

SOME PERSPECTIVES ON UNDERSTANDING IN SPOKEN INTERACTION¹⁾

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1. INTRODUCTION

The concept of understanding has a key position in the study of spoken interaction. It is, for example, not unreasonable to regard spoken interaction, or for that matter linguistic communication in general, as reducible to two main processes, namely, on the one hand, the understanding of, and, on the other, the production of communicative (linguistic) behavior.

Problems connected with understanding surface in many different branches of both theoretical and applied linguistics today. In studies of so called question-answering systems or expert systems, getting a computer to behave as if it had understood natural written discourse has, so far, been possible only for limited topic domains, often involving very ad hoc like procedures. If the computer is to process spoken discourse the achievements are even less impressive, usually involving a few hundred words, at the most, spoken by one or two speakers in a very rigidly limited number of linguistic contexts.

Problems concerning the concept of understanding also surface in such areas as intercultural communication, language acquisition, analysis of political argumentation and analysis of therapists' strategies to understand aphasic patients. The list can easily be prolonged and leaves no doubt that studying the nature of understanding is one of the central tasks we have to deal with both within the study of (linguistic) communication in general and within a number of more specialized areas and aspects of linguistic communication.

In view of the complexity of the concept of understanding and of the central position the concept for a long time has occupied in philosophical debate, cf. eg. Furberg (1981) and von Wright (1971), it is of course risky to venture into the discussion of the theoretical analysis of understanding, but my own need for a clarification of some of the issues

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involved has still made me take the risk, in the hope of response which will lead to further clarification of the issues involved.

2. AN INITIAL CHARACTERIZATION OF UNDERSTANDING

Let me start by the following abstract characterization of understanding. Understanding is a relation between an agent and some particular type of information. In the discussion below I will try to become more specific about the nature of the relationship and about the nature of the relational objects - the agent that understands and the information that is understood.

Some initial guidance can perhaps be found by studying the lexical item *understand* and its derived forms *understanding* (noun or adjective), *understandable* (adjective) and *ability* (noun). If we look at the meaning of these forms, the stemform *understand* is by itself most naturally taken as a verb denoting a relational process or state. The noun *understanding* denotes the reified relational process or state of understanding. The adjective *understanding* denotes a quality which an agent who understands has. The adjective *understandable* denotes the quality something has when it can be understood. The noun *understandability* denotes the reification of this quality.

From this we can now construct the following circular characterization of understanding: Understanding is a relation which holds when an understanding agent understands something which is understandable. Perhaps, the only virtue of this characterization is that it again points our attention to three important dimensions of interest in analyzing understanding: 1. properties of the agent who understands, 2. properties of the understanding relationship itself and 3. properties of the information which is being understood. Below I will now examine these three dimensions, starting with the object of understanding (the understood information), continuing with properties of the agent doing the understanding and ending up with a discussion of the relationship of understanding itself.

3. OBJECTS OF UNDERSTANDING

3.1. Some examples

What kinds of information can be objects of understanding? We will start our discussion by considering a number of sentences exemplifying different objects of understanding.

1. Bill now understands *that it can be cold in Africa*.
2. Bill now understands *John's accepting of the prize*.

3. Bill understands *John to be rich*.
4. Bill does not understand *whether John will come*.
5. Bill does not understand *if it's OK or not*.
6. Bill understands *who did (said, meant, wanted) it*.
7. Bill understands *what John did (said, meant, wanted, felt)*.
8. Bill understands *why*
when
how John *did (said, meant, wanted) it*.
where
9. Bill understands *John (chess, English, cities, swimming, the word "ombudsman")*.

Before I discuss examples 1 – 9 in more detail, it is perhaps wise to clarify the status of these examples and other examples in the paper. The examples do not provide final criteria of adequacy for the analysis. For example, there are probably other important differences between objects of understanding than those which are indicated in the sentences above and, secondly, it is not clear that the differences which are indicated by the sentences will really be the most important to take note of in a given theory of understanding. However, since linguistic constructions involving understanding are a fairly easily available, fairly clear and fairly complex type of evidence, it is reasonable to claim that attention to linguistically drawn distinctions is heuristically wise both in the analysis of understanding and of many other phenomena.

One might also question whether the similarities between various examples, where the word *understand* or any other forms derived from it occur, are sufficiently great to warrant them being treated together. The word *understand* could, after all, be a homonym.

In my opinion there is no general answer to an objection of this type. Each analysis has to be judged on its own merits. In the case of understanding, I will proceed as if the different examples reveal different aspects of understanding as a unified phenomenon, since below I will present a sketch of an analysis of understanding which I think does cover all or most of the examples discussed.

If we return to the differences between the examples, they can also, be brought out linguistically by, for example, paraphrasing or translating to another language, e.g. the verb *realize* can replace *understand* quite well in (1) but not in (9). If we carried out an analysis of this type, we would get a so called semantic field of relations which are similar to *understand*. The field and its analysis would then allow us to appreciate similarities and differences between verbs like *know*, *believe*, *realize*, and *understand*. Unfortunately, it has not been possible to perform this kind of analysis for this paper. The method is discussed in Allwood 1983.

Bearing the discussed reservations in mind, let us now inspect examples 1 - 9. On the basis of the examples we can claim that objects of understanding can be propositions (that-clauses), proposition-like objects (*poss-ing, for-to, whether, if*), propositional functions (all the clauses headed by WH-words) or any phenomenon presented in reified form (the various NP:s in (9)). Some of these constructions are perhaps of more interest than others, since they point to kinds of information we need to understand in many different circumstances. I would here like to point to the constructions involving *that, what, why, how* and simple NP:s. With regard to understanding in spoken interaction it is interesting to analyze the relationship between the WH-words *what, why* and *how* and predicates like *say, mean, feel, do, want*, since these predicates focus on important aspects of what it is we normally understand or try to understand in talking to each other. This can perhaps be expressed by saying that we normally try to understand what other people say, mean, feel or do and that we also often try to understand how and why they say, mean, feel and do what they do.

The different predicates stand in fairly complicated semantic relations to each other. We can sometimes understand what is said without understanding any of what is meant, felt, wanted or being done. But it is not so obvious that one can understand what is meant without understanding any of what is said, felt, wanted or being done or that one can understand what is felt without understanding what is wanted.

If we return to spoken interaction, a possible point of departure for our discussion is to say that we try to understand what is being said (or, alternatively, in order to include body communication, what is being communicated), by trying to understand the syntax, vocabulary and prosody of the expressions the speaker uses, as well as his communicatively relevant body movements. Competence with regard to linguistic and communicative conventions is, however, not sufficient to understand. It is here instructive to compare the following sentences:

(10) Bill understands chess

(11) Bill understands the word "chess"

(12) Bill understands that it can be cold in Africa

(13) Bill understands the sentence "it can be cold in Africa"

We see that (10) and (12) indicate different objects of understanding than (11) and (13). For example, it is possible to understand chess without understanding the word *chess*. It is also possible to understand that it can be cold in Africa without understanding the sentence: *It can be cold in Africa*. It is not clear, however, that one can understand the word chess, or the sentence *It can be cold in Africa* without understanding anything about chess or chill in Africa. Understanding of linguistic expressions, over and above, understanding of linguistic meaning conventions, seems to require, also understanding of that which is signified by the linguistic expressions.

