact nobody did.

b. Somebody left, but not everybody.
Some but not all of my best friends are women.
Not all my best friends are men, but some are.

The non-redundancy of (2.24b) vindicates the conversational analysis of the relation between *some* and *not all*, while vitiating the alternatives.

In the same manner, Chomsky's presuppositional approach to _few_ and _not many_, as mentioned above, can be shown to founder, by the non-redundancy of a continuation using the "presupposed" existential:

(2.25) a. $\left\{\begin{array}{l}\text{Few}\\ \text{Not many}\end{array}\right\}$ of the arrows hit the target, but some did.

b. $\left\{\begin{array}{l}\text{Little}\\ \text{Not much}\end{array}\right\}$ of this is incorrect, but some of it is.

While Chomsky is incorrect, as we have seen, in claiming that (2.26a) differs from the NEG-Q reading of (2.26b)--i.e. the reading on which negation is outside the scope of the quantifier

(2.26) a. Not many arrows hit the target.

b. The target was not hit by many of the arrows.

--in _logically presupposing_ the corresponding existential statement

(2.27) Some (of the) arrows hit the target.

he is nevertheless correct in observing a difference in strength in the two cases.

To begin with, (2.26a) is indeed inappropriate when uttered by a speaker who is aware that no arrows hit the target: under such conditions, it would be equivalent to using _many_ (_possible_, _warm_, _pretty_,...) where we know _all_ (_necessary_, _hot_, _beautiful_,...) to apply. The inappropriateness derives, in short, not from what Chomsky deems the "expressed presupposition" of (2.27), but from a conversational implicature of upper-bounding which attaches to non-universal negative-scale quantifiers like _few_ and _little_. On the other hand, as Chomsky notes, (2.26) is a more appropriate utterance under the same circumstances (albeit somewhat misleading). The <u>not</u> <u>many</u> $\rightarrow$ <u>some</u> implicature from (2.26a) to (2.27) is indeed stronger than the corresponding inference when the predicate is not immediately contiguous with its commanding negative, as in (2.26b).

The phenomenon illustrated here is far more general, however, and is related to the possibility of interpreting such non-contiguous negations as external. We observed in the last chapter that--as recognized by Jespersen (cf. also Smith (1970)--to negate a cardinal quantifier is generally to negate the (asserted) lower bound, so that (2.28a) expresses the sense of (2.28a'):

(2.28) a. I don't have three friends.
a'. I have fewer than three friends.
b. I don't have three friends (...but four).
b'. I have more than three friends.

With the appropriate intonation, however, and a continuation giving a reëvaluation of the indicated quantity, as in (2.28b), the reverse can be signified, viz. (2.28b'). But, as is generally the case with quantifiers, it is far more difficult to convey this "exceptional" sense, as Jespersen calls it, if the commanding negative is associated within the same surface constituent as the quantifier--even if we apply the contrastive intonation of (2.28b):

(2.29) a. I didn't answer $\left\{\begin{matrix}\text{many}\\ \text{one}\\ \text{three}\end{matrix}\right\}_1$ of the questions, but $\left\{\begin{matrix}\text{all}\\ \text{two}\\ \text{15}\end{matrix}\right\}_1$ of them.

b. Not $\left\{\begin{matrix}\text{many}\\ \text{one}\\ \text{three}\end{matrix}\right\}_2$ of the questions did I answer,

but $\left\{\begin{matrix}\text{all}\\ \text{two}\\ \text{15}\end{matrix}\right\}_2$ of them.

While it appears that the (2.29a) cases reflect the retention of an assertion under negation, this is precisely what can occur under external negation, when the negation is semantically associated with non-denotative aspects of the predicate. If a predicate may be rejected as in (2.29a) because of its implicatures (by externally negating it via contrastive stress and positioning the NEG in the auxiliary), it can also be rejected because of its associated presuppositions and entailments, as in the following cases:

(2.30) a. John didn't 'happen' to succeed (...he cheated).

b. The dog wasn't 'chasing' the cat (...the cat wasn't moving). (due to C. Fillmore)

c. Ptolemy $\left\{\begin{matrix}\text{didn't 'know'}\\ \text{couldn't have 'realized'}\end{matrix}\right\}$ that the sun revolves around the earth (...it doesn't).

In these sentences, all of which are marked by the characteristic rising intonation and contrastive stress associated with (2.28b) and (2.29a), the assertions of the pre-externally-negated propositions may still hold (e.g. <u>Ptolemy was sure that the sun revolves around the earth</u> in (2.30c)), but aspects of their non-assertive relations are taken issue with. As the quote marks indicate, we are simply rejecting the appropriateness of the predicate that had been proposed, for any of a wide variety of reasons.

Notice that the negative morpheme in these cases, as with the parallel (2.29a), must be in the auxiliary: we say of an unmarried but emancipated woman of fifty that she isn't a spinster (denying the connotation while granting the denotation), but hardly that she is a non-spinster.

We see thus that while not...many, with the negation external, can signify any value from all to none (excluding only that value affirmed by many with its upper-bound implicature intact), [not many] is restricted to the range of few.

We are also able to understand why the presupposition of anymore sentences, as in (1.24), is reinforced to the point of virtual unsuspendibility when the negation is directly attached to the adverb in initial position. The same results are illustrated by the following any longer pair:

(2.31) a. Trees don't grow in Brooklyn any longer, if (indeed) they ever did.

b. No longer do trees grow in Brooklyn, ??if (indeed) they ever did.

In short, "constituent negation" (in the sense of Klima (1964); cf. Jespersen's "special negation") emphasizes the internality of the negative in question, thus reinforcing any presuppositions, entailments, or implicatures associated with the constituent or with propositions in which that constituent figures.

§2.12 Scalarity and markedness

There are, we have seen, two quantificational scales with their respective extremes at the universal positive and universal negative (= negative existential) points, just as in the case of hot/cold, beautiful/ugly, old/young, tall/short, love/hate, etc. And just as we cannot "cross scales" in suspension if-not sentences by saying either *hot if not cold or *_cold if not hot_, neither can we do so in the case of the quantificational scales: *_few if not all_, *_all if not few_. In all of these scalar oppositions, the neutral form in a request for ranking information about an argument will employ a relatively weak element on the positive scale. Thus consider the following degree interrogatives:

(2.32) a. How warm is it?
How attractive is Eleanor?
How much do you like curling?
How often do you visit your sister?
How many cavities do you have?

b. How cool is it?
How unattractive is Eleanor?
How $\left\{\begin{array}{l}\text{much do you dislike}\\\text{little do you like}\end{array}\right\}$ curling?
How seldom do you visit your sister?
How few cavities do you have?

c. How hot is it?
How beautiful is Eleanor?
How much do you love curling?

d. How cold is it?
How ugly is Eleanor?
How much do you hate curling?

While none of these questions are completely ill-formed, it is evident that the asker of the (a) questions has provided his listener with less information than if he had substituted the forms in (b), (c), or (d). The (a) questions, specifically, convey no assumption on the part of the utterer that the scale on which the predicate in the answer will fall is the scale which includes the predicate mentioned in the request for information.

Whereas it is decidedly odd to ask one of the questions in (2.32b) and get a reply of "very hot", "ravishingly lovely", "quite often", or the like, it is not at all peculiar to phrase a question as in (2.32a) and receive a reply like "freezing", "not at all", or "never". The answer to a question containing a weak negative is thus expected to fall on the negative scale, while the reply to a question with a weak positive element may fall anywhere on either scale without necessarily raising eyebrows.

Just as "How unattractive is Eleanor?" with its weak negative element suggests strongly that she is unattractive (to some extent), so too the strong positive element in "How beautiful is Eleanor" suggest that she <u>is</u> beuatiful, and is thus non-neutral. The strong negatives in (2.32d) are <u>a fortiori</u> non-neutral, and expect a response on the negative scale. Both "How much do you love me?" and "How much do you hate me?" are as unfair in the assumptions they force as such standard presupposition-forcing questions as "Which one of us do you love?" or "Have you stopped beating your wife?"

Another example of this asymmetry between members of opposed scales is the equative construction:

(2.33) a. I may be short, but I'm as tall as you.
I may have few friends, but I have as many as you.

b. ?I may be tall, but I'm as short as you.
?I may have many friends, but I have as few as you.

We can say that one dwarf is as tall as another one, but hardly that one giant is as short as another. Notice that substitution of the comparative <u>shorter than</u> (or <u>fewer than</u> for <u>as few as</u> in (2.33b)) renders these constructions less aberrant.

In such corresponding pairs of scales, the neutral, assumptionless, positive member can be thought of as unmarked, relative to the non-neutral, assumption-bearing, negative member, which is relatively marked (i.e. marked relative to the given distinction).[10] The asymmetries in question have been long recognized and discussed, for example by Sapir (1944) who comments on "how helpless language tends to be in devising neutral implicitly graded abstract terms."

It is clear that nominalizations of semantically unmarked adjectives are also unmarked:

(2.34) height -- ?lowness
height -- shortness
width -- narrowness
warmth -- coolness
truth -- falsity
beauty -- ugliness
frequency -- rarity
speed -- slowness

The left, unmarked nominalizations, but not the right, marked ones, appear neutrally in question like "What (degree of) ____ does it have?" or "What is its ____?" The left-hand, positive nominalizations, in effect, label only the corresponding negative scale. Notice further that we can say of something that its height (or width) is negligible, but not its shortness (or narrowness).

Similarly,

(2.35) a. Calvin is short, but his height surprised me.
b. ?Kareem is tall, but his shortness surprised me.

The right-hand nominalizations, significantly, are also later diachronically and less well-integrated into the English lexicon, as manifested by the preponderance of the productive -ness suffix in these forms, and the absence of either morphological alternations or morphophonemic processes between adjectival and nominal forms. Semantic markedness, evidently, tends to be correlated with morphological marking.[11]

Finally, it is to be remarked that only unmarked adjectives and nouns normally occur with measure phrases:

(2.36) a. 3 meters long/*short
50 yards wide/*narrow
30 years old/?young (latter can be jocular)
a frequency/*rarity of 1000 cycles per second
a speed/*slowness of 60 miles an hour

b. twice as expensive/?cheap
half as expensive/??cheap
half again as tall/??short

Expressions like half as cheap (and, even more clearly, half again as cheap, presumably signifying $^2/_3$ as expensive), while superficially bearing information, are extremely difficult to decipher, given that cheap is on the negative scale for prices of objects (cf. reasonable if not *(in)expensive/cheap, cheap if not gratis, expensive if not prohibitive, etc.), in the same way that sentences like (2.36') are easier to accept as well-formed than they are to interpret:

(2.36') The new smart bomb can kill more peasants in a shorter period of time with fewer undesirable effects than any other weapon our scientists have created.

§2.13 Quantifiers and the binary connectives

Logicians have observed (e.g. Kalish & Montague (1964), in their discussion of truth-functional expansion) that for any formula $\forall x Fx$, where x is a variable ranging over the set

$\{x_1, x_2, \ldots, x_n\}$, we can construct a semantically equivalent formula, one with identical truth-conditions, of the form $Fx_1 \,\&\, Fx_2 \,\&\ldots\&\, Fx_n$. Similarly, $\exists x(x \in \{x_1, x_2, \ldots x_n\} \,\&\, Fx)$ is satisfied just in case $Fx_1 \vee Fx_2 \vee\ldots\vee Fx_n$ is satisfied. The operators and and or, then, are in an important logical respect parallel to the quantifiers all and some respectively. This relationship is also reflected in the nature of the theorems of distribution and confinement to be proved in any standard quantificational logic.

McCawley (1972 and class lectures) has given evidence that, for reasons of syntactic patterning as well as the logical equivalences just cited, it would be advantageous to co-derive existentials and disjunctions on the one hand, and universals and conjunctions on the other. In so doing, we could explain why both universals and conjunctions are found as the subject of performatives, but not existentials or disjunctions:

(2.37) a. Ralph $\left\{\begin{array}{l}\text{and}\\ {}^{*}\text{or}\end{array}\right\}$ I hereby promise(s) to give you $5.

b. $\left\{\begin{array}{l}\text{All}\\ {}^{*}\text{Some}\\ {}^{*}\text{One}\end{array}\right\}$ of us hereby promise(s) to give you $5.

The direct object of many performatives manifests a similar restriction:

(2.38) a. The Pope hereby excommunicates Daniel $\left\{\begin{array}{l}\text{and}\\ {}^{*}\text{or}\end{array}\right\}$ Philip.

b. The Pope hereby excommunicates $\left\{\begin{array}{l}\text{all}\\ {}^{*}\text{some}\end{array}\right\}$ radical American Jesuits.

The identical restriction must be stated on the object of the pseudo-imperative quasi-verbs discussed by Quang (1972):

(2.39) a. {Goddamn / Fuck / Screw / Down with} Nixon, Brezhnev, {and / *or} Mao.

b. {Goddamn / Fuck / Screw / Down with} {all / *some} of those imperialist butchers.

As a final illustration of the parallel patterning of operators and quantifiers, we shall turn to the matter of possible ambiguity in structures arising from the position and scope of negation. As observed in Carden (1970), (2.40a) is interpretable by some speakers as capable of synonymy with either (2.40b) or (2.40c).

(2.40) a. All (of) the boys didn't go.

b. All (of) the boys NEG-went.
(= None of the boys went.)

c. NEG [All (of) the boys went].
(= Not all of them went = Some didn't go)

For many speakers of this dialect, Carden's AMB dialect, disambiguation of (2.40a) can be provided by the intonation: with a slight rise on the quantifier <u>all</u> and a rising, comma intonation at the end of the sentence, the NEG-Q reading (2.40c) is forced, whereas a fall on the quantifier and a normal sentence-final falling intonation favors the NEG-V reading of (2.40b). Exactly the same ambiguity exists with the quantifier <u>both</u> (presumably due to the fact that the difference between the suppletive pair <u>both</u> and <u>all</u> is simply that the size of the set quantified by the former is presupposed to be two members, rather than more than two), and precisely the same intonation contours disambiguate <u>both</u> sentences as those just described. This can be verified by substituting both for all in the sentences of (2.40).

Now consider the corresponding sentences with enumerated rather than quantified sets:

(2.41) a. (Both) John and Bill didn't go.
b. John and Bill didn't go.
c. John and Bill didn't go.
d. John and Bill NEG-went. (= Both [didn't go])
e. NEG (John and Bill went). (= Not both of them went, i.e. one of them stayed)

(2.41a), with or without the connective both, is ambiguous in the same way as (2.40a): the negative can be associated either with the verb or with the operator (and hence the conjoined sentence as a whole). Again, intonation disambiguates: the contour in (2.41b) is compatible only with the reading specified by (2.41d), that in (2.41c) only with the reading in (2.41e).

The intuitive reason for the association of contour with reading is based on the semantics of negation and quantification (including that expressed by the binary connectives), and is identical for the ambiguities with all, both, and and: the NEG-V sentences state a complete proposition, in giving a (negative) predicate which holds for an entire set. With the NEG-Q readings, on the other hand, the proposition is in some sense unspecified, in that the predicate holds for only an unspecified subset. Comma intonation signals the absence of an implied continuation, a continuation with no parallel in the NEG-V readings:

(2.42) John and Bill didn't go, (just one of them).
Both (of) the boys didn't go,
All (of) the boys didn't go, (just some of them).

Notice that the implicit continuation we have filled in above is simply a scalar implicature: not all implicates not none, i.e. some.

As we would expect, disjunctions share with existentials the inability to be understood on a NEG-Q reading:

(2.43) a. Some of the boys didn't go.
b (Either) John or Bill didn't go.

in both (2.43a,b) the negative must be associated with the verb. Furthermore, a comma intonation (which would force an impossible reading) is totally uninterpretable with either (2.43a) or (2.43b).

Let us assume that McCawley is essentially correct in suggesting that a grammar of English (or rather universal grammar) must explicitly relate and to all and or to some, without necessarily committing ourselves to his attempt (McCawley 1972) to derive the quantifiers from coordinate structures involving the corresponding operators. In particular, we shall avoid troubling ourselves with the problem of deriving other quantifiers to which there are no obvious correspondents among the binary connectives. We will also conveniently overlook the noisomeness of contemplating a con- or disjunction of an infinite (and not necessarily denumerable) set of sentences as the source for a universally or existentially quantified set, e.g. (2.44b) as underlying (2.44a):

(2.44) a. I like all the natural numbers.

b. I like 1 & I like 2 & I like 3 & ...

We shall in effect choose the position of an existential rather than a universal Quang-defier.

In so doing, we would predict (although not formally account for) the behavior of quantifiers and operators in (2.41)-(2.43), on the basis of the _and_-_all_ and _or_-_some_ identifications. We would also expect that _or_ should reflect other crucial scalar properties of _some_, and this is in fact the case. Just as (2.45a) entails (2.45b), so too (2.46a) entails (2.46b):

(2.45) a. $\forall xFx$ (e.g. All the boys left.)

b. $\exists xFx$ (e.g. Some of the boys left.)

(2.46) a. P & Q (e.g. John left and Bill left.)

b. P v Q (e.g. John left or Bill left.)

But just as a speaker by uttering (2.45b) _implicates_ that nothing stronger, including (2.45a), holds (so far as he is aware), a speaker of good faith will only utter (2.46b) if he does not _know_ that (2.46a) holds. Informally, _some_ is entailed by, and implicates the negation of, _all_; _or_ is entailed by, and implicates the negation of, _and_.

Even the inference of P v Q from P (by the rule of addition or a corresponding theorem of the propositional calculus) and the corresponding rule of existential generalization in quantificational calculus, the rule which permits the inference of $\exists xFx$ from Fa (for any individual _a_), are both constrained in natural language by the Gricean maxim of quantity: (1.62i) "Make your contribution as informative as is required." Strawson, surprisingly, overlooks this parallelism. Although he rejects the entailment of $(P \vee Q)$ by P on the grounds that "the alternative statement carries the implication of the speaker's uncertainty" which is inconsistent with the simple assertion of P (1952, p. 91), he nevertheless accepts the <u>all</u>$\supset$<u>some</u> entailment without a quibble. As Geach points out in discussing this oversight, Strawson could--and, to obey the hobgoblin of small minds, should--have raised the identical issue of non-equivalence in uncertainty.[13]

What we have been advocating is that the classical entailments do indeed hold, as they must, in order to account for contexts in which the conventional rules are weakened or cancelled. For example, in a conditional context, if I were to utter (2.47a) or (2.48a), a listener could not claim (2.47b) or (2.48b) as a legitimate excuse for failing to notify me:

(2.47) a. If you see John or Bill, let me know.
b. I saw both John and Bill.

(2.48) a. If you meet somebody who knows Sally's address, let me know.
b. I met everybody who knows Sally's address.

There is a grain of truth in Strawson's words, as well, and a grain which aliments <u>some</u> as well as <u>or</u>: in normal contexts, all things being equal, existentials are upper-bounded by implicature, and disjunctions are exclusive by the corresponding implicature.

Parallel to the suspensions of the former implicature we can have suspensions of the latter:

(2.49) a. I know some $\left\{\begin{matrix}\text{if not}\\ \text{or}\end{matrix}\right\}$ all of your friends.

b. Claude will major in linguistics or necromancy, $\left\{\begin{matrix}\text{if not}\\ \text{or}\end{matrix}\right\}$ both.

Notice that the *or* in the *or both* suspender is *not* a true disjunction, as shown by its asymmetry (the impossibility of reversing the disjuncts, *linguistics or necromancy* and *both linguistics and necromancy*, alongside the reversibility of true disjuncts, as *linguistics* and *necromancy* themselves). Furthermore, it is just this superficiality of the disjunctive status of *or both* which prevents its recursion:

(2.50) Claude will major in linguistics or necromancy, or both (*, or both(*, or both...)).

Since (2.49b) as a whole, unlike its first disjunct, is not a true disjunction, *or both* cannot be appended, just as it is blocked from the suspender disjunctions in (2.3c,d). Suspender "disjunctions", in short, are no more deep disjunctions than are suspender "conditionals" in *if* and *if-not* deep conditionals.

§2.14 Degrees of equivocation

Given that the use of a quantifier is inconsistent with the knowledge of a stronger statement, in that it would violate the upper-bound implicature of that quantifier, we find on closer inspection that such violations seem to divide into two distinct categories, a fact for which Grice's analysis has not prepared us.

Consider the following statements, relative to the facts of the actual world (and to the speaker's awareness of these facts):[14]

(2.51) a. Some Americans smoke cigars.
b. ?Some Americans are over 18.
c. ??Some Americans speak English.
d. *Some Americans are earthlings.

Let us assume that some speaker utters each of these claims, while believing that many Americans smoke cigars, most of them are over 18, almost all of them speak English, and all of them are earthlings. If he nevertheless makes the "understatements" in (2.51), he is misleading his listeners. But while the degree of misleadingness, as we might expect, grows gradually more acute from (a) to (d), the nature of the equivocation in (2.51d) is, I believe, intuitively different in kind from that in (2.51a-c). Considering another example, (2.52a) is anomalous, as is (2.52b), while (2.52c) is merely a peculiar understatement.

(2.52) a. *Some men are mortal.
b. *Some integers smaller than 98 are also smaller than 100.
c. ?Some integers smaller than 100 are also smaller than 98.

The nature of the violation when <u>some</u> is used in place of <u>all</u> can be characterized as anomaly, while that resulting from the use of <u>some</u> rather than a stronger but non-universal quantifier (<u>many</u>, <u>most</u>, <u>almost all</u>) amounts to merely a greater or lesser degree of understatement.

A related distinction between anomaly and misleading understatement is that in contradiction and question-answering *all* can "deny" *some* but non-universal quantifiers cannot:

(2.53) a. Some men are mortal (tall, happy, etc.).
Are some men mortal (tall, happy, etc.)?

b. Yes, (in fact) {many / most / ?all} of them are.

c. No, {?many / ?most / all} of them are.

It may be tempting to attribute the anomaly of *some* in (2.52a,b) to the analyticity of these universals. The correct explanation, however, is that all speakers (with a complete knowledge of English) *know* that analytically universal propositions--or at least those involving knowledge of language rather than of mathematics--are universal. Not all speakers, however, are necessarily aware of synthetic universality.

Thus in (2.54)

(2.54) a. Some Presidents of the U. S. have been {
a. Republicans.
b. Democrats.
c. ?Protestants.
d. {*men. / *Caucasians.}
e. {*native-born. / *over 25.}
}

the (a), (b), and (c) sentences are misleading (many were Republicans, most were Democrats, and all but one were Protestants), but the (d) and (e) sentences, spoken by anyone who is aware of the relevant fact, are equally anomalous, although the universal corresponding to (2.54d) is synthetic (a black and/or female head of state presumably not being a contradiction in terms) and that corresponding to (2.54e) analytic (in that age and nationality are part of the constitutional definition of President; the analyticity becomes clearer if we substitute Presidents for native-born in this sentence). Technically, the difference between (d) and (e) is that any utterance of the latter results in anomaly (since the upper-bound implicature will always be violated), but anomaly in the former case will ensue only in utterances by speakers who are aware of given historical facts.

The understatement/anomaly discrepancy appears even among infinite sets, at least on an intuitive level.

(2.55) a. Some natural numbers are prime.
b. ?Some natural numbers are non-prime.
c. *Some natural numbers are integers.

Despite the fact that the sets of primes, non-primes, and integers are not only infinite but of the identical cardinality (i.e. a one-one correspondence is definable among them), (2.55c) strikes us as far worse than (2.55a,b), since all natural numbers are (necessarily) integers, while many are prime and "most" of them non-prime. A mathematician might balk at this intuition, and in particular at the use of such quantifiers as most in this context, unless of course the set of natural numbers were finitized by establishing an upper bound: Some natural numbers under 10^{100}, etc.

The proper subset relation in (2.55a,b) and not in (2.55c), is apparently the source of the intuitive judgments of anomaly, overriding the equivalence in cardinality of the actual sets involved. In the same way, notwithstanding the correspondence between the set of integers and its subset of even integers (every integer n can be mapped onto a corresponding even integer 2n), we observe:

(2.56) a. Some integers are even.

b. *Some integers are either even or odd.

The severity of the violation resulting from using some with the knowledge of all is matched by the use of any other non-universal quantifier under the same conditions:

(2.57) $*\left\{\begin{array}{l}\text{Many}\\ \text{Most}\\ \text{Almost all}\end{array}\right\}$ men are mammals.

If the degree of badness of "understatement", i.e. violation of the upper-bound implicature, were merely a matter of quantitative difference between the lower-bound asserted by the quantifier used in a statement and that asserted by the strongest quantifier which could be used, salva veritate, in the same context, there would be no way to explain the fact that (2.58a,b), involving the use of almost all for all, are decidedly worse than (2.58c,d), where some is used with the knowledge of almost all:

(2.58) a. *Almost all men are mammals.

b. *Almost all natural numbers are greater than -3.

c. ?Some Austrians speak German.

d. ?Some natural numbers are greater than 3.

The same observations we have been making concerning the positive-scale quantifiers of (2.1a) apply, mutatis mutandis, to the negative-scale quantifiers and to both positive and negative quantificational adverbs:

(2.59) a. *{Not all / Few} bachelors are married.

b. *The sun {has seldom / hasn't always} revolved around the earth.

c. *People don't speak Dalmatian everywhere these days.

d. *A full house {often / usually} beats two-of-a-kind.

None of the sentences in (2.59) could be uttered consistently by a speaker who is aware that the universal is true in each case.

§2.15 Inferences, invited and forced

To characterize this distinction we have established between types of implicature violations, let us refine the notion of conversational implicature. Geis & Zwicky and Karttunen[15] have introduced a notion of "invited inference" to describe a relation between sentences which resembles but is weaker than entailment.[16]

(2.60) a. Ralph wasn't able to pass the test.

b. Ralph didn't pass the test.

c. Ralph was able to pass the test.

d. Ralph passed the test.

e. Ralph was able to pass the test, but he didn't take it.

f. *Ralph wasn't able to pass the test, but he passed it anyway (e.g. by cheating).

(2.60a) entails (2.60b), the negation of its complement. Note that the former cannot be consistently conjoined to any proposition which asserts or entails the negation of the latter, as in (2.60f). With normal stress, (2.60c) strongly suggests that its complement, (2.60d), is true. This suggestion or expectation can be removed without contradiction, as in (2.60e). In Geis & Zwicky's term, the utterer of (2.60c) *invites the inference* of (2.60d), an inference which can be explicitly *un*invited by material in or out of the sentence.

Several of the predicates which Karttunen (1970a,b) describes as implicative or semi-implicative (i.e. as expressing an entailment in the use in positive sentences, negative sentences, or both) should be regarded not as *entailing* but rather as *inviting the inference* of their complement or of its negation. Consider, for example, the relations among the following sentences:

(2.61) a. Martha remembered to turn off the lights.
b. Martha turned out the lights.
c. Martha $\left\{\begin{array}{l}\text{didn't remember}\\ \text{forgot}\end{array}\right\}$ to turn out the lights.
d. Martha didn't turn out the lights.
e. ....so I had to remind her.
....but luckily she brushed against the switch.

Remember is listed in Karttunen (1970a) as a full implicative verb. If this classification is correct, positive sentences with *remember* like (2.61a) entail their complement, i.e. (2.61b), while negative *remember* sentences entail the negation of their complement--(2.61c) entails (2.61d).

But this is in fact not the case, at least for the majority of English speakers. While (2.61c) does suggest that (2.61d) is true, additional context can remove this invited inference, as is effected by the continuations in (2.61e). The status of the relation between positive *remember* and its complement in (2.61a,b) is somewhat harder to categorize, since the inference of (2.61b) is rather difficult to uninvite.

It must be conceded that Karttunen, in a later discussion of implicative verbs (Karttunen 1970b), does not classify _remember_ as an implicative (or, in fact, as anything at all), but _forget_ is listed therein as a full _negative_ implicative, and the same objection must be interposed. With actual negative implicatives (N.B.: the term _implicative_ refers to verbs bearing _entailments_ and not _implicatures_)--e.g. _fail_, _neglect_, and _avoid_--no qualification of the context as that in (2.61e) can remove the force of the entailment.

A parallel reclassification is in order for the purported _IF_-verb _persuade_:

(2.62) a. I persuaded Judy to leave.

b. I $\left\{\begin{array}{l}\text{forced}\\ \text{caused}\end{array}\right\}$ Judy to leave.

c. Judy left.

d. ...but then $\left\{\begin{array}{l}\text{she changed her mind.}\\ \text{Ben persuaded her not to.}\end{array}\right\}$

e. I caused Judy to come to intend to leave.

Without further modification, (2.62a) invites the inference of, but does not entail, its complement (2.62c). This invitation is subject to cancellation in such contexts as (2.62d)--note the characteristic _but_ which signals the removal of an invited inference, as in (2.60e) and (2.61e). Force and causation are evidently stronger means of control than persuasion, in fact irrevocable means: (2.61b) with its true _IF_-verbs _entails_ (2.62c), an entailment which cannot be removed by (2.62d).

Persuade is decomposed by Lakoff (1970a) into the structure CAUSE(COME(INTEND)), but it should be remarked that if the abstract predicates of causation, inchoation, and intention in the decomposed version are to be identified with their literal English counterparts, an asymmetry ensues. While (2.62a), as we observed, invites the inference of (2.62c), no such inference can be drawn from the purportedly identical decomposed form in (2.62e). Alternatively phrased, lexicalization of the abstract form is contingent upon the presence of the invited inference, just as in the case of cardinal numbers described in Chapter 1.

Another example of this sub-logical relation is represented by the conditional. In Geis & Zwicky's example,[17]

(2.63) a. If you mow the lawn, I'll give you $5.
b. If you don't mow the lawn, I won't give you $5.
c. _If_ _P_ _then_ _Q_ invites the inference _If_ _-P_ _then_ _-Q_.

According to the general principle stated in (2.63c), (2.63a) invites the inference of (2.63b)--and, incidentally, vice versa.

Now invited inferences, by virtue of their contradictability, must be considered a conversational relation rather than a strictly logical one. Unlike logical presupposition or entailment, invited inferences depend for their strength--indeed, for their very existence--on facts of context, both linguistic and extralinguistic. They, unlike true logical relations, can--as we have already demonstrated--be overtly repudiated without contradiction.

Strictly speaking, then, a speaker (not a sentence or proposition) can invite the listener to draw an inference, specifiable linguistic and conversational contexts. The language of this discussion is, of course, strongly reminiscent of that employed earlier to define conversational implicature. Furthermore, such inferences as that given by (2.63c) are intrinsically related to Grice's maxim of quantity. To offer a condition for something to apply, a protasis for some apodosis, is to implicate, all thing being equal, that *only* this protasis will do.

If, in other words, we stipulate P as a sufficient condition for Q, then we implicitly suggest that P is a necessary condition as well. We saw above that asserting a *lower* bound (as for cardinal numbers and quantifiers) implicates an *upper* bound, that just as *only n* presupposes *n*, n implicates *only n*. By the same token, *only if* presupposes *if* but *if*, in turn, implicates (or invites the inference of) *only if*. Hence, the rule of (2.63c) follows automatically from our characterization of scalar predicates.[18]

It should be added that this rule is incomplete as it stands: the inference of (2.63b) from (2.63a) is invited only assuming full knowledge of the relevant etiology. A speaker uttering the causal relation *if P then Q*--$P \vdash Q$--invites the inference that, *for all he knows*, $P \nvdash Q$. The epistemic condition is necessary here as with scalars; only if the speaker believes that ~P, as well as P, semantically entails Q is he guilty of misleading his listener.

The invited inferences of the complement of positive *able* (2.60) and *persuade* (2.62), and of the negation of the complement of *forget* and of negated *remember* (2.61), are more difficult to explain. Clearly, these do not simply constitute a scalar phenomenon: if anything, that would predict that in

(2.64) a. Bill was able to leave.
b. It was possible for Bill to leave.
c. Bill left.
d. Bill didn't leave.

the (a) sentence would implicate that Bill was <u>only</u> <u>able</u> to leave, that he didn't actually do so, whereas it in fact implicates not (2.64d), but (2.64c), its positive complement. A different application of the maxim of quantity appears to be involved: the mention of Bill's ability (or Judy's intention in (2.62a), Martha's recollection in (2.61a)) is relevant only if it had issue, if it led to an actual instance of leaving.

The apparently identical sentence in (2.64b), on the other hand, <u>is</u> scalar, due to the weak scalar element <u>possible</u> (cf. §2.2), and therefore <u>does</u> implicate <u>only</u> possible. Thus, while (2.64a) implicates (2.64c), the superficially similar (2.64b) implicates, in neutral contexts, the negation of its complement, viz. (2.64d). In order to render the application of the Gricean maxim non-circular, we need recourse to the information that possible (like <u>some</u>, <u>warm</u>, and <u>37</u>) is a scalar predicate, but <u>able</u> (like <u>persuade</u>, <u>forget</u>, and <u>intend</u>) is not.

The maxim of quantity, it will be recalled, has two conditions: the speaker provides the listener with (i) <u>all</u>, and (ii) <u>only</u> that information which he deems relevant. The upper bound implicated by scalars constitutes an instance of (i), but it is in principle impossible to determine which condition takes precedence in defining the implicature(s) of non-scalar, non-success verbs. Establishment of an entailment

$P \vdash Q$ in one direction is not sufficient to determine an implicature from Q into -P in the other, as shown by the non-implicature of (2.64d) by (2.64a), which we observed above, in the face of the entailment by (2.64c) of the latter.

A case of more-or-less scalar predicates in which the upper-bound implicature does apply is given by the following:

(2.65) a. Bill wanted to leave.
b. Bill tried to leave.
c. Bill succeeded in leaving.
d. Bill left.

Note that the entailment relations can be established:

(2.66) succeed $\vdash$ (at least) try $\vdash$ (at least) want

We find that the implicatures in (2.65) proceed in accordance with the general conditions for scalars: to utter (2.65a) is to implicate (albeit weakly) the negation of (2.65b), while to utter (2.65b) is to implicate the negation of (2.65c). Since <u>succeed</u>, unsurprisingly enough, counts as a success verb (a Karttunenian implicative), (2.65c) entails (2.65d). By what we can think of as a second-order implicature, any statement of either (2.65a) with <u>want</u> or (2.65b) with <u>try</u> implicates that (2.65d) is false, i.e. that Bill <u>didn't</u> leave.

As to the existence of an actual scale of predicates ranging from weak <u>want</u> through <u>try</u> to strong <u>succeed</u>, the establishment of such a scale would hinge on judgments of such sentences as:

(2.67) a. ?Harriet at least wanted to go. (she may have tried)
Harriet at least tried to go. (she may have succeeded)
b. ?Harriet wanted if not tried to go.
?Harriet tried if not managed to go.

c. ??Harriet only wanted to go. (she didn't try/go)
?Harriet only tried to go. (she didn't succeed)

d. Harriet wanted to go, and it's even possible that she tried to.
Harriet tried to go, and it's even possible that she succeeded.

