

The Role of Inference in the Resolution of Corrections

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Abstract

Building on the idea that corrections in dialogues can be viewed as anaphors which resolve to the information they correct, we investigate the role of inference in establishing the relation between a correction and its antecedent. Inferred information may serve to satisfy the requirement of semantic parallelism to which correction and antecedent are subject. It may also serve to produce the antecedent as such. The report presents an overview of the different kinds of inferencing that are relevant, on the basis of both constructed and real-life data. The last were taken from the Map Task Corpus and the BNC.¹

1 Introduction

In [Leu94], [GKL96] and [Gar97] it was argued that corrections are anaphors, whose antecedent is the information that they correct (the correctum). They differ from standard anaphors in the sense that they change, rather than extend the information predicated of the antecedent. It was assumed that the antecedent is identified through semantic parallelism: the ‘given’ part of the semantic representation of the correction must unify with the antecedent, its ‘focus’ must be contrastive to the parallel information in the antecedent.

If we can answer the question how such anaphors are resolved we have an account of the interpretation of corrections which, on the one hand, generalises the theory of anaphora resolution in an interesting way, and, on the other hand, shows that the semantics of corrections can be defined in terms of standard linguistic means. A complete account of the resolution of corrections will be given in (in preparation).² In this report we will only do some preliminary work and investigate the role of semantic and pragmatic inferencing in the resolution process.

We will present a categorisation of the types of inferencing that are involved in the resolution process. Inferencing may play a role in the resolution process in that it may help to produce the correctum, to produce the correction, or to establish a relation of contrast between the two. We will concentrate on the role of inferencing in the production of the correctum. The presentation will

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²This eventually resulted in an analysis of corrections as nonmonotonic updates, cf.[Leu04].

be based on proposals that have been made in the literature, and on our own analysis of real life examples taken from the British National Corpus and the Map Task Corpus.³

After a preliminary section in which it will briefly be explained what corrections are, and how the information structure of a correction constrains its relation to the correctum, we shall, in section 3, distinguish three inference types, namely logical entailment, default inference and accommodation. These types of inference may be applied to various sorts of information. In the sections that follow we will categorise different sorts of inferencing according to the kind of information that the inference process applies to.

Thus, we will distinguish inferencing on the basis of the features of- and relations between concepts (section 4), inferencing on the basis of world knowledge (section 5), inferencing about the beliefs, goals and intentions of the participants in general (section 6), inferencing on the basis of Gricean maxims (section 7), an inferencing process which we shall call ‘putting forward’ (section 8), inferencing about presuppositions or preconditions of utterances (section 9), and finally, inferencing about the communication process itself, which results from monitoring the interpretation and articulation of utterances (section 10). We summarise, and discuss some topics for future research in section 11.

2 What is a Correction?

We define a *correction* as an utterance which is intended by the speaker to provide alternative information for information that is present in the discourse context. By uttering the correction, the speaker conveys that he rejects a commitment to the contextually available alternative, and is, instead, committed to the alternative provided by the correction. The correction is an invitation to the addressee to revise his commitments accordingly. Here’s an example:

- (1) A: *John wants an orange.*
B: *No, he wants a banana.*

In the context of (1), participant B’s utterance means “The fruit that John wants is not an orange, but a banana”. By uttering the correction, participant B rejects the type of fruit that is provided by participant A, and offers another instead, which he believes to be the actual type of fruit that John wants. Clearly, B’s utterance is a correction of the immediately preceding one.

It is, however, not always as clear as in the case of (1) whether a reply is a correction or not. For an utterance to be a correction, it must reject some information given in the discourse context. However, the distinction between an utterance that, intuitively, rejects information, and one that doesn’t, may

³In doing the corpus searches, we did not aim at selecting *all* corrections present in the corpus, but rather at selecting examples of as many varieties of corrections as we could find. Since we were interested in corrections occurring in dialogues, the search on the BNC was restricted to the transcripts of the spoken text part of the corpus. The examples were gathered by doing searches on the phrases, ‘no’, ‘you’re wrong’, ‘you’re mistaken’, ‘nonsense’, and ‘rubbish’. The finds were read, and interesting cases were selected. As the search on the interjection ‘no’ produced several thousands of finds, an arbitrary selection of one hundred finds was made before reading. As for the Map Task Corpus, 24 out of the 128 transcripts were read through, and corrections of various kinds were selected from them. The length of the transcripts ranged from 60 to 481 turns.

be quite subtle. Thus, we find that in the following case, the first reply uttered by B rejects contextual information of some kind, whereas the second doesn't. Capitals occurring in the utterances indicate prosodically prominent syllables: they mark pitch accents.⁴

- (2) A: *John introduced BILL to Sue.*
a. B: *AND he introduced JACK to Sue!*
b. B: *Right. And he introduced JACK to Sue TOO.*

In (2a) participant A's utterance suggests to B that participant A assumes that the claim that John introduced Bill to Sue is a sufficient or complete description of the topic under discussion. However, according to participant B, a full description of the topic under discussion should include the information that John also introduced Jack to Sue. Thus, what B rejects is the claim of completeness which he takes to be implicated by A's utterance. The reply in (2b) has a different feel to it. Participant B does not consider A's claim to be a misrepresentation of the topic under discussion, he just assumes that A specified one item in a list (the list of individuals that John introduced to Sue), and now he adds another item to that list himself. Thus, in our view, (2a) is a correction, but (2b) is not.

Replies that serve to specify or disambiguate the preceding utterance constitute another case in which it is not so easy to decide whether information is rejected or not. Consider the following example.

- (3) A: *The woman overthere is my singing teacher.*
B: *The tall woman in the green coat, you mean.*

Participant B is not sure what woman A is referring to, and he utters a reply that supplies the referent of the individual A presumably intended to refer to. Thus, it disambiguates A's utterance, or, if one views A's utterance as meaningless through lack of reference, it provides a proper meaning. What kind of information is rejected by B's reply, if any? On the one hand, the update effect of the utterance seems to be the specification of information, rather than the replacement of information. On the other hand, participant B can be assumed to reject the expression 'the woman overthere' because of its failing reference. Following common practice, we will consider this kind of replies to be corrections.⁵

This does not mean that we will consider any utterance that serves to specify contextual information as a correction. We must admit, however, that we have no hard criterion to distinguish corrections from specifications. We build on the intuition that in some cases an utterance is unacceptable to a participant,

⁴Obviously, all utterances are uttered with a particular prosody. Since in this paper we are not concentrating on information structure and its articulation (see below) we shall only mark pitch accents when this is necessary to disambiguate an example, or to support the reader's understanding of the discussion.

⁵In [Lev89], Levelt distinguishes between self-corrections that are *error repairs* and ones that are *appropriateness repairs*. In the first case, an incorrect expression must be replaced by the correct one, in the second case, the culprit expression is not incorrect, but merely inappropriately used. It need not be replaced. This distinction corresponds to our distinction between corrections that replace information, and specificational corrections such as the one in (3), which provide additional information.

because, in his view, it is not as specific as it should and could have been at the point in the conversation at which it was uttered. Under such conditions, clarificatory replies like the one in (3) turn into corrections.

Further, the intuition that a correction rejects contextual information is weakened when the addressee's commitment to the correctum is weak, or not established yet. This is typically the case when the correctum is the proposition put forward by a yes-no question, and participant B rejects that proposition by answering the question negatively:

- (4) A: *Is John married?*
a. B: *No, Peter is married.*
b. B: *No, he isn't.*

It also happens when the correctum is in the scope of a conditional, a modal, or an epistemic operator.