3.2. *Foci of understanding*

In order to understand what is talked about, mastering linguistic conventions does not suffice, we must also use other relevant information. We can divide this information into two types: (i) information concerning the speaker and (ii) other factual information. Understanding what is said can, thus, be said to involve an interaction between linguistically triggered information, personal information about the speaker and other relevant factual information. Correspondingly, we have three foci of interest in understanding linguistic expressions: (i) information triggered by linguistic meaning conventions, (ii) information having to do with the speaker (writer), eg. what he/she did, meant, felt, wanted in saying (writing) such and such, (iii) other factual information pertaining to that which is being talked (written) about. In what follows there will be no separate discussion of writing or bodily communication, but most of the discussion, will be valid for these media of communication as well.

The foci of understanding are often in harmony but need not be. If the speaker knows less about the subject matter than the listener, it might happen that a situation arises where the listener understands the conventional meaning of the speaker's words and perhaps even what the speaker's communicative intent is, but finds the conventional meaning or communicative intent confused from a factual point of view and can therefore not integrate the three foci into one act of understanding. Similarly, understanding of what the speaker means or of the factual subject matter he/she is talking about, may, for example, in second language acquisition, sometimes take place in spite of a speaker who is departing from the usual linguistic meaning conventions of a certain language.

It is important to stress that the three foci of understanding that I have distinguished are separable only analytically. Empirically, one and the same act of understanding is usually directed at all three of them, where understanding of the speaker's intentions and of the factual circumstances which are spoken about can be regarded as goals, for which an understanding of the linguistic expressions serves as a means.

Another way of pointing to the focal multidimensionality involved in understanding spoken discourse (what is said) is to point to the so called indexicality of what is said (cf. Peirce, in Buchler 1955 and Garfinkel 1967). Understanding what is said, in many ways involves understanding, also, who said it and when, where, how and why it was said. All of these WH-marked dimensions can lead us to the speaker and the speech situation, but they can also lead us to a further specification of the subject matter or topic which is talked about, irrespective of the speech situation. In some cases, such as when a speaker wants to temporally anchor what is said, through use of tense endings, we have to take both speech situation (speech time) and the topic which is referred to, into account (reference time), cf. Reichenbach 1949.

3.3. 'Factivity'

Let me now turn to another aspect of the analysis of objects of understanding, namely the fact that *understand* seems to bestow 'factivity' (see Kiparsky & Kiparsky 1968 and Allwood 1976) on the objects of understanding. Consider again example 1.

(1) Bill now understands that it can be cold in Africa.

If (1) is true, it implies that it is also true that it can be cold in Africa. The factive implication would, however, not have held if Bill instead had *believed* that it can be cold in Africa. Factive implications also hold in (2) and in (3), (if (3) is acceptable at all). Similarly, the examples with WH-words in (6), (7) and (8) imply that there is an appropriate argument that will satisfy the propositional function which is the object of understanding. For example, (6), *Bill understands who said it* implies that there exists someone who said it (and that Bill can identify him or her).

Concurrently with factivity, understanding implies *belief* in the objects of understanding. So example (1) above implies that *Bill now, believes that it can be cold in Africa* and example (6) implies that *Bill believes that someone said it and can identify him or her*, in effect, that *Bill knows who said it*

The "factivity" of understanding means that we should expect the strangeness of examples like (14).

(14) Bill understood the problem, but he was wrong again.

If understanding implies factivity then what one has understood is taken to be a fact unless otherwise indicated by the utterance or by implicit information in the situation.

For example, as is now commonly recognized (Cf. Allwood 1972 and Levinson 1984), negation and modal expressions affect factivity. The fact that a certain predicate in a positive statement implies factivity does not mean that the predicate carries the same implication when it occurs in a statement which is being negated. Thus examples like (4) and (5) would not normally imply factivity, while an example like (15) could, but would not necessarily imply factivity, since the negation in some situations could be used to cancel the factive implication.

(15) Bill doesn't understand that it can be cold in Africa.

In fact, some readers, using certain types of implicit information, might even with the positive examples (1), (2) and (3) feel that they vary in their factive implications. This is not strange, since factivity, like most other "semantic" properties, is sensitive to implicit information.

A consequence of the factivity of understanding is that understanding is not an entirely subjective affair. Feeling that you understand does not always mean that you really

understand. If you really understand how the world is, then the world is as you understand it to be.

We could here, if it is seen as useful, develop a notion of *subjective understanding* which has no implication of factivity. Using this notion we could then say that feeling you have understood means that you have subjectively understood.

What happens when the objects of understanding are not propositions or proposition-like objects (cf example (9)). Mostly, in analogy with factivity we get an existence implication. The type of existence implied is sensitive to the ontological status of the object which is understood, so that in some cases, all that is implied is existence as a socio-culturally available object of contemplation. Linguistically, we can show awareness of the variation in existential status by the use of the preposition *about*. (16) is easier to accept than (17).

(16) John understands about Santa Claus, ghosts and unicorns.

(17) John understands Santa Claus, ghosts and unicorns.

Let us now consider the implications of the analysis, so far presented, for multiply embedded sentences.

(18) John: Oslo is the capital of Sweden.

(19) Bill understands that John says and means that Oslo is the capital of Sweden.

(19) Is a multiply embedded sentence which reports Bill's understanding of John's utterance (18). What factivity implies for (19) is that it is true that John says and means that Oslo is the capital of Sweden. It does not imply that it is true that Oslo is the capital of Sweden. Thus, Bill can understand *that* John means or says something (i) without necessarily believing that *what* John says or means is true and (ii) without it being the case that *what* John says or means is actually true.

Bill can also understand *what* John says and means, even though his understanding might be hampered by the fact that he cannot understand what John says as actual. It seems that we, as part of our understanding of various types of input information, classify the information as to factual and modal status. We can understand factual and actual information as well as nonfactual and nonactual information. This does not necessarily cause any problems except if we misclassify the information.

The factive implication of understanding, thus, only holds in relation to objects of understanding for which there is no explicit or implicit indication of nonfactivity, i.e. nonactualness.

Unfortunately, in English the word *factual* is ambiguous between (i) actual and (ii) potentially actual. This way of drawing the distinction is fairly similar to the way it is

drawn in Barwise and Perry (1983). Where the context so requires I will try to remove this ambiguity by using both terms and reserving the second sense for factual. The term *factive implication*, with this use of terms, thus, means an implication of actuality and not of mere factuality.

4. THE UNDERSTANDING AGENT

Let us now turn to a brief examination of the understanding agent. What are some of the properties an agent must have in order to be able to understand? I will here mention three such types of properties.

(i) The agent must have sufficient input mechanisms. A human being will normally have at least 5 senses, each connected with an ability to discriminate and recognize individual stimuli and types of stimuli. This requirement should be related to work on automatic speech understanding, where, so far, only very rudimentary mechanisms for processing visual and auditive information exist and one, in fact, normally works with digitally coded written expressions.