As far as can be determined from these examples, the scalar relation between _try_ and _succeed_ seems firmer than that relating _want_ and _try_.

In any event, suspension of the implicature as in (2.67d), as is the case for all upper-bound implicatures, results in admitting the (epistemic) possibility of a stronger proposition holding, and is therefore permissible. As we might expect from our earlier discussion of suspendibility, it is just such implicatures, which differ from the assertion in polarity, that can be so suspended. Thus the impossibility of suspension (but not of direct cancellation) of implicature in:

(2.68) a. Bill was able to leave,
{*and it's even possible that he didn't.
but he didn't.}

b. Bill forgot to leave,
{*and it's even possible that he left.
but he left (by accident).}

The two notions of conversational implicature and invited inference appear then to fall together, at least in that invited inference is a subcategory of implicature. We shall maintain that it is a proper subcategory thereof, that not all implicatures can be categorized as invited inferences. In particular, we can regard the inference of _not all_ from _some_, _many_, or _most_--and the inference of _some_ (= _not none_) from _not all_ or _few_ (= _not many_)--as conversationally _forced_ rather than merely _invited_.

We shall assume that on quantitative scales with defined end-points the negation of this end-point (or strongest element) must be inferred by the listener from the stipulation of any weaker element on that scale, while the negation of non-terminal elements may be inferred from the stipulation of relatively weaker elements. Inference in the latter case involves a considerably higher risk of disappointment.

Mor schematically, given a quantitative scale of n elements p_1, p_2,..., p_n and a speaker uttering a statement S which contains an element p_i on this scale, then

(2.69) (i) the listener can infer $\sim S^{p_i}_{p_j}$ for all p_j p_i ($j \neq n$)

(ii) the listener must infer $\sim S^{p_i}_{p_n}$

(iii) if $p_k > p_j > p_i$, then $\sim S^{p_i}_{p_j} \supset \sim S^{p_i}_{p_k}$

(where S^a_b denotes the result of substituting b for all occurrences of a in S)

In general, then, as (iii) indicates, the inference of the negation of $p_j(x)$ from the stipulation of $p_i(x)$ is safer, more likely to be justified, the further p_j is above p_i on scale P. If we are told by someone that some of his best friends are Zoroastrians, it is safer for us to conclude that it is not the case that most of them are than that not many are. We must draw the inference that not all are, i.e. that at least some are not Zoroastrians.

When we turn to matters of modality, and the interaction of modality and negation, in our later discussion, we shall see the relevance of invited and forced inference to the relationship between modals and quantifiers and to the notion of possible lexicalization.

§2.2 The Modal Scales

§2.21 Aristotle's *possible*

We shall open the investigation of the scalarity of modal, epistemic, and deontic values by tracing the course of modal logic back to its source. We shall learn, in so doing, the accuracy of Zeno Vendler's apposite warning:[19]

> At this point, as it often happens, we suddenly realize that the path of inquiry we hoped to open is already marked with the footprints of Aristotle.

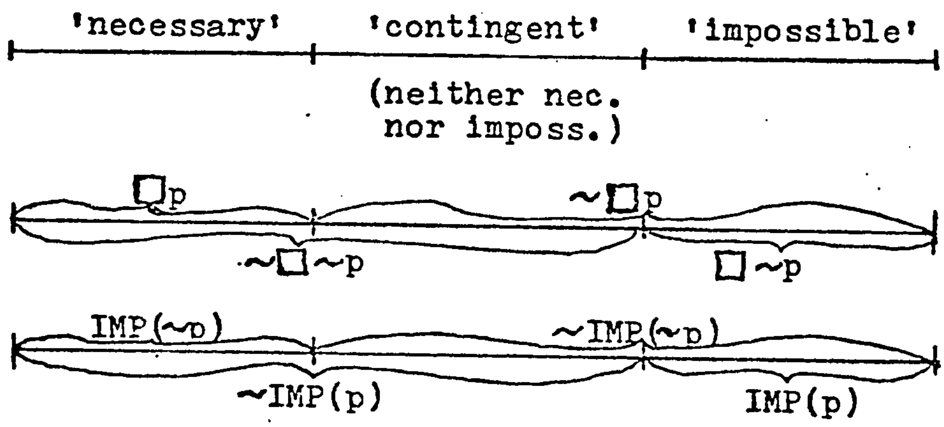
In *de Interpretatione*, Aristotle correctly observes that "for the same thing it is possible both to be and not to be", that in fact "everything capable of being cut or of walking is capable also of not walking or of not being cut".[20] The claim that $\Diamond p$[21] is consistent with $\Diamond{\sim}p$ is surely unexceptionable. But Aristotle does not stop here; rather, in the Prior Analytics,[22] he goes on to warn "I use the terms 'possibly' and 'the possible' of that which is not necessary but, being assumed, results in nothing impossible". This is "two-sided possibility", as distinguished from a one-sided variant admitted by Aristotle in the next sentence: "We also say ambiguously of the necessary that it is possible". The ambiguity here is that of *possible*, not *necessary*. Aristotle does use *possible* 'homonymously' for this sense, in which *possible* and *necessary* are no longer mutually exclusive. As Hintikka (1960) shows, Aristotle's use of 'homonymous' does not preclude a common, 'neutralized' application of the term, in this case for propositions which are neither necessary nor impossible.

If we segment a scale of possibility as in (2.70a), then the values for necessity and impossibility are assigned by Aristotle as indicated in (2.70b) and (2.70c) respectively.[23] We see that the problem of homonymous usage does not arise for the definition of these terms.

(2.70) a.

b.

c.

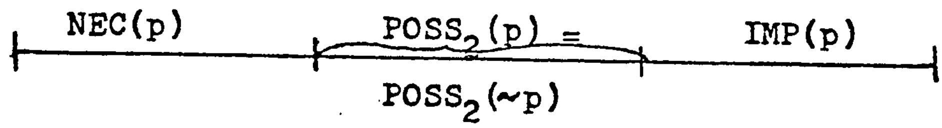


But one-sided possibility is defined as the contradictory of <u>impossible</u>:

(2.71)

while two-sided possibility is its contrary, restricted to the middle segment:

(2.72)



Notice that the latter sense of possibility is bilateral in that if p is possible, its negation ~p is possible as well. As formalized by Aristotle,[24] assuming we are using <u>possible</u> in conformance with the bilateral definition of (2.72), then

> that which is possible then will be not necessary and that which is not necessary will be possible.[25] It results that all premisses in the mode of possibility are convertible into one another.

Taking set membership as a case in point, 'it is possible to belong' may be converted into 'it is possible not to belong', since we can establish a law of complementary conversion transforming $\Diamond p \rightarrow \Diamond{\sim}p$ and vice versa. Given the propositions

(2.73) a. $\Diamond(A \in B)$ 'A possibly belongs to B'

b. ${\sim}\Diamond(A \in B)$ 'A does not possibly belong to B'

c. $\Diamond{\sim}(A \in B)$ 'A possibly does not belong to B'

we observe, with Aristotle, that (b) is the proper denial of (a), but (a), he proposes, implies (c) by complementary conversion and in fact, since conversion is symmetric, (a) is equivalent to (c).[26]

Having defined the two senses of possible, Aristotle nevertheless proceeds in de Int. to confuse them utterly. It is easy to show that complementary conversion is incompatible with the $\Box p \supset \Diamond p$ entailment:

(2.74)	(i)	$\Diamond p \supset \Diamond{\sim}p$	(COMPLEMENTARY CONVERSION)
	(ii)	${\sim}\Diamond{\sim}p \supset {\sim}\Diamond p$	(from (i) by contraposition)
	(iii)	$\Box p \supset {\sim}\Diamond p$	(from (ii) by subst. of equivalents, given the Aristotelian equation $\Box p \equiv {\sim}\Diamond{\sim}p$)
	(iv)	$\Box p \supset \Diamond p$	(cf. de Int. 13, 22b11)
	(v)	$\Box(P \vee {\sim}P)$	(cf. de Int. 9, 18a34ff.)
	(vi)	$(P \vee {\sim}P)\ \&\ {\sim}(P \vee {\sim}P)$	(from (iii), (iv), and (v))

But the contradiction in (vi), by virtue of which any necessary truth is both possible and not possible, only follows if we ignore, as Aristotle does,[27] the obvious truth that if possible is ambiguous, then (iii) holds for two-sided possibility--whatever is <u>necessary</u> is not <u>possible</u>$_2$--and (iv) does not, whereas for <u>one</u>-sided possibility, (iv) holds --whatever is <u>necessary</u> is also <u>possible</u>$_1$--and (iii) does not. Schematically,

(2.75) $\text{necessary}(p) \supset \text{possible}_1(p) \qquad \text{poss}_1(p) \not\supset \text{poss}_1(\sim p)$

$\text{necessary}(p) \not\supset \text{possible}_2(p) \qquad \text{poss}_2(p) \supset \text{poss}_2(\sim p)$

The pernicious ambiguity with which Aristotle was guilty of employing <u>possible</u> was resolved by his commentator Theophrastus (the 'Old Peripatetic') at the cost of rejecting the insight expressed by the law of complementary conversion and the identification of two-sided possibility as the normal sense of the term, a "distinguishing characteristic of Aristotle's modal logic".[28] Theophrastus, in rejecting the principle of conversion along with bilateral possibility as invalid, set the trend for future logicians, who followed him in identifying <u>possible</u> with Aristotle's one-sided sense, retaining the conversion principle into the notion of contingency, defined, much as was two-sided possibility, by

(2.76) $\text{contingent}(p) =_{df} \Diamond p \,\&\, \Diamond{\sim}p$

Significantly, this usage did not obtain universally in medieval logic: Abelard, more renowned perhaps for other escapades, found time to identify <u>possibile</u> with <u>contingens</u>, and establish a tri-valued modality based on <u>necessarium</u>, <u>possibile</u>, and <u>impossibile</u>. Unfortunately (for the consistency of his logic), he failed to disavow the <u>necessary</u> $\supset$ <u>possible</u> entailment.[29]

§2.22 Complementary conversion and the modal scale

It is true, as asserted by the tradition of Theophrastus and his successors up to the modern era,[30] that any system in which necessity entails possibility cannot embrace the principle of complementary conversion. (2.73a) cannot consistently imply (2.73c), if 'imply' is taken as 'logically entail', much less can they be regarded as equivalent. But it is not necessary in admitting this to throw out the baby of Aristotelian intuition along with the bath water of logical inconsistency. Just as Sir William Hamilton's insight into the upper-boundedness of *some* as *some but not all* was recapturable in §2.11 by applying the Gricean relation of conversational implicature, so too with Aristotle's insight into the normal upper-boundedness of *possible* in natural language as *possible but not necessary*.

The alternative boundedness of *possible* does not constitute a *linguistic* ambiguity, as Aristotle believed, any more than does the optional boundedness of cardinals, *pace* Smith (1970), but rather a conversational one: 'imply' in the previous discussion must simply be read as '(conversationally) implicate'.

Just as we do not use *some* with the knowledge of *all*, the knowledge that $\Box p$ precludes the sincere use of $\Diamond p$. *Possible* is entailed by *necessary*, as is *some* by *all*, and therefore implicates its negation. Since $\sim\Box p \equiv \Diamond\sim p$, complementary conversion is in effect, provided that it is regarded as a non-logical relation. As with many of the scales discussed above, the logical scale relating possibility and necessity admits an intermediate value:

(2.77) necessary(p)$\vdash$(at least)true(p)$\vdash$(at least)possible(p)

Expressed in more conventional language, standard modal logics[31] include the following postulates and/or theorems:

(2.78) $\Box p \vdash p$

$p \vdash \Diamond p$

$\Box p \vdash \Diamond p$

Whatever is necessary, _is_; whatever is, is possible. But, because of the rule of quantity, if we know something to be the case, we do not say that it is possible. Thus

(2.79) It is possible that this sentence contains nine words.

strikes us as a bit peculiar, albeit true. _Possible_, with its implicature of _not necessary_, will amount conversationally, if not logically speaking, to _contingent_.

§2.23 _Epistemic and logical modality_

Consider now the nature of the anomaly in the following sentences, uttered in the face of certain knowledge in one direction or the other:

(2.80) a. It's possible that John left.

b. John left.

c. John didn't leave.

d. It's possible that John left, ?and (in fact) he did.

e. It's possible that John left, *but (in fact) he did.

The violation resulting from the use of (2.80a) by a speaker who knows that (2.80b) is true represents the kind of understatement characteristic of a failure to provide all the relevant information. If the implicit contravention of the implicature is made explicit, as in (2.80d), no logical inconsistency ensues, although we may wonder why the speaker bothered to assert the first conjunct, rather than merely entail it by uttering (2.80b). If, on the other hand, the speaker is aware that (2.80c) is true, he _cannot_ use (2.80a): to do so would be not to equivocate or mislead, but to lie. Note the inconsistency of conjoining the two assertions, as in (2.80e).

No theorem can be derived in conventional modal logic which would account for the contradictory status of $\Diamond p \;\&\; {\sim}p$. The reason for this gap, according to those who have observed it,[32] is that the notion of possibility in (2.80), and indeed the usual sense of _possible_ denoted in natural language, is not a _logical_ but an _epistemic_ one, _possible_ as opposed to _certain_ rather than to (_logically_) _necessary_.

When _possible_ is used epistemically, we can have--as in (2.80e)--what Hacking calls "a logically possible state of affairs that is not possible", if we know that this state does not obtain.[33] The constraint is that "If I know that ~p, I cannot truthfully say that it is possible that p", at least if we retain the _that_ complementizer. Hacking observes that (2.81b), unlike (2.81a), _is_ logically consistent:[34]

(2.81) a. *It is possible that I shall go (but I won't).

b. It is possible for me to go (but I won't).

The presence of a contrary-to-fact subjunctive or later time of reference in the <u>possible</u> clause also amnesty the violation, as demonstrated by Karttunen:[35]

(2.82) a. *It isn't raining in Chicago, but $\left\{\begin{array}{l}\text{it may be raining there.}\\ \text{it's possible that it is raining there.}\\ \text{perhaps it is.}\end{array}\right\}$

b. It isn't raining in Chicago, but $\left\{\begin{array}{l}\text{it could be.}\\ \text{it's possible that it would be (if I had}\\ \quad\text{seeded the clouds).}\\ \text{tomorrow it may be.}\end{array}\right\}$

(2.83) a. I know that p, and it is possible that $\sim$p.

b. p, and it is possible that $\sim$p.

Hintikka (1962) has developed an epistemic modal logic in which, although (2.83b) cannot be shown to be inconsistent, the closely related (2.83a) can. Armed with the Hintikkan rule that we only assert what we know, the anomaly of (2.83b) will follow. (2.83b), then, is not logically inconsistent but what Hintikka would term 'epistemically indefensible'.[36]

The epistemic sense of <u>possible</u>, as observed above, contrasts with (i.e. implicates the negation of) <u>certain</u>. An intermediate point on the epistemic scale can be defined, and occupied by <u>probable</u> or <u>likely</u>:

(2.84) $\text{certain}(p) \vdash (\text{at least}) \left\{\begin{array}{l}\text{probable}\\ \text{likely}\end{array}\right\} (p) \vdash (\text{at least})\text{possible}(p)$

The implicatures are defined in the usual manner, and are subject to the usual suspensions and contradictions, as well as to reinforcement through assertion:

(2.85) a. It's {possible if not probable / probable if not certain} that John will leave.

b. It's possible that John left, in fact {he did leave. / it's certain.}

c. It's possible that John left, but not likely.
It's likely that John left, but not certain.

If we say that something is "more than possible", we are in general saying that it is in fact further along the road to certainty.

On the correspond'ng negative scale, we can establish a ranking as follows:

(2.86) impossible(p) ⊢ (at least) {improbable / unlikely} (p) ⊢ (at least) chancy(p) ⊢ (at least) uncertain(p)

Illustrations of this scale include the following:

(2.87) a. It's {improbable if not impossible / *impossible if not improbable} that John will leave.

b. Hubert's victory is {uncertain if not (downright) chancy. / *chancy if not (downright) uncertain. / chancy if not (downright) unlikely. / *unlikely if not (downright) chancy.}

c. It's improbable that you are right (but not {impossible. / *uncertain.})

Notice that while the colloquial <u>chancy</u> is uncomfortable in the presence of object complements (??<u>It's</u> <u>chancy</u> <u>that</u> <u>he'll</u> <u>win</u>.), evidence from sentences with nominalized sentential subjects indicates the location of <u>chancy</u> between <u>unlikely</u> and <u>uncertain</u> on the negative scale. That <u>chancy</u> is indeed a negative-asserting epistemic modal can be seen in the

(b) sentences above, as well as in the following examples:

(2.88) a. $\text{Victory is} \left\{ \begin{array}{l} \text{chancy} \\ \text{improbable} \\ \text{*(only) probable} \end{array} \right\} \left\{ \begin{array}{l} \text{at best.} \\ \text{if that.} \end{array} \right\}$

b. Survival under those conditions was
$\left\{ \begin{array}{l} \text{*possible if not chancy.} \\ \text{*chancy if not possible.} \\ \text{chancy if not impossible.} \end{array} \right\}$

The problem involved with the anomaly of (3.83a) can be shown to be related to that which arose for Aristotle[37] and is paralleled by other scalar predicates which embed propositions. Let S represent the strongest element on a scale and W the weakest. Then apparently a conversational, if not logical, contradiction ensues:

(2.89)	(i) $S \supset W$	(definition of scalarity)
	(ii) W implicates W~	(complementary conversion)
	(iii) $W{\sim} \equiv {\sim}S$	(theorem of quantificational logic, modal logic, etc.)
	(iv) W implicates ~S	(substitution of equivalents)
	(v) S is consistent with ~S	(i,iv: analogue of modus ponens)

The contradiction deduced here results from the upper-bounding of W: for (i) to be valid conversationally as well as logically, the implicature in (ii) cannot apply. Thus *all* entails *some* but is inconsistent with *some not* (= *not all*), *certain* entails *possible* but is inconsistent with *possible not* (= *not certain*), etc.

Notice that the distinction we drew in §2.15 between forced and invited inference applies to the epistemic scale: the use of *possible* invites the inference of the negation of non-universal probable and forces the inference of the negation of universal certain. For me to utter

(2.90) It's possible that it's raining out now.

is slightly misleading if I have reason to believe that the precipitation is probable (e.g. if I had heard a weather report forecasting that there would be a 70%--or even 100%--chance of rain at the time in question), but it would be anomalous for me to announce (2.90) in good faith if I were certain (e.g. through sensory input) that it is raining.

Just as the logical notion of possibility as it appears on the scale of (2.77) yields, in natural language, to the epistemic notion on the scale of (2.84), so too with its counterparts of logical necessity. As Karttunen remarks,[38] (2.91a), with its apparent instance of the necessity operator, should be stronger than (i.e. entail but not be entailed by) (2.91b), in accordance with the modal entailment $\Box p \supset p$.

(2.91) a. John must have left.

b. John has left.

c. John may have left.

But the reverse is in fact the case, as (2.91a) is not paraphrased by (2.92a), but rather by Karttunen's suggestion, (2.92b):

(2.92) a. It is logically necessary that John left.

b. I know something from which it logically follows that John left (although I cannot report this as an established fact).

Karttunen is probably correct in attributing this discrepancy to

> the general conversational principle by which indirect knowledge, i.e. knowledge based on logical inferences, is valued less highly than knowledge which involves no reasoning.[39]

Necessity is stronger than truth in modal logic, which "trusts" deductive proof more than sensory information concerning synthetic facts about the world. The reverse is the case for natural language, with its notoriously materialistic speakers and hearers who are more willing to commit themselves to their perception of reality, however unreliable we can show it to be, rather than to the elegance of the frequently counter-intuitive formal processes of logical deduction.

We notice the emergence of an asymmetry due to the absence of a reading corresponding to logical necessity: while the use of (2.91c) by a speaker does implicate his unwillingness to vouch for the stronger (2.91b) or (2.91a), there is no implicature whatsoever between (2.91b) and the theoretically stronger (2.91a), at least not in the direction from the former to the negation of the latter. Even logically necessary, analytic propositions like 2 + 2 = 4 can be stated without any guilt for misleading a listener through the failure to include that this fact is logically necessary.

§2.24 Deontic modality

In addition to logical and epistemic scales, we can determine a ranking for the values of permission and obligation. Von Wright (1951) has shown that parallel to the modal logic developed by Lewis[40] in which we can derive the theorem

$\Box p \vdash \Diamond p$, a system of deontic logic can be defined in which $Op \vdash Pp$, i.e. p is obligatory entails that p is permitted. More accurately, by von Wright's "Principle of Permission", O(A) entails P(A) for any act A, since obligation and permission are predicated of acts, rather than propositions *per se*.[41]

If obligation entails permission, then we should expect an utterance in the mood of the latter to implicate (force the inference) of the negation of the former. And so it does:

(2.93) a. You are $\left\{\begin{matrix}\text{required}\\ \text{obligated}\end{matrix}\right\}$ to marry my daughter.

b. You are permitted to marry my daughter.

c. You are not obligated to marry my daughter.

d. You are permitted to not marry my daughter.

e. You are $\left\{\begin{matrix}\text{not permitted}\\ \text{forbidden}\end{matrix}\right\}$ to marry my daughter.

(a) entails (b) and the assertion of the latter does indeed under normal circumstances implicate that (c), the negation of (a), is true (or rather not known to be false). On the negative side, (e) entails the weaker (c), and the knowledge that the former applies generally renders the latter inapplicable.

Since we can accept the deontic equivalence $\sim O(A) \equiv P\sim(A)$, included as a theorem in von Wright (1951), corresponding to the Aristotelian modal equivalence $\sim\Box p \equiv \Diamond\sim p$, (2.93b) implicates (2.93d) as well, as (c) and (d) are mutual paraphrases. By the same principle, (2.93d) will implicate (2.93b): the symmetric law of complementary conversion is as valid between the deontic values of permitted and permitted not as between

$\Diamond$ and $\Diamond\sim$, provided in both cases that the principle applies to the theory of speech acts and not to logical form.

Because of this upper-bound implicature, we must question the relevance to natural language of von Wright's claim that "in the non-smoking compartment, not-smoking is permitted and smoking forbidden".[42] Although the first clause of the conjunction may be logically valid, it would never occur to us to say that not-smoking is <u>permitted</u>, since it is <u>obligatory</u>.

Notice that it is possible to associate the superficially intransitive deontic predicates in (2.93) with morphologically related transitive verbs which manifest the identical scalar properties:

(2.94) a. I require you to marry my daughter.

b. I $\left\{\begin{matrix}\text{permit}\\ \text{allow}\end{matrix}\right\}$ you to marry my daughter.

c. I do not require you to marry my daughter.

d. I $\left\{\begin{matrix}\text{permit}\\ \text{allow}\end{matrix}\right\}$ you $\left\{\begin{matrix}\text{to not}\\ \text{not to}\end{matrix}\right\}$ marry my daughter.

e. I $\left\{\begin{matrix}\text{do not permit you}\\ \text{forbid you}\end{matrix}\right\}$ to marry my daughter.

In both transitive and intransitive cases, the upper-bound implicature of P(A) can be suspended, cancelled, or asserted:

(2.95) a. permit(ted) if not require(d)

b. permit(ted) and indeed require(d)

c. permit(ted) but not require(d)

§2.25 <u>The scale of syntactic modals</u>

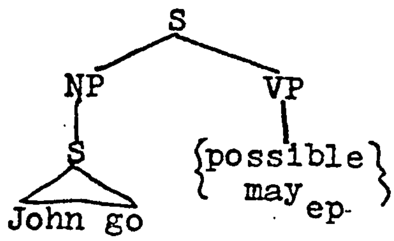
Corresponding to both modal/epistemic and deontic scales, we find the familiar if somewhat intractable class of syntactic modals. The semantic values for the relevant subset can be given as follows:

(2.96)

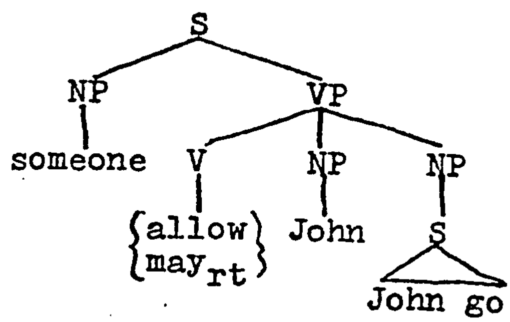
Modal	(i) Epistemic/ Logical	(ii) Deontic	(iii) ?
can/could	possibility	permission	ability[43]
may/might	possibility	permission	
should/ought	possibility	weak obligation; suggestion	
must/have to	certainty/ necessity	strong obligation	

Ross (1967) and Newmeyer (1969) have given evidence for treating epistemic and logical modals (column i) as subject-embedding intransitives. The correctness of their conclusions will be assumed here. Likewise, Newmeyer's analysis of non-epistemic "root" modals will also be assumed, at least for the deontic values of column (ii), although, as we shall see, not for the ability sense of <u>can</u>. Under this analysis,[44] <u>John</u> <u>may</u> <u>go</u> will be assigned two remote structures corresponding to its two possible disambiguations into <u>possible</u> (<u>that</u>) and <u>allow</u>, respectively:

(2.97) a.



b.



As Newmeyer notes,[45] no treatment of modal systems including his own has treated the correspondence between epistemic and deontic senses for each modal as anything other than an accident. But, he points out, it is not coincidental that the modal whose epistemic sense is *possible* has the deontic sense *permitted* rather than *obligatory*. The ambiguity of syntactic modals is indeed systematic, not random. We should be extremely skeptical if a field worker reported the discovery of a language with the following arrangement of modal values:

(2.98)

Modal	Epistemic	Logical	Deontic
blik	possible	necessary	weakly obligatory
bnik	probable	possible	obligatory
bvik	certain	possible	permitted

In order to predict this non-occurrence of intuitively impossible lexical items, it is necessary to explicitly relate epistemic and root structures, perhaps--as Newmeyer suggests--by embedding the former within the latter under a causative element, if the obvious pitfalls in this approach could be avoided.[46]

In any event, the root and epistemic modals correspond in terms of both entailment relations[47] and implicatures characteristic of scalar predicates:

(2.99) $\text{must} \vdash \text{(at least)}\,\text{should} \vdash \text{(at least)} \left\{\begin{matrix}\text{can}\\ \text{may}\end{matrix}\right\}$

For both root and epistemic readings, *can*, *may*, *could*, and *might* implicate the negation of the stronger modals, while *should* and *ought to* implicate the negation of *must* (which, incidentally, is not *mustn't*, but *needn't* or *~have to*).

Observe the following illustrations of the modal scale:

(2.100) a. John can, and indeed should, help that little old lady across the street.

b. Priests can, and indeed must, remain celibate.

c. It could be raining out, and indeed it is.

d. John may leave soon, but he {needn't. / doesn't have to.}

Unnegated epistemic <u>can</u> has a strange ring in modern English, and is generally replaced by <u>may</u>, <u>might</u>, or its root past tense <u>could</u> to indicate epistemic possibility:

(2.101) a. It {may / might / ?can / could / can't} be raining out.

b. John {?can / may} have already left.

The rule of complementary conversion applies to those modals which constitute semantic realizations of possibility and permission, i.e. the class in (2.101a), but not to the others, just as we would predict. Thus <u>may</u> can be converted into <u>may</u> <u>not</u>, in either root or epistemic contexts, but <u>should</u> can never be converted into <u>should</u> <u>not</u>. When Dear Abby reassures Worried that "the trance your sister went into could be a spell unrelated to your baby's feet",[48] her reassurance rings somewhat hollow, since she is implicating, by the conventional rules, that the trance indeed <u>could</u> have <u>been</u> related to the fish-shaped form of the feet of Worried's <u>young</u> niece.

In addition to the intuitive connection between root and epistemic syntactic modals, and to the logical and conversational postulates with respect to which the two categories exhibit similar behavior, there are instances of modal usages which are difficult to assign to one of these categories as opposed to the other. For example, in

(2.102) a. These lines may meet without crossing.

b. These lines may not cross.

the (a) sentences can refer either to what is (logically) possible is an ideal theoretical universe, or to what is permitted by the axioms. Notice that in (2.102b) the modal can be interpreted as within, as well as outside, the scope of negation. This is a characteristic of root _may_ and not the epistemic variety.

In (2.103a,b)

(2.103) a. The center for the team must be over seven feet tall.

b. A radioactive sample must contain plutonium.

c. There must be a revolution before 1984.

semantically deontic modals referring to obligation rather than certainty or logical necessity (e.g. the _it M be that_ paraphrase[49] of epistemic modals is impossible here) nevertheless bear inanimate subjects and embed stative verbs, behavior typical of epistemics.[50] Another generic sentence, that in (2.103c), must also be understood in a root sense, despite the application of _there_-insertion which characteristically blocks this reading. (2.103c) thus contrasts with (2.104a), in which the perfect aspect forces an epistemic reading--and yet even this proviso does not apply if the modal is _should_: (2.104b) is interpreted deontically.

(2.104) a. There must have been a revolution last year. (= certainty)

b. There should have been a revolution last year. (≠ probability)

§2.3 Modals and Quantifiers

§2.31 Sporadicity

Boyd & Thorne (1969) call our attention to what they refer to as a class of non-modal uses of the modal _can_. As well as the _ability_ sense of "He can swim over a mile" and the _achievement_ sense of "I can see the blackboard", they suggest that such instances of non-modal uses include those in

(2.105) a. Parties can be dull.

b. Welshmen can be tall.

reflecting a 'sporadic' aspect related to the overt time-reference in

(2.106) a. Sometimes, parties are dull.

b. Sometimes, Welshmen are tall.

Boyd & Thorne are correct in differentiating (2.105) from epistemic, logical, and deontic modality and from the _ability_ sense of root _can_, none of which--as shown by (2.107)

(2.107) a. It is possible that parties are dull. (≠2.105a)

b. *Parties are permitted to be dull.

c. *Parties are able to be dull.

--constitute grammatical paraphrases of (2.107a). Further-more, it does indeed appear that the relevant occurrences of can correspond to the possibility of paraphrases with sometimes:

(2.108) a. President Nixon can be $\left\{\begin{matrix}\text{dull.}\\ \text{?tall.}\end{matrix}\right\}$

b. Sometimes, President Nixon is $\left\{\begin{matrix}\text{dull.}\\ \text{?tall.}\end{matrix}\right\}$

To say that a single individual is sometimes tall is uninterpretable in a world with severe constraints on height alteration. In a world with no such constraints, e.g. Carroll's Wonderland, we could say both that Alice is sometimes tall and that she can be tall, depending on the composition of her liquid diet. The acceptability of (2.105b) and (2.106b), under the assumption that our physical laws obtain in Wales, must be ascribed to the plurality of the NP in these examples, and hence to the availability of the paraphrase Some Welshmen are tall.

§2.32 Correlations in logic and language

The relationship between the erstwhile possibility modal can and the existential quantifier some with its corresponding time adverbial sometimes is, of course, no accident. We have observed that some, the weakest positive quantifier whose use implicates the negation of every stronger quantifier, stands in the same relationship to its quantificational scale as that in which can stands to the stronger elements of the logical, epistemic, and deontic scales.

Let us summarize this correspondence by a schematic table indicating the appropriate quantificational, modal, and deontic operators, given varying degrees of knowledge about the state of the world. This knowledge, designated as <u>n</u>, will range from 0, indicating total negative certainty (certainty that ~), to 1, indicating total positive certainty. The arrows represent implicature, and W and S the weakest and strongest elements on the appropriate scale.

(2.109)

scalar value	quantifier	modal	deontic	knowledge
	appropriate scalar value			
S	all	necessary	obligatory	n=1
$W \not\rightarrow \sim S$	at least some, some if not all	at least pos., pos. if not nec.	at least perm., perm. if not oblig.	$1 \geq n > 0$
$W \rightarrow \sim S$	some	possible	permitted	$1 > n > 0$
$\sim S \rightarrow W$	not all= some not	not nec.= pos. not	not oblig. =perm. not	$1 > n > 0$
$\sim S \not\rightarrow W$	not all, if any	not nec., if (even) possible	not oblig. if (even) permitted	$1 > n \geq 0$
$\sim W$	not any, none	imposs.	not perm., forbidden	n=0

It will be observed that the content of the information conveyed by the operators in the third and fourth rows, e.g. <u>some</u> and <u>not all</u>, with implicatures, is virtually identical, as is predictable on the basis of the symmetry of complementary conversion. We shall see, below, the significance of this correspondence for the process of lexical incorporation. The two alternatives, however, differ considerably in force, since what is asserted by each is implicated by the other.

Conversational postulates aside, the parallel between modal and quantificational values can be established in accordance with strictly logical considerations.[51] Rudolf Carnap[52] observes in connection with a set of theorems for the modal operators:

> We see from these theorems that 'N' [i.e. $\Box$] is quite similar to a universal quantifier and '$\Diamond$' to an existential quantifier. This seems plausible, since $N\mathfrak{S}_i$ is true if $\mathfrak{S}_i$ holds in every state-description, and $\Diamond\mathfrak{S}_i$ is true if $\mathfrak{S}_i$ holds in at least one state-description.

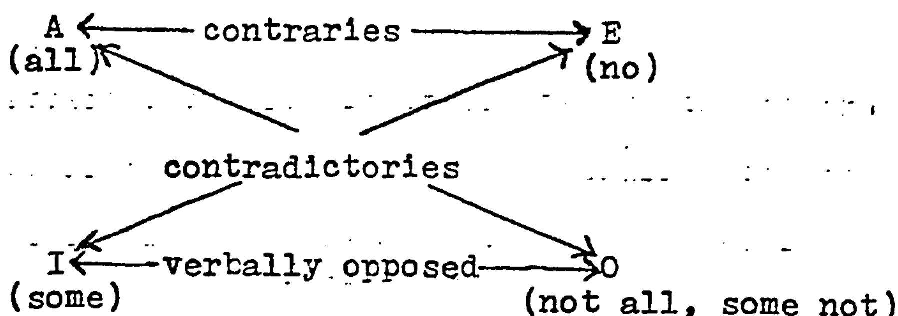
This insight, as we might expect, did not originate with Carnap. Russell (1918), treating modal notions as properties of propositional functions rather than of propositions themselves (which, under his analysis, can be only true or false), defines a propositional function as

> <u>necessary</u>, when it is always true;
> <u>possible</u>, when it is sometimes true;
> <u>impossible</u>, when it is never true.[53]

Two centuries earlier, Leibniz had recognized that the necessary obtains in every possible world, the possible in some possible world, and the impossible in none.[54]

Once more, the ubiquitous Aristotelian footprints mark the way. Aristotle's unique blend of insight and confusion on the topic of modality is matched by his treatment of the quantificational system. In the <u>Prior Analytics</u>, he expounds a system of relationships among the quantifiers which has come to be known as the "logical square":[55]

(2.110)



Aristotle thus distinguishes the "real" oppositions all/not all and none/some ('contradictory' in that the terms of each opposition must differ in polarity) and all/no ('contrary' in that both can fail to hold, although both cannot hold together, i.e. their negations are mutually consistent) from the "merely verbal" opposition of some/not all. The language of "merely verbal opposition" is strikingly reminiscent of the discussion elsewhere in the Prior Analytics of complementary conversion as applying to two-sided possibility. Here, as there, the difficulty revolves around the incompatibility between the all-some entailment and the relationship between some and some not (= not all).