- (5) A: *Gerald believes that Joe passed the exam.*
B: *No, he failed.*

Participant A cannot be assumed to be committed to the information that 'Joe failed the exam'. However, through the belief report about Gerald's belief A brings forward this proposition as a candidate commitment. The candidate commitment serves as the correctum of the correction uttered by participant B.

- (6) A: *It's possible that Joe passed the exam.*
B: *No, he failed.*

Similarly, in (6), participant B's reply corrects a candidate commitment, rather than an established one. In fact, even propositions that are in the scope of a negation according to the addressee may be corrected, by what might be called a confirmatory correction:

- (7) A: *This year, Jack didn't give Mary a bunch of roses.*
B: *No, he gave her a bunch of sunflowers.*

B's reply can be paraphrased as "Indeed, it was not a bunch of roses Jack gave to Mary. It was a bunch of sunflowers." The correction confirms A's assertion in rejecting the proposition it negates.

In all of these examples, the addressee is not committed to the correctum. Consequently, the intuition that a correction is taking place in these cases is weak. It is, in fact, an open question to us whether these replies can best be categorised as corrections, or whether it is better to view them as a slightly different kind of rejection utterances. For the space of this report we shall count them in as borderline cases of correction. They will appear in section 8, in which we discuss 'putting forward' as a type of inference.

As we said in the introduction of this report, we shall view a correction as a particular kind of anaphor, namely one that changes some feature of its antecedent (the correctum).

- (8) A: *John wants an orange.*

B: *No, he wants a banana.*

To illustrate, in (8) we assume that the antecedent of the correction is the proposition ‘John wants an orange’: like the antecedent, the correction refers to John’s desire for a piece of fruit. The correction is intended to replace the information that the kind of fruit that John desires is an orange by the information that the kind of fruit that John desires is a banana.

Thus, for a correction to be felicitous, the discourse context in which it is uttered must contain a correctum to which it can be assumed to resolve. Furthermore, we shall assume that the relation between the correction and its correctum is constrained by semantic parallelism: part of the information expressed by the correction must be given, i.e., shared by the correctum, but some other part of information must be contrastive to the parallel information in the correctum. For instance, in (8), the given information, shared by the correctum is ‘John wants a piece of fruit’, while the contrastive information is ‘banana’ versus ‘orange’.

We assume that the relation of semantic parallelism that is to be established is constrained by the information structure of the correction. Information structure structures the utterance into parts that have distinct functions in the interpretation process (at discourse level) or relative to operators occurring in the utterance. The relevant information structural distinction for the purpose of this paper is the distinction between ‘focus’ and ‘ground’. In general, information structure is articulated through the syntax or prosody of the utterance. Simplifying matters, we shall assume that in English, a focus is a constituent marked by prosodic prominence (pitch accent), whereas the ground is deaccented.⁶ Information structure constrains semantic parallelism in the sense that the ground of the correction must be information shared by the correctum, and the focus of the correction must contain information which is contrastive to the parallel information in the correctum.

Furthermore, we will assume that interpreting a correction successfully relative to a correctum has the effect of making the two incompatible i.e., a participant cannot be committed to the one without rejecting the other. As will be argued for in [Leu04], the incompatibility effect arises from the interaction of, first, the interpretation of the correction anaphorically relative to the correctum, and, second, the contrastivity of the correction and the correctum.

In this paper we will concentrate on examples in which the relation of semantic parallelism between the correction and its correctum can only be established with the help of some form of inference. Sometimes it is necessary to infer that certain properties hold of a given antecedent in order to establish parallelism. In this case, the antecedent is completed or extended, rather than created, through inference. It may also be the case that the correctum as such must be inferred in the discourse context, on the basis of the communicative content of the immediately preceding utterance. In both cases we shall say that the antecedent ‘is produced’ with the help of some form of inference. Similarly, the correction itself may be produced through inference. We will, however, focus on cases in which the correctum must be produced through inference. In the

⁶There are various theories of focus articulation on the market. See e.g. [Sel84], [Sel94], [Lad80], [CH68], [Gus92], [Jac91], [VZ93].

following sections, we shall take a look at the various ways in which inferencing plays a role in resolving a correction to its correctum.

To ease the reading of the examples we shall henceforth put the clause or sentence that expresses the information that serves as the correctum between double angled brackets ($\langle\langle\rangle\rangle$), and the correction between single ones ($\langle\rangle$). Sometimes the correctum or the correction cannot be indicated in this way, and then we shall use representations such as $\langle\langle impl \rangle\rangle$, which indicates that the correctum is an implicature.

3 Three Inference Types

The antecedent of a correction often is the information expressed by the immediately preceding utterance, as in the following example.

- (9) A: $\langle\langle Jack is late.\rangle\rangle$
B: $\langle No, he's in time.\rangle$

The correction uttered by participant B means ‘Jack is not late, he is in time’, that is, the antecedent of the correction is the proposition ‘Jack is late’. It is not always the case, however, that the antecedent of a correction has explicitly been mentioned in the preceding discourse: sometimes it must be inferred from the immediately preceding utterance or sequence of utterances. The following example illustrates this.

- (10) B: *I have an appointment with Jack at 10.*
A: *Whenever you have an appointment with him before 11,*
 $\langle\langle he is late.\rangle\rangle$.
B: $\langle No, he's in time.\rangle$. *There he is.*

Assuming that participant A accepts B’s assertion, participant A is committed to the information ‘B has an appointment with Jack at ten’. Furthermore, A is also committed to the information ‘when you have an appointment with Jack before eleven, he is late.’ Since an appointment at ten is an appointment before eleven (world knowledge) it can be deduced from this that Jack is late for this appointment. This inference serves as the antecedent of the correction uttered by participant B. The particular type of inference that is involved in this example is logical entailment.

In this section, we will discuss three major types of inference that are involved in producing the antecedent of a correction in case the antecedent has not been explicitly uttered in the conversation so far, namely logical entailment, default inference, and accommodation.

3.1 Logical Entailment

Obviously, entailment⁷ plays a major role in producing the antecedent of a correction. It acts on any information that is relevant for the interpretation process, be it world knowledge, conceptual knowledge, or the beliefs, goals and

⁷Whenever we use the term ‘entailment’ this refers to logical entailment.

intentions of the participants. Here are two more examples, taken from the Map Task Corpus⁸ and the BNC⁹, respectively.

- (11) A: *A forge. Well keep going down. Right?*
 And then loop ... towards the ... east.
 B: *«Underneath, what, wheatfields?» So I go straight*
 A: *<Not as far down as that.>* (MT,Q1EC6,7)

Participant B must draw a route on his map according to the instructions of participant A. At this particular point in the task, participant B is supposed to go down and then loop towards the east. B proposes to loop towards the east underneath wheatfields (an item on his map). Looping towards the east underneath the wheatfields is only possible if one goes down as far as the wheatfields. Thus, we infer that B proposes to go as far down as the wheatfields. Given this inference, a relation of semantic parallelism can be established between the correction and A's proposal.