(ii) The agent must be able to meaningfully connect apprehended input information with already understood background information. I will sometimes call this background information "preunderstanding". The expressions *background* or *pre-* have, in this connection, no other role than to indicate that some information has been understood earlier and provides a background for new information which an individual wishes to understand. Awareness and apprehension are necessary but not sufficient ingredients of understanding. Understanding also requires that we grasp how the information we are perceiving is meaningfully connected to other information. I suggest that what this means is that the connection must be of, for example, the following types: logical, causal, part-whole, set inclusion, means-ends, similarity, spatio-temporal contiguity etc. Possibly we should also require that the relation is relevant, cf the discussion in section 5.3.

(iii) The agent must have sufficient preunderstanding to be able to meaningfully connect the input information. The preunderstanding or background information can here include not only factual information but also values, norms, attitudes and emotions. Factual and emotional understanding usually interact in actual understanding. The adjective *understanding*, in fact, preferentially is interpreted in the sense of emotional understanding or empathy, e.g. (20).

(20) He is an understanding man.

(20) is normally interpreted as to mean *He is a man who shows empathy*. If we want to bring out a sense of more factual, rational understanding we can use the noun *understanding* as in (21) or (22).

(21) Bill has an understanding of arithmetic.

(22) Bill shows (an) understanding of John's problem.

We see that the presence of the article *an* in (22) somewhat enhances the interpretation of factual rather than emotional understanding.

It is very likely that an agent's preunderstanding is structured in some way. Many proposals have been made and many terms have been coined to capture this structure, e.g. *schema* (Kant 1975) *schema*, (Bartlett 1932), *script* (Schank 1975) and *frame* (Minsky 1977) *semantic fields* (Goodglass and Baker 1976). All these proposals have in common that they impose lasting static structures on memory and preunderstanding. However, one can question whether the structures should not instead be dynamic or at least dynamic as well, so as to allow memory and preunderstanding to be differently structured for different purposes. Such a perspective would be easier to harmonize with a view of understanding as at least sometimes governed by purpose and perspective.

It might be objected to this analysis of understanding and to this description of the requirements on the understanding agent that they have as a consequence that understanding can never get started. If understanding requires preunderstanding, how can there ever be a first act of understanding? To this objection, there are, at least, two possible replies. Firstly, it is not unreasonable to suppose that there might be types of innate understanding. Secondly, in an account which does not rely on innately given access to information, we would simply have to say that the first acts of perception were not acts of understanding. We first take in information and only subsequently use it to understand. Perhaps, one way to express this metaphorically is to say that the process of understanding is a kind of recursive process which is given its basis by perception.

5. THE RELATIONSHIP OF UNDERSTANDING

The point of departure for this paper has been to view understanding as a relationship between a piece of information, conceived of as an object of understanding, and an agent with input capacities, preunderstanding and a capacity to connect input with preunderstanding. I now want to discuss this relationship with regard to the following questions

- (i) Is understanding a dynamic or a static relationship?
- (ii) Are there degrees of understanding?
- (iii) Can understanding be evaluated?

5.1. State or process

A fairly fundamental question about understanding is whether it is a state or a process. Let us again consider some linguistic evidence.

(23) Please, understand what I mean.

(24) I am afraid, I am not understanding properly.

(25) I am afraid, I don't understand properly.

(26) After years of trouble I am understanding the meaning of it all.

(27) After years of trouble I understand the meaning of it all.

We see that it is possible to use both imperatives and progressive aspect with *understand*. This would have been much harder with a more clearly stative verb like *know*. However, it is also fairly clear that we often have a preference for a nonprogressive description of understanding. Compare (28) and (29).

(28) I understand what he means while he is talking but afterwards I forget

(29) I am understanding what he means while he is talking but afterwards I forget.

The conclusion I draw is that we can view understanding both as a process and as a state, but that we have a preference linguistically for viewing it as a state. This preference is probably supported by the factive nature of understanding. It is easier to conceive of a static than of a dynamic relationship to a fact.

Part of the problem in deciding whether understanding is a state or a process derives from the fact that the term *understanding*, like most other verbs in progressive form, allows for a process/product ambiguity. It can denote the process of understanding or the product this process leads to probably a state of understanding. To some extent, this ambiguity can be removed by using predicates which favor a process or a product interpretation, like in (30) and (31).

(30) Bill's understanding of arithmetic is quick.

(31) Bill's understanding of arithmetic is impressive.

5.2. Degrees of understanding

The question of whether there are degrees of understanding is connected with but not necessarily identical to the question of whether understanding is a process or a state. Consider again some examples.

(32) Bill understands the sentence better than John does.

(33) Bill's understanding of the problem has deepened.

(34) John understands only superficially what is going on.,

(35) Every day I'm understanding more and more.

It seems that we do talk about degrees of understanding. We understand things more or less, better or worse, deeply or superficially. We seem to be able to apply both a quantitative and qualitative measure to understanding. Usually these two aspects are not separated and it is questionable whether they really can be separated. If we look at earlier contributions that have proposed notions similar to that of degree of understanding. e.g. depth of intention (Naess 1966), pseudoconcept (Vygotsky 1962) or depth of understanding (Allwood 1976), they have not, as far as I can see, distinguished a qualitative from a quantitative aspect in degrees of understanding.

In order to further discuss this problem, I would first like to discuss how the notion of degrees of understanding can be tied to the analysis of understanding proposed so far. This analysis says that to understand is to meaningfully connect some input information $i(i)$ with some preunderstood background information $i(b)$. By adding to this preliminary analysis the account given in section 4 of the understanding agent, I now would like to propose the following analysis for the notion of *degrees of understanding*. An agent A understands the input information $i(i)$ to an extent which varies with 1) the degree of processing of the input (e.g. discrimination and recognition), 2) the amount and type of available preunderstood information and 3) the amount and type of meaningful connections established between $i(i)$ and $i(b)$.

From what has been said previously it should be clear that emotional and attitudinal information should be included in considering degrees of understanding. Consider (36) and (37) which both concern degrees of emotional understanding.

(36) Betty understands Bill's feelings better than Jill.

(37) Betty is more understanding to Bill than Jill.

I think that the same analysis of degrees of understanding with regard to input, connection and preunderstood information can be applied to both factual and emotional understanding and that the analysis holds independently of whether linguistic expressions are involved or not.

Given this analysis we can speak of zero or no understanding, i.e. a state where no input processing is done. Related to this state is a state where information is apprehended i.e. discriminated but where no connections are established to preunderstood background information. If we turn the scale around, it is, however, much harder to imagine what a

reasonable end point would be. What is meant by complete processing of input? What is meant by establishing all possible meaningful connections to all preunderstood information? There does not seem to be any straightforward quantitative sense in which one can speak of full or complete understanding. We seem always to be able to increase our understanding towards a fuller and more complete view of reality. Two fundamental reasons for this are, in my opinion, the fact that there seems to be no definite limit to the amount of information in reality and the fact that so far we have discovered no clear limits for man's ability to process this information.