It will be observed that the respective entailments from A and E on the upper horizontal of the square to I and O on the lower are in fact not designated on the chart. The laws of subalternation, $A \supset I$ and $E \supset O$, along with their contrapositive equivalents, are actually never stated by Aristotle, although they are deducible from his laws of opposition, yielded by detachment from $A \supset \sim E$ and $\sim E \supset I$ on the one hand, and from $E \supset \sim A$ and $\sim A \supset O$ on the other. While historians of logic[56] have had cause to wonder at the omission of the 'subaltern mode' in Aristotle's Organon and its postponement until the development of medieval scholastic logic, we might reasonably surmise that this omission, like the fate of complementary conversion, represented a casualty of war between logical consistency (or at least the avoidance of salient inconsistency) and insight into the structure of conversation.

Aristotle, it could be suggested, discovered conversational implicature in the same sense that Columbus discovered America when he stumbled upon Hispaniola. But implicatures are referred to as Gricean for the same reason that the New World does not bear the name of Columbus: Aristotle didn't know where he had landed when he got there.

Another semi-explicit recognition of the parallel between the quantifiers and the modals--specifically the deontic, or "authority" modals (cf. §3.321 below)--is due to Leech (1969). He cites the analogous behavior of the two "inversion systems" (in Leech's term) constituted by _all_/_some_ on the one hand, and _compel_/_allow_ on the other. To illustrate this parallelism of patterning, Leech cites the following sentences:[57]

(2.111) a. All cats do not like fish [NEG-V] = No cat likes fish.

a'. Some cats don't like fish = Not all cats like fish.

b. He compelled me not to shut the door = He did not allow me to shut the door.

b'. He allowed me not to shut the door = He did not compel me to shut the door.

§2.33 The existential _there_

If we accept the Leibniz-Carnap definition of modal operators in terms of quantifiers ranging over state-descriptions or possible worlds, perhaps along with the proposals in Hintikka (1962) for defining epistemic operators in terms of the speaker's knowledge of the relation between a proposition and a possible world, we should be prepared to look for evidence, beyond what we have already cited, for determining whether these correspondences play any appreciable rôle in the syntax of natural language.

Östen Dahl, in a footnote to his paper on indefinites (1970), points to two instances of grammatical patterning in which all and necessary seem to function together as opposed to some and possible. The rule of there-insertion[58] applies in general to indefinites only, so that (2.113a) can be derived from the semantically equivalent (2.112a), but the definitized (2.112b) cannot be transformed by there-insertion into (2.113b), with which it shares no reading, nor the generic (2.112c) into the non-equivalent (2.113c):

(2.112) a. An aardvark is in the garden.

b. The aardvark is in the garden.

c. An aardvark eats ants.

(2.113) a. There is an aardvark in the garden. (= 2.112a)

b. There is the aardvark in the garden. (≠ 2.112b)

c. There is an aardvark that eats ants. (≠ 2.112c)

Similarly, existentials qualify as indefinites (cf. Klima 1964) and consequently trigger there-insertion, but universals do not:

(2.114) a. Some men are in the garden. →
There are some men in the garden.

b. Somebody can swim the channel. →
There is somebody who can swim the channel.

(2.115) a. All the men are in the garden. ↛
There are all the men in the garden.

b. Everybody can swim the channel. ↛ There is everybody who can swim the channel.

Non-universal uses of universal quantifiers, it should be noted, *do* permit *there*-insertion, as with *all* and *every* in

(2.116) a. All kinds of people were at the party. → There were all kinds of people at the party.

b. Every sort of vegetable imaginable was in the ratatouille. → There was every sort of vegetable imaginable in the ratatouille.

Another non-universal construction with *every* (but not *all*) which permits a more complex version of *there*-insertion is exhibited in the following examples:

(2.117) a. The Democrats have {every / some / no / a(n)} {chance / possibility / prospect / right / opportunity} to win/ of winning/ of victory.

b. He doesn't have {any / *every} chance to succeed.

c. He has {no / *not every} right to say that to his mother.

Quantifiers *every*, *some*, and *no* (*not any*)--but not the negation of *every*--occur freely in this context. Whatever the *every* represents in this construction, it is clearly non-universal, and *there*-insertion proceeds accordingly, as in

(2.118) There is every {chance / possibility / prospect / .....} for the Democrats to win/of victory for the Democrats.

In (2.119a), by contrast, the *every* is universal and consequently blocks the application of the rule:

(2.119) a. They are similar in {every / some} respect.

b. There is {*every / some} respect in which they are similar.

The universality of <u>every</u> in (2.119a) is further demonstrated by the availability of a paraphrase with <u>all</u>, as opposed to the absence of this paraphrase in the construction illustrated by (2.118):

(2.120) a. They are similar in all respects.

b. *They have all {chances to win. / prospects of winning.}

Correlated with the behavior of existentials and universals under <u>there</u>-insertion, Dahl (1970) suggests, is the behavior of the nominalized modals under the same transformation in

(2.121) a. There is a {possibility} that you are right.
b. {*necessity}

The 'universal' <u>epistemic</u> value fares as poorly as the <u>logical</u> one:

(2.122) *There is a certainty that you are right.

But Dahl's argument for relatedness of quantificational and modal operators on the basis of <u>there</u>-insertion, even with the additional confirming evidence of (2.122) brought to bear, has its critical flaws. In the first place, we should expect the universal negatives <u>no</u> and <u>impossible</u> to pattern alike; the former does indeed permit <u>there</u>-insertion, while the latter does not:

(2.123) a. There was nobody in the garden.

b. *There is an impossibility that you are right.

Rather than providing negative evidence for the hypothesis, the ungrammaticality of (2.123b) merely fails to provide positive evidence for the claim, since the nominalized form impossibility is itself severely restricted in privileges of occurrence. The putative source for (2.123b) does not in fact exist, alongside the grammatical source for (2.121a). But necessity is constrained in an identical manner, as is certainty:

(2.124) { A possibility / *An impossibility / *A necessity / *A certainty } { exists that you are right. / that you are right...(must be granted). }

The only conclusion that can be drawn from the contrast in (2.121) is evidently that there-insertion freely applies to nominals in the given context, provided they occur in that context in the first place.

Notice that the quantifier most corresponds in scalar position to the modals likely and probable, occupying a level above half (or 50%) but less than the universal.[59] But the former shares with all its aversion to there-insertion, while the nominalized forms of the corresponding epistemic values share with possibility its tolerance of the transformation:

(2.125) a. There are { *all / *most / many / some } people who can swim the channel.

b. There is a (strong) { likelihood / probability } that you are right.

The death-knell has been sounded; there is, evidently, a very strong probability, if not certainty, that Dahl is wrong in his evaluation of the *there*-insertion test.

§2.34 The universal *absolute(ly)*

Fortunately, Dahl goes on to suggest an alternative which is defensible: the coöccurrence restrictions on predicates modified by *absolutely*. Dahl (1970) credits McCawley with the observation of the behavior of *absolutely* which is, as Dahl points out, consistent with the Carnap definition of modals in terms of quantifiers on possible worlds. Thus:

$$(2.126)\ \text{a.}\quad \text{absolutely}\left\{\begin{array}{l}\text{all}\\ \text{*some}\\ \text{no(ne)}\end{array}\right\}\qquad \text{b.}\quad \text{absolutely}\left\{\begin{array}{c}\text{necessary/}\\ \text{certain}\\ \text{*possible}\\ \text{impossible}\end{array}\right\}$$

So too with quantified adverbials, epistemics (cf. (2.126b)), decntics (both verbal and adjectival), and nominalized forms (in terms of *absolute N*):

$$(2.127)\ \text{a.}\quad \text{absolutely}\left\{\begin{array}{l}\text{always/everywhere}\\ \text{*sometimes/*somewhere}\\ \text{never/nowhere}\end{array}\right\}$$

$$\text{b.}\quad \text{absolutely}\left\{\begin{array}{l}\text{obligatory/required}\\ \text{*permitted}\\ \text{forbidden}\end{array}\right\}/\left\{\begin{array}{l}\text{require}\\ \text{*permit/*allow}\\ \text{forbid}\end{array}\right\}$$

$$\text{c.}\quad \text{(an) absolute}\left\{\begin{array}{l}\text{necessity/requirement/certainty}\\ \text{*possibility/*permission}\\ \text{impossibility/prohibition}\end{array}\right\}$$

The syntactic modals, both epistemic and root, fit the paradigm:

$$(2.128)\quad \text{He absolutely}\left\{\begin{array}{l}\text{must}\\ \text{*can/*may/*might}\\ \text{can't/mustn't}\end{array}\right\}\left\{\begin{array}{l}\text{go.}\\ \text{have gone.}\end{array}\right\}$$

The ambiguous string *may not* coöccurs with *absolutely* just in case the modal is within the scope of the negation, and hence is interpreted deontically, since the epistemic sense does not allow this reading:

(2.129) a. *It absolutely may not rain.

b. John absolutely [may not] leave. (= forbidden)

c. *John absolutely may [not leave]. (= permitted ~/possible ~)

The presence of a negative below the operator modified by <u>absolutely</u> does not alter the judgements of grammaticality, as long as the negation operator is associated in logical structure with the embedded predicate:

(2.130) a. Absolutely {everybody / *somebody} [didn't go]. (= NEG-V only)

b. It is absolutely {required / necessary / *permitted / *possible} for John [not to go].

In fact, any operator which is not the strongest scalar element on either a positive or a negative scale is incapable of modification by <u>absolutely</u>:

(2.131) a. *absolutely {many/most / often/usually / should / probable/likely} (not)

b. absolutely {*not always/*seldom / *not all/*few / *needn't/*do(es)n't have to / *uncertain/?unnecessary}

For some reason, the violation in <u>absolutely</u> <u>unnecessary</u> is of a less severe nature than I am capable of explaining.

That the scalar qualification is indeed the correct approach to the characterization of the behavior of <u>absolute(ly)</u> is confirmed through a series of examples due to Robin Lakoff:[60]

(2.132) a. That is absolutely {wonderful. / *good. / *bad. / terrible.}

b. I absolutely {love / *like / *dislike / loathe} snails.

As G. Lakoff points out, these facts throw a "damper" on Dahl's proposal for linking conditions on grammaticality of _absolutely_ sentences to Carnap's possible-world semantics in that these cases do not involve obvious instances of either quantification or of "predicates that can be understood...in terms of a possible world semantics".[61]

Instead, the constraint on _absolutely_ is linked directly to the notion of scalar predication, as expounded above. Specifically, _absolutely_, is restricted so as to precede the 'universal' element, the end-point, on any scale, positive or negative. The coöccurrence illustrated in (2.132) is a result of the paired scales of goodness/badness and love/hate, as demonstrated by the suspensions _good if not wonderful_/*_wonderful if not good_, _dislike and possibly even loathe_/*_loathe and possibly even dislike_, etc.

Not all scales, of course, have end-points, e.g. cardinal numbers. Under some conditions, however, zero functions as just such a (negative) end point; hence, absolute zero = 0^{o} Kelvin (*absolute 0^{o} Fahrenheit/Centigrade).

As G. Lakoff mentions,[62] many predicates can be taken either literally or figuratively, and only in the latter case can they be preceded by _absolute(ly)_. His examples are:

(2.133) a. Sam is an absolute elephant.

b. Moe is an absolute bastard.

(2.133a) cannot be predicated of an elephant, nor (2.133b) of an illegitimate child (who is not otherwise ill-esteemed by the speaker). The general condition seems to be the existence of a scale of comparison, which itself is possible only under the figurative interpretations. The predicates in (2.133) must be understood as predicating extreme degrees of size and obnoxiousness, for the same reason that only such a figurative scalar reading can be assigned to the comparatives in

(2.134) John is $\left\{\begin{matrix}\text{more}\\ \text{less}\end{matrix}\right\}$ of $\left\{\begin{matrix}\text{an elephant}\\ \text{a bastard.}\end{matrix}\right\}$ than Oscar.

In the same way, *freezing* and *boiling* can be interpreted either literally, as inchoatives, or figuratively, as the respective end-points on the *cold* and *hot* scales discussed in Chapter 1. Only in the latter case can *absolutely* appear as a quantifier, and never at all with a weaker element on the temperature scales:

(2.135) It's absolutely $\left\{\begin{matrix}\text{*lukewarm}\\ \text{*cool}\\ \text{*cold}\\ \text{frigid}\\ \text{freezing}\\ (\neq \text{becoming frozen})\end{matrix}\right\} / \left\{\begin{matrix}\text{*(lukewarm)}\\ \text{*warm}\\ \text{*hot}\\ \text{boiling/scalding}\\ (\neq \text{becoming gaseous})\end{matrix}\right\}$

An exception to the end-point principle reaffirmed by (2.135) was pointed out to me by J. McCawley: if we expect the value to fall on one scale, and instead it falls on the other, corresponding scale, a normally non-terminal scalar element can take a preceding absolutely:

(2.136) a. This (?iced) coffee is absolutely cold.

b. In England, they drink their $\begin{Bmatrix}\text{milk}\\ \text{beer}\\ \text{?coffee}\end{Bmatrix}$ absolutely warm.

Like the effect of scalar predicates themselves, the facts in (2.126) reflect cultural and conversational, rather than logical, conventions concerning the nature of the world.

§2.35 There and absolutely: evidence for any

An important, and, as we shall see, relevant application of the there-insertion and absolutely tests for universality serves to cast light on a central topic in the relationship of formal logic to the structure of natural language. Reichenbach proposes that all instances of the quantifier any, including those in (2.137a) and (2.137b)

(2.137) a. Anybody can win.

b. John didn't see anybody.

c. John didn't see everybody.

constitute tokens of the same lexical item, a universal quantifier which takes the widest possible scope. (2.137b) will differ in logical structure from (2.137c) "not in the meaning of the generalization, but only in the scope of the generalization", in that the negative operator will be within the scope of the quantifier in the former case, but outside its scope in the latter.[63]

Linguists, however, while agreeing with Reichenbach on the universality of the non-polarity any in (2.137a), have generally followed Klima (1964) in relating the polarity any of (2.137b) to, and indeed deriving it from, the existential <u>some</u> in (2.138).[64]

(2.138) John saw somebody.

Note that the equivalence of $\sim\exists xFx \equiv \forall x{\sim}Fx$ allows either quantifier/negative structure to underlie negative polarity <u>any</u>, all things being equal. But all things are not equal. That the linguists are indeed correct in distinguishing the two <u>any</u>'s of (2.137a,b) is supported by their behavior (the <u>any</u>'s', not the linguists') with respect to the rule which inserts an 'existential' <u>there</u>:

(2.139) a. *There is $\left\{\begin{matrix}\text{anybody}\\ \text{everybody}\end{matrix}\right\}$ who can win.

b. There wasn't anybody that John saw.
(cf. There was somebody that John saw.)

<u>There</u>-insertion is permitted just in case <u>any</u> corresponds to a (negated) existential and not to a universal quantifier, in accordance with the general condition on the application of the rule, as observed in §2.33 above.

If a sentence contains both a negative commanding and preceding <u>any</u> and the modal <u>can</u>, ambiguity results, despite the wide-scope condition imposed by Russell, Reichenbach, and Quine for the interpretation of <u>any</u>.

(2.140) a. ∝You can't do anything here.

b. $\sim\forall x$(you can do x here)

c. $\left\{\begin{matrix}\sim\exists x\\ \forall x\sim\end{matrix}\right\}$(you can do x here)

Intonation serves to disambiguate (2.140a) in favor of the (b) reading if the quantified NP itself receives a rising contour and the sentence as a whole is assigned a comma intonation, and in favor of the (c) reading when it is given a normal, sentence-final fall. The (b) reading thus corresponds suprasegmentally to the NEG-Q interpretation of *All the boys didn't leave* (cf. §2.13) and the (c) reading to the NEG-V interpretation, at least for a significant group of speakers. Like the NEG-Q case, in fact, the (b) reading for (2.140a) implicates the continuation ...{*just* / *but*} *you can do* *some things*, and the comma intonation is assigned accordingly.

Again, *there*-insertion disambiguates:

(2.141) There isn't anything you can do.

shares with (2.140a) only the latter's (2.140b) reading. It is, as we would predict, anomalous with the comma intonation forcing the NEG-universal reading.

In the same manner, (2.142a) can be understood as virtually synonymous with either (2.142b) or (2.142c), but *there*-insertion is possible only in the latter case:

(2.142) a. If {αanybody / everybody / somebody} can swim the channel, I can do it.
b.
c.

d. If there is anybody who can swim the channel, I can do it.

(2.142d) can only be taken in the sense of (2.142c).

As with conditionals, so with questions:

(2.143) a. αCan anybody swim the channel?

b. -αIs there anybody who can swim the channel?

If *there*-insertion selects the existential interpretation of *any* in ambiguous sentences and renders positive *any* sentences, where no such interpretation exists, ungrammatical, then the reverse should be true of absolutely with its restriction to universals. And, as G. Lakoff points out,[65] this assumption is justified:

(2.144) a. Absolutely anybody can win.
You can do absolutely anything.

b. John didn't see absolutely anyone.
Did John see absolutely anyone?

The ambiguous sentences discussed in relation to there-insertion are also disambiguated by absolutely, but in the opposite direction:

(2.145) a. You can't do (-αabsolutely) anything here.

b. If (-αabsolutely) anybody can swim the channel, I can do it.

c. Can (-αabsolutely) anybody swim the channel?

The insertion of absolutely in each case forces the universal reading on any and eliminates the existential interpretation.

If the any-no incorporation rule of Klima (1964) is applied to a negative existential, absolutely may, as we see in (2.146b), precede the resultant NEG-incorporated quantifier:

(2.146) a. John didn't see absolutely anybody.

b. John saw absolutely nobody.

In such sentences, and such sentences only, both there-insertion and absolutely can coëxist without contradiction:

(2.147) There is absolutely nothing you can do here.

Notice that if incorporation does not apply, a sentence with two possible readings, (2.148a), has had both of those available interpretations eliminated, one by there-insertion, and one by absolutely, disambiguating (2.148b) in both directions simultaneously and hence rendering it totally anomalous.

(2.148) a. αYou can't do anything here.

b. *There isn't absolutely anything you can do here.

The item just--in one of its myriad senses[66]--is parallel to absolutely in its restriction to the end-points of scales, and hence to the universal reading for any. Just in this usage seems to serve the specific function of isolating this reading from an otherwise ambiguous sentence:

(2.149) a. You can't do (-αjust) anything here.

b. ?(Just) anyone can't come to the party.

c. Amanda won't sleep with (-αjust) anyone.

It will be observed that (2.149b) is decidedly odd without an initial just, even with the appropriate comma intonation.

The significance of the disambiguating function of just to its acceptability becomes evident when we attempt to insert it in place of absolutely in pre-quantifier position when no disambiguation is necessary:

(2.150) a. $\left\{\begin{matrix}\text{Absolutely}\\ \text{*Just}\end{matrix}\right\}\left\{\begin{matrix}\text{everyone}\\ \text{no one}\end{matrix}\right\}$ can come to the party.

b. Amanda will sleep with $\left\{\begin{matrix}\text{absolutely}\\ \text{*just}\end{matrix}\right\}\left\{\begin{matrix}\text{everybody.}\\ \text{nobody.}\end{matrix}\right\}$

Parallel to, and usually reinforcing, the just disambiguation is that effected by old in post-any position:

(2.151) a. αAmanda won't sleep with (just) any old man.

b. -αAmanda won't sleep with (just) every old man.

The disambiguation produced by old in (2.151a)--on the appropriate interpretation--contrasts with its necessarily literal reading in (2.151b); cf. "I don't want any old baby, I want *mine*!"

Pre-quantifier *just* has then a peculiar if not unprecedented transderivational restriction: it occurs only before universal quantifiers which would have another, *non*-universal reading if no disambiguation were effected.

In (2.152a), the *just* inserted pre-quantificationally is not, strictly speaking, necessary to distinguish the (a) sentence with universal *any* from the non-occurring (b) with its *any* existential:

(2.152) a. Not just anybody can go.

b. *Not anybody can go.

c. Nobody can go.

But (2.152b) *does* serve as an intermediate stage in the derivation of the incorporated version in (2.152c). Viewed teleologically, *just* in interposed in (2.152a) to block this incorporation and force the desired $\sim\forall x$ reading.

Like *absolutely*, *just* coöccurs with end-point syntactic modals:

$$\text{(2.153) You just} \left\{\begin{array}{l}\text{must/have to}\\ \text{*should}\\ \text{*can/*may}\\ \text{*needn't}\\ \text{can't/couldn't}\end{array}\right\} \text{read "Son of Aspects".}$$

But unlike *absolutely*, *just* cannot precede most of the strongest adjectival and verbal elements of the deontic and epistemic scales:

(2.154) a. It's just $\left\{\begin{matrix}\text{impossible}\\ \text{*necessary}\\ \text{*certain}\\ \text{*obligatory}\\ \text{*required}\end{matrix}\right\}$ to read "Son of Aspects".

b. *I just $\left\{\begin{matrix}\text{forbid}\\ \text{require}\end{matrix}\right\}$ you to read "Son of Aspects".

It is ironic that the Great Disambiguator itself has failed, at least in superficial appearances, to practice what it preaches: *just* is, conventionally speaking, an ambiguous lexical item. In addition to, and in complementary distribution with, the intensifying absolutist sense of *no less than* in which it is restricted to coöccurrence with scalar end-points (and, as seen above, not freely even there), *just* also appears as a modifier of weak scalar elements, in the sense of *only*, *no more than*:

(2.155) a. I just lóve her.

b. I just like her.

(2.156) a. It's just (totally) impóssible for him to go.

b. It's just (barely) possible for him to go.

But this complementary distribution may not be, as is usually supposed, a mere accident of homonymy. Despite the apparent non-synonymy of *just* in the (a) and (b) sentences of the above pairs, and the concomitant disparity in the supra-segmentals, the emphatic rising pitch in the (a) sentences opposed to the normal sentence contour of the (b) examples, there may be more of a similarity, or at least of a predictability, than meets the eye.

The word *mere(ly)*, now restricted to the *only*, *no more* than reading of just, as in (2.155b) and (2.156b), originally designated "unmixed, pure", as in Hamlet's description of the world as "an unweeded garden,/that grows to seed; things rank and gross in nature/Possess it merely", or the more contemporary Yeatsian vision of the Second Coming, in which "mere anarchy is loosed upon the world"--i.e. utter, absolute anarchy. The Swahili particle tu is capable of displaying the same "ambiguity":

(2.157) a. yeye tu 'only he'

b. giza tu 'utter darkness'

A final suggestion for diachronic study: only, we have seen, responds to the upper-bounding no more than when modifying scalar predicates. We might describe the above behavior of just, mere(ly), Swahili tu, and other such items in various languages by noting that upper-bounding, being vacuous for end-points on a scale, would amount (perhaps through Grice's doctrine of the relevance of information) to emphasis of the scalar value. In the universal position, no more than = no less than, exactly. We might then expect only to develop this emphatic sense, which it has not yet achieved in formal English. In colloquial, informal speech, however, we observe just such 'ironic' uses of only:

(2.158) a. Jabbar is only fantástic, that's all.

b. Who's Dominic diPazzo? Why, he's only the greatest blind, one-armed shuffleboard player who ever lived!

§2.4 Conclusion

In Chapter 2, we have extended the discussion of scalar predicates, conversational implicatures, and suspension into the vital areas of quantificational and modal operators. We have seen that both quantifiers and modals fall into scalar classes, defined by entailment and implicature, and that a correspondence can be defined between quantifiers and modals which occupy corresponding positions on their respective scales.

We defined a test based on redundancy of material in the second conjunct of conjunctions, a test which argues in favor of the view that the relationship between few and not none (= some) should be characterized by sub-logical rather than logical rules.

We have also observed that while redundancy and contradiction differentiate implicatures from true logical relations, there are also several respects in which these two types of relations are similar, including suspendibility and behavior with respect to contrastively stressed predicates which are commanded by an external negation.

We noticed the relationship of the binary connectives and the quantifiers, in particular the way in which the exclusivity implicated by disjunctions corresponds to the non-universality implicated by existentials. This interconnection will play a central rôle in our investigation of the principles governing lexicalization in Chapter 4 (cf. §4.23).

The distinction between invited and forced inferences in §2.15 will also be relevant to later discussion, as will many of the details of the account of epistemic and deontic modality in §2.2. The conversational nature of the Aristotelian law of complementary conversion of modals cannot be insisted on too strongly if we are to understand the true character of modals in natural language--and the quantifiers, as well.

In §2.3, we attempted to garner syntactic evidence based on _there_-insertion and the distribution of _absolutely_ which would reflect the logical and conversational parallels between existentials and possibility on the one hand, as against universals and necessity on the other. These tests were then applied to the quantifier(s) _any_, where they seemed to indicate that we should discard the Reichenbach-Quine arguments for a unary treatment in favor of the two-_any_ approach of Lakoff, Smith, and Jackendoff.

We are about to see in §3.1 that there are also strong arguments, from the syntax and semantics of English, to _support_ just such a unary approach. We shall then go on to investigate various respects in which negation and possibility, the two triggers of _any_, pattern together in forming an apparent (if counterintuitive) natural class of logical operators.

NOTES TO CHAPTER 2

1 For a defense of the position that quantifiers are higher predicates, cf. Carden (1970) and G. Lakoff (1970a et passim).

2 McCawley (1972), p. 516.

3 Lincoln, to a caller at the White House (1865), cited in Bartlett.

4 Geach (1962), p. 18 (cf. Kneale & Kneale (1962), p. 353)).

5 Jespersen (1924), p. 324.

6 Horn (1969), pp. 103-5, based on a discussion in Partee (1968) and G. Lakoff (1968).

7 The material in this paragraph was developed in conjunction (no pun intended) with Howard Lasnik.

8 Notice that the anomaly of (2.18b) is ameliorated when the conjunction is removed: John, even John, is leaving is far from unacceptable, if perhaps a bit quaint in its pleonastic insistence.

9 This observation is due to David Perlmutter.

10 The notion of markedness as a feature attaching asymmetrically to one member of an opposition-pair was introduced by the linguists of the Prague Circle in the 1930's (e.g. in Trubetzkoy (1936)), and adapted for the description of universal phonology by Chomsky & Halle (1968). Gruber (1967) applies this notion to lexical oppositions.

11 By morphological marking we understand degree of analyzability or blatancy. The nonproductive -th suffix which conditions stem alternations is less analytic, less obviously segmentable, and hence less marked, in this sense, than the productive nominalizing suffix -ness. Morphological markedness, so defined, corresponds merely to presence and degree of overtness of the signalling of a grammatical process.

It must be pointed out that markedness, as applied to grammatical rules or the output thereof, has been used in a very different sense, in which the notion is defined so as to correlate with irregularity rather than overtness of the affixation. Width exemplifies an exception to the general nominalization process and hence, like other non-productive affixes, must be marked, while the regular process as in narrowness is unmarked (by this definition). As B.H. Partee points out, this sense of markedness is *inversely* rather than *directly* correlated with the semantic markedness discussed in this section.

To take another illustration of the convergence of semantic markedness and morphological marking (in the *overtness* sense), consider the category of sex gender and its representation in natural language, a binary opposition outside the domain of scalar predicates.

In languages which differentiate terms referring to females from those referring to males, it is almost universally the former which exhibit marking by the addition of an affix. Thus in French, *cousin* '(male) cousin'/*cousine* (f.), *grand* 'large (m.)'/*grande* (f.), etc. Or in English, *actor* (lit., 'one who acts')/ *actress* (< act+or+ess, 'one who acts and is female'), *hero/heroine*, etc.

But parallel to this evident morphological markedness of feminine, we find that the female is semantically marked as well. French marks gender in plural pronouns, and--as in other such languages--it is the masculine plural which pronominalizes sets containing both male and female individuals: "100 femmes et 2 hommes sont $\left\{\begin{array}{l}\text{entrés}\\ \text{*entrées}\end{array}\right\}$ et puis $\left\{\begin{array}{l}\text{ils}\\ \text{*elles}\end{array}\right\}$ sont partis." English, which does not differentiate plural pronouns by gender, manifests the same asymmetry in pronominalization of indefinites: "If you see someone who can help you, tell *him*...", "Is there anyone here who has failed to submit *his* assignment?", etc. The use of the feminine here is possible only if the speaker is committed to the presupposition that every member of the set over which the variable ranges is female.

The author of one such sentence is taken to task by radical lesbian Jill Johnston for perpetuating the asymmetry by persisting in "the male usurpation of a generic form" when he writes "I would never consider a patient healthy unless *he* had overcome his prejudice against homosexuality" (emphasis mine). By the same token, the term for a male human "usurps" the species term, *man* (actually the reverse ordering is reflected by diachrony), while the corresponding term *woman* "marks" the species term by prefixing a cognate of *wife*. The strength and productivity of the marking convention for sex is illustrated by the fact that the word *femelle*, originally unrelated to *male*, was apparently reanalyzed as *male* marked by an otherwise unattested prefix *fe-, and its orthography and phonology adjusted in accordance with that reanalysis, into *female*.

In the light of the negative status associated with the more highly marked member of opposition pairs, we begin to see what it means for women to be, linguistically speaking, marked men.

12 As pointed out by McCawley in a 1969 lecture at UCLA;

Quang's evidence (Quang 1966) for rejecting the imperative status of this set of "verbs" includes the absence of reflexivization in Screw you! and Goddamn you/God! (cf. *Goddamn yourself/Himself!).

13 Geach (1963), pp. 253-4. The uncertainty arises in the latter case in connection with the existential generalization from John left to Someone left.

14 Asterisks throughout the remainder of this section will be used to indicate anomaly, question marks to indicate oddity.

15 Geis & Zwicky (1970) and Karttunen (1970b).

16 As we shall see, invited inference, like conversational implicature, is actually a relation between the utterer of a statement and a proposition inferred from that statement, rather than a relation between propositions as is entailment (or presupposition).

17 Geis & Zwicky (1970).

18 As we would predict from the scalarity of conditionals like (2.63a), suspension of the implicature is permissible: "I'll give you $5 if you mow the lawn, and possibly even if you don't." In fact, even if concessives in general may be thought of as denying the implicature of an assumed conditional. For example, "I wouldn't beat you even if you begged me" contradicts the implicature "I would beat you if you begged me" of the implicit conditional "I wouldn't beat you if you didn't beg me". Schematically,

IF P, THEN Q implicates IF ~P, THEN ~Q;
EVEN IF ~P, (THEN) Q cancels this implicature;
IF P AND POSSIBLY EVEN IF ~P, THEN Q suspends this implicature.

19 Vendler (1967), p. 194.

20 de Interpretatione, Chapter 12 (in Ackrill 1963).

21 In the following discussion we shall employ the notation $\Diamond$p for 'p is possible' and $\Box$p for 'p is necessary'.

22 Prior Analytics, I.13,32a.

23 Aristotle, de Int., Chapter 12. For the charts, cf. Hintikka (1960).

24 Pr. Anal., I.13,32a.

25 For not necessary in the second clause, Hintikka (1960)

suggests we read 'not necessary' either way, i.e. 'neither necessary nor necessary not', or p will be possible if it is impossible. As we shall see, two-sided possibility can be read as one-sided possibility plus a conversational implicature. If so, Aristotle probably intends the weak negative scalar 'not necessary' to be read with its own implicature, i.e. 'not impossible'.

26 Pr. Anal., I.13,32a ff.: cf. Bochenski (1961), p. 81 for discussion.

27 in de Int. 13,22b10 ff.

28 Bochenski (1961), p. 82.

29 Bochenski (19), pp. 73-75; Kneale & Kneale (1961), p. 101.

30 E.g. Hughes & Cresswell (1968).

31 For example, Hughes & Cresswell (1968); Lewis & Langford (1932).

32 Hacking (1967) and Karttunen (1971), independently. For the development of an epistemic notion of possibility, cf. Hintikka (1962) and Frege, who noted in the Begriffschrift (1879) that "to say that P is possible is to say that the speaker knows nothing from which the negation of P would follow", cited in Karttunen (1971), p. 10.

33 Hacking (1967), p. 146.

34 Ibid.

35 Examples slightly adapted from Karttunen (1971), p. 4.

36 Hintikka (1962); cf. Karttunen (1971) for discussion.

37 in de Int., Chapter 13.

38 Karttunen (1971), p. 15.

39 Ibid., p. 17.

40 Lewis & Langford (1932).

41 Von Wright (1951); the term deontic derives from the Greek word for obligation and is due to Broad. Hintikka has suggested that the "Principle of Permission" should be restricted to deontically perfect universes and proposes its replacement by $O(O(A) \vdash P(A))$.

42 Von Wright (1951).

43 The ability sense of can is discussed below.

44 Newmeyer (1969).

45 Ibid., p. 136.

46 Ibid., pp. 136-7.

47 G. Lakoff (1970a), section VIII.

48 From "A Problem of 'Fish Feet'", in the Los Angeles Times, full text available upon request.

49 Newmeyer (1969), p. 124.

50 Cf. Ross (1967) and Newmeyer (1969) for discussion.

51 As pointed out by George and Robin Lakoff; cf. G. Lakoff (1970a), section VIII.

52 Carnap (1947), p. 186.

53 Russell (1918), p. 231.

54 Cited in Hacking (1967).

55 Cf. Bochenski (1957), pp. 38 ff. for discussion. There is no evidence that the term 'logical square' originally designated Aristotle himself.

56 For example, Bochenski (1957), p. 50.

57 Leech (1969), p. 56.

58 The restriction of there-insertion to non-generic indefinites is investigated in Pope (1972).

59 Evidence for this placement is given in Chapter 4.

60 Cited in G. Lakoff (1970a), p. 237. The third line of each set is my addition, inserted in accordance with the revision implicitly suggested here to the formulation of scalarity by Lakoff & Lakoff, who fail to separate the two distinct, albeit related, scales illustrated in each of (2.132a) and (2.132b).