- (12) A: *I want to «go in Christopher's seat.»*
 B: *<No you just stay there>* (BNC,KBW 11350 942 2 AJ0,25)

In (12), participant A proposes to go into someone else's seat. Since we know that if a person goes into another person's seat he does not stay in his present seat, what A proposes entails that he does not stay in his present seat. Again, the entailment is necessary to establish semantic parallelism between the correctum and the correction.¹⁰

3.2 Default Reasoning

Beside logical entailment, default inference or commonsense entailment plays an important role in producing the antecedent of the correction. Default rules are rules that fire only when counterevidence is absent. They implement the idea that a rule which holds in general may have exceptions. Commonsense entailment is entailment on the basis of rules of the form 'if x then normally y' and implements the same intuition. In [AD97], Asher discusses an example originating from [VZ93], in which, they claim, participant B makes an assertion that functions as a correction of a belief present in participant A's cognitive state. The belief ('the president likes the Delft China set') is inferred by commonsense entailment from what A says.

⁸The Map Task Corpus is produced in an experimental setting. Two testpersons, a giver and a follower, have been given a map of one and the same imaginary area. The giver has a route drawn on his map, the follower only has the starting point of the route marked off. The follower must draw the route on his map according to the instructions of the giver. They cannot see each other's maps, and the task is complicated by the fact that not all relevant items (e.g. wheatfields, diamond mine, picket fence,..) are present on both maps, and that sometimes an item is named slightly differently on each map.

⁹The BNC is a huge corpus, set up with the aim of giving a representative picture of contemporary British. Data may come from any source. Though information about the source of each fragment is available, in analysing the data one often lacks precise and detailed information about the nonlinguistic context of a conversation or the aims of the participants.

¹⁰In fact, something more complicated is going on. Since A only proposes to go into Christopher's seat, the entailment that he does not stay in his seat has the status of a proposal at best. In order to prevent the execution of the proposal participant B rejects it.

- (13) A: *I got the president a nice Delft china tray that matches the set he has in the living room. Was that a good idea?*
 B: *That was a bad idea. <The president [hates]F the Delft china set.>*

Participant B denies that it was a good idea to buy the president a Delft china tray. B's second utterance is an explanation of the denial. Explanations, according to [AD97], take place against the background of what the speaker takes the other participants' cognitive state to be; we explain a particular phenomenon in case we think the addressee needs to have his cognitive state corrected in order to see how this phenomenon follows from, or should be expected given what he believes. In the case of (13), B can be assumed to picture A's beliefs and intentions in approximately the following way:

- (14) a. *Want to please the president.*
 b. *Believe that if you buy something that the president likes, he will be pleased.*
 c. *Believe that if u likes x and u has x and y matches x, then normally u likes y.*
 d. *Believe that <<the president likes Delft china set>>.*
 e. *So intend to buy y and y is a plate and y matches Delft china set.*

Participant B will then reason from the premises (14a-d) to the conclusion (14e). Finally, B will complete his picture of A's behaviour by applying the default rule 'if intend to φ then eventually φ ' to (14e). The explanation uttered by participant B corrects (14d), one of the beliefs that B assigns to A on the basis of his reasoning process.

Similarly, in [Wal96] Walker uses default rules to model the epistemic reasoning that is going on in the process of accepting or rejecting other participants' utterances. The conclusions of these rules are cancellable, and Walker defines several types of rejections in terms of the default inferences they cancel, e.g. a denial of belief transfer cancels inferences based on the Belief Transfer Rule: if one agent A makes an assertion that p , then by default another agent B will come to believe that p .

Furthermore, she assumes that epistemic default rules may have different endorsements. The endorsement types Walker assumes are, in order of increasing weight: hypothesis, default, linguistic. In producing an utterance, a speaker assumes that the hearer is attending, that he will understand the utterance, draw the intended inferences, and accept what is asserted or proposed. However, these default inferences are only of endorsement type 'hypothesis', and will be cancelled by inferences of a stronger endorsement. Walker further introduces the default rule AIR, a rule that regulates the acceptance of an utterance as a mutual supposition, and whose strength is determined by the endorsement of the assumptions that justify its conclusion. To illustrate, consider the following example.

- (15) A: *<<We bought these pajamas in New Orleans for me.>>*
 B: *<We bought these pajamas in New Orleans.> (fall-rise)*

The content of A's assertion is added to the common ground on the basis of the AIR. This inference is of endorsement type hypothesis. In the context of

A's assertion, and given the particular intonation pattern of B's reply (fall-rise intonation)¹¹ B's utterance implicates that the pajamas (although they were bought in New Orleans) were not bought for A. Implicatures have the endorsement 'default'. Since the default inference is of greater weight than the hypothesis, the first will cancel the second. To be precise, in (15) the implicature cancels part of the hypothesis, namely the information that the pajamas were bought for A.

Thus, default rules do not only serve a purpose in expressing the intuition that rules may hold only under normal circumstances, they may also serve to model the fact that participants in a conversation must weigh the strength of their beliefs or assumptions against each other. Default rules are typically used to model rule-systems in which one rule may overrule another, such as Gricean maxims and the assumptions that participants make about each other's knowledge and beliefs. It can also be used to lay down common sense knowledge of the world, or rules of thumb. However, whether default rules are used to model a particular type of information, or not, may vary, depending on the perspective chosen by the author.

3.3 Accommodation

Many corrections have an antecedent that is produced with the help of *accommodation*. Accommodation (see [Lew79]) is the silent acceptance of information which does not follow from the discourse context given the conversation so far, but whose acceptance is a precondition for the truth, or acceptability in any other sense, of a new utterance. A minimal constraint on accommodation is that the information that is accepted is consistent with the discourse context. To illustrate, consider the following examples.

- (16) A: *«Jack brought his daughter to the exposition.»*
 B: *<No, he brought Kim to the dinner party afterwards.>*

The correction means 'John didn't bring Kim to the exposition, he brought her to the dinner party afterwards'. In order to be able to interpret the correction uttered by participant B relative to the given context, we must assume that Jack's daughter is Kim. Once we have accommodated this proposition it follows from the context that John brought Kim to the exposition, and parallelism can be established.

- (17) A: *«John called Mary a Republican.»*
 B: *<No, George insulted her.>*

Consider (17), and assume that this exchange takes place in an out of the blue context, in which we know nothing about American politics, Mary's political stand, and John's intentions. In order to be able to interpret B's correction felicitously in the given context, we must accommodate that John calling Mary a Republican was an insult to her. In an out of the blue context, the accommodated information cannot be inferred (either by logical entailment or common-sense reasoning) from the discourse context in which the correction is uttered.

¹¹See footnote in section 7 of this report, where this example is discussed in more detail.

It is simply added to the context in order to make the correction felicitous. This holds for example (16) as well.

Thus, accommodation is not a type of inferencing in the strict sense, rather it is a form of ‘jumping to conclusions’ which is done on the basis of the assumption that a new utterance is coherently interpretable, and that its speaker is able to justify the presuppositions of his utterance and considers the justification to be uncontroversial. Clearly, the accommodation process must be constrained somehow– it is not the case that the discourse context is flooded with any old proposition that could be added to it consistently– but it is still an open question what conditions license this type of pragmatic inference (see e.g. [San92] for some discussion). As a consequence, accommodation is particularly hard to model or implement in a formal reasoning module.

In sum, in this section we distinguished three types of inference that play a role in the production of the antecedent of a correction, namely entailment, default inference, and accommodation. Accommodation applies to the presuppositions or preconditions of a new utterance, entailment and default reasoning are types of inference that apply to any sort of information present in the discourse context.

Each type of inference determines a corresponding type of reasoning. However, different types of reasoning may also be distinguished in terms of the kind of information they apply to. An inspection of real life data shows that the reasoning that produces a suitable antecedent for the correction is based on various types of information.