Thus, from a quantitative perspective it seems reasonable to talk about degrees of understanding from 3 points of view: processing of input, amount of preunderstood information and amount of connections between input and preunderstood information. It also seems reasonable to view understanding in terms of an open-ended scale which has a zero but no obvious maximal point. Let us now take a look at the phenomenon of degrees of understanding from a more qualitative-point of view.

5.3. Qualitative and quantitative variation in understanding

5.3.1. Introduction

What are the sources of the evaluations of understanding given in (38), (39) and (40)?

(38) Bill's understanding of the matter is very good.

(39) Bill understands the matter very well.

(40) Bill has very good understanding of the matter.

I think we can find at least four possible sources of such evaluations:

- (i) The speaker has a subjective relation to Bill's understanding. He or she likes Bill's understanding.
- (ii) The speaker finds that Bill's understanding is in conformity with some norm or convention which specifies a standard for understanding.
- (iii) The speaker finds that Bill's understanding serves him as a means for reaching some goal.
- (iv) The speaker finds that Bill in some way can access much meaningful information connected with the subject matter at hand.

5.3.2. *Subjective evaluation*

Of these four sources the first is the most difficult to analyze. Compare (41) and (42) below:

(41) The food tastes good but I dislike it.

(42) The book shows good understanding but I dislike it.

We see that it is not too strange to claim that (41) is contradictory in some sense. Such a claim is not so easy to make for (42). One reason for this is probably that "tasting good" semantically involves "liking" in a way that "experiencing good understanding" does not. I can understand without liking or accepting emotionally what I understand.

5.3.3. *Standard*

The second source of evaluation presupposes a standard for what is to be counted as good (which in this case mostly can be paraphrased as correct) understanding. Generally, we know that norms and conventions can be both explicit or manifest and implicit or latent, cf Merton (1968). The scale from implicitness to explicitness in this case has to do with how aware people are of a norm and with whether the norm exists in written, codified form or not.

Since most people do not have direct access to other people's minds and their processes or states of understanding, evaluation has to be indirect and based on how understanding manifests itself in the behavior of another person. Cf also the discussion in section 7 below. This means that we can perhaps find claims about understanding based on implicit norms in relation to social customs, cf example (43).

(43) Bill has no understanding of the Swedish way of life. He always does the wrong things.

Explicit norms we can find in test situations. There even are comprehension tests. We can also find explicit norms in relation to formalized types of information as in mathematics or logic.

(44) Bill's results in the Swedish comprehension test were very good.

(45) Bill's proof of the theorem shows good understanding of mathematics.

5.3.4. *Relevance and sufficiency*

The third source of evaluation is based on seeing understanding as a means to achieve or attain a certain purpose or goal, i.e. a kind of means-ends calculus. One's understanding is evaluated in relation to the extent, to which it allows one to achieve a certain purpose.

Better understanding means a way of relating input information to preunderstood information, that allows one better to attain a certain goal.

Relating understanding to goal attainment and purposive activity also allows us to introduce two subsidiary notions, namely *sufficient understanding* and *relevant understanding*, where sufficient understanding can be defined as understanding which enables an agent to attain a particular goal and relevant understanding can be defined as understanding which is meaningfully connected to the attainment of a particular goal (cf Allwood 1984). It, thus, involves a kind of second order meaningfulness, (i.e. relevant understanding is a meaningful connection between the attainment of a goal and understanding, which, in turn, is a meaningful connection between input information and preunderstood background information.

The notion of sufficient understanding is interesting because it provides us with a possible positive end point for understanding. When we have sufficient relevant understanding we can attain a certain goal. In a sense, this is full understanding. We don't need more understanding to accomplish what ever we are doing. It is questionable whether any other sense of completeness of understanding, than sufficient relevant understanding, can be explicated.

A consequence of the concept of goal oriented understanding is that what is sufficient or relevant understanding of a particular phenomenon will vary with the needs and purposes of a particular agent in a particular situational activity. So when my mechanically minded friend tells me *you have something wrong with your carburator*, and all I understand is that I have something in the motor of my car that has something wrong with it, I would claim I have sufficient understanding of the utterance, in relation to the activity of taking the car to a car repair shop to have it repaired. If my goal, instead, were to try to fix it myself, my understanding would clearly be insufficient.

To summarize, qualitative variation in understanding can be understood in an instrumental or goal oriented fashion, by viewing understanding as a state or an activity, which either in itself or as a part of another activity can be judged with regard to degree of goal attainment

5.3.5. *Completeness and correctness*

The fourth source of evaluation is basically the same as the quantitative approach discussed in section 5.2. It is this source of evaluation which seems to be the primary intuition behind a nongoal oriented analysis of complete understanding. On this approach to have good understanding of a phenomenon X is to have as correct and complete information as possible about X and its meaningful relations to other phenomena. Since ultimately everything has a meaningful relation to everything else, this means that good understanding will ultimately be the same thing as complete and correct understanding and that both types of understanding together ultimately will have to involve a relationship to the totality of everything. This has as a consequence that really nothing, except perhaps GOD or the world itself (which might be the same thing), can have good understanding. In

particular, the understanding of any individual human agent or even group of human agents must always be bad, empty and incomplete. Perhaps, the notion of complete and correct understanding can be understood as a kind of regulative ideal, i.e. as something we presuppose in order to make types of information cumulatively compatible, both within and between different understanding agents (cf Kant 1975 and Haglund 1984). If we take the notion in this way, we see that it is not possible to use it of an individual act of understanding.

In fact, one of the reasons behind viewing qualitative variation in understanding in terms of completeness and correctness is that one takes the notion of understanding to be independent of agent and situation. The only thing that is required is a kind of general ability to process, connect and store information in a way which is homomorphic to that which exists in the source of information. (The terms *homomorphism* and *isomorphism* are here not used in their limited, precise mathematical meanings, but in the more general sense of partial structural similarity (homomorphic) and complete structural similarity (isomorphism).) Perhaps one can characterize this ideal of understanding as one where the relationship between understood information and the source of information is seen to progress via increasingly complex homomorphism to isomorphism (or on some accounts identity). In the end there is total understanding and this is a state where everything is seen with all its meaningful connections to everything else. As we can see it is likely that it is this view of understanding which inspired Aristotle and Hegel to their views of the end state of the world as one where the world has complete self awareness and self understanding.

5.3.6. *The evaluator*

After having discussed, what I hope, are some of the principal sources of evaluation I would now like to briefly discuss the evaluator, i.e. the person who is doing the evaluation. For the purposes of the present discussion I want to distinguish between: (i) self-evaluation, i.e. evaluation by the understanding agent with regard to his/her own states (possibly processes) of understanding and (ii) *other-evaluation*, i.e. an agent's evaluation of the understanding of another agent

All of the sources of evaluation that have been discussed above, can, as far as I can see, be used both for self-evaluation and for other-evaluation. For self-evaluation, they provide criteria for internal feedback that the individual can use, to make his own understanding better. For other-evaluation they provide criteria for the evaluation of other agents' (manifested) understanding. In this second function. they also provide a starting point for a discussion of how to empirically observe states (and possibly processes) of understanding that vary in quality. See section 7.