61 G. Lakoff (1970a), p. 237.

62 Ibid., p. 238.

63 Reichenbach (1948), pp. 105-6. Quine (1961) follows this

one-<u>any</u> approach, which has its source in a suggestion by Russell.

64 These linguists include G. Lakoff (1970a), Smith (1971), and Jackendoff (1971).

65 G. Lakoff (1970a), pp. 235-6.

66 For a description of this myriad, including a concurring view of the relatedness of the relevant senses, cf. Cohen (1969).

CHAPTER 3

POSSIBILITY AND NEGATION

(an (un)natural class?)

"The structure of every sentence is a lesson in logic."
--J.S. Mill

§3.1 *Factoring*: Evidence from *Any*

From evidence in §2.35, the *any* question is easy to resolve: the *any* in positive sentences with *can* and the polarity *any* in negative sentences represent two distinct logical items. The fact of their identical morphology is, *pace* Russell, Reichenbach, and Quine, a mere coincidence. In fact, this is borne out by the isolation of situation in English from the usual trend encountered in the languages of the world to separate the two cases morphologically.

But: there is significant counterevidence to the coincidence view, some of which we shall proceed to examine. In the first place, both *any*'s--but no other quantifier other than *no* (< *not any*)--can be followed by the normally negative-polarity *at all* or by *whatsoever*:

(3.1) a. I $\left\{\begin{array}{l}\text{didn't see anybody}\\ \text{saw nobody}\end{array}\right\}$ $\left\{\begin{array}{l}\text{at all.}\\ \text{whatsoever.}\end{array}\right\}$

b. $\left\{\begin{array}{l}\text{Anybody}\\ \text{*Everybody}\end{array}\right\}$ $\left\{\begin{array}{l}\text{at all}\\ \text{whatsoever}\end{array}\right\}$ can come to the party.

c. If $\left\{\begin{array}{l}\text{anybody}\\ \text{*everybody}\\ \text{*somebody}\end{array}\right\}$ at all can swim the channel, I can.

From this paradigm, especially from the fact that *any* can occur in (3.1c) with either universal or existential import, but neither of its touted paraphrases are able to do so, we would tend to classify the two _any_'s together as against universal _every_ on the one hand and existential _some_ on the other.

In another construction, both _any_'s act together on the side of universals, or scalar end-points. As observed by Peter of Spain (cf. §1.12), _but_ in the sense of 'but not, except'--and its equivalents, _save_ and _except_--can appear after universal and universal negative quantifiers, but not after weak or intermediate values. Observe the patterning of _any_ with respect to _but_:

(3.2) a. {Everybody / Anybody / *Somebody / Nobody} {but / except} John can pass the test.

b. He's {everything / anything / *something / nothing} but a linguist.

c. {All / Any / *Most / *Many / *Some / *Few / None} of my friends {save / but} Roscoe would like you.

d. I didn't answer {any / *all / *most / *many / *some} of the questions but the last.

e. Dryden {thought that none / doubted that any} but the brave deserve the fair.

The Reichenbachian analysis of _any_ as uniquely a universal quantifier taking wide scope is clearly supported by these data.

But a set of logical relations reveals a far deeper, more fundamental resemblance between the two <u>any</u>'s. It has been observed[1] that de Morgan's Law for propositional calculus, $\sim P \;\&\; \sim Q \equiv \sim(P \vee Q)$, has an analogue in natural language.

(3.3) a. I don't eat cauliflower and I don't eat kohlrabi.

b. I don't eat (either) cauliflower or kohlrabi.

By this analogue rule, (3.3a) is transformed into the semantically equivalent (3.3b). The latter, of course, has an additional reading in which it is derived via conjunction reduction from a disjunctive source:

(3.4) I don't eat cauliflower or I don't eat kohlrabi.

Now consider the following sentences:

(3.5) a. I can eat cauliflower and I can eat kohlrabi.

b. I can eat (either) cauliflower or kohlrabi.

(3.6) a. The Bucks could win and the Lakers could win.

b. The Bucks or the Lakers could win.

The same "factoring" rule that applied to convert a conjunction of negative propositions into a negated disjunction applies to derive the (b) sentences of (3.5) and (3.6) from the corresponding (a) sentences, the "either is possible" form from the "both are possible" form. Schematically, the rules correspond exactly:

(3.7) a. $\sim Fp \;\&\; \sim Fq \rightarrow \sim F(p \vee q)$

b. $\Diamond Fp \;\&\; \Diamond Fq \rightarrow \Diamond F(p \vee q)$

For (3.5b) and (3.6b), just as for (3.4b), a disjunctive source can be understood, on the reading where the possibility is predicated of either one proposition or the other rather than of both. In both negative and *can* sentences, the source can be ascertained by appending disambiguating material:

(3.8) a. { I don't like John or Bill-- } { I forget which. }
b. { John or Bill can lift that rock-- } { can you guess which? }

Because of the specificity of the additional material, the disjunctive reading for both (3.8a) and (3.8b) is forced.

If we pronominalize *either* NP_1 *or* NP_2 into *either of those NP's*, *either NP*, *either of them*, or *either*, only the conjunctive source can be understood:

(3.9) a. I don't eat either { αcauliflower or kohlrabi. / $-\alpha$of { those vegetables. / them. } }

b. I can eat either { αcauliflower or kohlrabi. / $-\alpha$of { those vegetables. / them. } }

To demonstrate the impossibility of the disjunctive reading with *either of them*--and, *a fortiori*, with *either tout court*--observe the ungrammaticality of

(3.10) I { don't / can } eat either (of them), *but I forget which (of them).

The crucial case for the resolution of the status of the two *any*'s involves the operation of factoring from a source containing more than two conjuncts.[2]

(3.11) a. I don't like John and I don't like Bill and I don't like Fred →

b. I don't like (John or Bill or Fred) →

c. I don't like any { of those boys. / of them. / boy(s). / Ø. }

(3.12) a. I can eat spinach and I can eat broccoli and I can eat kohlrabi. →

b. I can eat (spinach or broccoli or kohlrabi) →

c. I can eat any $\left\{\begin{array}{l}\text{of those vegetables.}\\ \text{of them.}\\ \text{vegetable(s).}\\ \emptyset.\end{array}\right\}$

Any thus forms a suppletive set with non-predisjunctive *either*. Notice the following congruences:

(3.13) a. Either John or Bill left. = One of them left.
≁ *Either of them left.

b. John or Bill or Fred left. = Some/One of them left.
≁ *Any of them left.

(3.14) a. John and Bill came in, and/but I $\left\{\begin{array}{l}\text{*saw}\\ \text{could see}\\ \text{didn't see}\end{array}\right\}$ either of them.

b. John, Bill, and Fred came in, and/but I $\left\{\begin{array}{l}\text{*saw}\\ \text{could see}\\ \text{didn't see}\end{array}\right\}$ any of them.

In both disjunctions derived from conjunctions and *any*/*either* quantified propositions triggered by *can*, there is a semantic non-correspondence with true conjunctions and universals. The conjunctive and universal sentences bear a *joint* reading (cf. McCawley 1968) corresponding to *together*, as well as sharing the non-joint *each* reading of disjunctive and *any* versions. Compare the following sentences:

(3.15) a. $\left\{\begin{array}{l}\text{Hubert or George}\\ \text{Either (of them)}\end{array}\right\}$ could be nominated.

b. $\left\{\begin{array}{l}\text{Hubert and George}\\ \text{Both (of them)}\end{array}\right\}$ could be nominated.

c. Hubert and George could each be nominated.
= Fx & Fy

d. Hubert and George could be nominated (together).
= F(x & y)

(3.16) a. Anybody can win.

b. Everybody can win.

c. $\forall x \Diamond Fx$

d. $\Diamond \forall x Fx$

The (a) sentences in each group can receive only the non-joint (c) interpretation, with the modal inside the scope of the connective or quantifier (cf. "_Any_ takes wide scope"). _And_ and _all_/_every_ may be within the scope of the modal, however, so that the (b) sentences can be read either as (c) or as (d). Disjunctive factoring is impossible in the logical structure with a joint predicate (indicated by the conventional notation of (3.16d) and the somewhat unconventional notation of the NP* case of (3.15d)), hence the asymmetry of _any_ and _all_, _either_ and _both_.

Similarly, the de Morgan factoring rule with negative trigger does not apply to conjunctions of NP's rather than of S's:

(3.17) a. I don't like ham and I don't like eggs → I don't like ham or eggs.

b. I don't like (ham 'n' eggs) ↛ I don't like ham or eggs.

(3.18) a. I love you more than {Tom, Dick, and Harry. / all my other boyfriends.} →

I love you more than {Tom, Dick, or Harry. / any of my other boyfriends.}

b. I love you more than {Tom, Dick, and Harry / all my other boyfriends} put together. →

I love you more than {Tom, Dick, or Harry / any of my other boyfriends} (?put together).

In essence, then, Reichenbach and Quine are correct: *any* differs from *every* and *all* in taking wide scope, but wide scope with respect to its trigger, whether the trigger be negation or possibility. Thus the ambiguity of such constructions as (2.140a), (2.142a), and (2.143a) hinges on which operator has triggered the *any*. We also see why Jackendoff's claim (1971, pp. 497-8) that the non-synonymy of

(3.19) a. You may take any of them.

b. You may take all of them.

vitiates Quine's one-*any* (as a wide-scope universal) approach is not justified: Jackendoff has ignored the fact that the modal *may* has scope, a scope included within *any* in (3.19a) but outside the quantifier *all* in (3.19b). It is this scope difference which accounts for the non-synonymy.

Let us illustrate the mechanism of *all*-*any* factoring by examining the six possible orderings of the negation operator, the possibility modal operator, and the universal quantifier in logical structure, and the surface realizations corresponding to each of the orderings:[3]

(3.20) a. N Q M $\sim(\forall x)\Diamond(M(j,x))$
John can't marry (just) ányone.
(= he must be selective)

b. N M Q $\sim\Diamond(\forall x)(M(j,x))$
John can't marry everyone.
(= he can't practice omnigamy)

c. Q N M $(\forall x)\sim\Diamond(M(j,x)) \equiv \sim(\exists x)\Diamond(M(j,x))$
John can't marry anyone.
There isn't anyone John can marry.
(= he must remain a bachelor)

d. Q M N $(\forall x)\Diamond\sim(M(j,x)) \equiv (\forall x)\sim\Box(M(j,x)) \equiv \sim(\exists x)\Box(M(j,x))$

John needn't marry (just) ányone.
There isn't anyone John must marry.

e. M N Q $\Diamond\sim(\forall x)(M(j,x)) \equiv \sim\Box(\forall x)(M(j,x))$
John can [not marry everyone].
John needn't marry everyone.
(= he can be a non-omnigamist)

f. M Q N $\Diamond(\forall x)\sim(M(j,x)) \equiv \sim\Box(\exists x)(M(j,x))$
John can [not marry anyone].
John needn't marry anyone.
(= he can remain a bachelor)

We can now refine the Reichenbach-Quine notion of "wide scope" for <u>any</u>: <u>any</u> does indeed differ from <u>every</u> and <u>all</u> in that it necessarily takes wide scope, but only wide <u>with respect to its trigger</u>, i.e. the logical operator (either negation or possibility) appearing immediately to the right of (inside the scope of, with no other elements intervening) the quantifier when the <u>all</u>-<u>any</u> rule (and the corresponding rule for the binary connectives) applies.

Thus in the joint-reading example of (3.20b), no suitable operator appears to the right of the universal quantifier, and <u>any</u> is therefore impossible. In (3.20c), on the other hand, <u>any</u> does occur, triggered by the negative operator immediately within its scope. Now consider (3.20a): the universal quantifier does <u>not</u> have wide scope with respect to negation, so that Reichenbach's dictum would appear to forbid <u>any</u> (as is the case with the relevant readings of the ambiguous (2.65a), (2.67a), and (2.68a)). But under the present formulation, we observe that the quantifier in these cases <u>does</u> have wide scope with respect to the modal operator, and that this modal operator is possibility (or permission)--rather than necessity (or obligation)--with the result that the quantifier is indeed realized as <u>any</u> with the rising intonation characteristic of a modal trigger in this configuration.

There are admittedly many differences between the negative and possibility operators as triggers of factoring, differences which cannot be resolved here. Among the more salient of these disparities is that located in the nature of the constraints on the position of the trigger. Neither <u>any</u>/<u>either</u> nor ex-conjunctive disjunctions can precede their negative trigger in surface structure, unless they do not command it:

(3.21) a. $*\left\{\begin{array}{l}\text{Anybody}\\ \text{Either of them}\end{array}\right\}$ didn't leave.

b. (Either) John or Fred didn't leave. $\neq \sim L(j) \,\&\, \sim L(f)$

c. The man who answered any questions didn't leave.

d. For John to answer any questions $\left\{\begin{array}{l}\text{would be surprising.}\\ \text{was not expected.}\\ \text{was difficult.}\end{array}\right\}$

These restrictions do not apply in the same way to the <u>can</u> trigger or elements which embed a notion of possibility:

(3.22) a. $\left\{\begin{array}{l}\text{Anybody}\\ \text{Either of them}\end{array}\right\}$ can leave.

b. (Either) John or Fred can leave. $= \Diamond L(j) \,\&\, \Diamond L(f)$

c. *The man who answered any questions could leave.
A man who answers any questions can leave.

d. ?For John to answer any questions would be $\left\{\begin{array}{l}\text{possible.}\\ \text{easy.}\end{array}\right\}$

It will be assumed that a more complete treatment of factoring would be capable of describing, if not explaining, these differences, and of making precise the structural conditions on the application of the factoring transformation, if indeed it is a transformation.

In any event, let us summarize the operation of factoring as we have discussed it thus far:

(3.23) $\Diamond Fx \,\&\, \Diamond Fy \xRightarrow{\text{FACT.}} \Diamond F(x \vee y)$ <u>Of x & y (...& n),</u> <u>$\Diamond F$</u> either of them

$\Diamond Fx \,\&\, \Diamond Fy \,\&\ldots\&\, \Diamond Fn \xRightarrow{\text{FACT.}} \Diamond F(x \vee y \vee\ldots\vee n)$ any of them

$\Diamond Fx \vee \Diamond Fy \xRightarrow{\text{C.R.}} \Diamond F(x \vee y)$ one of them

$\Diamond Fx \vee \Diamond Fy \vee\ldots\vee \Diamond Fn \xRightarrow{\text{C.R.}} \Diamond F(x \vee y \vee\ldots\vee n)$ one/some of them

$\Diamond Fx \,\&\, \Diamond Fy \xRightarrow{\text{C.R.}} \Diamond F(x \,\&\, y)$ both of them

$\Diamond Fx \,\&\, \Diamond Fy \,\&\ldots\&\, \Diamond Fn \xRightarrow{\text{C.R.}} \Diamond F(x \,\&\, y \,\&\ldots\&\, n)$ all of them

Under negation, there is an additional parallel between <u>either</u> and <u>any</u> in that the negative can be incorporated into a NEG-disjunctive morphology, but only if derived from a conjunctive-NEG source:

(3.24) a. αI didn't see either John or Bill. (= ~Sj & ~Sb) →
-αI saw <u>neither</u> John <u>nor</u> Bill.

b. I didn't see either of them. →
I saw <u>neither</u> of them.

c. I didn't see any of them. →
I saw <u>none</u> of them.

Neither <u>either</u> nor <u>any</u>, in any of their occurrences, is capable of floating onto the verb, alongside other "universal" quantifiers which appear in the '____ of them' frame:[4]

(3.25) a. I didn't see all/both/each of them. $\xRightarrow{\text{Q.FL.}}$
I didn't see them all/both/each.

I didn't see some/either/any of them $\not\Rightarrow$
*I didn't see them some/either/any.

b. John or Vernon can $\begin{Bmatrix}\text{both}\\ \text{either}\end{Bmatrix}$ go.

c. Both/all/each of the boys can go. $\overset{\text{Q.FL.}}{\Longrightarrow}$
The boys can both/all/each go.

Either/any/some of the boys can go. $\not\Longrightarrow$
*The boys can either/any/some go.

The modals <u>can</u> and <u>could</u> trigger factoring in all three of their possible interpretations:

(3.26) a. John $\begin{Bmatrix}\text{can}\\ \text{could}\end{Bmatrix}$ solve any equation. (= <u>able</u>)

b. Anything $\begin{Bmatrix}\text{can}\\ \text{could}\end{Bmatrix}$ happen. (= <u>possible</u>)

c. Anybody $\begin{Bmatrix}\text{can}\\ \text{could}\end{Bmatrix}$ come, if they wish(ed) to.
(= <u>permitted</u>)

<u>May</u>, which shares the deontic and epistemic senses of <u>can</u>, and <u>might</u>, which shares its epistemic sense, both trigger factoring as well:

(3.27) a. You may marry $\begin{Bmatrix}\text{either Dorothy or Frederick.}\\ \text{anybody (you choose).}\end{Bmatrix}$

b. Anything $\begin{Bmatrix}\text{may}\\ \text{might}\end{Bmatrix}$ happen.

c. You may or may not be happy with this analysis.

But epistemic possibility expressed by <u>possible</u> <u>that</u> does not in general permit factoring:

(3.28) a. It's possible for you to marry Dorothy and it's possible for you to marry Fred →
It's possible for you to marry (either) Dorothy or Fred.

b. You are $\begin{Bmatrix}\text{able}\\ \text{permitted}\end{Bmatrix}$ to marry Dorothy and you are $\begin{Bmatrix}\text{able}\\ \text{permitted}\end{Bmatrix}$ to marry Fred (but not both). →
You are $\begin{Bmatrix}\text{able}\\ \text{permitted}\end{Bmatrix}$ to marry (either) Dorothy or Fred (but not both).

c. It's possible that you will marry Dorothy and it's possible that you will marry Fred $\nrightarrow$ It's possible that you will marry either Dorothy or Fred.

The disjunction in (3.28c) is only interpretable as "either one or the other is possible" but not as "both are possible": note that we can substitute *either of them* for the disjunctions in the output of (3.28a,b) *salva grammaticalitate*, but not in (3.28c): **It's possible that you will marry either of them*. Similarly,

(3.29) a. It was possible for any of them to marry her.

b. *It is/was possible that any of them married her.

(3.30) a. I can {imagine / see} that either {Yvette or Yvonne / *of them} will marry Sam.

b. I can {imagine / see} either {Yvette or Yvonne / of them} marrying Sam.

All the predicates in the semantic class of ability *can*--i.e. *possible for*, as opposed to *possible that*--will trigger factoring:

(3.31) a. Either {Albert or Gwendolyn / of them} is {capable / *incapable} of that deed.

b. It was easy for Garth to seduce {young or tender maidens. / any maidens. / anybody.}

c. Anything is easy to do when you know how.
?Anything is hard to do (even) when you know how.

d. It's a snap to answer {either / any} of those questions.

The locution *it's a cinch* is ambiguous between a *tough*-movement *for-to* complementizing sense in which *cinch* is parallel to snap in (3.31d) and denotes easy, and a raising, that-complementizing sense in which it denotes certain. Only in the former case does it's a cinch, like easy and unlike certain, trigger factoring:

(3.32) a. It's {a cinch / a snap / easy / *certain} for John to marry.

It's a cinch for John to marry {Louise or Grenda. (= Cl & Cg) / either of them.}

b. It's {a cinch / *a snap / *easy / certain} that John will marry.

It's a cinch that John will marry {Louise or Grenda. (= Cl & Cg) / *either of them.}

When enough embeds a proposition, it can be paraphrased, as a rule, by the ability modals:

(3.33) a. John was clever enough to answer. =

b. John was {so clever / clever to the extent that} he {could / was able to} answer.

Notice that the implicature associated with (3.33b), namely that John did indeed answer, is associated equally with enough, and is equally cancellable:

(3.34) John was clever enough to answer, but the time had elapsed.

As we might expect, enough shares the triggering facility of able:

(3.35) a. John was clever *(enough) to answer any question.

b. John was clever to answer either x_1 or x_2. ($\supset Ax_1 \vee Ax_2$)

John was clever enough to answer (either) x_1 or x_2. ($\supset \Diamond Ax_1$ & $\Diamond Ax_2$)

With any and either the success implicature is removed--both for able and enough. Lauri Karttunen has pointed out (class lectures, 1971) that

(3.36) When he was young, John could seduce any girl.

doesn't implicate (or 'invite the inference') that he actually achieved any seductions, although it does appear stronger than

(3.37) When he was young, John could have seduced any girl.

If the success implicature ruled out by any/either--and, not surprisingly, by ex-conjunctive disjunctions--is made explicit by assertion, as in (3.38), factoring is blocked:

(3.38) a. He was able to answer any of the questions, {?*and did so. / but wasn't asked to do so.}

b. He was able to capture (either) a first or a second prize (= a(c(f)) & a(c(s))) {...but failed. / ?and succeeded.}

From the following sentences, it is evident that the "positive" any is conditioned by the modality of the sentence in which it occurs.

(3.39) a. I {*require / permit / allow} you to marry anybody.

b. It is {*obligatory / permitted / *necessary / possible} for you to marry anybody.

c. You {*have to / *must / *should / *will / can/may} marry anybody.

But under some conditions *any* is triggered by positive *will* (or embedded *would*):

(3.40) a. Any doctor will tell you that Stopsneeze helps.

b. Pigs will eat anything.

c. John said he would do anything once.

The *will* in such sentences is interpreted generically, as observed by Zeno Vendler,[5] to whom (3.40a) is due. No simple futurity reading is possible, as indicated by the unacceptability of a definite time adverbial coöccurring with *any*:

(3.41) John or Bill will tell you tomorrow at 5:30 P.M. that dogs have fleas. ($\neq$ T(j) & T(b))

(3.42) $\left\{\begin{array}{l}\text{Either of them}\\ \text{Anybody}\end{array}\right\}$ will tell you (*tomorrow at 5:30 P.M.) that dogs have fleas.

As Vendler suggests, (3.40a) is paraphrased by a conditional:

(3.43) If you ask any doctor, he will tell you that Stopsneeze helps.

and it is clear that factoring does indeed occur in the antecedent of conditionals. Thus,

(3.44) a. If you see John, shoot and if you see Bill, shoot. → if you see (either) John or Bill, shoot.

b. If you see $\left\{\begin{array}{l}\text{either of them}\\ \text{anybody}\end{array}\right\}$, shoot.

Emily Pope[6] points out that restrictive relative clauses on generic NP's can contain *any*, and attributes this to their derivation from conditionals. For example,

(3.45) a. Parents $\left\{\begin{array}{l}\text{who have any sense}\\ \text{if they have any sense}\end{array}\right\}$ know that you don't let kids eat pencils.

b. *My parents who have any sense...

The fact that any is triggered in the antecedent of conditionals is generally ascribed to the "negative" properties of such clauses. It is true that in those contexts where any is triggered by the negative but not the possibility operator, it appears in protases as well:

(3.46) a. This won't do you any good.

b. *This can do you any good.

c. If this does you any good, let me know.

(3.47) a. ITT didn't do anything about it.

b. *ITT can do anything about it.

c. We should find out if ITT did anything about it.

Furthermore, as we observed in Chapter 1, many other non-factored negative-polarity items, e.g. ever--although not all such items (*If he could care less,...)--are triggered in protases and not under possibility (*He can ever go, etc.).[7] But we must realize that even assuming an analysis of conditionals which would predict the negative properties of antecedent clauses (perhaps through the recognition that such clauses are either presupposed to be false, in the case of counterfactual conditionals, or else at least implicated to be unverified, i.e. not to be known to be true), we must somehow thereby account for the ability of conditionals to trigger the and-or rule.

We shall not dwell upon the possible source of the failure of ever, as noted, to be triggered by possibility, unlike the evidently equivalent at any time. For some reason, although possible triggers any, it is manifestly not the case that a $\Diamond$ is for <u>ever</u>.[8]

Let us assume that conditionals do trigger factoring as a third and (to take the null hypothesis) separate trigger for the rule. The factoring rule for conditionals can be stated as follows:

(3.48) If Fp then S and if Fq then S → If F(p or q) then S
$(Fp \vdash S)$ & $(Fq \vdash S) \rightarrow (F(p \vee q) \vdash S)$

All three factoring rules we have established can be generalized to cases where the predicates in each conjunct do not match. In the instances we have cited, it is assumed for convenience that the two (or more) predicates are identical, but this is merely a special case involving, as it were, double factoring, of the predicate as well as the operator. Some non-matched cases are:

(3.49) a. Ahmed doesn't eat pork or drink alcohol.

b. Zoroastrians can eat pork or drink alcohol.

c. If Ahmed eats (any) pork or drinks (any) alcohol, $\left\{\begin{array}{l}\text{turn him in to the nearest imam.}\\ \text{he will feel guilty.}\end{array}\right\}$

The general formalization of the first stage of factoring is therefore

(3.50) a. $\sim P \,\&\, \sim Q \,\&\ldots\&\, \sim R \rightarrow \sim(P \vee Q \vee \ldots \vee R)$

b. $\Diamond P \,\&\, \Diamond Q \,\&\ldots\&\, \Diamond R \rightarrow \Diamond(P \vee Q \vee \ldots \vee R)$

c. $(P \vdash S) \,\&\, (Q \vdash S) \,\&\ldots\&\, (R \vdash S) \rightarrow (P \vee Q \vee \ldots \vee R) \vdash S$

At a later point, if further reduction is possible, the disjunction can be replaced by <u>either</u> or <u>any</u>, depending on the number of factored disjuncts.

It should be noted that while the logical entailments corresponding to (3.50a,c) are valid in both directions (i.e. de Morgan's Law is an equivalence relation as is the formula in (c)), the entailment corresponding to (3.50b) is valid only in the direction followed by factoring.

We shall offer no explanation for an apparent discrepancy with the <u>either</u>/<u>any</u> suppletion: the ability of <u>either</u> but not <u>any</u> to appear in certain locative constructions with stative verbs:

(3.51) a. Flowers bloomed on $\left\{\begin{array}{l}\text{either side of the path.}\\ \text{*any portion of the grounds.}\end{array}\right\}$

b. There was a door $\left\{\begin{array}{l}\text{on either side of the room.}\\ \text{*in any corner of the room.}\end{array}\right\}$

Neither shall we spend enough time analyzing Vendler's claim that sentences with <u>any</u> can be characterized as representing offers or choices which the speaker is presenting to his listener(s).[9] This claim does seem to be substantially correct, as is shown by the appearance of <u>any</u> --and, incidentally, of suppletive <u>either</u> and factored disjunctions--in offers (but not commands!) with no overt negation, possibility modal, or protasis in sight:

(3.52) a. Pick any card (?or I'll kill you).

b. Marry either Christine or Christopher.

c. Look through either window (?or else!)

The factored forms in (3.52) do not originate simply from a conjunction embedded under an imperative as in

(3.53) a. Pick $card_1$ & pick $card_2$ &...

b. Marry Christine and marry Christopher.

It is evident that the offers in (3.52) are not related to the commands in (3.53), which have paraphrases with <u>should</u>

or _must_ and which in fact do coöccur with _or I'll kill you_, _or else_, and their ilk, but are instead related to sentences like those of (3.54a) and (3.55a) which contain the factoring trigger _can_ and which, as Gordon & Lakoff[10] show, are conversationally interpretable as offers:

(3.54) a. You can pick $card_1$ & you can pick $card_2$ &... →

b. You can pick ($card_1$ v $card_2$ v ...) →

c. (You can) pick any card.

(3.55) a. You can marry Christine & you can marry Chris →

b. You can marry (Christine or Chris).

However the details of factoring are resolved, and wherever its description is eventually placed within the framework of an account of the grammatical, logical, and conversational structure of natural language, we have demonstrated that significant similarities in the behavior of _any_ with respect to negation and modal _can_ cast doubt on the premise--supported by the patterning of _there_-insertion and _absolutely_, although not by that of _at all_ and _whatsoever_, nor by Q-floating or the _anything but_ construction--that the two _any_'s are indeed separate logical entities (notice that under the factoring proposal, both _any_'s will be universal quantifiers before factoring--or, more accurately, conjunctions, which as we saw in Chapter 2 are intimately related to universals--and existential, or disjunctive, afterwards). We have also observed an important respect in which negation is analogous, although not identical, to possibility and permission, in that all of these logical operators share in the triggering of the rule of disjunctive factoring.

§3.2 POSSIBLE and IMPOSSIBLE Polarity

§3.20 Modals and polarity

The analogy between negation and possibility is not confined to their shared capacity to trigger factoring. Baker (1970), Horn (1970, 1971), Schmerling (1970), and others have observed the existence and characteristics of a large, indeed open-ended, class of "negative-polarity items" whose ability to occur in acceptable sentences of English is restricted to environments which contain a suitably placed NEG.

The details of the structural conditions on the trigger can vary in accordance with the overtness of the trigger's negativity as well as with the nature of the polarity item. For example, among the time adverbials, ever is a more "liberal" polarity item than yet or anymore and hence appears in a wider range of contexts (e.g. after a factive in (3.56a) and in a counterfactual clause in (3.56b)) than do the latter, while in turn yet and anymore have weaker constraints than does negative-polarity until, as (3.56c) indicates (the adverbials are to be understood as applying to the lower sentence in each case):

(3.56) a. John didn't realize that Frieda
{had ever done a thing like that.
*lives in Chicago anymore/yet.
*arrived until midnight.}

b. If Mary were to {ever do a thing like that...
?live in Chicago yet/anymore...
*arrive until midnight...}

c. Did Mary ever swallow a goldfish?

Has Mary swallowed a goldfish yet?

Does Mary swallow goldfishes anymore?

*Did Mary swallow a goldfish until she got permission? (perhaps OK, albeit odd, with durative until)

The conditions for negative polarity depend not only on such factors as position of the negative trigger (in terms of precedence and command), and on the overtness of the negative element (whether the NEG is lexically incorporated, and to what extent), but also on whether the negative is asserted, entailed, or presupposed. Thus, negative polarity item any appears in the overtly negative context of (3.57a), but not in (3.57b), although the latter presupposes the acceptable (3.57c). The facts for polarity item (WH+) the hell, which depends crucially--as with suspensions of presupposition in questions (cf. §1.13)--on lack of relevant knowledge, are precisely the reverse.

(3.57) a. I wish I didn't know anyone here.

a'. *I wish I didn't know what the hell I was doing.

b. *I wish I knew anyone here.

b'. I wish I knew what the hell I was doing.

c. I don't know anyone here.

c'. I don't know what the hell I'm doing.

While the existence of positive-polarity items alongside negative-polarity items cannot be disputed (cf. Baker 1970), it should be recognized that the former phenomenon is more marginal, less fully integrated into the language.

In the first place, positive-polarity items are fewer, farther between, and more difficult to organize into natural semantic classes than their negative counterparts (cf. the <u>do a thing</u> class in Schmerling 1970). Furthermore, while positive trigger conditions can always be violated in direct denials, negative-polarity trigger conditions often cannot. This is especially clear in the case of paired polarity items as in (3.58c) and (3.58d):

(3.58) a. ??John <u>does</u> have a red cent. (= has some money)

*John <u>did</u> arrive until midnight.

b. John <u>isn't</u> far taller than Max.

I <u>wouldn't</u> rather be in Philadelphia.

c. *Trees <u>do</u> grow in Brooklyn anymore. (OK if non-polarity <u>anymore</u>)

*She <u>has</u> retired yet.

d. Trees <u>don't</u> still grow in Brooklyn.

She <u>hasn't</u> already retired.

Not all acceptable violations of trigger conditions are merely a result of direct denial of a well-formed sentence, as seen in the above examples with their contrastively stressed auxiliaries. The principal factor determining relaxation of the relevant conditions--"amnesties", to adopt Ross' term--is, speaking teleologically, the amount of work the listener needs to do in order to reconstruct the syntactic structure which makes the violation explicit. The more work, the more "inaudible"[11] the violation is, and the more acceptable the resultant sentence. Again, different polarity items are placed in different positions along the hierarchy in terms of degree of inaudibility needed to redeem a violation, but the hierarchy itself appears constant. Consider the following cases:

(3.59) a. Rudolf doesn't have any friends, but Theobald {*does. / ?has (*any).}

b. ?Rudolf doesn't live in Chicago anymore, but Theobald does.

c. *Rudolf didn't arrive until midnight, but Theobald did. (= arrived before then)

d. Rudolf didn't arrive until midnight, but that's not true of Theobald.

e. Rudolf, unlike Theobald, didn't arrive until midnight.

(3.60) a. ??Amaryllis didn't bother to call me, but Chloe did. (= took the trouble to call)

b. Amaryllis, unlike Chloe, didn't bother to call me.

While liberal _any_ is more acceptable than _anymore_ in the context of DO-replacement in (3.59a,b), the latter is still marginally acceptable in this context, especially as compared with more restrictive _until_ in (3.59c) and _bother_ in (3.60a). But even the stricter conditions on these items may be amnestied in the constructions of (3.59d,e) and (3.60b), where the structure containing the anomalies (e.g. *_Theobald_ _arrived_ _until_ _midnight_) has been radically permuted to the point of inaccessibility.

Notice that positive-polarity conditions, as we would expect, are far easier to amnesty:

(3.61) a. I would rather be in Philadelphia, but W.C. wouldn't.

b. The Empire State Building is far taller than the Pru, but Building 20 isn't.

c. Lake Superior is still swimmable, but Lake Erie isn't.

Parallel to the phenomenon of negative polarity, we find that a large class of words and expressions in English --or more precisely (as with negative polarity), several discrete classes of items--depend for their occurrence on the presence of a commanding possibility operator, although --as with negative polarity--there are variables determined by the individual item and by the strength and overtness of the degree to which the trigger expresses possibility. To begin the study of these POSSIBLE-polarity items,[12] we shall consider the restrictions on afford, in the sense 'incur, spare':

(3.62) a. *Howard afforded (to buy) a Rolls.

b. Howard {can / could / was able to} afford (to buy) a Rolls.

c. It was {possible / *necessary} for Howard to afford a Rolls.

Like the requirement on the trigger for any-factoring, the possibility modal commanding afford cannot be epistemic or logical possible that; but, unlike any, afford and similarly restricted items, accept neither generic will nor deontic commanders: notice that may and might, which share the logical, epistemic, and deontic values of can and could, do not coöccur with afford:

(3.63) a. *It is possible that Howard {afforded / will afford} a Rolls.

b. *Howard is permitted to afford a Rolls.

c. *Howard $\left\{\begin{array}{l}\text{may/might}\\ \text{should}\\ \text{must}\\ \text{will}\end{array}\right\}$ afford a Rolls.

d. *If Howard affords a Rolls,...