The relevant kind of reasoning may be reasoning about the relations between concepts, about world knowledge (including knowledge about the actual situation in which the discourse takes place), or about the beliefs, goals and intentions of the participants, in particular the beliefs, goals and intentions that concern the communication process that is going on. It may be reasoning about the presuppositions of an utterance, reasoning on the basis of Gricean maxims, or reasoning about information that has been ‘put forward for discussion’ by an utterance. Finally, it may be reasoning about the desired versus the actual interpretation of an utterance, or about the articulation of an utterance. Each of these kinds of reasoning will be presented in the following sections.

4 Relations between Concepts

The inference process by which we produce the antecedent of a correction is often based on lexical semantics, i.e., on what we know about concepts and the relations between them. For example, we will be able to resolve the correction uttered by participant B in the following dialogue on the basis of our knowledge that ‘to be afraid of’ and ‘to be scared of’ are synonyms.

- (18) A: *«Jack is afraid of spiders.»*
B: *<No, Jim is scared of spiders.>*

Given A’s utterance and our lexical semantic knowledge we can infer that Jack is scared of spiders, and establish parallelism between the correctum and the

correction. Similarly, we can resolve B's correction in the following real life example, because we know that 'taking a look at something' is a form of 'bothering about something':

- (19) A: *Oh well* \ll *don't bother about it* \gg , *we'll soon sell it. No problem.*
 B: *<No let me take a look at it>, let me take a look. (..)*
 (BNC,12,KC1 792 805 2 AJ0)

The required inference may also be based on a subsumption relation:

- (20) A: \ll *Tim has got a PUPpy.* \gg
 ? B: *<No, his SISTER has got a dog.>*

Since puppies are dogs, it can be inferred that Tim has got a dog, and because of this parallelism can be established.¹² In the following example, resolution of the correction is based on our knowledge of the concept 'starting': When several agents cooperatively start an event at a certain time, the event itself starts at that time.

- (21) A: \ll *We were supposed to start at six o'clock.* \gg
I mean some of us were in at six.
 B: *<No no no it wasn't supposed to start at six>, it was supposed to*
 (BNC,10,JTB 439 679 2 AJ0)

Concepts may also be related via a change of perspective, for instance, we know that a 'buying' can be viewed as a 'selling', a 'giving' as a 'getting', a 'telling' as a 'hearing', and an 'insulting' as a 'being insulted'. In the following examples, we assume that a change of perspective has taken place, and infer the information we need to establish parallelism between the correctum and the correction:

- (22) A: \ll *Someone told Mary about the budget cuts.* \gg
 B: *<No, Alice heard about them.>*

- (23) A: \ll *Harold insulted Julia.* \gg
 B: *<No, she was insulted by George.>*

To end, note that reasoning about concepts may not just serve to infer information that supports givenness or sharedness of the ground of the correction in the discourse context, but also to infer information that supports contrastivity of the focus of the correction and its parallel information in the correctum. Consider the following example.

- (24) A: *[-] too old. Think* \ll *it's got too old.* \gg
 B: *<No it's fine.>*
 (BNC,KBW 11350 942 2 AJ0,25)

¹²The correction is not completely felicitous, but this is not because we cannot infer the necessary information. The problem seems to be that the correction does not contain information which is parallel to the property 'puppy' in the correctum. Note that 'a dog' in the correction does not resolve to 'a puppy' in the correctum, hence the feature 'puppy' is not necessarily shared between them.

We know that anything which is ‘too x’ is not fine. In particular, we infer that, according to participant A, ‘it (whatever it is) is not fine as far as age is concerned’. Further, we accommodate that participant B considers it to be fine as far as age is concerned, i.e.w. according to B it is not too old. Given this additional information, the correctum and the correction can be seen to be properly contrastive, and the parallelism requirement is satisfied.

5 World Knowledge

Much of our reasoning is based on world knowledge. Here’s an example, taken from the Verbmobil corpus:

- (25) A: *«dann schlag’ ich Ihnen vor, dass wir gleich zu Beginn des Dezembers zuschlagen, und zwar am ersten und zweiten.»* <Pardon, am zweiten und dritten wuerde es mir ganz gut passen,>... (VM, Finkler 233)
 A: *«then I propose to you that we strike directly at the beginning of December, that is, on the first or the second.»* <Sorry, the second and the third would be quite convenient to me,>...

Participant A is trying to pinpoint a date for an appointment. The correction can be paraphrased as ‘It is not the first and the second that would be convenient to me, but the second and the third, so my proposal is to strike on the first or second, rather than the second and third.’ The correctum in this case is the complex consisting of the proposal to strike on the first and the second, plus the inferred information that the first and the second would be convenient to the speaker. This follows from the preceding discourse and world knowledge: we know that if someone proposes to make an appointment at a certain date, then presumably that date is convenient to him. Turning things around, we assume that if A corrects the date that is convenient to him he presumably intends to correct the date he previously proposed for the appointment, since that date is no longer convenient. Thus, the correction is, like the correctum, complex, and both are produced with the help of an inference process which is based on our world knowledge about the making of appointments.

World knowledge includes knowledge of the actual situation in which the conversation takes place. Clearly, in order to know exactly what is corrected by the specificational correction uttered by participant B in the following discourse we must know the actual situation in which it takes place:

- (26) A: *«That’s my singing teacher, overthere.»*
 B: *<You mean the woman that’s going around the corner now?>*

Apparently, the deictic elements in A’s utterance fail to refer uniquely. We infer that in the actual situation, there is a range of possible references for the deictic elements in A’s utterance. The inferred range is reduced to include only one individual by the correction.¹³

¹³Compare the discussion of this example in section 2.

6 Beliefs, Goals and Intentions

In the preceding sections many examples were shown in which epistemic reasoning (i.e., reasoning about the knowledge or beliefs of participants) and reasoning about the goals and intentions of the participants played a role. We shall refer to this type of reasoning loosely as ‘epistemic reasoning’. Epistemic reasoning is all-present in communication. It serves to link an utterance to what it is presumably intended to convey by the speaker in the given context. It serves to interpret an utterance coherently relative to the conversation so far (compare the discussion of example (13) above). It serves to evaluate new information conveyed in the conversation relative to a participant’s own beliefs, goals and intentions. Last but not least, it serves to establish and maintain what is commonly called the ‘common ground’ of the conversation.¹⁴

What is the common ground? A precondition for successful communication is that the participants are able to understand each other. The speaker can only be sure that the addressee understands his utterance correctly if the addressee interprets the utterance relative to the context which the speaker considers to be the relevant context of interpretation. In other words, successful communication presupposes that the context of interpretation is shared by the participants. Thus, the participants in a conversation will assume that they share a common ground consisting of mutual beliefs and background knowledge. During a conversation, the common ground must be maintained, that is, it is of the utmost importance to find out whether the participants share their epistemic attitude towards information that is communicated or not, and to prevent or repair miscommunications.

World knowledge, knowledge of the relations between concepts, knowledge of Gricean maxims, knowledge of what triggers presuppositions, knowledge of what took place in the discourse so far, all of this is presumed to be present in the common ground of a conversation. Thus, whatever the sort of information is we are reasoning about, epistemic reasoning is always taking place in the interpretation process. One might say that whenever participants reason about the world or about each other’s claims for the purpose of the conversation, this takes place within a shell of epistemic reasoning.

In particular, in order to be justified in uttering a correction, the corrector must know what the other participant was talking about, in spite of what he said. And when the corrector utters the correction, the addressee must likewise be able to find out what the correction is about, in spite of his own incorrect belief about it. Consider the following example again.