5.4. ***Relations between different types of variation in understanding***

In discussing the different types of evaluation of understanding we have focussed both on evidential criteria available to the evaluator (i.e. subjective feelings and standards for

evaluating behavior which is supposed to manifest understanding) and on relations and properties which pertain to the phenomenon of understanding itself (i.e. understanding as a means for goal attainment and understanding in terms of coherence, correspondence and conventional fit).

None of the four types of evaluation need necessarily exclude any other. I can simultaneously have a feeling about somebody else's understanding, judge its fit with some standard, judge its degree of goal attainment, judge its internal coherence and judge the degree of complexity in its structural similarity with that which is being understood. I should also be able to use one or several of the types of evaluation while neglecting the others. The different types of evaluation, therefore do not, at least not, on an initial analysis imply each other. However, this statement has to be somewhat modified on a slightly deeper analysis.

Standards, norms and conventions, very often, come about in order to facilitate goal attainment or if we use Lewis's 1969 analysis of convention, they come about to facilitate the existence of a state of affairs which by a population is preferred to a state which would result as a consequence of not adhering to the conventions. Thus, also in Lewis's analysis there is a preferred outcome and since it is not unreasonable to regard a preferred outcome as a goal, we can say that to judge understanding using a standard is therefore, mostly, to implicitly judge it in relation to some goal.

Another difficulty is that no goal-attainment via understanding is ever possible without some degree of homomorphism between the understood information and the source of this information. Goal attainment presupposes some degree of homomorphism. In fact, this also holds for any standards of understanding. There can be no good understanding according to any standard if there is not some correspondence between the understood information and that which is understood.

It is also fairly straightforward to relate subjective appreciation of understanding to our proposal, at least, if we are dealing with what might be called rational subjective appreciation to understanding. Such appreciation and evaluation is probably based on a mixture of intuitions about degree of homomorphism, degree of coherence and degree of sufficiency and relevance in relation to some particular goal and in the cases where a standard exists, intuitions about the degree of fit with this standard. Homomorphism is therefore a presupposition of all the other types of evaluation of understanding, and therefore must be included in any analysis of qualitative variation in understanding. However, if it is isolated it leads to the difficulties involving total and complete understanding which we have noted above.

I would now like to briefly sketch a possible way of viewing the interaction between the four types of evaluative criteria we have discussed. Understanding is on this view an organization of information which enables an agent to connect particular input information in a meaningful way with accessible already understood background information. The input information is made available through attention in such a way that it can be said to derive from the successive foci of interest that an individual has.

Mostly the attended to input information can be said to be the result of attention from a certain perspective. The perspective can be of a concrete spatial kind as when we see something from above or from below. It can also be generated in other ways. Perhaps the most important of these ways is the establishment of a perspective as the result of a certain goal orientation. For example, we apply different perspectives depending on whether we see other people as having friendly or unfriendly intentions towards us or as having more or less power than ourselves. The perspective we apply will be tied to the goals we have; in the examples above, for example: defence, generosity, carefulness or security. The goals and perspectives we adopt will lead to a certain selection and structuring of information. Different types of information and structure of information will be relevant in relation to different perspectives and goals.

What has been said about processing of input information also applies to establishing meaningful connections. Goals and perspectives will determine what meaningful connections are relevant to establish between input information and accessible preunderstood information. They will also determine how much processing of information and understanding is sufficient to attain a certain goal.

What this analysis offers is thus a view of understanding as a type of information processing, the static products of which aim to satisfy the double requirements of some degree of homomorphism with reality and relevance to purpose and perspective. If the understanding also aims at being rational, it must show internal coherence, i.e. it must be subject to the principle of noncontradiction. If the understanding not only aims at rationality but also at correctness, it must, in addition show correspondence with reality; a special case of this being fit with (semantic, linguistic) conventions.

The analysis, thus. gives us an analysis of understanding as a relation between $i(i)$ and $i(b)$, where increased quality is gained by introducing a number of restrictions on the relation. The first and basic restriction is that $i(i)$ and $i(b)$ should be meaningfully connected. Besides this basic requirement our analysis has then pointed to a number of dimensions which can be regarded as imposing additional requirements on the meaningfulness constraint. The dimensions we have pointed to are:

- (i) completeness
- (ii) relevance
- (iii) sufficiency
- (iv) coherence
- (v) correspondence (& conventional fit)

The dimensions, which, as we see recall the classical "theories of truth", together provide "a system of checks and balances" for good understanding. However, any dimension if adhered to exclusively can come into conflict with the others. We have above, for example discussed the difficulties which go with an analysis of understanding based on a combination of completeness, coherence and correspondence and does not pay any attention to relevance and sufficiency. The best understanding, on the view presented here,

is therefore an understanding which, to some extent, satisfies all five types of criteria, while, at the same time, being sensitive to the consequences adherence to one type of criterion has for adherence to another type of criterion.

But conflicts, between the dimensions, can arise in many other ways. A standard for understanding may be discarded, for example because the goal it serves is no longer entertained by a certain agent or group of agents. It may also be discarded because circumstances have changed in such a way that the standard no longer indicates an efficient way to reach a particular goal. In such cases, there could then be a conflict between following the norm and efficiently trying to attain the goal which the norm originally was serving.

Similarly, what is sufficient understanding to attain one goal might seem extremely insufficient and superficial in relation to another goal. Compare, again, the understanding of a carburetor sufficient to bring my car to the car mechanic and the understanding of a carburetor required to give a description of its function or to mend it.

Over and above the ability to achieve sufficient understanding for a particular activity, we also have the ability to generalize and compare over activities. We can thus compare our levels of understanding of a certain phenomenon with regard to different activities and by abstraction form a type of understanding which generalizes over activities. We can, in this way, come to see that a particular means can serve many goals or that a particular goal can be reached by several means. We can also by abstraction form ideas about relations between types of means and types of goals. Furthermore, we can form a union of the different types of understanding we have of a phenomenon and build up a complex understanding which attempts to unify several perspectives.

It is clear that the more activities we generalize over the greater will be the role of homomorphism and the lesser will be the role of specific goal attainment. As Peirce might have expressed it: Given enough generalization, different types of pragmatically motivated understanding will tend to overlap with understanding built up only with the goals of completeness, truth by correspondence and coherence in mind. Cf Buchler 1955. The fact that we can have both specifically goal oriented understanding and more generalized understanding, means that it becomes possible for us to view the understanding we think is sufficient for a particular task as more superficial than what we ourselves have accessible, potentially, from the point of view of generalized and homomorphic understanding.

On a cultural level, we also find both goal specific understanding and more generalized types of understanding. However, the high status of generalized understanding reified through such written records as scientific treatises, textbooks, encyclopaediae and lexica have led us to largely neglect the important role for understanding, of such concepts as goal orientation and perspective, both on a cultural and on a personal level.