The largest class of POSSIBLE- (or rather ABLE-) polarity expressions consists of stative *tell* in various constructions denoting perception and discrimination. There is a systematic relationship between *can tell* and *know* in these constructions, as the following examples make clear:

(3.64) a. *tell the difference between X and Y*

I $\left\{\begin{array}{c}\left\{\begin{array}{l}\text{can}\\ \text{*may}\\ \text{*should}\\ \text{*will}\end{array}\right\}\text{ tell}\\ \text{know}\\ \text{learned}\\ \text{understand}\end{array}\right\}$ the difference between yin and yang.

Anybody will tell you the difference...(OK but non-stative, communicative)

It's possible for me to tell the difference between yin and yang.

b. *tell X and Y apart*

I $\left\{\begin{array}{l}\text{can tell}\\ \text{*know}\\ \text{*told}\end{array}\right\}$ Ong and Eng apart.

It's $\left\{\begin{array}{l}\text{easy}\\ \text{hard}\end{array}\right\}$ to tell them apart.

How do you tell them apart?

c. *tell X from Y*

I $\left\{\begin{array}{l}\text{can tell}\\ \text{know}\\ \text{*told}\end{array}\right\}$ Tweedledum from Tweedledee.

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the phonology of the latter. The *can* related to *know* seems intuitively to be the ability *can*, an intuition confirmed by the ability of *know* to trigger ABLE-polarity items. If the *can* (*tell*)-*know* relationship could be made explicit in a synchronic grammar, much of the idiosyncratic character of *know* would become explicable. Notice, furthermore, that many languages identify the ability *can* with *know* (*how to*), as in French: *Je sais parler français*.

The idiom illustrated in (3.66b) has an additional condition of negativity, which applies as well to the following related expressions:

(3.67) Albert { doesn't know / can't tell / ?knows / ?can tell / *told / *didn't tell } { his ear from his elbow. / his ass from { his elbow. / a hole in the { wall. / ground. } } }

While no POSSIBLE-polarity items we are to encounter exclude a negative from the configuration commanding the modal, some of these items demand a negative in that position. POSSIBLE-polarity items together with their trigger can themselves constitute negative-polarity items, but not positive-polarity items.

The class of IMPOSSIBLE- (or UNABLE-) polarity idioms illustrated in (3.67) is in fact open-ended and productive,[13] deriving from the ABLE-polarity *tell* *X* *from* *Y* of (3.64c), with the additional feature that X and Y be easily distinguishable to anyone with normal acuity. In other words, there is an implicit *even* contained in (3.67), just as in the class of negative-polarity items discussed in Schmerling (1970): *touch a drop*, *lift a finger*, etc.[14]

The *hawk/handsaw* case of (3.66a), in fact, involves a borderline member of this class and can only be understood as Hamlet intending it in his warning to Guildenstern to imply a contrast either with another's lack of acumen or with others' disparagement of one's own.

Another class of items which occur only in the environment ~ABLE ____ is comprised of (at least) two items with the sense of 'understand', *fathom*[15] and *make head(s) or tail(s) out of*:

(3.68) a. It's {*possible / impossible} for me to {make head or tail out of / fathom} syntax.

b. I'm {*able / unable} to fathom your behavior.

Observe that the negative may be fully incorporated into a lexical item, but the sentence is still acceptable, as in (3.69a), or the self-referentially valid (3.69b), as long as the negative commands the ABLE modal, and the modal the polarity item:

(3.69) a. I {doubt / *believe} that he'll be able to make head or tail out of this report.

He can {rarely / *often} fathom such complexities when stoned.

b. It's possible to make head or tail out of this sentence {only / *even} if you ignore the presupposition.

Two *can't*-polarity idioms which are more restricted in their command requirements are *kick* (= 'complain') and *care* *less* (actually, a *couldn't*-polarity item). In the latter case, the negative may be absent on the surface, but the residual positive-appearing expression *must* be interpreted ironically, as if the negative were there. Notice that while the negative commanding these expressions may be levitated via NEG-raising, very little else is permitted, including incorporation of the modal or negative:

(3.70) a. He {couldn't / *can / *should(n't) / *didn't} {kick / care less} about his salary.

b. He's unable to {*kick about / fathom} your behavior.

c. It's {impossible / hard} for me to {*care less about / fathom} syntax.

d. John's callousness {prevents him from caring / makes him incapable of caring} (*less) about you.

The *can't* *seem* *to* construction investigated by Langendoen (1970) should be regarded as another UNABLE-polarity item. As Langendoen observes, the sentences of (3.71) are mutually related in a way in which the sentences of (3.72) are not:

(3.71) a. John can't seem to do linguistics.

b. John seems {to be unable / not to be able} to do linguistics.

(3.72) a. John can seem to do linguistics.

b. John seems to be able to do linguistics.

The scope of *seem* is semantically within the scope of the modal in (3.72a), but the reverse is true for the other sentences, at least on their primary readings. Langendoen proposes to derive (3.71a), in which the scope relations are belied by the superficial structure, from the logical structure underlying its paraphrase (3.71b); it is significant that, as noted by Langendoen, the *can't*-raising transformation only applies to the ability sense of *can*:

(3.73) a. John couldn't seem to leave.

$$\text{b.}\quad \begin{array}{l} = \\ \not\leq \\ \not\leq \end{array}\ \text{It seems that} \left\{\begin{array}{l} \text{it wasn't possible} \left\{\begin{array}{l}\text{for John to leave.}\\ \text{that John left.}\end{array}\right\} \\ \\ \text{John wasn't permitted to leave.}\end{array}\right\}$$

A class of items that, like the *hawk*/*handsaw* distinction, favor the $\sim\Diamond$____ environment without insisting on it[16] is that of the predicates in (3.74) when taken in the sense 'endure, tolerate':

$$\text{(3.74)}\quad \text{I} \left\{\begin{array}{l}\text{can't}\\ \text{?can}\\ \text{*didn't}\end{array}\right\} \left\{\begin{array}{l}\text{bear}\\ \text{stand}\\ \text{take}\\ \text{abide}\\ \text{stomach}\end{array}\right\} \left\{\begin{array}{l}\text{linguistics.}\\ \text{writing dissertations.}\end{array}\right\}$$

While the parenthesized negatives in (3.75) are not required, these idioms are more acceptable, and more frequently encountered, in the contexts which feature either overt negation--one patiently awaits the continuation...*but only* (*rarely*, *on weekends*, *under duress*, etc.)--or implicit contrast either with someone other than Adolf (in which case *Adolf* is stressed) or with a previous claim (in which case the *modal* is stressed, to assert its lack of negativity).

$$\text{(3.75)}\quad \left\{\begin{array}{l}\text{It's (im)possible for Adolf to}\\ \text{Adolf is (un)able to}\\ \text{Adolf can('t)}\end{array}\right\} \left\{\begin{array}{l}\text{bear}\\ \text{stomach}\end{array}\right\} \text{violent acts.}$$

The behavior of these predicates is thus parallel to the amnesty of the trigger violations for positive- and negative-polarity items observed above in cases like *I do give a damn what happens to you* and *He doesn't still live in Chicago*.

One 'endure'-class verb which presumably ought to be in the UNABLE-polarity *bear/stomach* class but for some reason surfaces instead as a *won't*-polarity item is the obsolescent *brook*:

(3.76) a. $\text{I} \left\{\begin{array}{l}\text{will brook no} \\ \text{*can brook no} \\ \text{*will brook} \\ \text{*brooked no}\end{array}\right\} \text{insubordination.}$

b. He said he would brook no nonsense.

Additional random examples of non-*bear/stomach*-class (semi-IM)POSSIBLE-polarity items are illustrated below:

(3.77) a. $\text{He} \left\{\begin{array}{l}\text{can't} \\ \text{?can} \\ \text{*should}\end{array}\right\} \text{help feeling sorry for himself.}$

b. $\text{He} \left\{\begin{array}{l}\text{can't} \\ \text{?can} \\ \text{*should}\end{array}\right\} \text{spare a dime.}$

c. $\text{He} \left\{\begin{array}{l}\text{can't} \\ \text{?can} \\ \text{*should}\end{array}\right\} \left\{\begin{array}{l}\text{cut} \left\{\begin{array}{l}\text{the mustard} \\ \text{it}\end{array}\right\} \text{as a linguist.} \\ \text{hack it as a linguist.} \\ \text{hack linguistics.}\end{array}\right\}$

While the ABLE-polarity items coöccur with the *tough*-movement adjectives and nouns of the *easy* class,[17] listed in (3.78), the UNABLE-polarity items select their triggers only from the members of this class which have negative force, i.e. one from column (b), none from column (a):

(3.78) a.. easy
simple
a snap
a breeze
a cinch (≠ certain)

b. hard
difficult
tough
tricky
a hassle

(3.79) a. It was {easy / hard / a cinch} for Lionel to afford his train set.

. *It's a cinch that Lionel afforded his train set. (= certain)

b. It was {*easy / not easy / hard / *not hard / *a cinch / a hassle} for Lionel to make head or tail out of syntax.

The quasi-modal try, along with its implicative mates manage and succeed and its negative-implicative counterpart fail, coöccurs with some of the more liberal, less trigger-choosy ABLE-polarity items, necessarily implicating lack of success in the case of the UNABLE-polarity expressions:

(3.80) a. I {tried / failed / managed} to {tell the difference between Tweedledum and Tweedledee. / tell them apart. / ?hack linguistics. / ??stand you.}

b. Howard {*failed / *tried / ?managed} to afford a Rolls.

c. I {failed / tried / *managed / made a(n) {futile / abortive / *successful} attempt} to make head or tail out of syntax.

To explain the capacity of try, fail, and manage to trigger these polarity items, we must seek an analysis which makes explicit the semantic relationship of these predicates to the notion of ability. The entailment relation of *fail(x,S)* to *~able(x,S)* and of *manage(x,S)* to *able(x,S)*--notice, incidentally, that for most speakers, *manage* is a more successful trigger of *afford* than are its non-success mates in (3.80b), or negated *manage* in the same construction--does not suffice. Sentences with non-modally-qualified predicates will themselves entail that the agent was *able* to perform the act in question, e.g. *John left* entails that he was able to leave, just as does *John managed to leave*, and yet only in the latter case can an ABLE-polarity item grammatically occur.

As a clue to the modal semantics of *manage* and *try*, we observe that the ability modal (but no other) can appear either above or below these predicates in certain contexts with little or no obvious change in meaning:

(3.81) a. Do you think you {can / will} manage to solve the problem?

b. I {?can / can't / couldn't ($\cong$ didn't) / ?have to ($\neq$ didn't) / ?must (not) ($\neq$ didn't) / ?should(n't) ($\neq$ didn't)} manage to solve it.

c. I tried to {be able / ?have} to solve the problem.

Wayles Browne notes that Serbo-Croatian speakers accept the intercalation of an ability modal in the complement of *try* as synonymous with the pre-inserted version, so that (literally) *He tried that he could leave* is a paraphrase of *He tried that he leave* (i.e. 'He tried to leave'), although this paraphrase relation is regarded as 'illogical' by at least one informant who admits its existence.

It is conceivable, bearing these facts in mind, that a rule of *able*-incorporation, usually obligatory but under some conditions optional, is responsible for the triggering of the polarity items by these verbs, in the absence of an overtly signalled ability modal.

This modal seems also to be optionally incorporable not only into *enough* and *too* (as we shall see below), but also into the adverb *how* (but not into other "WH"-words which resemble *how* syntactically), as seen in (3.82a,a') and in the *How dare you?* construction of (3.82b), brought to my attention by Wayles Browne. As a result, *how*--but not *why*, *when*, et al.--acts as a trigger for the polarity expressions of (3.82c,d,e):

(3.82) a. How was it possible for you to win?
(on one reading) ≅ How did you win?

a'. $\left\{\begin{array}{l}\text{When}\\ \text{Where}\\ \text{Why}\end{array}\right\}_1$ was it possible for you to win? ≇ $\left\{\begin{array}{l}\text{When}\\ \text{Where}\\ \text{Why}\end{array}\right\}_1$ did you win?

b. How dare you say such a thing?!
= How could you dare to say it?
≠ How $\left\{\begin{array}{l}\text{?did}\\ \text{*should}\\ \text{*must}\end{array}\right\}$ you dare to say it?

c. $\left\{\begin{array}{l}\text{How}\\ \text{*Why}\\ \text{*When}\end{array}\right\}$ did you afford such an expensive house?

d. $\left\{\begin{array}{l}\text{How}\\ \text{*Why}\\ \text{*When}\end{array}\right\}$ do you tell $\left\{\begin{array}{l}\text{a bactrian from a dromedary}\\ \text{them apart}\end{array}\right\}$ (without counting humps)?

e. I don't know { how / ?why / *whether } she { stands him. / afforded a champagne-filled water bed. }

The non-synonymy indicated for *why* in the (3.82a') example applies only to the *what for?* agentive reading, and not to the non-agentive *how come?* interpretation, under which *why* is analogous to the manner sense of *how* and can thus incorporate ability. When this sense of *why* can be forced, as in (3.82e) with *stand* (but not with *afford*), an embedded polarity item is marginally acceptable.

It shouldn't need to be added that by pushing the problem of the acceptability of ABLE-polarity items by *try*, *manage*, and *how* back one step by positing ABLE-incorporation into these items (with the somewhat shaky evidence we have provided) we have not solved the problem, if perhaps we have made a step in the right direction.

The negative commanding an ABLE-polarity item can in general (although not in the case of the highly restrictive *can't seem to* construction of Langendoen 1970) be indefinitely removed from the presence of that item, and can even be lexically incorporated, as we saw in (3.69):

(3.83) I doubt that Bill believes John can { fathom syntax. / *seem to do syntax. (OK if ≠ seem ~ABLE) }

In at least one item, the negative *must* be incorporated, and specifically into comparatives. Comparatives will of course permit UNABLE-polarity items just as they permit negative-polarity items as a whole. Thus:

(3.84) a. Transderivational constraints are more than I can fathom.

b. ?TDC's are more than I can make head or tail out of.

If (3.84b) is less acceptable than (3.84a), this difference should be ascribed only to the stranded preposition in the former. But now consider:

(3.85) a. Paul accepts more ungrammatical sentences than you $\left\{\begin{array}{l}\text{can} \\ \text{*should} \\ \text{*will}\end{array}\right\}$ shake a stick at.

b. *You can't shake a stick at the (number of) ungrammatical sentences that Paul accepts.

The shake a stick at construction is the only example I am aware of that falls into the (limited) class of comparative-ABLE-polarity items.

In addition to the negative, the modal itself can be lexically incorporated, either with or without a commanding negative. We shall observe the effects of such lexicalizations upon the classes of ABLE- and UNABLE-polarity items.

§3.21 Modal incorporation and POSSIBLE polarity

In §3.1 we observed that enough can be decomposed into an ability paraphrase revealing what Karttunen refers to (class lectures) as its 'invisible modal'. In the same way, its negative counterpart too can be 'unpacked' into an inability clause:[18]

(3.86) a. X enough to Y = so X that $\Diamond$Y
X to the extent that $\Diamond$Y

b. too X to Y = so X that $\sim\Diamond$Y
X to the extent that $\sim\Diamond$Y

We also observed that enough in the past tense, like *able*, implicates success; the same is true of negative-commanded (but not negative-polarity) *too*. Note that the strength of this implicature varies with the predicate under qualification:

(3.87) a. Ferd $\left\{\begin{array}{l}\text{was clever enough}\\ \text{wasn't too dumb}\end{array}\right\}$ to answer the question, $\left\{\begin{array}{l}\text{but he didn't.}\\ \text{but time ran out.}\end{array}\right\}$

b. Ferd was kind enough to open the door, $\left\{\begin{array}{l}\text{?but he didn't.}\\ \text{?but not strong enough.}\end{array}\right\}$

Sentences with *too*, or with negative-commanded *enough*, like those with negative-commanded *can* or *able*, entail the negation of their complements:

(3.88) Bertrand $\left\{\begin{array}{l}\text{wasn't able}\\ \text{wasn't smart enough}\\ \text{was too stupid}\end{array}\right\}$ to answer the question, *but he did anyway.

Since they embed the relevant modality, both *enough* and *too* trigger ABLE-polarity items, whereas UNABLE-polarity items coöccur only with *too* (or with *~enough*):

(3.89) a. Howard $\left\{\begin{array}{l}\text{is rich enough}\\ \text{has enough money}\end{array}\right\}$ to afford a Rolls.

b. Igor is $\left\{\begin{array}{l}\text{*smart enough}\\ \text{not smart enough}\\ \text{too stupid}\end{array}\right\}$ to make head or tail out of it.

c. He's $\left\{\begin{array}{l}\text{?acute enough}\\ \text{too Daltonic}\end{array}\right\}$ to tell chartreuse from vermilion.

d. These examples are $\left\{\begin{array}{l}\text{?good enough}\\ \text{too sloppy}\end{array}\right\}$ to bear careful scrutiny.

Directly corresponding to *have enough X to Y* and *be X enough to Y* we find the construction *have the X to Y*, where the definite determiner can be regarded as 'standing in' for *enough* or *sufficient*. One indefinitely large class of fillers for this frame consists of various body-parts and other terms which have come to be somehow symbolic of courage and/or audacity (the line of demarcation being somewhat thin and ill-defined between the two), despite the absence of an *enough* paraphrase for several of these parts:

(3.90) a. have enough {audacity / courage / ?balls / ?heart} to blow up M.I.T.

b. be {bold / courageous / ?ballsy / ?hearty} enough to marry one's sister

c. have the {courage / audacity / gumption / heart/stomach / nerve/cheek / guts / balls / (unmitigated) gall} to assassinate oneself

The *have the X to Y* construction shares with *enough* the positive past tense implicature of Y and the corresponding negative entailment of ~Y when it is commanded by a negative in any tense:

(3.91) a. ??Roger had the unmitigated gall to assassinate Walter Cronkite, but he missed.

?Napoleon had the daring to rule the world, but he didn't have the luck.

b. *Oedipus didn't have the balls to kill his father and marry his mother, but he did so {unwittingly. / anyway.}

Given an attribute whose sufficiency is relevant, *have the X to* permits ABLE- and *~have/lack the X to* permits UNABLE-polarity items:

(3.92) a. Howard has the money to afford a nicer car than a VW (but he's a coleopterophile).

Ferd has the {discernment / experience} to tell the difference between gold and iron pyrite.

b. Orville {?has / doesn't have / lacks} the acumen to tell a Rembrandt from a Keane.

Sidney {*has / doesn't have / lacks} the brains to fathom anything beyond Gödel's proof.

Karttunen (1970a) lists the following examples of ONLY-IF predicates, verbs which do not force the entailment of their complement, but which, when negated, do force the entailment of the negation of that complement:[19]

(3.93) can / be able / possible / be in the position   have (the) {time / opportunity / chance / patience / foresight / courage}

It seems eminently plausible that the predicates assignable to Karttunen's entailment-class categories are not assigned on an arbitrary basis with respect to their other semantic properties. Specifically, the basic semantic criterion of the ONLY-IF verbs is their correspondence to the notion of possibility. The entailment manifested by these predicates will therefore follow directly from the modal entailment $\sim\Diamond P \vdash \sim P$.

The IF verbs, on the other hand (force, make, cause, have), involve, as Karttunen observes,[20] ex- or implicit reference to the notion of causation. The relevant logical entailment is correspondingly CAUSE $(x,S) \vdash S$. Note that embedded causatives, such as those in *kill*, *melt*, and *open*, share the entailment relations of *cause*, as do *bring about* and its synonyms:

(3.94) a. They didn't {kill lexical decomposition / cause lexical decomposition to die} so it's still alive.

b. They {killed lexical decomposition / caused lexical decomposition to die} *but it didn't die.

c. Aristotle {contemplated / *effected} a bust of Homer (for reckless driving), but decided against it.

Logical necessity, to the extent that it is represented in natural language (cf. Karttunen 1971), represents a subtype of causation, as in *necessitate*, rather than the reverse. Ability and causation may indeed turn out to constitute the basic entailment-related notions in natural language. Note that if we translate causation back into necessity and retain the classical entailments for modal operators, Karttunen's 'complex cases'[21] fall out as derivations from the axioms of standard modal logic.

In any event, it is crucial that these modal entailments do *not* hold for deontic values. Von Wright's system differs from Lewis'[22] chiefly in the absence of such entailments for the obligation operator and the negation of the possibility operator:

(3.95) a. $\Box p \vdash p$ b. $O(A) \nvdash A$

$\sim \Diamond p \vdash \sim p$ $\sim P(A) \nvdash \sim A$

If, in fact, obligation entailed fulfillment and lack of permission (or forbidding) entailed non-performance of the forbidden act, we would--in that halcyon universe (or prison-camp)--have no distinction between modal and deontic systems. In heaven, deontic logicians are on relief.

Because of the deontic non-entailments in (3.95b), predicates which involve deontic judgements fail to appear in the IF and ONLY-IF columns of Karttunen's classifications (Karttunen 1970a,b). Thus:

(3.96) a./a'. John didn't have the {*chance/opportunity / authority/right} to leave, but he left anyway.

b./b'. I {*forced / ordered} John to leave, but he didn't.

c./c'. I {*prevented/kept John from leaving, / forbade John to leave,} but he left anyway.

We see that the deontic *have the X to* expressions, which can be unpacked into structures involving obligation (expressed by root *should* or *must*), rather than ability, do not carry negative entailments, as seen in (3.96a').

This distinction between the non-primed modal predicates of (3.96) which bear an inviolable entailment and primed deontic predicates where no entailment follows (although a cancellable implicature may) was observed by Leech (1969). In his unfortunately rather neglected study of modality, Leech distinguishes *causation* from *authority* and notes in effect that of the two, only authority can be overridden, through the intercession of the will.

As is pointed out by Leech, some verbs are ambiguous between causation and authority readings, where the authority reading is in general impossible with no animate agent. Only in the former case does an entailment follow:

(3.97) a. My mother didn't {permit me to / ?let me} go to the picnic, but I {sneaked away. / went anyway.}

b. {The sudden downpour / My three flat tires} didn't {permit me to / let me} go to the picnic, *but I went anyway.

Note that Leech's distinction between modal and deontic permit is reflected syntactically by the give permission paraphrase:

(3.98) a. {My mother
b. *The sudden downpour} didn't give me permission to go.

This duality of permit has direct relevance to the study of ABLE-polarity, since--unlike factoring--the polarity items cannot have deontic triggers. Thus the contrast in the following causation/authority pairs:

(3.99) a. John's {salary increase / *mother} permitted him to afford a new car.

b. (Even) John's {new glasses / *mother} didn't permit him to tell a hawk from a handsaw at fifty yards.

In the same way, the deontic have the X to expressions block the amoral ABLE-polarity items, which know no ought, but only able:

(3.100) a. Howard has the {opportunity / *authority} to afford a new car.

b. Those who died before 1957 never had the {chance / *right} to fathom syntax.

Predicates which unambiguously involve authority or causation select polarity items accordingly:

(3.101) a. John's $\begin{Bmatrix}\text{salary increase}\\ \text{mother}\end{Bmatrix}$ enabled him to afford a new car.

b. John's insistence on structured arguments $\begin{Bmatrix}\text{prevents him from making}\\ \text{keeps him from making}\\ \text{*forbids him to make}\end{Bmatrix}$ head or tail out of linguistics.

c. (Even) a crash course from St. Augustine $\begin{Bmatrix}\text{wouldn't}\\ \text{?would}\end{Bmatrix}$ enable John to tell good from evil.

d. Only a crash course from St. Augustine would enable John to $\begin{Bmatrix}\text{tell good from evil.}\\ \text{?fathom morality.}\end{Bmatrix}$

These results are consistent with the relation of the predicates in the above sentences to the concepts of modality, deonticity, and negation. The verbs which embed ability and permission can be unpacked as follows, where <u>allowed</u> will stand unambiguously for von Wright's permission operator P(A):

(3.102) a. enable (x,y,z) = x causes y to be able to z

b. let (x,y,z) = x causes y to be $\begin{Bmatrix}\text{able}\\ \text{?allowed}\end{Bmatrix}$ to z

c. allow (x,y,z) = x causes y to be $\begin{Bmatrix}\text{?able}\\ \text{allowed}\end{Bmatrix}$ to z

d. permit (x,y,z) = x causes y to be $\begin{Bmatrix}\text{able}\\ \text{allowed}\end{Bmatrix}$ to z

e. $\begin{Bmatrix}\text{prevent}\\ \text{keep}\end{Bmatrix}$ (from) (x,y,z) = x causes y not to be able to z

f. forbid (x,y,z) - x causes y not to be allowed to z

When any of these predicates embed the <u>able</u> sense, they trigger ABLE-polarity items; when they embed <u>allowed</u>, they do not. Truly, what is done in polarity, as well as what is done out of love,[23] "always happens beyond good and evil".

While the trigger requirements of ABLE- and UNABLE-polarity items are at least as hard to relax as those of negative-polarity items--which, as noted in §3.20, are harder to amnesty than those attaching to positive-polarity items--amnesty is nevertheless possible under some conditions, especially under direct contradiction of a claim or assumption that is well-formed with respect to the usual polarity conditions. Here again, the severity of the violations is determined in large part by inaudibility:

(3.103) a. I couldn't afford a taxi, but I'd have to afford one. (from Anthony Burgess' <u>MF</u>)

b. I didn't think he could cut $\left\{\begin{array}{l}\text{the mustard}\\ \text{it}\end{array}\right\}$, but $\left\{\begin{array}{l}\text{I was wrong.}\\ \text{?he did.}\\ \text{??he did cut it.}\end{array}\right\}$

§3.22 <u>NECESSARY polarity</u>?

What is remarkable, and what needs an explanation which will not be forthcoming here, is the absence of $\Box$-polarity items corresponding to the $\Diamond$-polarity cases we have discussed in §3.21. Very few idioms indeed can be reasonably advanced which demand a commanding <u>should</u> or <u>must</u>, and none at all demanding a negation over necessity or obligation (i.e. UNNECESSARY- or <u>needn't</u>-polarity items, the reason for whose absence we shall investigate in Chapter 4). The cases that do exist fall into the deontic category, requiring a commanding item expressing obligation, rather than necessity or certainty. Thus:

(3.104) a. He was {forced / required / ?permitted / ?forbidden} to open up in the name of the law.

b. You {have to / must / should / ?can/?may / ?are allowed to} beware {the ides of March. / of the dog.}

It is not clear whether (*open up*) *in the name of the law* and *beware* should be analyzed as occurring only under expressions of obligation; a plausible alternative is that suggested by Jerry Morgan (personal communication) to account for the behavior of the former idiom: the claim that it is restricted to the *command* or *order* performative. Compare:

(3.105) a. {Open up in the name of the law, / Beware the ides of March,} {will you?! / or else! / *won't you? / *please. / *if you wish.}

b. Open up in the name of {all / ?anything} that's holy.

c. ?Beware of either the dog or the cat.
Beware of both the dog and the cat.

Both factoring (cf. §3.1) and tags which force an *offer* reading for the imperative (as in (3.105a)) block the idioms in question.

Another possible NECESSARY-polarity item is illustrated by the following examples:

(3.106) a. You {have to / 've got to / must / *should / *can/*might} see it to believe it.

b. For us to be able to use this sample,
it {has to / must / should / *can / *is allowed to / is necessary for it to / *is possible for it to} contain plutonium.

c. If this sentence is to have any sense, it
{must / ?should / *can} be interpreted in the appropriate way.

As John Lawler pointed out to me, all of these sentences share a common logical structure, 'In order for P to be true, Q must be true', i.e. P only if Q. It is from a full analysis of the underlying syntax and semantics of this structure that an explanation will emerge for the intuitively natural restriction on necessary-condition clauses that they contain a modal expressing that necessary condition, e.g. must, and marginally should, but never can.

Incidentally, as Robin Lakoff observes,[24] there is a corresponding appearance of can in the sufficient-condition clause, the apodosis of only-if conditionals, where the protasis does not contain a modal:

(3.107) a. This sentence {can / *should / *must} have any sense only if it contains a modal.

b. You {can / must} believe it only if you see it. (can: $\cong$ 3.106a) (must: $\not\cong$ 3.106a)

c. We {can / must} use this sample only if it contains plutonium. (can: $\cong$ 3.106b) (must: $\not\cong$ 3.106b)

Before commenting unsatisfactorily on the possible reason(s) for the disparity between the plethora of can-polarity items as opposed to the dearth of analogous must-polarity items, we shall pass on to yet another can/must asymmetry in which ability typologically resembles negation.

§3.3 LexicalizABILITY

The final parallel between negation and possibility to be considered here is that revealed by the process of lexical incorporation. Just as the negative operator can be lexicalized as un- or in- (or as a-, dis-, or non- under varying syntactic and semantic conditions)[25], we find the abilitative affix with the not surprising morphological shape -able/-ability.[26]

The abilitative ending is most generally found affixed to verbs as an adjectivalizer; the adjective thus formed modifies the original object of the original verb, with the indefinite subject having been deleted after passivization. The following correspondences are typical:

(3.108) a. One is (not) able to read this book. = This book is (un)readable.

b. One was (not) able to penetrate the forest. = The forest was (im)penetrable.

c. One is (not) able to eat snails. = Snails are (in)edible.

d. One is (not) able to see angels. = Angels are (in)visible.

Note the morphological alterations which frequently accompany -able derivation.

The generalization that -able attaches only to objects of transitive verbs is however incorrect. Notice the following counterexamples to such a claim:

(3.109) a. Leather is durable. (≅ able to last)

b. Rutabagas are perishable. (≅ able to perish)

If the paraphrases with able to are not exact, it is nevertheless clear that neither object-affixation nor passivization is at issue with intransitives last and perish.

Similarly, -able affixes onto intransitive nouns and adjectives as with knowledgeable 'having knowledge' or peaceable 'disposed to peace'. On the other hand, we never find examples of incorporation of -able onto agents, whether of transitive or intransitive verbs. Compare:

(3.110) a. Suzanne is lovable = One is able to love Suzanne.
≠ Suzanne is able to love (someone).

b. *Suzanne is goable. (= Suzanne is able to go.)

The correct generalization is not statable along the lines of subject and object, since rutabagas is as much the subject of perish in (3.109b) as Suzanne is of go in (3.110b). Rather, we must conclude that -able is blocked from agents, affixing instead to "objective" nouns in the sense of Fillmore (1968), i.e. subjects of some intransitives as well as objects of transitives.[27]

Instruments are banned along with agents. Openable is predicable of objects (doors, cans) but not of agents (men, or wind in *The wind is openable (= able to open (things))), or instruments (*The key is openable.). Although we may ascribe these facts to the non-occurrence of the deleted object form *The key can open, note that we also cannot say

**Speed is killable* in the sense of *Speed can kill*, with deleted indefinite object.

We can consider (3.111a) to derive from either (3.111b) or (3.111c); in either case, *open* is semantically objective:[28]

(3.111) a. This door is openable.

b. One can open this door. = This door can be opened.

c. This door can open.

While *agreeable* can modify NP's denoting humans, these humans are not truly agents. Notice the intransitivity of the verb:

(3.112) a. I am agreeable to your proposal.

b. I {can / am {able / ready / willing} to} agree to your proposal.

Compare *I am* **sayable* (**utterable*, **mentionable*,...) *that John left*.

The verb embedded in *changeable* with the sense of 'fickle' as in

(3.113) {An Aquarius / The weather} is changeable.

corresponds to neither a true active nor a real passive, but is roughly analogous to a Greek 'middle voice' form, of which the subject both performs and is affected by the action.

The sense of the abilitative suffix varies with individual items, especially in the case of those items for which the derived form has long existed. In many cases, however, what strikes us as semantic vagaries are capturable by means of implicatures which are "read off" able.

When we say someone is lovable, we generally imply ('implicate') that one is not only able to love him/her, but that it is easy for one to do so. But You can love him/her shares the same implicature, if in somewhat weakened form.

Similarly, Jacobson (1971) observes that enjoyable in (3.114a) implies success (as in (3.114b)), as illustrated by the oddness of (3.114c):

(3.114) a. We found the movie enjoyable.

b. We enjoyed the movie.

c. ?We found the movie enjoyable, but we didn't enjoy it.

But notice that the same implicature is associated with

(3.115) We found that we were able to enjoy the movie, ?but we didn't.

If the implicature is stronger with the lexicalized -able form, the reason may be ascribable to a general tendency of lexicalization to reinforce implicatures, a tendency which we observed in Chapter 1 in connection with the upper-bound implicature of lexicalized cardinal numbers as in two-bagger or biennial.

Let us confine our attention to the large class of V-able forms in which the verb has been passivized and the derived adjective is associated with the underlying object of the verb. In these forms we observe the following set of paraphrasing constructions:

(3.116) a. It is possible for X to V Y (...for anyone to read the book)

b. X is able to/can V Y (Anyone is able to/can read it)

c. Y ?is able to/can be Ved by X (The book ?is able to/can be read by anyone)

d. Y is capable of being Ved (by X) (The book is capable of being read (by anyone))

e. Y is Vable (?by X) (The book is readable (?by anyone))

Unincorporated _able_, as in (3.116c), is marginal for most speakers with an embedded passive, and the suppletive _capable_ is substituted to ameliorate the marginality:

(3.117) a. ?The river is able to be forded.

b. The river is capable of being forded.

The derived subject Y in (3.116c,d,e) can be regarded as having arrived in subject position via _tough_-movement. Notice that in general the NP's which can suffix -_able_ are identical to those which can be _tough_-moved over such predicates as _easy_ and _impossible_:

(3.118) a. The door is easy to open.

b. *The man is easy to {go. / open the door.}

c. *Speed is easy to kill.
(cf. It's possible {that speed kills. / for speed to kill.})

(3.119) a. The door is openable.

b. *The man is {goable. / openable.}

c. *Speed is killable.

The correspondence is not complete, however, in that _tough_-movement can strand prepositions whereas -_able_ formation cannot:

(3.120) a. Chopsticks are impossible to {eat with. / use.}

b. Chopsticks are {*inedible with. / unusable.}

Able, as we observed, does not readily permit *tough*-movement, although it does permit raising. *Possible* and *impossible*, on the other hand, permit only *tough*-movement, and indeed even that may be restricted by many speakers when *possible* is unnegated:

(3.121) a. The book is {impossible / ?possible} (for me) to read.

b. *John is {impossible / possible} to read the book.

c. ?The chickens are possible to eat.

d. It's possible that the chickens will eat.

e. It's possible {that someone will / for someone to} eat the chickens.

But even if the acceptability of *possible* is somewhat marginal in (3.121a), it is far worse in (3.121b) for all speakers. Moreover, if (3.121c) has an interpretation, it is clearly that which is compatible with its derivation via *tough*-movement from (e) and not via raising from (d): *chickens* in the forced reading of (3.121c) can only have been an underlying object.

Now there is intrinsically no reason why epistemic *possible* and *impossible* should not permit raising along with their co-scalar modal partners *certain* and *likely*--but not *probable*! Note that the situation of (3.121c) is reversed with respect to *probable*:

(3.122) a. The chickens are $\left\{\begin{array}{l}\text{*probable}\\ \text{likely}\end{array}\right\}$ to eat.

b.

c. ?Seaver is probable to start.