- (27) A: *«John wants an orange.»*
B: *<No, he wants a banana.>*

If B’s only information about John’s desire were A’s assertion, B would simply accept that assertion and assume that John wants an orange. In the case of (27), however, B finds out, in evaluating A’s claim relative to his own beliefs, that what B asserts is incorrect. B’s evaluation depends crucially on what B believes A is talking about, independently from what A says. B knows, or thinks he knows, what desire of John’s A intends to refer to, although B falsely refers to the object of John’s desire as ‘an orange’. There must be information which

¹⁴See e.g. [Sta78], [CM81], [Lew69].

is shared by B and A and which convinces B that A is referring to this particular desire of John's. For example, A and B both saw John coming into the kitchen to look for a piece of fruit. In addition, B must have reason to believe that John was looking for a banana. Maybe John told B that he wanted a banana, or maybe B knows that John hates peeling oranges and only eats bananas, or maybe B saw him coming out of the kitchen with a banana in his hand. Finally, in order to justify the assumption that A is actually talking about this particular desire of John for some piece of fruit, B must be convinced that A could indeed make the error he actually made, even though they shared certain relevant information between them. It must be possible to explain A's error in some way. For example, A may not have seen that John came out of the kitchen with a banana in his hand.

In short, the corrector must know quite a lot about the addressee's beliefs and the information that is available to him before he is in a position to correct that addressee. It is impossible to utter a correction without being clear about what information is shared between you and the correctee. The common ground provided the information that we need to determine the referent of both the correction and the correctum.

7 Conversational Implicature

Conversational implicature is a central notion in pragmatic theory. It is a type of inference that is based on general principles for cooperative interaction. It explains how a participant in a conversation can communicate more than just the truth-conditional content of his utterances.¹⁵

In [Gri75] and [Gri78] a set of basic principles guiding the efficient and effective use of language in cooperative conversation were proposed. First of all, language users are commonly supposed to adhere to the principle of *cooperativeness*: make your contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged. More specifically, this means that language users are assumed to behave according to certain maxims of conversation. Grice specifies the maxims of Quality, Quantity, Relevance and Manner. The maxim of Quality requires that a participant is sincere and tries to make his contribution one that is true. The maxim of Quantity requires that a participant makes his contribution as informative as is required for the current purpose of the exchange, and does not make it more informative than is required. According to the maxim of Relevance, a participant must make his contribution relevant. Finally, the maxim of Manner requires a participant to be perspicuous (specifically, to avoid obscurity and ambiguity, to be brief and orderly).

In interpreting each other's utterances, each participant will assume that the other follows these guidelines, and that the other assumes that he follows them himself. The assumption that participants adhere to the maxims of conversation is only a default assumption: maxims may be flouted. When this happens, it will still be assumed that the participant is behaving cooperatively and that, hence, the flouting can be justified in some manner. Both observing and flouting of the maxims may trigger conversational implicatures.

¹⁵An overview and discussion of the theory of implicature, with references to the relevant literature, can be found in [Lev83].

The main characterising features of conversational implicatures are that they are *cancellable* and *reinforceable*. Consider

- (28)a. *John has three cows.*
b. *John has only three cows and no more.*
c. *John has three cows, in fact ten.*
d. *John has three cows, he does not have any more cows.*

On the basis of the maxim of Quantity, the utterance of (28a) will by default implicate, or trigger the implicature (28b).¹⁶ If the speaker of (28a) would know or believe that John actually has more than three cows (e.g. five) his utterance would be less informative than it should have been. Assuming that the speaker follows the maxim of Quantity, it must be the case that he does not know or believe that John has more than three cows. Hence the utterance of (28a) implicates (28b) to us. As (28c) shows, an implicature can be cancelled by a subsequent utterance. Finally, as (28e) shows, implicatures may be reinforced by the context: stating the implicature explicitly does not lead to infelicity.

Conversational implicature is involved in the resolution of corrections in that it may serve to produce the antecedent of the correction, or the correction itself. Consider the following examples.

- (29) A: ... *Yeah. I've got a saloon bar as well above that, though.* <<impl>>
B: <*No, you're not going into a saloon bar, Mark.*>
(MT,Q1EC3,154)

In (29), participant A makes a remark which participant B considers to be irrelevant because on his map, there is no saloon bar. Participant B assumes that A must have some sensible reason for his utterance, even though it flouts the maxim of relevance. Thus he assumes that A mentions a saloon bar because he would like to go into a saloon bar. In other words, A's utterance implicates to B that A intends to go (in the fantasy world represented by the map) to a saloon bar. The implicature is the antecedent of B's correction. Note, that the assertion of A's that triggers the implicature is not rejected by the correction.

In the following example, an implicature serves to complete the correction.

- (30) A: (...) *The argument has been made clearly and repeatedly that fox (...) fox hunting with hounds is not effective. (...) Farmers themselves will say there are better ways of controlling fox population.*
B: <<*Rubbish.*>>
A: <*It might be rubbish,*> *try talking to a farmer occasionally.*
(BNC,43,JNB 624 948 15 AJ0)

In (30), participant B asserts that the claim 'fox hunting with hounds is not effective', is rubbish. Participant A denies B's assertion by saying that it might be rubbish. Since participant A chooses to use the weaker expression 'might be' rather than the stronger one 'is', his utterance implicates, by the maxim of

¹⁶We shall use the verb 'implicate' to mean 'trigger the implicature', no other sense will be intended.

quantity, that according to A the stronger term does not apply: it might be rubbish, but it need not be. The implicature completes B's claim, so that there is a contrast between the information in focus 'might but need not' and the correctum 'is'. Hence, the parallelism requirement is satisfied.

Third, here is an example in which both correction and antecedent are produced through implication.

- (31) A: *Right, erm, did we not have a fair amount of discussion about this at the time, before << impl >>*
 B: *Not that I can remember at all. < impl > (3, J45 180 917 2 AJ0)*

Participant A's utterance is of the form 'Did we not p?'. This implicates to the addressee that in A's view, p is the case, that is, A's utterance implicates that A believes that they did have a fair amount of discussion about the given topic before.¹⁷ B's reply implicates that, in his view, it is not the case that they had a fair amount of discussion about the given topic before.¹⁸

An important subclass of conversational implicatures is the class of *scalar* implicatures. Scalar implicatures may arise when an utterance contains a linguistic expression which is an element on a linguistic scale. A linguistic scale is a set of linguistic alternates which can be arranged in a linear order by degree of informativeness or semantic strength. In general, if a speaker asserts that a lower or weaker point on a scale obtains, then he implicates that a higher or stronger point on the scale does not obtain. On the basis of the maxim of Quantity we assume that the statement he makes is the strongest or most informative that can be made in the situation.

As for the interpretation of corrections, it can be observed that when the corrective reply contains the scalarly lower or weaker element, then the correction is completed by an implicature, when the utterance preceding the correction contains the weaker element, then the antecedent is completed by an implicature. In both cases this makes the correction and the correctum contrastive, so that the parallelism requirement is satisfied. Consider the following examples, in which the relevant linguistic scale is [some < all].

- (32) A: <<All men are chauvinists.>>
 B: <SOME men are chauvinists.>

B's reply implicates 'not all men are chauvinists'. Given the implicature, the correction and the correctum are properly contrastive: the correction can be paraphrased as 'the amount of men that are chauvinists is not all, but only some and not all.'

- (33) A: <<Some men are chauvinists.>>
 B: <ALL men are chauvinists.>

¹⁷It is not quite clear to us on the basis of which maxims this implicature arises. It seems to be a conventionalised effect of querying the falsity of a proposition rather than the truth.