6. NONUNDERSTANDING

Different forms of nonunderstanding such as misunderstanding and lack of understanding are important in many types of human interaction. I would therefore now like to use the preceding analysis to try to shed some light on these concepts. One way to do this is to start by giving a definition of sufficient understanding. An agent A is said to have *sufficient understanding of some input information i(i)* to the extent that

1. A has relevant access to i(i)
2. A has relevant access to i(b) (background information)
3. A can meaningfully and relevantly connect i(i) and i(b)
4. A has evidence for the truth and correctness of i(i), i(b) and of Cmr (i (i)), i (b)), where Cmr is the relation "meaningfully and relevantly connected with".
5. 1 - 4 are true and correct.

As we see this definition mimics the classical definition of knowledge as true available information with evidence, but adds the requirement of a true, relevant and meaningful connection of the available information to stored background information. We can perhaps also see that by deleting the word *relevant*, i.e. taking away a relation to a goal, in the definition, we get a definition of understanding simpliciter.

We can make the requirements tougher by requiring that A should know that 1, 2, 3 and 4 hold, again mimicking the classical discussion of whether to know one has to know that one knows. Since my intuitions on this point are very unclear this option is left for future analysis. There is also a problem concerning how we should differentiate conditions 2, 3 and 4 from each other. For example, the word *relevant* in condition 2 can be used to indicate a relation to an external goal but it can also be used to indicate a relation between i(b) and i(i), in which case part of the job that A should do according to condition 3, is already done by meeting the relevance part of condition 2. Similarly, one can argue that finding evidence for i (i), in accordance with condition 4, in many cases will be a specific case of condition 3. The reason the conditions are stated separately is that even through they do overlap to some extent, they are not identical. Since the conditions also capture many of the central facts and intuitions about understanding, I have let them stand until a better formulation can be found.

We can now characterize various different types of nonunderstanding by negating the different criteria of the definition.

1 . *Total lack of understanding (and perception)* is what we get if A has no access at all to any input information. In other words, we are negating condition 1 and by implication 2-5, as well.

2. *Awareness but no understanding* is what we get when A has access to input information but has no background information or is unable to make any connections between i(i) and i(b). Here we are negating all conditions except 1.

3. *Partial understanding or lack of understanding* can arise when only part of the relevant input is processed or when only part of the connections between relevant $i(i)$ and relevant $i(b)$ are made. We can describe the negation here as negating an implicit universal quantification over relevant accessible $i(i)$ and/or over relevant accessible connections between $i(i)$ and $i(b)$. The consequence of this negated universal quantification is that there either is relevant $i(i)$ not accessible to the individual or that there are relevant connections between $i(i)$ and $i(b)$ not made by the individual.

Whether we call the phenomenon in question partial understanding or lack of understanding is determined by phenomena which are similar to the phenomena that determine whether we call a bottle half full or half empty, i.e. it's determined, among other things, by the purpose for which the evaluation was made.

4. *Insufficient understanding* arises when input processing of $i(i)$ or establishment of connections between $i(i)$ and $i(b)$ are insufficient for A to attain a particular goal. What is negated, in this case, is that a sufficient means-ends relationship holds between A's understanding and the goal in question. Insufficient understanding is, thus, very closely related to *irrelevant* understanding, i.e. understanding that can not be meaningfully related to attaining the goal in question.

5. *Incorrect understanding* arises when either a particular state of understanding or a particular instance of manifested understanding (i) is not in accordance with some standard, (ii) is incoherent or (iii) is false. The three types of correctness can fail to apply separately, so that something can be according to standard and coherent but false etc. For a discussion of the distinction between understanding an incoherent sentence and an incoherent state of understanding, see below.

6. *Incomplete understanding* is either the same thing as the above defined partial understanding or else it is intended in some more absolute sense, in which case it can be related either to some particular body of generalized understanding, attributable to an individual or to a group of individuals, or to the potential totality of meaningful relations. In the latter case it is not clear, as has also been argued above, that the notion can really be explicated. In both of the latter cases what is being negated is a universal quantification over the meaningful relations which are thought to be available in the two cases.

7. *Misunderstandings* arise when input is processed and a meaningful connection is made but for some reason the resulting information structure is incorrect or irrelevant. In fact, there are from this perspective at least three types of misunderstandings:

- A. $I(i)$ or $C_m(i(i),i(b))$ is irrelevant but correct (C_m stands for meaningful connection.)
- B. $I(i)$ or $C_m(i(i),i(b))$ is irrelevant and incorrect.
- C. $I(i)$ or $C_m(i(i),I(b))$ is relevant but incorrect.

Misunderstandings are thus a composite phenomenon made up of a combination of irrelevance and incorrectness. In section 7.5 below I will argue that irrelevance is slightly more important as a criterion for classification of misunderstandings.

The most problematic of the types of nonunderstanding discussed above is perhaps incorrect understanding. Can one understand an incoherent sentence without having incoherent understanding? in order to answer questions of this type we have to analyze in what sense one can understand a false or contradictory sentence. It seems clear that we understand such sentences in some sense, since otherwise it would be hard to explain how we are able to classify them as false or contradictory.

In order to start our analysis, let us suppose our input information is the contradictory sentence (46).

(46) The car is totally blue and not blue.

What we do in hearing or reading (46), according to the view put forth in this paper, is to attempt to meaningfully and relevantly and mostly also coherently connect (46) with i(b). This process consists, among other things, in using our competence regarding lexical and grammatical conventions to activate information corresponding to the words and grammatical constructions in (46). But it also consists in trying to connect the information which is activated linguistically with other i(b) in a meaningful, relevant and coherent fashion. In the case of (46), this either leads to a reinterpretation of the sentence or to a realization that the information in one part of the sentence cannot be coherently or even meaningfully connected with the information in another part of the sentence. At least not, if what looks like a very basic constraint on factual meaningful connections, namely noncontradiction, is to be upheld. We can therefore not understand (46) as a factual claim. We can, however, meaningfully connect (46) to the modal and semantic parts of our i(b) and classify it as a contradiction. For very many purposes we now have sufficient understanding of (46). We understand it as a contradiction.

In the case of (19) *Oslo is the capital of Sweden*, things are slightly more complicated but similar in principle. (19) is not in itself contradictory but it is not compatible with i(b) like: *Stockholm is the only capital of Sweden*. If we are sure our i(b) is correct, we can again use our modal and semantic i(b) and classify (19) as a false sentence, which means that we can not add it to our understanding of what the actual world is like.

Something similar happens when we understand fiction. We regard meaningful actual connections as irrelevant to at least those parts of the fictive text which are declared to be different from our own understanding of the actual world. My understanding of fiction can therefore be regarded as lexical and grammatical understanding supplemented by relevant and meaningful connections to all factual i(b) which has not been excluded, by the principle of noncontradiction, by what is mentioned in the text.

To summarize: The understanding of all linguistic expressions involves an activation of information by semantic conventions. To understand the information that has been activated more fully it must usually be further meaningfully connected to i(b). The form that this further connection takes is dependent on, among other things, whether we regard i(i) as actual or not. If we do not classify i(i) as actual we can still understand it, i.e.

meaningfully and relevantly connect it with i(b), by for example, using semantic and modal i(b) to classify it as contradictory, false or fictive.