(3.122a), while admittedly ungrammatical, would be interpreted in the same way as the grammatical (3.122b) with synonymous *likely*, so that *chickens* would be assumed as the underlying *subject*, since *probable* does not appear on the *possible*-*easy* scale of *tough*-movers. (3.122c), in fact, does have a (marginal) reading (cf. *a probable starter*), one that derives by raising and not *tough*-movement.

The reason for the total inability of *(im)possible* to undergo raising may be attributable to the fact that these items also function with *easy*/*hard*/*difficult* and their ilk, as non-epistemics, in which capacity they undergo *tough*-movement. Predicates in English exhibit a strong tendency to exclude one of these two raising rules if they admit the other.[29]

That the failure of *possible* to permit raising of its subjects, as seen in (3.121), does not constitute a deep semantic fact is demonstrated by the situation in Greek. Aristotle's editor Ackrill comments on the difficulty of consistently rendering *dunaton*, Aristotle's term for possibility (one- and two-sided):

> The word has an impersonal use, as in 'it is *dunaton* for something to walk'; here it can be rendered by 'possible'. But it can also be used in a different construction, for example, 'something is *dunaton* to walk'; here it must be translated 'capable'. It must be remembered that this difference of translation

does not correspond to any difference in Aristotle's terminology.[30]

The -*able* affix, not surprisingly, exhibits many of the properties we have seen to be associated with predicates of ability and possibility. Among these are factoring:

(3.123) a. That sentence is derivable by either raising or EQUI.

b. = $\left\{\begin{array}{l}\text{That sentence is derivable}\\ \text{One can derive that sentence}\end{array}\right\}$ by raising *and* $\left\{\begin{array}{l}\text{that sentence is derivable}\\ \text{one can derive that sentence}\end{array}\right\}$ by EQUI.

c. That sentence is derivable by either transformation.

Although agentive *by*-phrases do not freely coöccur with -*able*, especially where the derived form differs morphologically from the underlying verb, when such agents do marginally occur they can occur as factored *anyone*:

(3.124) a. My handwriting is $\left\{\begin{array}{l}\text{readable (?by anyone).}\\ \text{legible } \left(\left\{\begin{array}{l}\text{?*by anyone}\\ \text{?to anyone}\end{array}\right\}\right).\end{array}\right\}$

b.

Adjectives in -*able*, or rather the modals from which they are derived, trigger ABLE-polarity items to which the modal suffix is attached, e.g. *affordable*. If there is a negative in construction with the -*able* form and outside the scope of the modal, then UNABLE-polarity items are triggered, e.g. *unfathomable* (= incapable of being fathomed). Note the following:

(3.125) a. I find syntax totally unfathomable.

b. I don't believe syntax is fathomable $\left\{\begin{array}{l}\text{to}\\ \text{by}\end{array}\right\}$ mere mortals.

The ability of *fathom* to lexicalize into *unfathomable* is an argument for the transformational derivation of the adjective: observe that *fathomable*, unlike the semantically similar *understandable*, constitutes a negative-polarity item, just as does *can fathom*/*be fathomed* but not *can understand*/*be understood*.

The commanding negative can appear within the same lexical item as the -*able* suffix (as in (3.125a)), since all items of the form *unVable* or *inVability* necessarily have --for reasons to be discussed in Chapter 4--the logical structure ~(able(V)), with the modal inside the scope of negation. Apparent counterexamples like *unfoldable* on the reading ((un(fold))able), 'capable of being folded', involve instances of non-negative *un*-.

To the ABLE-polarity *bear* which favors, without demanding, a negative commander corresponds the lexicalized *(un)bearable*, with the same coöccurrence properties. *Unbearable* thus occurs more easily than *bearable* in discourse-initial position, with no direct denial of a prior assumption or claim interpretable, just as *can't bear* occurs more easily than *bearable* under the same conditions.

We do not find **unstandable* or **unstomachable* (although the latter does not sound totally hopeless), but then even their purported sources are not impeccable: cf. ?*incapable of being stood*/*stomached*, as against *incapable of being borne*. One *bear*/*stomach* class synonym of *endurable* whose lexicalized form is in fact better than its purported source is *insupportable* (*torture*)--cf. ?*the torture was incapable of* *being supported* (= endured).

The perception/discrimination *tell*-class of ABLE-polarity items do not affix -*able*, at least partly as a result of preposition-stranding (**They are tellable apart*). Notice, however, that *distinguish*, when used to express perception of differences, favors an abilitative commander, including lexically incorporated -*able*:

(3.126) a. John $\left\{\begin{array}{l}\text{?distinguished} \\ \text{could(n't) distinguish}\end{array}\right\}$ chartreuse and vermilion.

b. Chartreuse and vermilion are (in)distinguishable.

Just as the phenomenon of $\Box$-polarity, as discussed in §3.22, is extremely marginal both in the scope of its instantiation and in the peripheral status of its representatives, in contrast to the healthy, thriving status of $\Diamond$-polarity, so too with $\Box$-affixation.

The strongest candidate for a *must* affix paralleling the ability suffix is, as with $\Box$-polarity, strictly deontic as well as marginal: the *must*- prefix itself.

Corresponding to *X is readable* ('it is possible for one to read X'), we find--occasionally and informally--*X is a must-read* ('it is necessary/obligatory for one to read X'). Similarly, *That movie is a must-see*. But the restrictions of this process are legion: not only does it share the non-agentive constraint of abilitatives (?**That man is a must-go*) but it is also apparently confined to verbs of perception:

(3.127) a. John's steak is $\left\{\begin{array}{l}\text{edible.} \\ \text{?a must-eat.}\end{array}\right\}$

b. The identical NP is $\left\{\begin{array}{l}\text{deletable.}\\ \text{?a must-delete.}\end{array}\right\}$

The lesser degree of lexicalization involved in the must-V cases as compared with the Vable construction is all too apparent from the orthography, morphophonemics (or lack of same), and transparently non-word intonation pattern.

But the disparity between can-affixation and must-affixation so evident in English is not isolated to one language. Swahili, for example, boasts a productive abilitative verb-to-verb derivational affix -ik/-ek which surfaces in such predicates as

(3.128) a. kula 'to eat'/kulika 'to be edible'

b. kutenda 'to do, make'/kutendeka 'to be practicable'

Swahili exhibits no corresponding necessitative affix, and although some languages have both abilitatives and necessitatives, no language to my knowledge contains only necessitatives. In Turkish, a language with necessitatives as well as abilitatives, the two forms do not correspond in status. Notice that the English abilitative is an adjectivalizer which is capable of further derivational adjustment (as by the negative prefixes or the nominalizing -ity), while the necessitative must- is a nominalizer which blocks additional derivation, setting up a fixed form.

J.R. Ross (in class lectures) has demonstrated a hierarchy of predicativity with respect to the readiness of members of a given category to undergo transformations. It can be determined that verbs are most 'predicative', and nouns least, with adjectives occupying an intermediate position. (Note that Ross' result conforms to our intuitions about the scale of predicativity. One can imagine a skeptical lexicalist uttering (3.129a), but hardly (3.129b).)

(3.129) a. Lakoff and Bach claim that even
{nouns are predicates, let alone adjectives.
b. {?adjectives are predicates, let alone nouns.}

Given this hierarchy, it is not surprising that -able forms full-fledged adjectives and must- only half-fledged nouns, nouns which cannot even pluralize.

By the same token, Turkish abilitatives,[31] like those of Swahili, form full-fledged verbs, which can manifest all verbal properties including suffixation of verbal endings. The abilitative morpheme, coincidentally (or so J. Hankamer assures me) displaying the form -abil-, thus takes the aorist suffix -ir. Note that Turkish abilitatives, unlike those of English and Swahili, can take agentives as arguments:

(3.130) a. Kitap okunabilir. 'The book can be read/is readable.'

b. Ahmet kitabı okuabilir. 'Ahmed can read the book.'

c. Ahmet qidebilir. 'Ahmed is able to go.'

(I have omitted the epenthetic, predictable y which phonetically precedes the abilitative in (3.130b). The initial vowel of the abilitative is subject to vowel harmony, as in (3.130c); the infix -n- in (3.130a) signals the passive.)

The lexicalizations formed by the necessitative suffix, by contrast, fail in crucial respects to act like true verbs. Tense-suffixation is impossible, and indeed the necessitative morpheme can be diachronically (although probably not synchronically, on a justifiable basis) decomposed into an infinitival particle ma/me and an adjectivalizing suffix -li. In any event, the necessitatives in -malı/-meli are felt as adjectives, not verbs.

We thus find, as against oku<n>abilir 'can <be> read', the necessitative oku<n>malı 'ought to <be> read', but--as we have seen--the parallel is far from absolute.

Related to the abilitatives is the form olabilir 'perhaps', derived from ol- 'be' via the abilitative and the aorist (tense-less tense) endings. Olabilir is thus literally maybe, and just as English does not contain a parallel lexicalization for *mustbe, we do not find the corresponding Turkish form *olmalı for 'necessarily'; instead the periphrastic synthetic construction is used, olması lâzım, literally 'its being is necessary'. The same situation persists in French; peut-être vs. *doit-être.

The generalization is clear: lexicalization of necessity is more peripheral and less fully integrated within the linguistic structure than that of ability, where it exists at all. Other languages which manifest this result include German (with its -bar abilitative and no corresponding necessitative), and both Persian and Hindi, which--as Mary Lou Walch informs me--exhibit similar asymmetries to those observed in Turkish.

§3.4 Afterword

As, you may ask, to the reason for the parallel you grant we have demonstrated between possibility (but not necessity or certainty) and negation? From what aspects of the structural, semantic, logical, or conversational properties of _possible_ does it follow that it, like negation, triggers factoring and polarity items as well as affixation?

The answers to these stirring questions, as you may have surmised, are not immediately forthcoming. But, if we may be permitted a(nother) speculation, negation, as Jesperson (1917) observed, is relatively marked with respect to assertion: hence, as noted in §3.20, the disparity between the strength of the conditions on negative-polarity as against positive-polarity items, the existence of a negative marker in many languages (e.g. English _not_) in the absence of any marker for positivity, etc. The same is true to some extent in the case of modality: it is not an accident that Leech (1969) labelled his categories _authority_ and _causation_ rather than _permission_ and _ability_, nor that _deontic_ logic was named (see Chapter 2, fn. 41) for the Greek term for obligation rather than the term for permission.

As with negation, possibility triggers more processes and plays a more central rôle in the structure of natural language than does necessity or certainty in part because it "needs" to, as a result of its marked status. Note in particular that we need not express necessity as in _It was necessary for John to leave_: we cannot communicate this with either a simple assertion that he left nor a simple negation, since in both cases we would be providing more information than we have a right to, in the absence of hard knowledge in one direction or the other.

Notice that in addition to the typological correspondence between negation and possibility in the triggering of polarity items, a correspondence not parallel by other modal concepts, we find in at least two cases that normally negative polarity requirements can be relaxed to include the *may*/*might* of possibility, but not the *will*/*would* of futurity, the *should* or *must* of probability, or simple positive modalities:

(3.131) a. Sidney $\left\{\begin{array}{l}\text{hasn't}\\ \text{*has}\end{array}\right\}$ succeeded yet.

b. Sidney $\left\{\begin{array}{l}\text{may}\\ \text{might}\\ \text{*should}\\ \text{*must}\\ \text{*will}\end{array}\right\}$ yet succeed. (= Sidney hasn't succeeded yet, but he $\left\{\begin{array}{l}\text{may}\\ \text{might}\\ \text{should}\\ \text{...}\end{array}\right\}$)

(3.132) a. You $\left\{\begin{array}{l}\text{didn't care}\\ \text{*cared}\end{array}\right\}$ to make $\left\{\begin{array}{l}\text{any}\\ \text{some}\end{array}\right\}$ suggestions.

b. You $\left\{\begin{array}{l}\text{may}\\ \text{*should}\\ \text{*must}\\ \text{*will}\end{array}\right\}$ care to make some suggestions.

There are, not surprisingly, no idioms or expressions triggered by the unnatural non-class consisting of negation and necessity (or certainty).

As warned, this discussion constitutes fairly idle speculation. In Chapter 4, when we examine the relative status of the negations of possibility and necessity, i.e. $\sim\Diamond$ and $\sim\Box$, we shall be prepared to offer a more satisfying account for the asymmetry we shall have observed. Phrased as this explanation will be in terms of conversational postulates, it will remain unclear how such an account can be incorporated within a traditionally framed grammar of English.

NOTES TO CHAPTER 3

1. For a discussion of the relevance of de Morgan's Law to English and suggestions on the derivation of <u>neither</u> and <u>nor</u>, cf. Partee (1970) and Green (1969).

2 The same caveat on the co-derivation of operators and quantifiers discussed in Chapter 2 applies here.

3. This formulation was developed in conjunction with Howard Lasnik.

4 Postal, in lectures at Santa Cruz and M.I.T. (1971-2), has discussed the rule of quantifier-floating. He proposes that the quantifiers which can float are only those universal quantifiers which appear in the context '____ of them', thus correctly excluding both <u>some</u> and <u>every</u>. Dave Perlmutter has suggested an alternative basis for the constraint on Q-float: the monosyllabicity of those universal quantifiers which float. The data from English do not select either approach against the other.

5 Vendler (1967), p. 82.

6 Pope (1972).

7 As we shall see below, two negative-polarity items other than any are triggered by $\Diamond$, viz. <u>yet</u> and <u>care to</u>.

8 Blame and/or credit for the pun is to be assigned to Emily Pope.

9 Vendler (1967), Chapter 3.

10 Gordon & Lakoff (1971).

11 The term <u>inaudibility</u> is also due to J.R. Ross.

12 This happy, if misleading (in being overly broad), term is due to Jerry Morgan.

13 Mary-Louise Kean has informed me of the existence of an expression "X doesn't know shit from Shinola" whose sense is closely related to the idioms of (3.130), Shinola being a brand of dark brown shoe polish. Other local variants undoubtedly exist.

14 Cf. Horn (1971) for discussion.

15 I am indebted to G. Lakoff for calling my attention to this beautiful predicate, and to R. Lakoff for calling his attention to it.

16 The *bear*/*stomach* class item *abide* was brought to my attention by B.H. Partee, who points out that its negative restrictions are stronger than those for the other items of this class, suggesting that *abide* may be a *can't* polarity item.

17 For some interesting observations on the relationship of ABLE to the *easy* class, cf. P. Jacobson (1971).

18 R. Lakoff and L. Karttunen have pointed out instances of *too* which embed non-ability modals. *Mary is too young to become pregnant* can be interpreted as asserting that she is so young she can't get pregnant, or so young that she shouldn't (although she may be able to physically). As R. Lakoff observes, a man can be *too influential* or *too rich* to pay taxes, in at least some dialects, if he uses his money or the influence to avoid paying them (*so X that he needn't Y*). The same ambiguity is found with *enough*. We shall ignore the sense of *enough* in *The room was easy enough to clean* or *Harry is likely enough to go*, in which it corresponds to 'rather'. Note that such uses of *enough* share the positive-polarity status of *rather*: **The room wasn't easy enough*/*rather easy to clean*. [illegible].

19 Karttunen (1970a), p. 330.

20 *Ibid*., pp. 332-5.

21 *Ibid*., pp. 336-7.

22 Von Wright (1951); Lewis & Langford (1932); cf. Hughes & Cresswell (1968).

23 Cf. Nietzsche, *Beyond Good and Evil*, Aphorism & Entr'acte no. 153.

24 In class lectures, summer 1971.

25 For a discussion of the semantics of negative affixes, cf. Zimmer (1964); for their history, cf. Jesperson (1917), Chapter XIII.

26 Chapin (1967, IID,F; Appendix II) provides an extensive listing of -*able* and -*ability* forms and proposes a defensible account of their derivation (although he claims incorrectly that -*able* does not attach to intransitives).

27 The adjective *breathable* is a unique example of an -*able* adjective interpretable as either transitive in its source (*air is breathable*, i.e. able to be breathed) or

intransitive ("Naugahyde is breathable", i.e. able to breathe).

28 Fillmore (1968).

29 The one exception I know to this generalization is the verb take as used in expressions of time:
(i) The pool took five hours (for me) to clean.
(ii) $\left\{\begin{array}{l}\text{I took}\\ \text{It takes}\end{array}\right\}$ five hours to clean the pool.
I shall not bother to explain the semantic distinction between $\underline{\text{take}}_{\text{time}}$ and $\underline{\text{take}}_{\text{money}}$ which determines that the latter does not permit raising:
(iii) That watch took \$50 (?for me) to buy.
(iv) $\left\{\begin{array}{l}\text{*I took}\\ \text{It took}\end{array}\right\}$ \$50 to buy that watch. (OK on irrelevant reading.)
Another apparent counterexample, it's a cinch, in
(v) John is a cinch to win.
(vi) That room is a cinch to clean.
represents two distinct lexical items, corresponding respectively to subject-raiser certain and object-raiser easy, as we have seen in this chapter.

30 Ackrill (1963), p. 149.

31 I am deeply indebted to Jorge Hankamer for the Turkish data.

CHAPTER 4

CONVERSATIONAL CONSTRAINTS ON LEXICALIZATION

(or, Why cannot can but can not cannot contract)

"Of course, linguistics is not my profession. So you must not pay any attention to my theory."

--Philip Jose Farmer, "The Voice of the Sonar in my Vermiform Appendix"

§4.1 The Asymmetry of Modal/Negative Incorporation

§4.11 Contraction

A particularly troublesome ambiguity in English is illustrated by the following sentences:

(4.1) a. αA good Christian can not attend church and still be saved.

b. A good Christian can $\left\{\begin{array}{l}\text{even}\\ \text{I believe}\\ \text{or so I'm told}\\ \text{if he chooses}\end{array}\right\}$ not attend church and still be saved.

c. A good Christian $\left\{\begin{array}{l}\text{cannot}\\ \text{can't}\end{array}\right\}$ attend church and still be saved.

(4.2) a. αYou could not work hard and (still) get a Ph.D.

b. You could, if you bribed your chairman, not work hard and (still) get a Ph.D.

c. You couldn't work hard and still get a Ph.D.

The intercalation of parenthetical expressions, as in the (b) sentences of (4.1) and (4.2), provides a disambiguation in favor of the reading in which the negative is associated with the lower sentence, within the scope of the modal in logical structure.

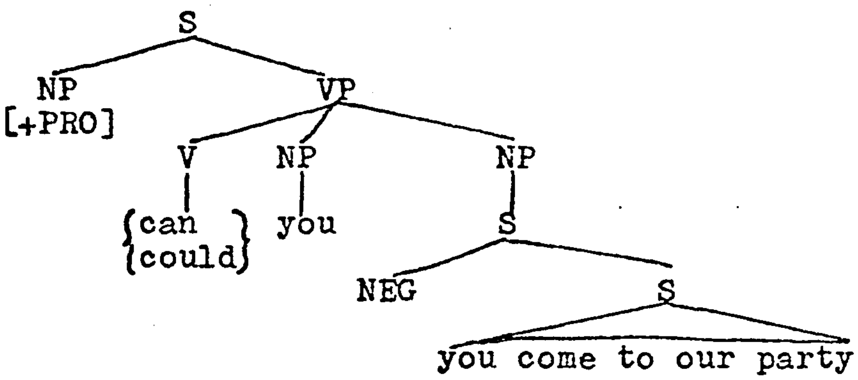
Contraction, as in (4.1c) and (4.2c), disambiguates in the opposite direction: while (4.1b) might correspond to the position of a liberal theologian, the stance represented in (4.1c) is at least radical. The contracted negative must be interpreted as _outside_ the scope of the modal. Similarly, (4.2b) and (4.2c) each paraphrase one sense of (4.2a) and have no reading in common.

While the facts under discussion here hold, _mutatis mutandis_, for epistemic, logical, and abilitative readings of the _can_/_could_ modal, we shall use the deontic value of permission to illustrate the two scope possibilities. Following Newmeyer,[1] we can--given the ambiguous sentence

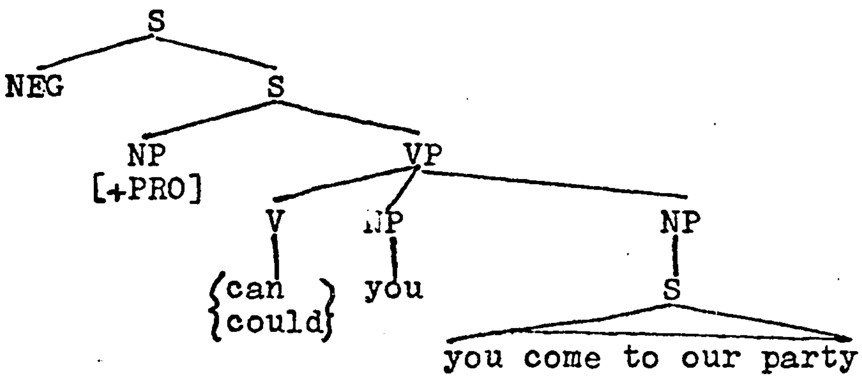
(4.3) a. You $\left\{\begin{matrix}\text{can}\\ \text{could}\end{matrix}\right\}$ not come to our party.

--establish the two corresponding logical structures

(4.3) b.



c.



(Irrelevant details have been omitted.) There would then be a NEG-lowering rule operating in (4.3c) to assure that the negative is placed in its surface position after the modal. Assuming this rule to be post-cyclic, it is in fact obligatory if the negative has not been otherwise affected by additional rules: note that NEG-raising applies to (4.3c) if the structure is embedded under an appropriate predicate, yielding e.g.

(4.4) I don't $\left\{\begin{matrix}\text{think}\\\text{believe}\end{matrix}\right\}$ that you can come to our party.

Such NEG-raised sentences, of course, bear only the (c) reading with wide scope for the negative, since there is no provision for transporting the negative element over the modal in (4.3b).

While intonation generally provides the decisive clue towards the correct disambiguation of the unepenthesized, uncontracted (a) versions of (4.1), (4.2), and (4.3), with the pairings of intonation contour and scope assignment determined in accordance with the dialect of the speaker and hearer, most dialects do permit a neutral, ambiguity-preserving intonation. In any event, the crucial point for the argument in this section is that the contraction of *can not* and *could not* into *can't* and *couldn't*--and the orthographic collapsing of the former into *cannot*--proceeds only on the reading of (4.5b), not that of (4.5a).

(4.5) a. It is $\left\{\begin{matrix}\text{possible}\\\text{permitted}\end{matrix}\right\}$ to not V/It is not $\left\{\begin{matrix}\text{necessary}\\\text{obligatory}\end{matrix}\right\}$ to V.

b. It is not $\left\{\begin{matrix}\text{possible}\\\text{permitted}\end{matrix}\right\}$ to V/It is $\left\{\begin{matrix}\text{necessary}\\\text{obligatory}\end{matrix}\right\}$ to not V.

Contraction, in other words, is possible from a logical structure corresponding to $\sim(\Diamond\ldots)$ but not from $\Diamond(\sim\ldots)$, where the modal operator is used broadly to include both epistemic and deontic modality as well as logical.

An exception to this generalization which is glaring enough to "prove the rule" is contained in a stanza from the Mamas and Papas' song "I Saw Her Again Last Night", in which contraction is forced by the meter and the intended reading is otherwise impossible:

(4.6) I saw her again last night;
You know that I shouldn't
Just string her along, it's just not right:
If I couldn't, I wouldn't.

The fourth line, as pointed out by Sharon Sabsay (who brought it to my attention), must be read not as the tautologous "if it were impossible for me to string her along, I wouldn't do it", but rather as "if it were possible for me <u>not</u> to string her along,...", i.e. with the normally uncontractable structure of (4.5a). I leave the question of whether this contraction is acceptable, even under the duress of metrical considerations, to the judgement of the reader (or listener).

As we would expect, only the contractable NEG-M forms, which clearly represent the negation of modal sentences, permit positive tags characteristic of negative sentences. M-NEG constructions, on the other hand, permit only negative tags, if that:

(4.6) a. John $\left\{\begin{matrix}\text{cannot} \\ \text{can't}\end{matrix}\right\}$ go, $\left\{\begin{matrix}\text{can} \\ \text{*can't}\end{matrix}\right\}$ he?

The positive tag in (4.6b) is acceptable as an "echo-tag", with the sense "I don't believe you".

If the structure underlying the contractable $\sim\Diamond$ sequences as in (4.3c) is indeed converted via NEG-lowering into an identical structure to that which underlies the uncontractable $\Diamond\sim$ sequences (e.g. (4.3b)), there appears to be a global derivational constraint required to block contraction of *can*/*could* *not* when derived from a remote structure in which that scope relation obtained.[2] But the question is *why*?: in particular, why does this global constraint, unlike those discussed in Lakoff (1970b), block contraction of just those elements which have *not* altered their command and precedence relationships? All things being equal, which they rarely are, we would assume the reverse process: if we were a benevolent god, providing English speakers with a language in which pernicious ambiguities are avoided whenever possible, we would merely order the rules so that contraction (or the prerequisite destressing) precedes NEG-lowering over *can*, thereby obviating the need for a global constraint which can "remember" a prior stage of the derivation.

Furthermore, the derivational constraint as stated is of limited relevance, since the basic generalization of the form *M* + *NEG* (*in* *remote* *structure*) $\not\Rightarrow$ *Mn't* doesn't hold: *shouldn't* does derive from a logical structure in which the surface order obtains. As observed in Chapter 2, the negation of (4.7a) is not (4.7b)--in which the negative must be associated with the verb, i.e. the lower sentence--but rather one of the alternatives in (4.7c):

(4.7) a. John should leave.

b. John $\left\{\begin{array}{l}\text{should not}\\\text{shouldn't}\end{array}\right\}$ leave.

c. John $\left\{\begin{array}{l}\text{needn't}\\\text{doesn't have to}\end{array}\right\}$ leave.

Notice that the restriction of NEG-raising to the NEG-M reading of <u>can not</u> (as discussed under (4.4) above) does not apply in the case of <u>should</u>: since <u>should</u>, unlike <u>can</u> (and all other modals),[3] is in the semantic class of <u>likely</u>, <u>probable</u>, and <u>expect</u> (cf. Horn 1971), it permits NEG-raising just as do these predicates. We find therefore that

(4.7') I don't believe that John should leave.

has a reading which semantically reflects the successive (cyclical) application of NEG-raising to the remote structure containing (4.7b) as a complement, i.e.

(4.7") I believe that John should [not leave].

Thus, we see that <u>can not</u> contracts when it negates <u>can</u>, while <u>should not</u> contracts although it does <u>not</u> (except perhaps in direct denials) negate <u>should</u>. These results begin to resemble the type of phenomenon classified as transderivational constraints:[4] for any sequence M+NEG in a stage of a derivation, if there exists another derivation in which this sequence can arise as the representation of an underlying NEG+M sequence, then the sequence which contains an unlowered negative cannot serve as the input to contraction. In other words, contraction is only blocked when an ambiguity is thereby avoided.

Even when so formulated, the contraction constraint is far from perfect. Thus, may not--as we might expect--contracts (if at all) only when the negative has been lowered, on the interpretation of prohibition. Notice, however, that on the epistemic reading, where no lowering can apply (and hence no ambiguity arises), contraction is also blocked:

(4.8) a. John [may not] go ==> mayn't (=forbidden)

b. John may [not go] =≠=> mayn't (=allowed not)

c. It may [not rain] =≠=> mayn't (=possible not)

Even the contraction in (4.8a) is unacceptable for many speakers of American English, and is in any case less frequently encountered than are can't and couldn't, probably due to phonological factors.

Phonology is however not involved in the case of might and must, nor do either of these modals permit NEG-lowering (i.e., with both modals, a lower negative is logically included within the scope of the modal), and yet the contractability of the M+NEG combinations differ radically, at least for most American speakers:

(4.9) a. John might [not go] =≠=> ?John mightn't go.

b. John must [not go] ==> John mustn't go.

c. It $\left\{\begin{matrix}\text{*mightn't}\\ \text{?mustn't}\end{matrix}\right\}$ be raining out.

We shall offer no explanation for the comparative inability of must not to undergo contraction (in at least some dialects) when, as in (4.9c), the modal is interpreted epistemically.

It is clear that neither the derivational nor the transderivational formulation is sufficient to constrain contraction, at least without additional refinement. But even if we could somehow account for the deviations from the formulae, we should not be satisfied. To ascribe intractable syntactic and semantic phenomena to the workings of global derivational and transderivational constraints is all too often to provide a fundamentally non-explanatory device for stating the impenetrability of the data to analysis within the mechanism of an adequately constrained, falsifiable theory.

In many cases, unsurprisingly enough, transderivational constraints seem to arise from certain perceptual strategies of interpretation basic to all speakers, as the "neo-functionalists"--Bever, Klima, Langendoen, and others--have attempted to demonstrate (although the non-universality of many of these ambiguity-blocking devices casts such an account into question). Transderivational rules would then serve the rôle of tactics in the speaker/hearer's teleology.

In the case under consideration here, we shall propose a different basis for the constraint: not perceptual universals, but universal principles of natural logic and of the structure of conversation.

It will be observed that in the examples we have thus far discussed, including the troublesome <u>might</u> and <u>must</u> cases of (4.9), every instance of a contractable modal + negative sequence corresponds roughly to the logical configuration of (4.5b) rather than to that of (4.5a), i.e. to impossibility or prohibition rather than to the lack of necessity, certainty, or obligation. We can thus hypothesize that the feature controlling contraction is not phonological or syntactic, but rather involves the presence of the appropriate semantic or logical configuration.

Let us assume that, whenever there is a risk of confusion (and, for many speakers, even when no such risk exists, as with *mightn't), only those sequences of M+NEG which signify 'impossible' or 'forbidden' can undergo contraction. Notice that most speakers who cannot contract might not and may not (with unlowered NEG) do accept the contraction of these sequences at least marginally in tags:

(4.10) a. John may leave, $\left\{\begin{array}{l}\text{may he not?}\\ \text{mayn't he?}\end{array}\right\}$

b. John might leave, $\left\{\begin{array}{l}\text{might he not?}\\ \text{mightn't he?}\end{array}\right\}$

c. John can leave, $\left\{\begin{array}{l}\text{can he not?}\\ \text{can't he?}\end{array}\right\}$

The sense of all tags is that of a (sentential) negation of that sentence to which they are appended; tagged sentences invariably have the logical form '$F\theta, \sim F\theta$?' and never the form '$F\theta, F{\sim}\theta$?' The tags in (4.10) thus ask semi-rhetorically whether it is possible that John will leave, not whether it is possible that he won't. It is therefore not surprising that contraction of may not and might not is favored in tag environments which force the $\sim\Diamond$ reading. Likewise, the tag in (4.10c), despite its superficial appearance, contains a lowered and therefore contractable negative.

The hypothesis of the logical constraints on contraction cannot be expressed in the strong form ($\sim\Diamond/\Box\sim$ always contracts and $\sim\Box/\Diamond\sim$ never), because of counterexamples like the acceptability of mightn't in some dialects and--more definitively--the universal acceptability of needn't, a M+NEG combination with only the sense of $\sim\Box$.

Note that, as stated transderivationally, the constraint against contraction will not apply to need not for just this reason, i.e. its unique interpretation in which the negative is lowered from its higher commanding position in logical structure. As remarked in Ross (1967), need as a modal is a negative polarity item, so that (4.11a) can be substituted, in accordance with the suggestion of Ross, for the configuration realizable as (4.11b), but not that which underlies (4.11c):

(4.11) a. John $\left\{\begin{array}{l}\text{need not}\\ \text{needn't}\end{array}\right\}$ go.

b. John doesn't need to go. ($\sim\Box$ John go)

c. John needs to not go. ($\Box\sim$ John go)

Since the $\sim\Box$ configuration represented by need not is not homophonous with any structure interpretable as $\sim\Diamond$ or $\Box\sim$, contraction into needn't needn't be blocked.

In general, the possibilities for contraction apply regardless of the epistemic or deontic interpretation of the relevant modal. Thus:

(4.12) a. She can't go = She isn't $\left\{\begin{array}{l}\text{allowed}\\ \text{able}\end{array}\right\}$ to go.

b. He shouldn't be there yet =
It's $\left\{\begin{array}{l}\text{improbable that he's there.}\\ \text{morally/legally bad for him to be there.}\end{array}\right\}$

The contraction facts therefore lend support to the correlations between the various readings for each modal as discussed in Chapter 2, and to proposals like that of Newmeyer (1969) in which root modals are derived from a structure embedding the corresponding epistemic.

In some cases, however, there is an asymmetry. Specifically, as noted above, must not contracts more readily when the commanding modal is deontic than when it is epistemic or logical, as in the examples of (4.9). This fact, in conjunction with those which we shall observe in the next section in connection with exempt and excuse, as well as the lexicalization of unnecessary, seem to define a 'conspiracy' which assures that deontics in general permit lexical incorporation and other lexical processes more readily than do epistemics; contraction is just one such process.

Notice, for example, that could functions as the past tense of can only in its deontic (permission) and ability senses, while the past tense of epistemic can is only realizable as the perfect can have (Ved). Similarly, might--now restricted (except in embedded clauses) to an epistemic value--used to have a root, deontic reading in older stages of English. At that time, it functioned as the past of permission may, as E. Wayles Browne has pointed out to me.

Syntactic modals followed by a negative and commanding an embedded perfect exhibit analogous semantic properties to those characterizing contraction. Consider the following sentences of this syntactic form:

(4.13) a. He $\left\{\begin{array}{l}\text{can}\\\text{could}\\\text{may}\\\text{might}\\\text{should}\\\text{must}\end{array}\right\}$ not have left.

b. He $\left\{\begin{array}{l}\text{can}\\\text{could}\\\text{may}\\\text{might}\\\text{should}\\\text{must}\end{array}\right\}$ have $\left\{\begin{array}{l}\text{not left}\\\text{stayed}\end{array}\right\}$.

The only reading for the (a) sentences with <u>may</u>, <u>might</u>, <u>should</u>, and <u>must</u> is that in which the negative is associated with the lower sentence (due to the fact that no lowering can apply over <u>should</u>, <u>must</u>, or over the necessarily epistemic interpretations which must be assigned to <u>may</u> and <u>might</u> in (4.13a)). These (4.13a) sentences can thus be paraphrased by the corresponding (b) sentences in which the perfective marker <u>have</u> is intercalated between the modal and the negative.

With <u>can</u> and <u>could</u>, on the other hand, no such semantic equivalence between the (a) <u>not</u>-<u>have</u> order and the (b) <u>have</u>-<u>not</u> order obtains: the vastly preferred, if not unique, interpretation of these (a) sentences is inconsistent with the lower-S position of the negative forced by the (b) order.