¹⁸This implicature seems to arise from an additional maxim of politeness or saving face. Saying that 'he cannot remember at all (that p)', participant B avoids an explicit disagreement about the issue whether p. He is saying something weaker than he intends to convey in order to avoid a conflict.

Conversely, in (33) A's utterance implicates 'not all men are chauvinists', which completes the correctum. Our claim is that in the case of scalar implicatures, the implicatures serve to complete the correction or the correctum. Alternatively, it could be claimed that the implicatures themselves constitute the correctum or correction. To motivate our preference, consider again example (32), which we repeat here.

- (34) A: *Some men are chauvinists.*
implicature: <<not all men are chauvinists>>
 B: <ALL men are chauvinists.>

Now, if it were just the implicature which is the antecedent of the correction, as indicated by our marking in the example, than any correction which may serve to correct the implicated information should be felicitous in the context of (34). In other words, we expect the corrections in (35a) and (35b) below to be felicitous in the context of (34) as well.

- (35) A: <<Not all men are chauvinists.>>
 a. B: <All men ARE chauvinists!>
 b. B: <you mean WOMen.> (*meaning: not all women are chauvinists.*)

However, this is clearly not the case:

- (36) A: *Some men are chauvinists.*
implicature: <<not all men are chauvinists>>
 a. # B: <All men ARE chauvinists!>
 b. # B: <you mean WOMen.> (*meaning: not all women are chauvinists*)

Apparently, the implicated information is not independently available to serve as an antecedent for an arbitrary correction. In addition to this observation we have the intuition, at least with respect to cases in which scalar implicature is involved, that the correction is interpreted directly relative to the preceding utterance. That is, a relation of parallelism is established directly between the reply and the preceding utterance, and the implicature arises because the focus in the correction and its parallel element in the antecedent (i.e. the scalar items) must be contrastive.

Marilyn Walker, in [Wal96], gives a detailed discussion of the type of correction illustrated by example (32), which, in her terminology, is an implicature rejection. Relative to implicature rejections, she addresses three issues: how can they be distinguished from confirmatory utterances, i.e. acceptances? How can they arise at all in a context in which they contradict the preceding assertion and would normally be cancelled? What restricts the implication process? As for the first question, Walker shows that the intonational features of the utterance disambiguate between an acceptance- and a rejection reading. Consider the following example.

- (37) A: *We bought these pajamas in New Orleans for me.*
 B: *We bought these pajamas in New Orleans.*

Uttered in sustained tones, or with downstepped H*+L accents, B's reply confirms (the whole of) A's assertion. Uttered with a fall-rise intonational contour, the utterance functions as an implicature rejection. In that reading it means: we bought these pajamas in New Orleans, but not for you.¹⁹ Normally, intonational marking will disambiguate between the two readings.

In addition, Walker assumes that an implicature rejection is only triggered in case there exist a specific relation between the information structure of the preceding assertion and the information structure of the reply. She claims that *acceptances* re-realise focal information from U1 and mark it as old information, whereas *rejections* re-realise the open proposition from U1, and replace the focal item with a scalarly related item. Unfortunately, it is not quite clear exactly how this applies to the main example that Walker discusses— unless we assume a rather unorthodox focus for participant A's utterance:²⁰

- (38) A: \ll *We BOUGHT these pajamas* [_F *in New Orleans for ME*]. \gg
 B: \langle *We bought these pajamas* [_F *in New ORLEANS*]. \rangle (*fall-rise*)

In any case, the idea is that if a certain correspondence between the information structure of the reply and of the preceding utterance obtains, the reply must be interpreted as an implicature rejection. Now, because the reply is interpreted as a rejection of the preceding utterance, the implicature it triggers is not cancelled by the preceding utterance. This answers the second question, mentioned above. Further, information structure restrains the implication process in general, since only scales which can be identified from the focus/open proposition structure of the reply and the preceding utterance are salient. This answers the third question.

In our view, Walker's claim that implicature rejections re-realise focal information is problematic in that we are not sure that it can be maintained given standard assumptions about information structure, and because it does not seem to be generalisable to corrections in general, as the following example shows.

- (39) A: *Does Jan have a job?*
 B: *Yes, he does.* \ll *He's got* [_F *the job in AMsterdam, at the phiLOSophy department*]. \gg
 A: *Can't be true.* \langle *It's* [_F *HERman*] *who got that job.* \rangle

Clearly, the correction uttered by A does not instantiate the same open proposition as its antecedent.

We believe that Walker's observations can also be explained without assuming such a strong condition on the information structures of the reply and its antecedent. First, it is a general rule of conversation that participants must signal a detected discrepancy in belief as soon as possible (compare Walker's

¹⁹Fall-rise is an intonational contour describable in Pierrehumbert's system as L*+H-L-H% [Pie80]. It is distinguished from other contours by the fact that it is scooped (see [Lad80]). There may be more than one accented syllable, and for each such accented syllable there must be an abrupt drop in pitch within the following two syllables. In addition, fall-rise is characterised by a sentence final rise in pitch. See [Hir85], [HW85].

²⁰This is the information structure that Walker herself seems to suggest in a footnote on page 22.

Collaborative Principle). Consequently, the information that is rejected or replaced tends to be focal information. Nonfocal information is presumed to be given in the common ground by the speaker. Either the addressee should have rejected that information earlier in the discourse if he does not agree with the speaker, or the speaker is incorrectly presuming this information to be uncontroversial. This explains the awkwardness of the following implicature rejection (Walker's example (47')):

- (40) A: \ll *We bought me these pajamas in [New ORLEANS].* \gg
 ?? B: \langle *We bought these pajamas in New ORleans.* \rangle (*fall-rise*)

Second, it can be assumed that the Fall-Rise intonation triggers the assumption that the reply is intended as a rejection or partial acceptance of the preceding utterance. Hence it cannot be assumed that the speaker accepted the preceding utterance, and consequently the information asserted through the preceding utterance cannot cancel the relevant implicature. Finally, it could be assumed that only scales of expressions of the semantic type of the focus of the reply will be activated. Thus, the implication process would be restricted by the information structure of the reply only.²¹

In our account of the felicitous example (38), the correction is completed by an implicature which constitutes the contrast between the correction and the correctum, in order to satisfy the parallelism requirement. Without the implicature there would be no contrast. What the exact information structure of the corrections is remains to be decided. It could either be assumed that the reply uttered by B is in focus as a whole, and the implicature is part of that focus as well, or it could be assumed that the focus is just the implicature, but in that case it would not be syntactically realised.

8 Putting Forward

The aim of any sensible conversation is to establish or change the attitude of the participants towards the information which the conversation is about. Each utterance in a dialogue places certain information on the 'conversational gameboard'²², and the addressee is supposed to evaluate that information and make clear what his attitude towards it is, i.e., he must indicate whether he accepts or rejects it, or whether he 'doesn't know', or wants to know more about it before accepting or rejecting it.

Interestingly, it seems to be the case that in evaluating the information conveyed by an utterance, a participant does not just consider the propositional content of that utterance as a whole, he also decomposes it into its constituting parts (i.e. simplex propositions) and evaluates these independently from their relation to the whole. Corrections may be directed against one of these constituting parts rather than the whole of the preceding utterance. We shall say that an utterance *puts forward* its propositional content and the simplex propositions it contains for discussion or evaluation.

²¹ Compare [Kup96] who claims that comment values (the focus, in our terms) give rise to scalar inferences when functioning as satisfactory answers to questions (where questions constitute discourse topics).