Let us now return to the term *incorrect understanding*. What this term is meant to cover are not the cases where we understand sentences as contradictory or false. But, rather, it is meant to cover either cases where we think we understand something but what we think we understand turns out to be incoherent or cases where we understand something to be a fact but this turns out to be false. Incorrect understanding with regard to a standard occurs, for example, when we have incorrect knowledge of a linguistic convention and therefore incorrectly understand, for example, the meaning of the word *chair* to be the same as the meaning of the word *table*.

Another problem with the notion of incorrect understanding is whether to view it as a type of understanding or not. The problem is made harder by my proposal to view both understanding and nonunderstanding, in general, not as all or non matters, but as matters of degree. Underlying the degrees in understanding I have proposed several implicit scalar dimensions. The main ones are: degree of completeness, degree of relevance, degree of sufficiency and degree of coherence and correspondence. Only one of the scalar dimensions has a reasonably clear maximal point, namely sufficiency. Sufficiency can, however, be used to derive maximal points also for the other 3 dimensions. If we consider correspondence alone, we see that it can be viewed as an all or non matter, and that this view is reasonable for some types of information, such as single propositions. As soon as we start to regard more complex information structures, (such as a set of propositions), we seem to do better justice to our intuitions regarding degrees of understanding if we regard also correspondence as a matter of degree. If we now combine correspondence, coherence and completeness we can construct a kind of end point in the regulative ideal of complete correct understanding.

If we instead consider the other end of the scale; the only dimension which has a clear zero point is degree of completeness. The notions of totally irrelevant and totally insufficient understanding are unclear, in a way which is reminiscent of the notion of totally correct and complete understanding. Totally incorrect understanding, seen in terms of homomorphism, is not much clearer than its positive counterpart. A very low degree of structural similarity holds as soon as you compare two objects, since any structure can be mapped on to a point.

This means that any classification of a purported state of understanding as understanding or nonunderstanding could be based on one or several of these underlying scalar dimensions. The effect of this is that the predicates of *understanding* and *nonunderstanding* themselves become derived complex scalar predicates and like any scalar predicates can be classified both from their minimal and maximal endpoints. Thus, we can say about a certain woman; *she is 4 feet tall* or *she is 4 feet short*, depending on our goals and perspective. When there is a clear minimal point usually the maximal scalar is taken to include the minimal scalar so that we can say, for example, *she is 0 feet tall*. Shortness, in a sense, becomes a type of length. Since the endpoints of the dimensions underlying understanding are not as clear as in the case of length, there will not be as clear a preference

for a certain direction of classification. But otherwise, both *understanding* and *nonunderstanding* will follow, more or less, the rules of use of other scalar predicates.

7. OPERATIONAL CRITERIA FOR UNDERSTANDING AND NONUNDERSTANDING

7.1. *Problems of operationalization*

I would now like to briefly discuss the problem of finding some type of operational criteria for understanding. This is a very important problem for any empirical research dealing with understanding.

The general problem of surplus theoretical meaning is aggravated in the case of understanding by the problems of access to mental processes. We have to use introspection or observation of the ways in which understanding is manifested through behavior. Both of these types of observation provide rich possibilities for scepticism with regard to the validity and reliability of the observations. I think we can safely say that, so far, there are no operational criteria which enable us with certainty to claim that a certain person has understood or has not understood some phenomenon. We have no really good ways of separating seeming understanding or seeming nonunderstanding from real understanding or real nonunderstanding. What we can aim for is perhaps "a strategy of investigating reasonably clear cases of understanding and nonunderstanding".

Another difficulty is that in dealing with linguistic behavior and a fairly abstract phenomenon like understanding, there is really no way of escaping that a fairly high degree of interpretation is present in the "observational data". We must, in fact, to a great extent, rely on interpretation of the content and function of linguistic data in order to find cases which might throw light on the different states and processes of understanding. This, in turn, means that the sense in which we are using "operationalization" and "observation" are far removed from the ways in which these terms were used in the classical days of logical empiricism.

Below I will now examine separately possible criteria for positive understanding and possible criteria for nonunderstanding. In spoken interaction the speaker's communicative behavior, in particular his/her utterances provide a kind of double base for studies of understanding. On the one hand they can be used as indicators of his/her understanding of other speakers- utterances and on the other hand the utterances can in themselves be seen as manifestations of the speaker's understanding. A problem with the latter type of study is that we often can understand more than we can verbalize and conversely that we sometimes can correctly say things we don't understand. These types of problems become especially salient in investigating language acquisition or aphasic rehabilitation.

Drawing on the discussion of the evaluation of understanding above, I will now discuss the following types of criteria which I think can be helpful for observation:

- (i) Relevance criteria
- (ii) Coherence criteria
- (iii) Criteria based on conventional correctness, correspondence and consensus.
- (iv) Criteria based on degree of completeness and degree of activation.

7.2. Relevance and positive understanding

To make the discussion more concrete consider the following examples:

(47) A: What time is it?
B: Nine o'clock.

(48) A: What time is it?
B: The mountain is called Old Smoky.

(49) A: The weather is good.
B: Let us now return to the topic we are here to discuss.

As mentioned earlier, I take as my point of departure here that a very central part of the notion of relevance can be explicated as being related to a goal or a purpose. Given this notion we can say that (47) exhibits B as saying something which is immediately relevant to the conventional purpose and content of A:s question in a way that (48) does not. It is probably possible to find a relevant connection between A:s and B:s utterances in (48), but the connection is not immediately apparent as is the case in (47). However, example (49) shows us that the relevance of the utterance cannot simply be seen by looking at the relation between an utterance and the utterance(s) that immediately precede it. Sometimes an utterance is relevant because it is relevant to the global purpose of an interaction. It might here be helpful to operate with the notions global, intermediate and local relevance, cf Allwood 1984.

We take relevance to be a sign of understanding since it seems likely that understanding is a necessary requirement for a speaker to make a relevant contribution to cooperative communicative interaction. Local relevance requires that the agent be able to understand the preceding speaker's utterance including its purpose(s). If he/she is not able to understand it is highly unlikely that what he/she says will be relevant. More global relevance does not always require that the preceding speaker's utterance be understood, but it instead requires understanding of the overriding purposes of the interaction.

The value of relevance as an indicator of understanding will vary with the complexity of the connection between utterances.

(50) A: It's cold but not as cold as last year

B: mm

B's utterance is clearly relevant to A's and could thus indicate understanding. But the complexity of the connection is very low. All B's utterance really indicates is that he has noticed that A has stopped speaking and that he has to give a response. The response can then depending on context be interpreted as *I'm listening, continue, I understand* or *I agree*, where the more complex interpretations mostly presuppose the less complex interpretations. Thus, relevance becomes a better indicator of understanding when it is combined with some complexity, in the interrelations between utterances.

Relevance is useable as a criterion not only in relation to the understanding of a previous speaker's utterance but also in relation to whether the speaker understands his/her own utterance. We can simply say that if an agent is able to produce a relevant utterance, this is an indication that he/she understands what he/she is doing. For how would he/she be able to control his/her utterance relevantly without understanding how the various parts of the content of the utterance are related both to the purpose(s) of the utterance itself and to the purpose(s) of the previous utterances.