When we leave the domain of syntactic modals and their interaction with negation, we find the same generalizations holding with respect to the behavior of lexical items whose sense includes the notions of modality we have been discussing.

§4.12 <u>Impossibility</u> <u>and</u> "<u>unnecessity</u>"

Contraction can, and indeed should, be regarded as a subspecies of the general process of lexical incorporation. We saw in the above section that contraction is relatively favored by the logical configuration $\sim\Diamond/\Box\sim$ and relatively disfavored by the configuration $\Diamond\sim/\sim\Box$, although these remarks must be taken to characterize a tendential, implicational asymmetry rather than an absolute dichotomy. We shall now illustrate the wider ramifications of this asymmetry in terms of generalized constraints for modal/negative lexicalization.

Consider the following modal causatives and their semantically equivalent, if not syntactically related, decompositions:

(4.14) a. <u>prevent</u>: 'make/cause to be(come) impossible', 'dis+(en)able'

b. <u>forbid</u>: 'make/cause to be(come) illegal/ immoral', 'dis+allow'

When we examine the lexicon for equivalents to <u>prevent</u> and <u>forbid</u>, i.e. representations of (4.15a), we find an extensive set, as exemplified by the predicates of (4.16a); yet when we seek equivalents of the configuration in (4.15b), we find few such predicates, although--as seen in (4.16b)--the set is not entirely empty:

(4.15) a. cause something to be impossible, illegal, immoral ($\Longrightarrow \sim\Diamond$)

b. cause something to be unnecessary, unobligatory ($\Longrightarrow \sim\Box$)

(4.16) a. ban, bar, deter, disallow, enjoin, exclude, inhibit, interdict, preclude, prohibit, proscribe, refuse, veto, withhold

b. excuse, exempt

While the two verbs in (4.16b) seem to constitute genuine counterexamples to the strong form of the lexicalization hypothesis--in that (4.17a) does approximate the sense of (4.17b)

(4.17) a. The instructor {excused / exempted} Albert from taking the exam.

b. The instructor make it not obligatory for Albert to take the exam.

--it is nevertheless noteworthy that these two items not only contrast significantly with the much larger class of (4.16a), but must also be taken deontically. There are in fact no parallels to the non-deontic <u>prevent</u> involving removal of necessity as distinct from removal of obligation.

While most of the predicates in (4.16a) are themselves generally most felicitous when used in deontic contexts, they can have a strictly modal import, in particular with non-agentive subjects. The test for modal vs. deontic value, as we observed in §3.21, involves entailment of the negation of the complement and hence membership of the given predicate in Karttunen's <u>negative</u> <u>ONLY-IF</u> class. Thus:

(4.18) a. John's mother {*prevented / prohibited} him from marrying Hermione, but he married her anyway.

b. *John refused to marry Hermione, but he did so.

c. *Lack of finances precluded her going to college, but she went anyway.

d. $\left\{\begin{array}{l}\text{Gwendolyn} \\ \text{*Space/Time} \\ \text{*(His) modesty}\end{array}\right\}$ forbade his revealing who was responsible for saving her life, but he finally owned up to it.

Impossibilitative predicates, as we have noted, are roughly equivalent to the class of negative ONLY-IF verbs which force the entailment of the negation of their complement unless they themselves are negated, in which case no entailment follows. If there were any "unnecessitative" predicates, they would conceivably fall into a class of negative IF verbs which would, under negation and only then, force the entailment of their complement. It is to be noted that in (Karttunen 1970a) no such verbs are listed: unlike the multiply-instantiated classes of positive and negative ONLY-IF (possibilitative) verbs and positive IF (necessitative or causative) verbs, as well as the positive and negative IF and ONLY-IF verbs (the "full implicatives" like manage and avoid with no assertion of their own beyond what they presuppose and entail), no candidates are suggested by Karttunen for membership in the negative IF class. It is true that he does find one example of such a predicate in the later version of the paper (Karttunen, 1970b), but it is remarkable that the open-endedness of the other categories contrasts with this class, purported to include but one member, the non-modal hesitate:

(4.19) a. Egbert hesitated to leave $\not\vdash$ Egbert $\left\{\begin{array}{l}\text{did} \\ \text{didn't}\end{array}\right\}$ leave.

b. Egbert didn't hesitate to leave $\vdash$ Egbert left.

If the asymmetry we encounter here can be explained in terms of an all-encompassing set of constraints on lexical incorporation of modality and negation, these facts will in turn provide support for such a hypothesis.

It was conceded above that excuse and exempt can incorporate such deontic modals as those appearing in the paraphrase eliminate the necessity/need for and that they thus constitute counterexamples to any hypothesis which states that such modals cannot be incorporated under negation into causative predicates, although this hypothesis still stands for logical necessity.

Two other predicates which are only apparent counterexamples to this claim are the verbs waive and obviate. While these verbs often coöccur with a direct object expressing an obligation or requirement--as in

(4.20) a. The lower court's decision obviated the need for an appeal.

b. Ted's committee chairman waived the requirement of an oral defense.

--they must merely be analyzed as denoting 'eliminate' unless such modals can actually be incorporated into the predicates themselves. The crucial sentences for such a consideration would be those of (4.21), taken as necessarily paraphrasing the corresponding examples of (4.20):

(4.21) a. The lower court's decision obviated an appeal.

b. Ted's committee chairman waived an oral defense.

It is not entirely clear that the "understood" modal in (4.21a,b) must be one of obligation, rather than possibility or right.

Turning our attention to lexical incorporation of modality and negation into non-causatives, and specifically into surface adjectives, we find analogous results. There are indeed several adjectives, including *superfluous*, *needless*, *unobligatory*--and *unnecessary* itself--which correspond to the configuration $\sim\Box$. But notice that each of these items, including *unnecessary*, must be interpreted deontically. Unlike *impossible*, which denotes lack of ability or of logical (or epistemic) possibility--as opposed to *forbidden*, *illegal*, etc.--*unnecessary* can only be read as a synonym of *unobligatory*, i.e. *permitted not* rather than *possible not*. Thus compare the disparity illustrated in the following sentences:

(4.22) a. It's impossible for a bachelor to be married.

To be two places at once is logically impossible.

b. It's {not necessary / *unnecessary} {for the earth to rotate. / that the earth rotates.}

That there are nine planets is {not (logically) necessary. / *(logically) unnecessary.}

Thus while *not necessary*, like *not possible*, can lexicalize, the process in the former case is relatively more constrained than in the latter. There are other indications of this asymmetry: opposite the nominalization *impossibility* we do not find any lexicalized nominalization of *unnecessary*:

(4.23) a. The impossibility of {a priest's marrying... / living in both California and Massachusetts...}

b. *The unnecessity of {a minister's marrying... / living in Massachusetts...}

Nor can we substitute, *salva veritate*, either *needlessness* or _superfluity_ for the sense of 'lack of necessity' in the context of (4.23b).

Pointing to the imbalance we are seeking to establish, there is in addition both crosslinguistic evidence and the synchronic witness of a diachronic asymmetry borne by the morphology of the English adjectives _impossible_ and _unnecessary_.

We can state as a generalization about morphological processes that productivity of an affixation at a given stage in the history of a language is strongly correlated with a tendency for the relevant affix _not_ to affect the phonology of the stem with which it comes in contact. Unproductive processes, on the other hand, are "fixed", fully incorporated into the linguistic system, along with often extensive morphophonemic conditioning triggered thereby. In particular, the presence of such instances of sandhi as assimilation (_ad_+_similation_) rules, as well as stress shifts (cf. Chomsky and Halle 1968) and a tendency to permit further affixation, are indicative of the nonproductivity of an affix. In short, lack of productivity and presence of morphophonemic processes reveal much about the degree to which a prefix or suffix is lexicalized, made fully into an indissoluble part of a word.

In §3.3, we observed that the morphological evidence in connection with the abilitative -_able_ suffix and the necessitative _must_- "prefix" indicates the extent to which the former does--and the latter does not--constitute an instance of true lexical incorporation. By the same token, it is clear that the iN- prefix as illustrated by impossible, undergoing nasal assimilation to the position of the stem-initial consonant, is more fully incorporated than the non-assimilating un- of unnecessary.

While the coronal nasal would not be expected to shift in unnecessary, cf. unmotivated (*ummotivated), unparted vs. impartial, etc. The negative prefix, needless to say, does not figure in any principled decomposition of umpire.

But the choice of prefix in the two basic modal negations is not an historical accident, isolated from the etymology of these terms. Both French, to which we owe the positive equivalents of these modal notions, and Latin, which in turn bequeathed its terms to French, contain lexicalized equivalents for impossible but not for unnecessary:

(4.24) a. (French) impossible/*innécessaire

b. (Latin) impossible/*innecessarius, -a, -um

We are prepared to state an implicational universal at this point: if a language contains a lexicalization of $\sim\Box$, it will also contain a lexicalization of $\sim\Diamond$ (but not necessarily the reverse); furthermore, if one of these is more fully lexicalized (in terms of lack of productivity of the affix, absence of restrictions on syntactic and semantic contexts for lexicalization--e.g. the restriction of the English lexicalization of $\sim\Box$ to deontic contexts--absence of overt signalling of the negative, etc.), it will always be $\sim\Diamond$. Notice, in passing, that several of the lexicalized equivalents for 'render impossible/illegal/immoral' in (4.16a)--e.g. enjoin, interdict, prevent, prohibit, veto, bar, ban--contain either a non-exclusively negative prefix or no obvious prefix whatsoever, while the two instances of the corresponding class in (4.16b) both explicitly manifest the privative ex- prefix.

To illustrate the disparity we have outlined, consider the sublexicon given in (4.25):

(4.25) a. V: castrate, emasculate, geld, spay, neuter

b. Adj: impotent, sterile, frigid

c. N: eunuch, gelding, capon, poularde

While the various forms above refer to the act or result of rendering someone incapable of engaging in (or enjoying) sexual relations and/or of bearing the offspring therefrom, with some of these items carrying additional presupposed material (e.g. the referent or subject of capon is presupposed to be a male rabbit or chicken, and that of poularde to be a hen), I know of no items denoting the process of making it unnecessary for one to (or possible for one not to) engage in such activity or yield the fruit thereof.

§4.13 Corroborative evidence

We observed in §3.2 the existence of a large class of ABLE-polarity items, a subset of which constitutes UNABLE-polarity items which must be commanded in logical structure by an ability modal and a negative, in that order. Examples of this subset are:

(4.26) a. I $\left\{\begin{array}{l}\text{can't fathom}\\ \text{*can [not fathom]}\end{array}\right\}$ your behavior.

b. It's {impossible / *unnecessary} for me to make head or tail out of syntax.

c. Slobbovians are totally {incapable / ?capable} of telling their (collective) ear from their elbow.

In addition to the UNABLE-polarity items, every ABLE-polarity item can be dominated by a negative outside (but not within) the scope of the modal:

(4.27) a. It's {not possible / impossible} for me to afford a kidney-shaped swimming pool.

b. *It's possible for me not to afford a kidney-shaped swimming pool.

However, there seem to be no lexical items which can only occur in the environment $\sim\Box$__ or $\Diamond\sim$__, items which exhibit the coöccurrence properties of grinch in (4.28):

(4.28) a. You {needn't / *can('t) / *did(n't) / *have to / don't have to} grinch her getting married.

b. It's {unnecessary / *impossible / *easy/*hard} for anyone to grinch that we are in love.

Those items occurring in configurations commanded by impossibility are in short not offset by any items requiring a commanding lack of necessity, i.e. by any needn't-polarity items.

As seen in §3.3, the possibility of combining a negative to a stem with an abilitative suffix results in an open-ended set of adjectives of the form {in / un}Vable and their corresponding nominalizations in -ability. These adjectives and nouns have the logical form $\sim$[V[able]] or $\sim$[$\Diamond$[V]], i.e. impossible to (be) V(ed).

It is not a coincidence, we are now prepared to recognize, that these items do not have the logical structure $[\sim[V]]$*able*, i.e. $\Diamond[\sim[V]]$, and that in fact *no* English lexical items incorporate both modality and negation as affixes into a predicate in a configuration logically equivalent to *possible not V*, including any combination of affixes representing the logical configuration $\sim[\Box[V]]$.

Nor is this restriction limited to English. Turkish, as we observed in §3.3, contains both abilitative and necessitative verbal affixes, as illustrated below:

(4.29) a. okuyabilir 'can read', 'able to read'
okunabilir 'can be read', 'is readable'

b. okumalı 'ought to read'
okunmalı 'ought to be read', 'read-worthy'

The crucial facts for the present argument are those which hinge on the negations of these verbal and adjectival forms. It is not surprising, in the light of what we have seen to be the relatively autonomous status of $\sim\Diamond$, that the negative corresponding to the abilitative in (4.29a) is not only lexicalized, but is realized via a morphological shape distinct from other negative morphemes as well as from other modality markers:[5]

(4.30) Ahmet kitabı okuya*maz*. 'Ahmed $\left\{\begin{array}{l}\text{can't}\\ \text{is unable to}\end{array}\right\}$ read the book.'

Kitap okuna*maz*. 'The book $\left\{\begin{array}{l}\text{can't be read}\\ \text{is unreadable}\end{array}\right\}$.'

While there is a lexicalized negation apparently corresponding to the necessitative in (4.29b), it is significant that this negation is marked by the usual negative affix -ma-; furthermore, and more importantly, this negation is logically included within the scope of necessity, just as in English shouldn't, mustn't, etc., as the glosses indicate:

(4.31) Ahmet kitabı okumamalı. 'Ahmed ought not to read the book.'

Kitap okunmamalı. 'The book ought not to be read.'

What, then, you may ask, is the logical negation of the necessitative? As it happens, the only possibility of negation outside the logical scope of -malı involves an analytic two-word expression composed of the necessitative and the Turkish equivalent of not:

(4.32) oku(n)malı değil 'doesn't have to (be) read'

Some additional confirming evidence of the universality of the impossible/unnecessary asymmetry is provided by French. The verb pouvoir 'to be able' can occur impersonally with reflexive morphology as well as with a personal subject; in either use, the negation, in its normal syntactic position, is logically outside the scope of the modal, hence resulting in the denotation of impossibility:

(4.33) a. Elle ne peut pas venir. 'She can't come.'

b. Il ne se peut pas qu'elle vienne. 'It's not possible for her to come.'

Negation of the impersonal necessitative verb falloir, on the other hand, although identical to that of pouvoir from the viewpoint of superficial syntactic patterning, is associated with the lower sentence, again resulting in the sense impossible:

(4.34) a. Il faut qu'elle vienne. 'She $\left\{\begin{array}{l}\text{must}\\ \text{has to}\end{array}\right\}$ come.'

b. Il ne faut pas qu'elle vienne. 'She must not come.'

Similarly, with the weaker <u>devoir</u> 'ought to, should':

(4.35) Elle ne doit pas venir. 'She shouldn't come.'

In order to provide a logical negation of necessity, we must resort to the more formal surface adjective <u>nécessaire</u> or the periphrastic constructions <u>avoir</u> <u>à</u>, <u>avoir</u> <u>besoin</u> <u>de</u>, etc., as in

(4.36) a. Il n'est pas nécessaire qu'elle vienne.
b. Elle n'a pas à venir.
'She needn't come.'

We noted in §3.2 that <u>too</u> incorporates a modal along with negation. The usual interpretation of this modal + negative combination is $\sim\Diamond$ or $\Box\sim$, as in

(4.37) a. Shirley is too young to $\left\{\begin{array}{l}\text{become pregnant.}\\ \text{have a baby.}\\ \text{get married.}\end{array}\right\}$

= so young that she $\left\{\begin{array}{l}\text{can't } (\sim\Diamond)\ldots\\ \text{shouldn't } (\Box\sim)\ldots\end{array}\right\}$

$\neq$ so young that she $\left\{\begin{array}{l}\text{needn't } (\sim\Box)\ldots\\ \text{can not } (\Diamond\sim)\ldots\end{array}\right\}$

b. Baby Huey is too fat to sit in his high chair.

= so fat that he $\left\{\begin{array}{l}\text{can't}\\ \text{shouldn't}\end{array}\right\}$ sit in it.
(due to R. Lakoff)

$\neq$ so fat that he needn't sit in it.

Under some exceptional circumstances, the hidden modal may be interpreted as a necessity operator within the scope of negation, as in this example due to Robin Lakoff:

(4.38) Ronald is too rich and influential to pay taxes.

= so rich...that he needn't ($\sim\Box$) do so.

In general, however, this interpretation is quite difficult to come up with. Let us assume that too lexicalizes the construction [so ADJ that $\sim$], and--optionally--an embedded able to or have to under the negation, so that the intermediate structures for (4.37a) and (4.38) would resemble (4.39a) and (4.39b) respectively:

(4.39) a. Shirley is too young to be able to become pregnant.

b. Ronald is too rich and influential to have to pay taxes.

It then appears that the incorporation of the abilitative into a $\sim\Diamond$ structure proceeds more successfully, and in more contexts, than does the incorporation of the necessitative into a $\sim\Box$. In other words, the modal in a too X to (be able to) Y structure is more easily elided than that in a too X to (have to) Y structure.

In addition, there is significantly no device for the free incorporation of any $\sim\Box$ configuration into English adjectives. The too facts thus jibe with the general situation we have seen unfolding, in which the extensive set of lexical items with an incorporated $\sim\Diamond$ configuration (e.g. the prevent/forbid class of (4.16a) or the adjectives of the form unVable) contrasts vigorously with the absence, or at least dearth, of corresponding items with an incorporated $\sim\Box$ configuration.

Together with the evidence from Turkish and the behavior of falloir under negation, the case of the missing needn't-polarity items, the morphological asymmetries, and the trend suggested by the implicational universals discussed in the previous section, these facts on modal/negative incorporation constitute additional evidence to support the claim that the tendency for $\sim\Diamond$ modals to permit contraction more freely than $\sim\Box$ modals is not an accident, but is instead illustrative of the effect on possible lexicalization of the underlying logical asymmetry between these structures.

§4.2 The Nature of the Constraints

§4.21 Implicature and lexicalization

Assuming that we have demonstrated the extent to which the asymmetry we have revealed to exist between the modal notions _not possible_ and _not necessary_ is realized in English and other natural languages, the question which we asked ourselves (rhetorically) towards the beginning of this chapter still lies unanswered: why? As a start in the direction of framing a reply, let us assume that--in some real, although difficult to make explicit, sense--a language, just as a people are supposed to get the government they deserve (somber thought!), can be seen as getting only those lexical items it actually needs.

In this light, we can see that impossibility demands lexicalization or incorporation into a lexical item to a greater extent than does "unnecessity". If the use of _possible_ or _permitted_ conversationally implicates the negation of stronger predicates along the same scale, and in fact _force_ the inference of the negation of the strongest predicate on the modal or deontic scale, as the case may be, then these negations need not themselves receive a corresponding lexicalization. Since possible forces the inference of not necessary (= possible not) and permitted forces the inference of not obligatory (= permitted not), these negations are limited in the extent to which they can be incorporated. This limitation does not apply to strong negations of the form $\sim\Diamond/\Box\sim$, such as prevent, forbidden, and impossible, as these negations do not follow conversationally from the predication of any positive scalar value, nor are they related to other such values by the Aristotelian principle of complementary conversion or verbal opposition (cf. Chapter 2).

But if the determinant for establishing constraints on possible (or preferred) lexicalizations is to consist in the applicability of conversational implicatures, then no weak negative scalar element should lexicalize, since all such predicates must be inferred from the specification of the weak element on the corresponding positive scale. In particular, our results on the lexical incorporation of modality should be directly extendable to the scales of quantification.

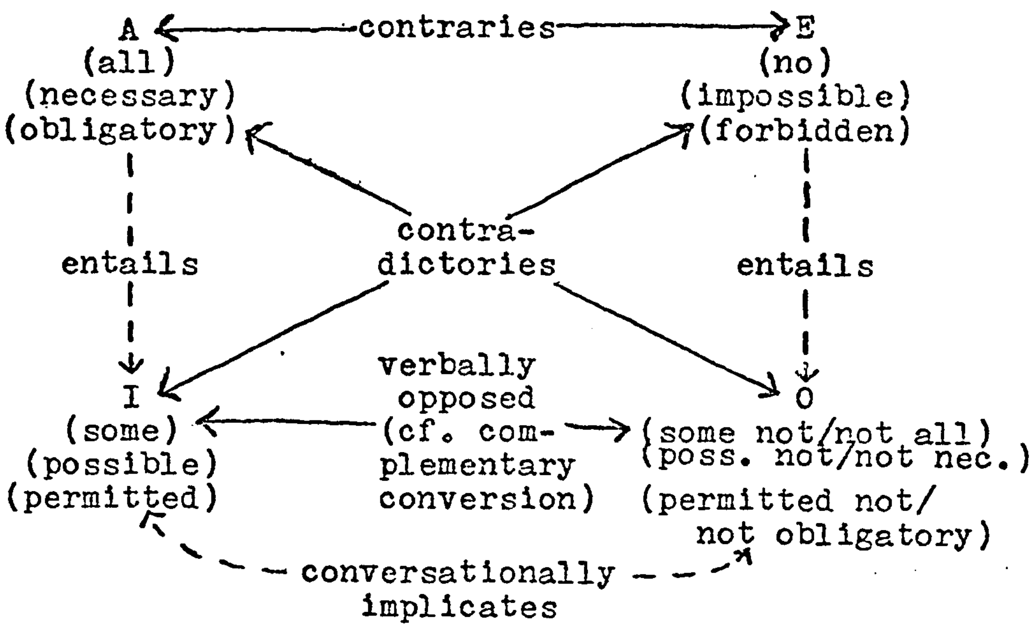
We observed in §2.3 that the behavior of some is directly analogous to that of possible, and all to that of necessary, in the establishment of meaning postulates (entailments) and conversational postulates (implicatures), and that these analogies are reflected in the patterns of natural language, specifically in the determination of suspendibility and in the coöccurrence restrictions on *absolutely*. We traced these correspondences to the Leibniz-Russell-Carnap definition of necessity (and possibility) in terms of truth in all (*bzw*. some) possible worlds.

Moving from possible world semantics into possible word semantics, we should expect to find lexicalized equivalents of the negative existential (= universal negative) configuration, but not of the negative universal (= existential negative); the E corner of Aristotle's square but not the O corner. And this, as the reader may have eagerly anticipated, is indeed the case.

In fact, the statement of the constraint is absolute, without exception, in the realm of the quantifiers. *Some not* (= *not all*), which follows conversationally from the assertion of the "verbally opposed" *some* and hence does not merit an independent lexicalization, is not--to my knowledge--incorporable into a lexicalized (i.e. one-word) quantifier in any language, while lexicalizations of *all not* (= *not some*) abound.

Aristotle's logical square, as he implicitly understood, is not logically symmetrical, and this asymmetry is directly superimposable onto that which characterizes modality:

(4.40)



The dotted lines above represent the logical and meta-logical (conventional) relations we have established among the relevant scalar values.

Aristotle distinguishes the two forms of negation, complementary and contrary, as follows:

> I call an affirmation and a negation <u>contradictory</u> when what one signifies universally the other signifies not universally, e.g. 'every man is white' and 'not every man is white', 'no man is white' and 'some man is white'. But I call the universal affirmation and the universal negation contrary opposites, e.g. 'every man is just' and 'no man is just'. So these cannot be true together, but their [contradictory] opposites may both be true with respect to the same thing, e.g. 'not every man is white' and 'some man is white'.[6]

Thus, while E is in this sense the contrary of A in that predicates cannot be consistently alleged to hold for all members of a non-empty set and for none, O is <u>not</u> the contrary of E (and in fact generally follows from the assertion of the latter).

While the terms of neither type of negation are mutually consistent, the _neither X nor Y_ form will be consistent for contrary negations, which allow for (at least) a third, intermediate value, but not for contradictory negations, which exhaust the possible states. Thus:

(4.40') a. *both $\left\{\begin{array}{l}\text{all}\\ \text{some}\end{array}\right\}$ and none

a'. *both $\left\{\begin{array}{l}\text{necessary}\\ \text{possible}\end{array}\right\}$ and impossible

b. neither $\left\{\begin{array}{l}\text{all}\\ \text{*some}\end{array}\right\}$ nor none

b'. neither $\left\{\begin{array}{l}\text{necessary}\\ \text{*possible}\end{array}\right\}$ nor impossible

In the light of the hypotheses, both tendential and absolute, concerning the constraints on lexicalization as demonstrated in the above section, and of the claim that the explanation for the facts described by these hypotheses is to be sought in the realm of forced conversational inference, and granting the homomorphism between the scale of quantifiers and the scales of modality, it is hardly fortuitous that the English lexical items _no_, _none_, _never_, _nowhere_, _nobody_, and their $(\sim\exists) \equiv (\forall\sim)$ ilk must seek in vain for any $(\sim\forall) \equiv (\exists\sim)$ mates. It is also significant that while certain constructions--e.g. the structure discussed in §2.33 and exemplified by the sentence

(4.41) She $\left\{\begin{array}{l}\text{had} \left\{\begin{array}{l}\text{every}\\ \text{some}\\ \text{no}\\ \text{*not every}\end{array}\right\}\\ \text{didn't have} \left\{\begin{array}{l}\text{*every}\\ \text{any}\end{array}\right\}\end{array}\right\}$ right to slam the door on his right thumb.

--permit the "natural class" of lexicalizable (and hence basic or primary) quantificational/negative configurations corresponding to the A, I, and E (but not O) vertices, no constructions will select the "unnatural" set A, I, and O.

§4.22 Some proto-formulations

It is instructive to note that the asymmetry of the (4.40) square, and the establishment of the corresponding tripartite (rather than quadripartite) lexical opposition dividing the spectrum of possible states, were implicitly recognized over fifty years ago by Otto Jespersen. In his epochal survey of negation,[7] Jespersen sets up three categories or classes for quantifier-related notions, instantiated as follows:

(4.42)	A:	all	always	everybody	everywhere
	B:	some	sometimes	somebody	somewhere
	C:	none	never	nobody	nowhere

Jespersen also proposes two equivalence rules relating these categories, or "tripartitions":

(4.43) a. $A\sim = C$

b. $\sim A = B$

The first of these rules makes the unobjectionable claim that e.g. <u>none</u> is equivalent to <u>all</u>...<u>not</u> (on the NEG-V reading of the latter); Jespersen might have added a thrid term to the formula ($= \sim B$).[8]

The equivalence in (4.43b), on the other hand, represents the controversial position which, as we have seen, results ultimately in the derivation of logical contradictions (if the elements in the A category are taken to entail the corresponding element in B); notice that <u>not</u> <u>all</u>, by this formula, is equivalent not just to _some not_ (i.e. $\sim A = B\sim$), but to _some_. As we noted in §2.11, the claim of Jespersen's (and Sir William Hamilton before him) that _some_ (and, we shall see, _possible_ as well) is logically upper-bounded as well as lower-bounded, and thus interpreted as _some but not all_, is unpopular with most logicians. Among other oversights, Jespersen does not acknowledge the epistemic status of the equivalence in (4.43b): if we know F to hold for (at least) some x's and are uncertain about the others, nothing prevents us from allowing that "Some x's Fx".

While Jespersen observes that the negation in (4.43b) is logically outside the scope of the universal, as in his cited instantiations of this formula (_not always_ = _sometimes_, _not all_ = _some_), he goes on to point out that this logical order may not correspond to the surface order:

> But very often _all_ is placed first for the sake of emphasis, and the negative is attracted to the verb in accordance with the general tendency [i.e. for negatives to appear in the AUX] mentioned above.[9]

He offers examples of this attraction:

(4.44) a. Thank Heaven, all scholars are not like this.

b. Tout le monde n'est pas fait pour l'art.

c. All that glisters is not gold.

This phenomenon, of course, is responsible for the emergence of the NEG-Q readings which, as noted in §2.1 (cf. Carden 1970), is actually the preferred interpretation of sentences of this form. Indeed, it is often difficult for speakers to force the NEG-V or A~ reading without some specific disambiguating clue, such as the semantics of the commercial in (4.44'a) or the <u>even</u> in (4.44'b), as discussed in Horn (1971):

(4.44') a. Everybody doesn't like something, but nobody doesn't like Sara Lee.

b. All my friends haven't even been to Omsk once.

Let us suggest a possible source for the existence of the NEG-lowering (or "attraction") rule operating over universals (but not existentials): if Jespersen is correct in positing a conspiracy whereby "nexal" negation (as opposed to "special" or lexically-incorporated constituent negation) tends to show up in the auxiliary position, rather than sentence-initial position, we see that the inability of the NEG-universal to undergo lexicalization, as distinguished from the NEG-existential configuration, results in the provision (by our benevolent grammer-god) of an "out" in the form of the lowering rule. Since the negative is normally incorporated into the existential quantifier it commands, thus shifting its status from "nexal" to "special" negation (e.g. <u>not</u> + <u>some</u> → <u>none</u>; <u>not</u> + <u>sometimes</u> → <u>never</u>), it cannot lower over the existential, because it "doesn't need" such an out.

Jespersen's insight was in realizing that the notions of modality mesh with the grid established for the quantifiers. He recognizes that the logical categories

(4.45) A: necessity 'must, need'

B: possibility 'can, may'

C: impossibility 'cannot'

represent, in his words, "nothing else but special instances of our three categories above", and that the same equivalences hold, e.g.

(4.46) $A\sim = C$ (necessary not = impossible)

$\sim A = B$ (not necessary = possible) [shades of complementary conversion!]

$\sim C = B$ (impossible not = necessary)

Furthermore, by adding "an element of will with regard to another being", Jespersen (1917, p. 92) arrives at the deontic categories

(4.47) A: command

B: permission

C: prohibition

Notice that in each of these trichotomies, with Jespersen's categories A, B, C corresponding respectively to the A, I, E vertices of Aristotle's square, there is no equivalent for the O vertex. Unbeknownst to his readers, and possibly to himself, Jespersen has shaved off the category D with Occam's razor.

Von Wright, in introducing deontic logic, attempts to establish a set of correspondences illustrating the relative positions of the deontic values with respect to the more familiar, "extensively studied" modal concepts. The relevant columns of his table, as filled in by Anderson & Moore,[10] are as follows:

(4.48)

Alethic	Existential	Deontic
necessary	universal	obligatory
possible	existing	permitted
contingent	partial	indifferent
impossible	empty	forbidden

As Anderson & Moore admit, their label _partial_ does not appear in von Wright's original table, and its position left blank, "on the grounds that no suitable English words were available". Moreover, von Wright's entry of (_morally_) _indifferent_ in the third row of the deontic column, as he himself points out, is not a conventional usage in the relevant sense. Indeed, even the status of _contingent_ in the alethic or truth-mode column is open to a similar doubt, being historically invented by medieval logicians to extricate themselves from the corner into which they found themselves from the corner into which they found themselves painted by Aristotle and his one- and two-sided brushes (cf. §2.2).

As logicians, von Wright and Anderson & Moore are presumably more reluctant than Jespersen to abandon the position in each mode represented by the entries in the third line of the table, but while they are correct in the (implicit) claim that all four values, as defined in most consistent systems of logic, represent distinct points within each scale, with correspondingly distinct truth conditions, the effect of conversational postulates is to assure that the distinction between the values of the second and third lines--at least for the conventional purposes of natural language--is, in Aristotle's words, "merely verbal".

§4.23 _Lexicalization and the binary connectives_

While Jespersen and von Wright, in their observations of the parallelisms we have been discussing, confined their attention to quantificational and modal notions, we encounter no resistance in extending their categories, both real and semi-pseudo, to deal with the behavior of the binary operators *and* (&) and *or* (v) of the propositional calculus.

As we have observed in earlier chapters, the conjunctive *and* corresponds logically, conversationally, and syntactically to the universal *all*, and the disjunctive *or* to the existential *some*. In particular, the assertion of a disjunction $P \vee Q$ forces the inference on the part of the listener that the speaker, if he is playing by the rules, is not certain that the conjunction $P \,\&\, Q$ holds as well.

If it is true that *or* implicates *or not* just as *some* implicates *some not*, then we should expect *or not* to fail to lexicalize just as *some not* fails to do so. Observe the following sentences:

(4.49) a. John isn't tall $\left\{\begin{array}{l}\text{and he isn't handsome.}\\ \text{nor is he handsome.}\end{array}\right\}$

a'. John isn't tall $\left\{\begin{array}{l}\text{or he isn't handsome.}\\ \text{*nand is he handsome.}\end{array}\right\}$

b. Mary can't come, $\left\{\begin{array}{l}\text{and Sally can't (either).}\\ \text{nor can Sally.}\end{array}\right\}$

b'. Mary can't come, $\left\{\begin{array}{l}\text{or Sally can't.}\\ \text{*nand can Sally.}\end{array}\right\}$

While *nor* lexicalizes $(\&\sim) \equiv (\sim\vee)$, just as *no* lexicalizes $(\forall\sim) \equiv (\sim\exists)$, there is no lexical item **nand* corresponding to $(\vee\sim) \equiv (\sim\&)$, just as we encounter a gap in the lexicon where we might have expected to find a quantifier **nall* for $(\exists\sim) \equiv (\sim\forall)$.

The quantifier *neither*, suppletive to *no(ne)* and limited to ranging over sets with two members, signifying 'both not' $\equiv$ 'not either', also fails to find a mate of the form *<u>noth</u> = 'not both', 'one not':

(4.50) a. John and Mary came in,
but { both of them [didn't stay]. (NEG-V) }
{ neither of them stayed. }

a'. John and Mary came in,
but { one of them didn't stay. }
{ both of them didn't stay. (NEG-Q) }
{ *noth of them stayed. }

b. Mary can't come, and { Sally can't either. }
{ neither can Sally. }

b'. Mary can't come, { or (else) Sally can't. }
{ *{or / and} noth can Sally. }

c. Sue { didn't use either / used neither } of them.
$\sim Fx \;\&\; \sim Fy \equiv \sim(Fx \vee Fy)$

c'. Sue { didn't use both / *used noth } of them.
$\sim(Fx \;\&\; Fy) \equiv \sim Fx \vee \sim Fy$

Correlative conjunctions behave in like fashoin:

(4.50') a. Both John and Mary [didn't come in]. (NEG-V)
Neither John nor Mary came in.

a'. Either John or Mary didn't come in.
Both John and Mary didn't come in. (NEG-Q)
{ Not both / *Noth } John and Mary came in.

b. Sue { didn't use either / used neither } pills or loops.

b'. Sue { didn't use both / *used noth } pills and loops.

Notice the interconnection of the lexicalizability of <u>not either</u> (as opposed to <u>not both</u>) to the fact that the negation cannot lower in the former instance (but can in the latter) over the quantifier. These results are, of course, identical to those for the suppletive non-binary quantifiers some and all.