²² a term common in Dialogue Game Theory, see [Car83], [Ham71], [Gin94].

In other words, the antecedent of a correction may be a proposition which is put forward by the preceding utterance. This occurs quite commonly when the preceding utterance is a conditional, as in the following two examples.²³

(41) A: *If* \ll *they find out I'm renting this place illegally* \gg ,
they will throw me out.

B: *<They're not going to find out.>*

(42) A: \ll ₁*If they find out I'm renting this place illegally,*
 \ll ₂*they will throw me out.* \gg ₁ \gg

B: *<They won't.>*

Participant A makes an assertion of the form ‘if p then q’. This puts forward: if p then q, p, and q. The correction in (41) takes ‘p’ as its antecedent: the correction means that it is not the case that the people referred to will find out that A is renting the relevant place illegally. Note that the conditional itself is not rejected by the correction. Neither is the correction interpreted in the scope of the condition. The correction in (42) is ambiguous: it can mean ‘they will not throw you out (whatever the circumstances may be)’, and it can mean ‘it is not the case that if they find out you’re renting this place illegally, they will throw you out.’ In the first case, the consequent of the conditional is put forward and serves as the correctum, in the second case the conditional as a whole is the correctum. (Actually, the two readings are hard to distinguish, because in the first case, as a consequence of the correction of ‘they will throw me out’ the whole conditional must be corrected. The conditional is not the correctum, however.)

As a further illustration, here’s a real-life example, taken from the Map Task corpus.

(43) A: *Do you have a desert?*

B: *Yes. I've got a desert ... which, if* \ll *I continue straight down past the diamond mine* \gg

A: *<No, don't go ... don't go any further than the desert >...*

don't go onto the desert. (MT,Q1EC3,33)

Participant A says ‘if I continue straight down past the diamond mine’ by which he puts forward the action ‘I continue straight down past the diamond mine’. The action is the correctum of the correction uttered by participant A; the correction forbids the action.²⁴

Next, ‘putting forward’ occurs when an utterance expresses the propositional attitude of some agent with respect to a proposition. The interpreting participant will unwrap the proposition from the attitude in whose scope it is, and evaluate it in its own right. We’ve already come across an example of this in section 3.1, where ‘I want p’ put forward the proposal p, (example (12)). Here’s another example:

²³As we said in section 2 we are not sure whether the replies in these examples should be categorised as corrections or not. They are different from the standard case because the addressee is not committed to the correctum.

²⁴In fact, in order to satisfy the parallelism constraint, it must be inferred that the action that B proposes involves going further than the desert.

- (44) A: *John believes* \ll *they are going to pull down the old POST- office* \gg .
 B: *<No, they're NOT.>*

Thus, in (44), participant A asserts 'John believes they are going to pull down the old post-office'. This puts forward the proposition 'they are going to pull down the old post-office', which is the correctum. While the proposition that is put forward is rejected, the belief report that contains it is not affected by the correction. The following real-life example illustrates the same point, and shows in addition that putting forward may join with other types of reasoning to produce the antecedent of a correction:

- (45) A: *I thought* \ll *you were going left* \gg .
 B: *<No, we're going right.>* (MT, Q1NC1,313)

A asserts 'I thought you were going left'. Since it is part of the task which the participants are executing that A follows the route which is specified by B, B assumes that A assumes that they're both going the same way, and, hence, that A's utterance puts forward the proposition 'we (A and B) are going left'. This is the correctum of the correction uttered by B. Crucially, the correction means 'We're going right, not left', and not 'Participant A thought we (A and B) were going right, not left'. The last reading would obtain if the antecedent of the correction were the whole of A's assertion.²⁵

Finally, here's a more complex example, which combines both forms that were previously discussed.

- (46) A: *I was just gonna say erm that provided, provided this is [-] working alright,* $\ll_1 \ll_2$ *you could just copy this* $_2 \gg$ *if you've got a fast copier* $_1 \gg$.
 B: *<No I, no I, well I have, but mine's mini tapes.>*
 (BNC,GYX 432 939 2 AJ0,7)

Participant A's assertion is of the form 'I was just gonna say that if p, then (r if q)', which puts forward, among others, r and q. Of these propositions, r (you could just copy this) seems to be the most salient, it is probably the point of the exchange in (46) to establish whether B can copy the relevant paper or not. We assume that B's reply must be interpreted as follows: No, I can't just copy this, although I have a fast copier. My copier requires mini tapes, and for a copier which requires mini-tapes it does not hold that if it's fast then I can just copy this. Thus, participant B first corrects r and then accepts q. This implies that he does not accept (r if q), another one of the propositions put forward through A's utterance. He explains this rejection by saying 'but mine's mini tapes', which implies that in this particular case the rule (r if q) does not hold.

Any reader who is familiar with standard theory of anaphora resolution (e.g. as it is implemented in Discourse Representation Theory, see [KR93]), will have noticed by now that the corrections discussed in this section do not behave as one would expect an anaphor to behave. Normally, an anaphor cannot pick up an antecedent whose discourse referent is in the scope of a modal or logical

²⁵Alternatively, it can be assumed that the correction is an entailment of participant B's reply, namely 'I (B) am going right'. This then acts directly on the proposition put forward by A's utterance, and the correction means 'I (B) am not going left, I'm going right'.

operator. Hence, the infelicitousness of the use of the anaphor in the second sentence in the following example is predicted. The anaphor and its antecedent are underlined.

(47) A: *John didn't give Mary a bunch of roses. # They were red roses.*

The prediction carries over to anaphora occurring in corrections, as the following example shows.

(48) A: *John didn't give Mary a bunch of roses.*
B: *No, they were sunflowers.*

However, corrections, viewed as anaphors, seem to behave differently:

(49) A: *John didn't give Mary a bunch of roses.*
B: *No, he gave her a bunch of SUNflowers.*

B's reply is a correction of the proposition which is negated, and put forward, by A's utterance. In fact, it confirms A's statement by correcting the proposition 'John gave Mary a bunch of roses', that is, B's reply can be paraphrased as "Indeed, it was not a bunch of roses John gave to Mary, it was a bunch of sunflowers". Taking example (49) at face value, this means that the antecedent of the correction is a proposition which is in the scope of a negation, something which is out of the question with normal anaphors, i.e. personal pronouns.

One might counter this by pointing out that participant B assumes that it is a mutual belief that it was in fact the case that John gave Mary a bunch of flowers (although he did not give her a bunch of roses) and that this proposition, which is outside the scope of a negation, is the antecedent of B's reply. Furthermore that reply is to be characterised as a specification rather than a correction. It is certainly the case that we accommodate that John gave Mary a bunch of flowers during the interpretation process. This can also be viewed, however, as a result of the interpretation of B's reply as a correction of the embedded proposition: if it were not for the parallelism which is established between the correction and 'John gave Mary a bunch of roses', how would we know what information to accommodate?

If we adopt the original idea, namely that corrections are anaphors that are not sensitive to scoping domains that normally function as barriers to anaphora resolution, it must be explained why corrections are different from other anaphors. There are several directions in which we can search for an explanation. First, it could be assumed that this particular characteristic is due to parallelism, i.e., that parallelism is a discourse relation which can reach into domains that are not normally accessible to anaphora. Second, it could be assumed that corrections are different because they pick up propositions rather than individuals as antecedent, and that propositional anaphora do not obey the same rules as anaphora that refer to individuals.