7.3. Coherence and positive understanding

The role of coherence for understanding is perhaps clearer than the role of relevance. An incoherent utterance cannot be understood as factual if not reinterpreted. We take incoherence to be a sign of lack of understanding since we assume that other speakers mostly are rational and that rationality in most cases will lead them to try to be coherent. Another reason for taking incoherence to be a sign of lack of understanding is that since we take reality to be coherent, valid understanding of reality must also be coherent.

But the fact that incoherence leads to nonunderstanding does not mean that coherence leads to understanding. Coherence in an information structure is a necessary but not sufficient condition of understanding. Over and above coherence the information structure should, as I have argued above, exhibit a meaningful and relevant connection between i (i) and i (b). Thus, coherence in combination with relevance in a produced linguistic utterance is a fairly good sign of understanding.

The role of coherence is approximately the same in relation to how an utterance indicates understanding of previous utterances and in relation to how the utterance indicates that the speaker understands what he himself is saying. In both cases incoherence indicates that something has gone wrong with understanding while coherence indicates that something could be right.

It might be useful to distinguish between two types of coherence (i) intrutterance coherence and (ii) interutterance coherence. Intrutterance coherence holds within an utterance and is what tells us that (51) but not (52) is coherent.

(51) I saw a big beautiful tree

(52) I saw an ugly beautiful tree

It is, of course, possible to give (52) a coherent interpretation, where we pick out an ugly exemplar among the beautiful trees.

Interutterance coherence holds between utterances and is what tells us that (53) but not (54) is a coherent sequence of utterances.

(53) A: I saw a big tree

B: Yes it was beautiful

(54) A: I saw a beautiful tree

B: Yes, it was ugly

In (54) the *yes* in B's utterance indicates agreement with A's statement. The conditions of reference on the pronoun *it* pick out the same referent that A was talking about. But the direct predication which is made is incoherent with A's utterance. This time no coherent alternative interpretation is really possible. To state something equivalent to the coherent interpretation of (52) B would have to do more work and say something like (55):

(55) Yes, but in comparison to all the other beautiful trees in the forest it was ugly.

7.4. Correctness, correspondence and positive understanding

When we are judging some stretch of behavior as to whether it manifests understanding or not, considerations of correctness often enter the picture. For example, we could test whether somebody had understood the word *chair*, by asking them to point to a chair. If they point to the right kind of object, we say that they have understood the word. We, thus, use information about a linguistic convention to make a correctness judgement and on the basis of this judgement attribute understanding or nonunderstanding.

But correctness judgements do not only derive from conformity with a norm or a standard. They are also based on consideration of truth. If I ask A, who is learning the language which I use for my question, where he lives and he gives me an answer which is in accordance with what I believe to be true, then I believe that A understood the question. This impression is also supported by the relevance and coherence of the answer. If A gives a relevant answer I believe to be untrue, I am, in fact, left in doubt as to whether A is lying or has not understood.

We can say that correctness in the form of consensus about standards, e.g. linguistic conventions, and in the form of consensus about correspondence with facts are two criteria, on the basis of which I am willing to attribute understanding of an utterance to another person. The criteria seem to apply with equal relevance whether we are judging a

speaker's utterance as a sign of his understanding of another speaker, or as a sign of understanding of his/her own utterance.

7.5. Completeness, activation and positive understanding

Also completeness can be used as a criterion of positive understanding. Especially, if it is used in combination with the earlier discussed criteria. If a person is able to give a fairly long, relevant, coherent and true response to another speaker, it is likely both that he/she has understood the other speaker and that he/she has a good understanding of his/her own utterance.

Completeness can perhaps also be related to degree of activation. If a speaker is very active in a discussion, this can, again in conjunction with other criteria probably be taken as a sign of understanding.

7.6. Attribution of nonunderstanding

Attribution of nonunderstanding is as difficult as attribution of understanding. There seem to be no criteria by which to conclusively rule out understanding.

(56) A: Are you cold
B: Yes, I car no

B's utterance in (56) is *prima facie* irrelevant, incoherent, not totally in accordance with linguistic conventions and perhaps false, if we interpret his utterance to mean that he claims not to have a car and simultaneously believe he has a car. Probably, we would in this situation feel fairly secure in attributing nonunderstanding to B, both of A's utterance, and of his own utterance. But we might, of course, be wrong. B, who is learning English could, for example, be saying: "Yes, I am cold. I had to walk here. My car broke down."

We have, however, to live with this risk, if we want to investigate nonunderstanding empirically. On the basis of considerations of irrelevance, incoherence, linguistic incorrectness and falsity we have to look for cases that we think are interesting and investigate them more closely, cf Allwood & Abelar 1984.

Let us now consider how the criteria interact. If we are able to classify an utterance for all four dimensions we get 16 possible combinations. But the number of combinations is, in fact, greater since if a dimension is undecidable or unclear we might have to classify an utterance on the basis of 1, 2 or 3 dimensions only. If one reflects about the resulting 44 possibilities the following observations can be made. We take an utterance as a sign of understanding when it is possible to classify the utterance as relevant, coherent, linguistically correct and true. We also take an utterance as a sign of understanding if it is possible to classify it for a subset of these positive features and for no negative features.

We take an utterance as a sign of some type nonunderstanding if it can be classified as irrelevant. Unless the utterance is classified as incoherent, incorrect and false at the same time, it is likely that we are dealing with some type of misunderstanding, perhaps in addition to lack of understanding. A positive occurrence of one of the features of correctness and coherence gives an indication that an interpretation has been made, even if it is an irrelevant one.

When an utterance is classified as incoherent we take it as a sign of lack of understanding. Incorrectness is in the same way a sign of lack of understanding. Neither incorrectness nor incoherence would, however, necessarily be a hindrance to taking an utterance as a sign of sufficient understanding. Falsehood is perhaps the most difficult of the criteria. There are two reasons for this. Firstly, since any judgement of falsity will be made on the basis of consensus or nonconsensus with the speaker, there is always a risk that our beliefs about what is true or false might be wrong and that therefore what we believe is a sign of a misunderstanding on the part of the speaker might, in fact, be a sign of deeper understanding than our own. Secondly, even when our judgement of falsity is correct, it is often more likely that it is a sign of deceit than of misunderstanding. Thus, a judgement of falsity is perhaps our least reliable guide in attributing nonunderstanding. Falsity can really only be a good criterion of misunderstanding if we think that the speaker is sincere and that what he is saying is either relevant, coherent or correct.

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ABSTRACT

The paper provides an analysis of some aspects of understanding with special consideration of the role of understanding in spoken interaction. Firstly, what is understood - the objects of understanding are discussed. Secondly, the understanding agent is discussed. Thirdly, understanding as a relation between an understanding agent and an object of understanding is discussed. Two main purposes of the latter discussion is to attempt to clarify the notions of degrees of understanding and evaluation of understanding. Fourthly, there is a discussion of the concept of nonunderstanding, and several types of nonunderstanding are distinguished. Finally, there is a discussion of what kinds of operational criteria are available for studying understanding and nonunderstanding in spoken interaction.