In summation, we can construct a chart to contrast the position of the three lexicalized combinations of negation and quantification with that of the non-lexicalizable combination. The A, B, C categories are Jespersen's, the D category is the one implicitly recognized by Jespersen to represent a pseudo-value in natural language:

(4.51)	QUANTIFIER	CONNECTIVE	PRECONNECTIVE
A:	all	and	both (...and)
B:	some	or	either (...or)
(A~=)C:	none $\binom{\text{all}\sim}{\sim\text{some}}$	nor $\binom{\text{and}\sim}{\sim\text{or}}$	neither (...nor) (both~, ~either)
(B~=)D:	*nall $\binom{\text{some}\sim}{\sim\text{all}}$	*nand $\binom{\text{or}\sim}{\sim\text{and}}$	*noth (...nand) (one~, ~both)

§4.24 The intermediate values

In our discussion of the conversational constraints on the lexical incorporation of sequences of negation and other logical operators--modal, quantificational, and connective--we have thus far confined our attention to those scalar values at the extremes of their respective scales, the weakest values (e.g. some, possible, permitted) and the strongest (e.g. all, necessary, obligatory). We have found the following results to obtain, where W denotes the weakest and S the strongest lexical operator on a given positive scale:

(4.52) a. S entails W

b. W implicates (forces the inference of) $W\sim \equiv (\sim S)$; $W\sim \equiv (\sim S)$ does not "need" to lexicalize; and

(i) does not lexicalize; or at least
(ii) tends not to lexicalize as fully as the corresponding $\sim W \equiv (S\sim)$ sequence.

The choice of (i) vs. (ii) is determined by the relevant scale, and in large part by the surface category of the relevant lexical items, with the constraints operating more strongly on verbs than adjectives (in keeping with Ross' hierarchy discussed at the end of Chapter 3), and most strongly (i.e. as (i)) on the quantifiers and binary connectives.

The question to which we have not yet addressed ourselves is that relating to the behavior of the intermediate scalar values, the question of whether such values will lexicalize along with a negative <u>within</u> their scope, like the S values, or along with a negative <u>outside</u> their scope, like the W values.

The answer to this question, as we shall see, depends on the relative position of the logical operator under investigation with respect to the mid-point on its scale. Consider the tables below:

(4.53)	a.	all ~	=	no(ne)
		most ~	=	∅
		a majority ~	=	a minority
		half ~	=	∅
		many ~	=	∅
		some ~	=	∅
	b.	~some	=	no(ne)
		~many	=	few

$\sim$half = $\emptyset$

$\sim$most = $\emptyset$

$\sim$majorty = $\emptyset$

$\sim$all = $\emptyset$

c. always$\sim$ = $\sim$ever, $\sim$sometimes = never

usually$\sim$ $\cong$ $\sim$often = seldom
$\sim$frequently = infrequently, rarely

often$\sim$ $\cong$ $\sim$usually = $\emptyset$

sometimes$\sim$= $\sim$always = $\emptyset$

The generalization expressed by the formulae of (4.53) seems to be the following, where Q represents a quantifier or quantificational adverb whose asserted lower bound is either less than, equal to, or greater than the midpoint M on the relevant positive scale:

(4.54) $\exists$ possible lexicalization of (or lexical equivalent to)

	$\sim$Q?	Q$\sim$?
Q < M	yes	no
Q = M		no
Q > M	no	yes

The operational procedure for determining the relative position of a quantifier (or other scalar element, hence denoted by E) with respect to the midpoint M of the scale on which it appears is as follows:

(4.55) a. If [E...and E...$\sim$] is logically consistent, then $E \leq M$.

b. If [E...and E...$\sim$] is logically inconsistent, then $E > M$.

c. If the extension of [exactly $Ex\theta x$] is necessarily equivalent in size to (coextensive with) that of [exactly $Ex{\sim}\theta x$], then $E = M$.

As the quantifiers *some* and *many* fall below M on their scale, while *most* and *all*, the (contradictory) negations of (and only of) *some* and *many* can be expected to lexicalize, and in fact do so, into *no(ne)* and *few* respectively. The blank in chart (4.54) corresponding to *~half* will be discussed and filled in below.

Notice that while *all* and *most* are above the halfway point on the quantificational scale, as illustrated by the contradiction which ensues from the attempt to quantify a set with either of these operators, and them to stipulate that both a given property and the "inverse" of this property hold for the members of a set so quantified--as in

$$(4.56)\ \begin{array}{l} \text{a.}\\ \text{b.}\\ \text{c.}\\ \text{d.}\\ \text{e.}\end{array} \left\{\begin{array}{l} \text{*All (of)}\\ \text{*Most of}\\ \text{Half (of)}\\ \text{Many of}\\ \text{Some of}\end{array}\right\}_1 \text{ the eggs broke, and } \left\{\begin{array}{l}\text{*all}\\ \text{*most}\\ \text{half}\\ \text{many}\\ \text{some}\end{array}\right\}_1 \left\{\begin{array}{l}\text{of them didn't.}\\ \text{remained intact.}\end{array}\right\}$$

--only *all not* has a lexicalized equivalent.

It will be maintained here that the non-occurrence of an equivalent for *most~*, such as in **Least of the eggs broke*, constitutes an accidental gap in the system of English quantifiers, quite distinct from the systematic gaps corresponding to *~most* and *many~*. Notice that the nominalization of *most*, i.e. *majority*, can lexically incorporate a lower (but not a higher) negative into *minority* (= less than half).

It is not difficult to ascertain that *few* corresponds to ~many rather than to most~. In the first place, given the sentences

(4.56') a. Most of the aardvarks didn't leave.

b. Not many of the aardvarks left.

c. Few of the aardvarks left.

it appears that while the (b) and (c) sentences entail each other (there being no circumstances under which one would be true and the other not true, let alone false), and the (c) sentence furthermore entails the (a) sentence, it is nevertheless not the case (as is point out by Smith[12]) that (4.56'a) entails (4.56'c), since the former would be true if 49% of the earth pigs in question had actually dispersed, but the latter would be at least questionable under the conditions of this possible world.

The crucial fact is that few, like many, but unlike all, some, and most, involves a prior expectation of the size of the relevant subset (i.e. of how many members of the original set are described by the given property, or in that relation). While the operational procedure involved in determining the truth of the first conjunct of (4.56 a,b,c,e) or of (4.56'a) consists in merely establishing the total membership of the set in question (the number of aardvarks) and the membership of the subset belonging to the relation leave, and then dividing the former by the latter. Any proportion greater than 0% (and, for countable rather than mass nouns, often restricted to subsets with more than one member) can be described by some, any proportion greater than 50% by _most_, and any proportion equal to 100% by _all_ (ignoring the problem of extending this procedure to infinite sets).

But the truth of the (4.56d) sentence with _many_, or of its negative counterparts in (4.56'b,c) with _not many_ and _few_, cannot be established in this manner. There is no simple proportion constituting the lower bound of _many_, or the upper bound of _few_: to know whether _many_ or _few_ apply we require additional information about the set in question--and the context--with respect to the relevant property.

Few, then, corresponds to negated _many_, and shares the logical properties of _not many_, in both specific sentences like (4.57a) and generic sentences like (4.57b):

(4.57) a. Many of the eggs broke and many didn't.

a'. $*\left\{\begin{array}{l}\text{Not many}\\ \text{Few}\end{array}\right\}$ of the eggs broke and $\left\{\begin{array}{l}\text{not many}\\ \text{few}\end{array}\right\}$ didn't.

b. Many firemen wear red suspenders but many don't.

b'. $*\left\{\begin{array}{l}\text{Not many}\\ \text{Few}\end{array}\right\}$ firemen wear red suspenders but $\left\{\begin{array}{l}\text{not many}\\ \text{few}\end{array}\right\}$ don't.

But there is no single quantifier Q such that $\underline{Q\sim} = \underline{\sim\text{many}} = \underline{\text{few}}$.

Notice, incidentally, that the quantifiers _many_ and _few_, along with their mass equivalents _much_ and _little_, must be interpreted as referring to the _relative size_ of the subset they quantify, rather than primarily to the _absolute ratio_ of this subset to its superset, and that these (along with such non-proportional quantifiers as the cardinals) are--significantly--the *only* quantifiers which are normally capable of appearing as superficial predicates of natural language sentences, or of bearing adjectival counterparts which can do so. This fact is illustrated by the following contrasts:

(4.57') a. The men who left were { many (in number). / numerous. / *all/*most/*some (in number). }

a'. The men who left were { few (in number). / *none/*not all (in number). }

b. The water was plentiful.
(≅ There was much water.)

*The water was _____.
(≅ There was { all of the / most of the / some (of the) } water.)

b'. The water was scarce.
(≅ There was little water.)

?The water was non-existent.
(≅ There was no water.)

Notice that these same quantifiers, and only these, can appear in a NP after the determiner *the*:

(4.57") a. The { many / few / seven / *all/*most/*some/*no } men who left were Greek.

b. The { ??much/✓little / *some/*no/*all } (food) that you ate was contaminated.

I have no explanation for the evident atrociousness of *much* in (4.57"b), which is far more severe than the negative-polarity status of *much* would predict.

When we enter the domain of the intermediate-scale time-adverbials, the situation is somewhat more complex. *Usually* is not strictly equivalent to *most of the time*, at least for many speakers, while *often* is--as we would expect--at least roughly equivalent to *much* (and hence not necessarily half) *of the time* or *in many instances*. Thus if John rides a bicycle to work 51 times out of a hundred, we do not ordinarily say that he *usually* does so, although we can say that he does so *most of the time*. *Usually* apparently includes the notion of characteristic behavior, while *most* does not, although both of these values are above the mid-point on their respective scales.

Whether *usually* is as relativistic as *many*, in which case the *usually~* $\cong$ *~often* and *often~* $\cong$ *~usually* congruences of (4.53c) might become full equivalences, is difficult to determine, and probably subject to differences from speaker to speaker. Nor, if *not often* $\nleq$ *usually not*, is it a simple matter to establish which of these configurations corresponds to the semantics of *seldom*. My intuitions reflect the view that *seldom*, like *~often*, demarks a stronger negative value than does *usually~*, and hence that the former expressions unidirectionally entail the latter.

In any event, the crucial questions to decide for the matter of lexicalizability are indeed decidable, since *usually* is demonstrably *above* its mid-point and *often*--like its virtual synonym *frequently*--below that mid-point. Thus:

(4.58) a. The Maharishi $\left\{\begin{array}{l}\text{often}\\ \text{frequently}\\ \text{*usually}\end{array}\right\}_1$ wears striped trousers, and he $\left\{\begin{array}{l}\text{often}\\ \text{frequently}\\ \text{*usually}\end{array}\right\}_1$ doesn't.

b. The Maharishi $\left\{\begin{array}{l}\text{*seldom}\\ \text{*infrequently}\\ \text{*rarely}\\ \text{doesn't} \left\{\begin{array}{l}\text{*often}\\ \text{usually}\end{array}\right\}_3\end{array}\right\}_2$ wears undershirts, but he $\left\{\begin{array}{l}\text{*seldom doesn't wear them.}\\ \text{*infrequently doesn't wear them.}\\ \text{*rarely doesn't wear them.}\\ \text{doesn't} \left\{\begin{array}{l}\text{*often}\\ \text{usually}\end{array}\right\}_3 \text{ not wear them.}\end{array}\right\}_2$

It will be observed that *not usually*, unlike *not often* or the equivalent *seldom*, is compatible with a lower negation in (4.58b) (if somewhat awkward). The same is true of *not all* (as opposed to *not many*): *Not all my friends smoke pot, and not all of them don't*.

It will in fact be the case that if (and only if) a scalar element, e.g. a quantifier, is *not* above the mid-point on its own, positive scale, then its contradictory negation *will* be above the mid-point on its negative scale, and will therefore be incompatible with a lower negation. We can formalize this generalization as follows:

(4.58') Iff $Q \leq M_Q$, then

(i) $\sim Q$ can lexicalize (see 4.54)

(ii) $\sim Q > M_{\sim Q}$

(iii) $\sim QxFx \mid \sim Qx{\sim}Fx$ (using Russell's $p|q$ notation to denote 'p is incompatible with q'[13])

As we have already seen, these results do not hold for the quantificational scales alone, applying equally to the binary connectives, the alethic and deontic notions of modality, and--by extension--to other scalar predicates which can embed propositions. We shall explore these areas in the impending section.

§4.3 Formulation of the Constraints

We have yet to formulate a generalized statement governing the possibility of lexical incorporation of negation into other logical operators or into lexical items already including such operators. Let us examine the following hypothesis, applying to those cases in which the incorporated negative has wide scope, in the light of what we have observed in this chapter. ($F(x)\theta$ will designate a proposition-forming operator F--binding the variable x in the case of quantifiers--taking in its scope some proposition θ.)

(4.59) If $F(x)\theta$ and $F(X){\sim}\theta$ are compatible--i.e. if the formula $F(x)\theta$ & $F(x){\sim}\theta$ is not logically inconsistent--then

(i) $F(x)$ forces the inference that (as far as the speaker knows) ${\sim}A_F(x)$, where A_F is the end-point or extreme value on the scale of which F is an element;

(ii) ${\sim}F$ can lexicalize
(iii) $F{\sim}$ cannot lexicalize
} all other things equal

(iv) ${\sim}F$ is above the midpoint on its scale

(v) ${\sim}F(x)\theta | {\sim}F(x){\sim}\theta$

As examples of what (4.59) accounts for, consider the following paradigm:

(4.60) a. Some have greatness thrust upon them.

(i) IMPLIC: Not all have greatness thrust upon them (= Some do not).

(ii) ~some → (no/none)

(iii) some~ $\not\rightarrow$

b. It's possible for aardvarks to eat spiders.

(i) IMPLIC: It's not necessary for aardvarks to eat spiders (= It's possible for them not to).

(ii) ~possible → (impossible)

(iii) possible~ $\not\rightarrow$

c. Many hangnails are fatal.

(i) IMPLIC: Not all hangnails are fatal (= Some are not).

(ii) ~many → (few)

(iii) many~ $\not\rightarrow$

d. I permit you to marry my daughter.

(i) IMPLIC: I am not forcing you to marry my daughter (= I permit you not to).

(ii) ~permit → (forbid)

(iii) permit~ $\not\rightarrow$

e. John and Mary often make love in the bathtub.

(i) IMPLIC: They do not always make love in the bathtub (= Sometimes they don't).

(ii) ~often → (seldom)

(iii) often~ $\not\rightarrow$

f. Either Yvonne or Yvette will marry Sam.

(i) IMPLIC: Not both Yvonne and Yvette will marry Sam (= Either Yvonne or Yvette won't marry Sam).

(ii) ~(either...or) → (neither...nor)

(iii) (either...or)~ $\not\rightarrow$

The facts outlined above follow from the compatibility of each of the operators in question with that operator commanding a lower negative: <u>many are and many aren't</u> (c), <u>they often do and they often don't</u> (e), etc. Notice that we cannot conclude from the compatibility of F and F~ that the use of the former invariably implicates the latter, but only that it implicates W~, where W is the weakest element on the scale of F: <u>many</u> does not implicate <u>many~</u> (although it is compatible with it), but merely <u>some~</u>; <u>often</u> implicates not <u>often~</u>, but only <u>sometimes~</u>.

As predicted by (4.59iv) and (4.59v), the contradictory negatives lexicalized in (ii) of each case in (4.60) are both above the midpoint of their respective negative scales, and <u>in</u>compatible with a lower negation. Thus <u>few</u> is stronger than <u>not half</u>, and it cannot be the case both that few hang-nails are fatal and that few are not; nor can I consistently both forbid you to marry my daughter and simultaneously forbid you not to.

As formulated, (4.59) predicts (incorrectly) that there can be no item corresponding to <u>possible~</u> in (4.60b,iii)--but cf. <u>unnecessary</u>. Such counterexamples, as we saw earlier in this chapter, are largely restricted to the surface category of adjectives, in particular to those which are marked by an overt, productive, non-assimilating negative prefix.

(4.59) will also predict the lexicalizability of <u>~half</u> (but not of <u>half~</u>, since <u>half</u> and <u>half~</u>, unlike the terms of the nearly homonymous conjunction in the title of Hemingway's novel, are mutually consistent. It was for this reason that Churchill was able to utter his famous retraction of an earlier claim about Parliament when he had let it slip that "Half the ministers are asses". The retraction? "Half the ministers are not asses".

While neither of the sequences actually corresponds to a lexicalized English quantifier, it is claimed here that the non-correspondence in the case of *~half* is accidental while the gap for *half~* is deliberate. This prediction is supported by the existence of the nominal form (*a*) *minority* which shares the truth conditions of *~half* (<50%) and by the non-existence of any parallel form corresponding to *half~* (≥50%~).

Other, more easily confirmable, predictions made by (4.59) include

(4.61) ~much → (little) much~ ↛
~sometimes → (never) sometimes~ ↛
~frequently → (rarely) frequently~ ↛
~somebody → (nobody) somebody~ ↛

The arrows here and in (4.60) need not be taken as representing a transformational derivation of the negative-incorporated operators, but merely indicate--for our present purposes--the semantic equivalence between a given negative/operator sequence and a corresponding operator "generated" by (4.59ii) with the negative incorporated to a greater (*few*, *seldom*, *forbid*) or lesser (*nobody*, *impossible*) extent.

In order that we may account for certain lexicalizations to which there do not correspond any ~F structure, but only sequences of the form F~, we must develop a complementary formulation to that in (4.59), applying to those operators which do not meet the condition of the previous hypothesis:

(4.62) If F(x)θ and F(x)~θ are incompatible (i.e. if their conjunction is logically <u>in</u>consistent, so that F(x)θ|F(x)~θ), then

(i) F~ can lexicalize into a natural language predicate, but

(ii) ~F cannot.

Some examples of the application of this formulation of the constraint are as follows:

(4.63)	majority~ → minority	~majority ↛
	all~ → no/none	~all ↛
	always~ → never	~always ↛
	(both...) and~ → (neither...) nor	~(both...) and~ ↛
	force~ → prevent	~force ↛

Logical operators conforming to the condition imposed for F in (4.62) tend to have contrary negations as well as contradictory (thus <u>all~</u> is the contrary and <u>~all</u> the contradictory of <u>all</u>); in each case, it will be the contrary and not the contradictory that will lexicalize.

While the addition of the (4.62) formulation is not required in order to generate the items in (4.63), for which this rule merely provides an alternate source to that given by (4.59), there does not seem any way to avoid this addition in dealing with such paradigms as the following:

(4.64) a. ??I believe you're right and I believe you're $\left\{\begin{array}{l}\text{not right.}\\ \text{wrong.}\end{array}\right\}$

(i) believe$\sim$ $\rightarrow$ doubt

(ii) $\sim$believe $\not\rightarrow$

b. ??I say you're right and I say you're $\left\{\begin{array}{l}\text{not right}\\ \text{wrong.}\end{array}\right\}$

(i) say$\sim$ $\rightarrow$ deny

(ii) $\sim$say $\not\rightarrow$

These question-marked sentences do not constitute strictly logical contradictions in themselves, but they clearly characterize <u>reports</u> of contradictory <u>beliefs</u> or <u>claims</u>, and so can be thought of as representing second-order contradictions. The formulation of (4.62) could easily be adjusted to explicitly include this species of contradiction, but we shall assume they have been covered by the original language.

Parallel to the predicates in (4.64) we observe the following incorporations via the <u>dis</u>- prefix:

(4.65)	persuade$\sim$ $\rightarrow$ dissuade[14]	$\sim$persuade $\not\rightarrow$
	claim$\sim$ $\rightarrow$ disclaim	$\sim$claim $\not\rightarrow$
	encourage$\sim$ $\rightarrow$ discourage	$\sim$encourage $\not\rightarrow$
	prove$\sim$ $\rightarrow$ disprove	$\sim$prove $\not\rightarrow$

None of these predicates (in their pre-incorporated form) can appear without contradiction when conjoined to propositions which contain the identical predicate embedding the negation of its original predicate. Hence, for each of the predicates F in (4.65), F|F$\sim$, and each of these verbs is therefore governed by the constraints in (4.62). The negative *dis*- prefix incorporated into each predicate must have originated by raising (at least semantically) from its position below that predicate in remote structure.

Notice in particular the difference in logical structure corresponding to the predicates *disallow* (in which the scope of negation is, as on the surface, *outside* that of *allow*) and e.g. *disprove* (in which the scope of negation is *within* that of *prove*):

(4.66) a. I allow you to leave and I allow you $\left\{\begin{array}{l}\text{not to.}\\ \text{to stay.}\end{array}\right\}$

$$\left.\begin{array}{l}\text{(i) } \sim\text{allow} \rightarrow \text{disallow}\\ \text{(ii) allow}\sim \not\rightarrow\end{array}\right\}\text{ by (4.59)}$$

b. ??I proved that you left and I proved that you $\left\{\begin{array}{l}\text{didn't.}\\ \text{stayed.}\end{array}\right\}$

$$\left.\begin{array}{l}\text{(i) } \sim\text{prove} \not\rightarrow\\ \text{(ii) prove}\sim \rightarrow \text{disprove}\end{array}\right\}\text{ by (4.62)}$$

Only in formal deductive systems can we validly prove both a proposition and its negation, if our premisses are contradictory. In ordinary language, (4.66b) is viewed as a contradiction, and the lexicalization facts follow.

When we disallow an act we are *not* allowing what von Wright (1951) would call the negation of that act, but when we disprove a hypothesis we *are* proving the complement of that hypothesis. I know of no way to predict and/or explain this disparity between the logical form of *disallow* and that of *disprove* outside the mechanism of the principles which we have been investigating.

It should be remarked that the constraint on lexicalization as formulated in (4.62), as was the case with (4.59), generally must exempt adjectives of the *un-* form. Indeed, we find a number of paired adjectival *un-* and verbal *dis-* forms with disparate logical structures:

(4.67) disavow (avow~) /unavowed (~avowed)
disconfirm (confirm~)/unconfirmed (~confirmed)
disprove (prove~) /unprove$\left\{\begin{matrix}\text{d}\\\text{n}\end{matrix}\right\}$ (~prove$\left\{\begin{matrix}\text{d}\\\text{n}\end{matrix}\right\}$)

--not to mention such unpaired adjectives as *uncertain*, *unnecessary*, *unconvinced*, etc.

We have already shown that morphologically and semantically these *un-* adjectives, or at least *unnecessary*, are relatively "un"lexicalized, despite their appearance. In the case of *uncertain* (*~certain*), there is at least one additional piece of evidence towards this conclusion, provided by syntactic patterning. While both *certain* and its unlexicalized contradictory negation, *not certain*, permit the rule of raising (to subject), this rule is blocked by the incorporated version *uncertain*:

(4.68) a. That Hubert will win is $\left\{\begin{array}{l}\text{certain.}\\\text{not certain.}\\\text{uncertain.}\end{array}\right\}$

b. Hubert is $\left\{\begin{array}{l}\text{certain}\\\text{not certain}\\\text{*uncertain}\end{array}\right\}$ to win.

While this observation does not apply to *unlikely*, we shall see that the semantic structure of *unlikely*, as distinguished from that of *uncertain*, does conform to the predictions of (4.62) and therefore need not suffer the embarrassment to which counterexamples are susceptible: *Hubert is unlikely* _to_ _win_.

We have thus far neglected the topic of the intermediate forms on the scale of epistemic modality, forms which--as we can demonstrate--correspond to the quantificational values _most_ and _usually_ (rather than to _many_ and _often_). Observe the behavior of these items in connection with a lower negation:

(4.69) *It's likely that Hubert will succeed and it's likely that he won't.

*Hubert is likely to win and likely to lose.

(4.69') *It's probable that the Vietnamese will survive the war and probable that they won't.

Likely in (4.69) and _probable_ in (4.69'), like _certain_ and _necessary_ but unlike _possible_, are inconsistent when conjoined with a lower negation, i.e. probable(θ)|probable($\sim\theta$). In conformance with the principles of (4.62), we should expect _probable_ and _likely_ to incorporate a lower negative, but not a higher one. And this (surprise!) is precisely what we find.

While _not_ _probable_ is ambiguous, due to the fact that _probable_ is in the class of NEG-raising predicates discussed in Horn (1971), the incorporation of the negative is possible _only_ if that negative was raised. The facts are as follows:

(4.70) αnot probable

(i) $\sim$probable

(ii) probable$\sim$

-αimprobable ($\leftarrow$ probable$\sim$)

While the results here are superficially the converse of the case of can not contraction discussed at the beginning of this chapter, in which lexicalization (i.e. contraction into can't) proceeded only if the negative had been lowered, the explanation is ultimately the same, with can governed by (4.59) and hence incorporating a higher negative, and probable governed by (4.62) and hence incorporating a lower NEG. Nor is it likely a coincidence that these raising and lowering rules providentially applied just when necessary in order to place the negative in the appropriate position for incorporation.

Likely, another NEG-raiser, similarly permits either logical interpretation to be assigned to the sequence not likely. The preferred reading for unlikely is, as with improbable, with the negative inside the scope of likely. However, since the prefix involved is the notorious un- rather than the well-behaved iN- of impossible and improbable, the constraints are weaker. There is in fact a dialect (of which Green alleges herself to be a speaker[15]) which allows unlikely the reading ~likely as well as likely~.

Notice that the permissibility of the neither...nor construction manifests the contrary status of at least one reading of the prefixal negation with likely and probable:

(4.71) $\left\{\begin{array}{l}\text{neither likely nor unlikely}\\ \text{neither probable nor improbable}\end{array}\right\}$ (e.g. a 50% chance)

In order to get the contradictory reading, the following conjunctions must be consistent:

(4.72) a. ?It's unlikely that he left, and unlikely that he didn't.

b. *It's improbable that he left, and improbable that he didn't.

While (4.72b) is as unacceptable as we would predict from the stipulated impossibility of analyzing <u>improbable</u> as deriving from the logical structure <u>~probable</u>, the <u>unlikely</u> case in (4.72a), which should presumably be acceptable on the <u>~likely</u> reading of <u>unlikely</u>, is not exactly impeccable.

But note that even an unincorporated negative sounds awkward in this construction, unless it is assigned contrastive stress:

(4.73) ?It's not $\left\{\begin{matrix}\text{likely}\\ \text{probable}\end{matrix}\right\}$ that he left, and it's not $\left\{\begin{matrix}\text{likely}\\ \text{probable}\end{matrix}\right\}$ that he $\left\{\begin{matrix}\text{didn't leave.}\\ \text{stayed.}\end{matrix}\right\}$

We are apparently trafficking with the curious fact that the NEG-raising reading, when available for a predicate, is always strongly preferred (as perhaps attributable to Gricean rules), even when to force that reading results in anomaly.

Because of considerations beyond either the scope or the grasp of this chapter, factive predicates are exempted from the constraints on lexical incorporation of negatives described above. Observe the following cases of such apparent misbehavior on the part of factives, none of which (for obvious, semantic reasons) can be consistently conjoined to a proposition containing the same factive with the complement negated.

(4.74) ~remember → forget   remember~ $\not\rightarrow$

~reveal → conceal   reveal~ $\not\rightarrow$

~cognizant (of) → ignorant (of)   cognizant (of)~ $\not\rightarrow$

(Fr.) ~savoir → ignorer   savoir~ $\not\rightarrow$

If the Kiparskys' analysis of factivity (1968) is correct, then it would be Ross' movement constraints which would block an incorporation of a lower negative into a factive. We must, however, explain the differences between NEG-raising (which can apply only to verbs in certain semantic subsets of the non-factives) and NEG-incorporation (which applies freely to non-factives meeting the demands of (4.62), even if they are non-NEG-raisers like _say_, _prove_, and _hope_).

Nor do the constraints provide for the incorporation of negatives into certain verbs which do not take complements, such as _~have_ (← _lack_) and _~trust_ (← _distrust_). Indeed, we must restrict the domain of the constraints we have proposed to the natural class of what we shall call _gracious_ predicates: those predicates which can accept a complement without presupposing it to be true.

Let us end this discussion with a glimpse at one last gracious predicate, _true_, and the negation it incorporates. In Russellian logic, as noted in §1.11, _true_ and _false_ are contradictory opposites (since Russell chooses, for "verbal convenience", "to define the word 'false' so that every significant sentence is either true or false"[16]). _False_ is identified as _~true_, and _true~_ as a distinct category does not arise.

With the development of a trivalent logical system, we find that the true/false distinction Comes to be regarded as a contrary opposition, with the contradictory negation of true redefined as untrue or non-true.

When we examine true as a logical operator, we find that it behaves precisely as a standard predicate obeying the guidelines established by (4.62):

(4.75) *It's true that this is the last example, and it's true that it isn't.

*t(P) & t(~P)

(i) true~ → false

(ii) ~true ↛

There is, of course, a lexicalization corresponding to ~true, and it has precisely the pre-adjectival form we would expect: untrue.

§4.4 Conclusions

We have now come full circle. We began, in §1.1, with an exposition of the development of the notion presupposition in three-valued logics, hinging on the differentiation between the contradictory and contrary negations of true, not true, and false, respectively.

After extending the treatment of presuppositions to deal with other cases than Strawson and Austin had originally intended, and observing the properties of suspender-clauses which have the effect of lifting presuppositions, we turned to the closely related question of scalar predicates and their upper-bounding conversational implicatures which, while suspendible under comparable conditions to those governing presuppositions, can--unlike logical entailments and presuppositions--be directly denied with no resultant contradiction.

Special care was taken to distinguish suspender _if_-_not_ clauses from concessive clauses, in terms of their behavior with respect to intonation contours, polarity items, and incorporation of the negative. This distinction between "real" and suspender conditions is paralleled by a similar distinction between "real" and suspender disjunctions, discussed in §2.11, in which the operational procedure is based on symmetry and on the appropriateness of _or_ _both_ tags.

A recurrent theme of this dissertation has been the relationship of logical postulates (entailment and presupposition) to conversational ones (implicatures, including invited inferences). In Chapter 2, we dwelt on the redundancy test which distinguished logical from sub-logical relations, and which indicated that the relations among certain English quantifiers must be treated by Gricean rules.

On the other hand, there were several respects observed in which the behavior exhibited by the semantic notions seemed to parallel that of the presumably "merely pragmatic" implicatures. The patterning of _as_ _X_ _as_ _any_, _if_-_not_, and _or_--and, in general, the interconnection of implicature and polarity--as well as the nature of external negation investigated in §2.11, and the coöccurrence of _absolutely_ in §2.34

are cases in point.

In Chapters 3 and 4, we turned to a slightly different matter, although one inextricably related to and based on the earlier discussion: the establishment of asymmetries among sets of logical operators. These asymmetries are ascribable to sub-logical rules, and therefore cannot be predicted or accounted for by formal logic alone.

In Chapter 3, it was shown that the possibility operator, but not the necessity operator, shares certain important typological traits in English with the negation operator, specifically the ability to trigger <u>any</u> and <u>either</u> (as well as converting deep conjunctions into surface disjunctions), the ability to trigger a large and non-random class of polarity items, and the ability to be lexically incorporated in the form of affixes.

In Chapter 4, we were concerned with revealing a more basic asymmetry, one characterizing not only modal and quantificational operators (including the binary connectives of §2.13 and §4.23), but all proposition-embedding operators and predicates which conform to the hypotheses defended in §4.3.

The parallel between corresponding elements of the quantificational and modal scales observed in Chapter 2 is now reflected in the parallel behavior of these operators with respect to lexicalization.

Contraction of modal/negative sequences is seen as a subcase of the principles by which lexical incorporation of a negative into a predicate or operator is determined by conversational rules; in particular, by whether such incorporation is pragmatically "necessary" or whether it would be exempted by the existence of an implicature associated with another configuration. Not all, as we saw, is blocked from lexicalization by the existence of the some-not all implicature demonstrated in Chapter 2.

The circle is closed by the application of the lexicalization hypotheses to the true and false connectives defined in Chapter 1. Where we have not trodden is into the area of how the conversational, non-logical, "pragmatic" character of the constraints on lexical incorporation is to be integrated into an explanatory and well-constrained theory of language. In avoiding this issue, while revealing the domain of semantic properties which affect it directly and must be dealt with by any theory, we hope to have shed some light on the matter of just what kind of theory must be sought.

If our presentation has been less conclusive and less definitive than one might have desired, if our approach has been more tendential than tendentious, it is because such an approach is determined by the very nature of our realms of inquiry.

THE END

NOTES TO CHAPTER 4

1 Newmeyer (1969), p. 136 ff.

2 Cf. Lakoff (1970b). An alternative to the global mechanism, here as elsewhere, is the insertion (prior to NEG-lowering) of a dummy symbol to which the later contraction rule would be sensitive. For discussion, see Baker & Brame (1972) and the reply of Lakoff (1972). As the correctness of either approach is not at issue here, we shall ignore the controversy.

3 With the exception of synonyms of *should*, e.g. *ought to* and--as Wayles Browne notes--*better*. Thus:

(i) I don't think he $\left\{\begin{array}{l}\text{ought to}\\ \text{better}\end{array}\right\}$ go.

= I think he $\left\{\begin{array}{l}\text{ought to}\\ \text{better}\end{array}\right\}$ not go.

(ii) I don't think he has to go.

≠ I think he has to not go (i.e. to stay).

4 The term and notion of transderivational constraint is due to George Lakoff and is discussed in unpublished and/or unwritten papers by Lakoff, Perlmutter, Grinder, Postal, J. Hankamer, and in Ross (1972).

5 As in §3.3, the Turkish data here are due to J. Hankamer.

6 Aristotle, *de Interpretatione* 17b16-25 (in Ackrill (1963)). For the 'logical square', cf. *Prior Analytics* 29a27.

7 Jespersen (1917), Chapter VIII ("The Meaning of Negation"), p. 86; cf. Jespersen (1924), p. 324 ff.

8 Jespersen (1917), p. 86; pp. 91-2.

9 *Ibid*., p. 87.

10 Von Wright (1951); Anderson & Moore (1957), p. 325.

11 For discussion, see the references listed in Chapter 3, fn. 1.

12 Smith (1970), p. 67.

13 Russell (1918), p. 210.

14 The derivation of *dissuade* from *persuade*~ is defended in G. Lakoff (1969). Notice, however, that here--as elsewhere--the correspondence is not exact. In particular, we do not *dissuade* somebody from doing something unless (s)he has already decided to do it: ??*Sam dissuaded*

Zelda from marrying Ferd, although she had never intended to marry him. Persuade not is perfectly acceptable in the same context. In any event, there are admittedly dis- verbal forms for which any decomposed paraphrase is lacking, including the nonce form due to Margaret Mead in her warning, "We have to disinvite so many babies from being born."

15 Green (1969), p. 45.

16 Russell (1959), p. 131.

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