Third, it could be assumed that their behaviour is a typical effect of the non-monotone character of corrections. Normal anaphora pick up an antecedent and preserve the information we have about it. Corrections, however, pick up an antecedent and change the information we have about it. In particular, they can pick up something which is rejected (and, consequently, in the scope of a negation) and change it into something which is accepted, and the other way

around. The standard notion of accessibility, as it is defined in D.R.T. or File Change Semantics, only takes into consideration monotone anaphora, that do not allow for a swap between accepted and rejected information. Corrections, being nonmonotone anaphora, require a different notion of accessibility.

In this report we do not have the space to work out these three arguments and the relations that possibly exist between them. However, especially the last argument we find intuitively plausible, and in what follows we will assume that corrections obey to different rules of accessibility due to their nonmonotone character.

9 Presuppositions

A lot of corrections occurring in dialogues are corrections that cancel a presupposition of the preceding utterance, thereby rejecting that utterance as meaningless, inapplicable, not making sense, irrelevant or inappropriate in the given context. We will assume that the correctum of these corrections is the presupposition. The utterance that triggered the presupposition may be rejected as well as the presupposition, as a secondary update effect of the correction. A typical example occurs in the following exchange.

- (50) A: *That's ... that's correct, uh-huh. And go below the diamond mine*
 B: *Mmhmm*
 A: *And below the graveyard <<pres>>...
 below the graveyard but above the carved wooden pole.*
 B: *Oh hang on. <I don't have a graveyard.>* (MT,Q1EC3,5)

Participant A presupposes that there is a graveyard present on B's map. A's second utterance in (50) triggers this presupposition through the definite description 'the graveyard'. For A's utterance to be meaningful, there must be an object to which the definite description refers. Unfortunately, the presupposition is not satisfied according to participant B, and B corrects it by saying 'I don't have a graveyard'. Further, since B does not have a graveyard, he cannot go below it. Thus, in B's view, A's utterance is does not make sense in the given context because the action he proposes cannot be executed.

Typically, corrections that correct a presupposition of the preceding discourse are not marked by the speech act marker 'no'. As the following example shows, it is awkward to say 'no' to a presupposition:

- (51) A: *That's ... that's correct, uh-huh. And go below the diamond mine*
 B: *Mmhmm*
 A: *And below the graveyard ...<<pres>>
 below the graveyard but above the carved wooden pole.*
 ?? B: *<No, I don't have a graveyard.>*

The use of the speech act marker 'no' seems to be restricted to the rejection of information that was previously asserted, implicated or put forward, i.e., information that the speaker intended to communicate as new information to the addressee.

Presuppositions are, like implicatures, not entailments of utterances, but rather pragmatic inferences. Other than logical entailments, presuppositions are normally *preserved* when the sentence that triggers them is negated, or expresses a modal context. Hence, they can be corrected felicitously:

- (52) A: *Don't go below the graveyard.* <<pres>>
 B: <*I don't have a graveyard.*>
- (53) A: *You ought to have gone below the graveyard.* <<pres>>
 B: <*I don't have a graveyard.*>

There are many more embedding contexts that allow for the preservation of presuppositions but not for the preservation of entailments, for example embedding in the antecedens of a conditional, embedding under disjunction, embedding as the complement of a factive verb. See [Lev83] for an overview. Two other important characterising features of presuppositions are that they are *defeasible* in certain contexts, and that they are tied to particular expressions in the utterances that produce them, so-called *presupposition triggers*. The last property serves to distinguish presuppositions from implicatures.

In many cases, it is not at all unreasonable to think of an implicature of an utterance as a precondition, or as information which the speaker is 'presupposing' when he makes his utterance. For instance, in the following example, one might say that A's question presupposes that it is his intention to go to the farmland:

- (54) A: *But how am I going to get to the farmland or any- or anything else?*
 <<impl>>
 B: <*You don't want to go to the farmland.*>
I just asked you if I had ... if you had farmland.
(MT,Q1NC1,283)

However, this pragmatic inference is inferred on the basis of the maxim of Relevance,²⁶ rather than on the basis of a particular expression in A's utterance. Therefore, we consider it to be an implicature. To further illustrate this point, consider the following dialogue.

- (55) A: *Right, well you're going downwards, and but you're going to the left of the Apache camp. So you're going vertically downwards and then your line's sort of going left.*
 B: *Right.*
 A: *And have you got a carved wooden pole? No?*
 B: *No. I don't.*
 A: *That's just ... that's in the cen- in the centre of the page,*

²⁶Assuming that B's question is relevant in the given conversation, B must have a reason for asking it that fits into the general goal of the task that the participants are executing. The reason for asking how to get to the farmland is likely to be that A believes the route is going to the farmland, that, consequently, he adopted the intention to go there, and that he can only go there if he knows how to get there.

just above the Apache camp though,

B: *Right, okay.*

A: *So, you have to avoid that, so ... you're going down sort of <<impl>>*

B: *<H- hold on, I'm I'm kinda above the Apache camp at the moment,>*
(MT, Q1NC5,47)

As before, one might say that A's last utterance shows that A 'presupposes' that B has already passed the Apache camp, and that B corrects this presupposition in the last utterance of the dialogue. Again, however, the inference follows from general principles of conversation²⁷ rather than from a specific expression occurring in B's utterance. Thus, we categorise A's inference that B believes that A already passed the Apache camp as an implicature rather than a presupposition.

In all of the following cases, however, the pragmatic inference can be assumed to be triggered by a specific expression occurring in the utterance and we categorise it as a presupposition.

(56) A: *We regret very much that Ella failed the exam. <<pres>>*

B: *<But she passed!>*

The factive verb 'regret' is a well-known presupposition trigger; it presupposes the truth of its complement. Thus, participant A's utterance in (56) triggers the presupposition that Ella failed the exam, and that is the antecedent of the correction. Rejecting the presupposition of the preceding utterance, participant B further conveys that the regret expressed in it does not make any sense.

(57) A: *Who's been using this Macintosh? <<pres>>*

B: *<NObody has.>*

It is a wide-spread assumption—though not shared by everyone—that wh-questions trigger the presupposition obtained by replacing the wh-word by the appropriate existentially quantified variable. Thus, the question uttered by participant A triggers the presupposition 'someone has been using this Macintosh'. We believe the presupposition is strengthened by the past tense and the progressive form of the verbal complex. Correcting the presupposition of A's question, B discards that question as being not to the point, or inappropriate.

(58) A: *What are the profit margins as a percentage of sales for each installation? <<pres>>*

B: *<Margins don't depend on sales.> They are calculated as the difference between unit product cost and list price. ([WM83])*

Finally, in (58) it is the expression 'the profit margins as a percentage of sales' that triggers the presupposition that the profit margins can be computed on the basis of sales. Participant B corrects this presupposition, thereby indicating that the question is not sensible. We have only given a few examples here, for

²⁷We assume that A has the intention to be cooperative. This implies that he assumes that B can execute the directions he is giving. Having passed the Apache camp on the map is a precondition for this.

an extended list of presupposition triggers plus references to the literature that discusses them we refer to [Lev83], chapter Four.

Another characterising feature of presuppositions that was mentioned above is that they are *defeasible*, or cancellable, in contexts in which entailments are not. The context may be the set of mutual beliefs of the participants, the textual context, or the sentential context. The problem of giving a theory that predicts correctly which presuppositions of component clauses are inherited by the complex whole of a sentence (and which are not) is called the *projection problem*. Presuppositions that do not project to the top level, that is, that are not accepted as true in conjunction with the whole sentence, are said to be cancelled or defeated. Typically, a presupposition that is projected to top level can be corrected felicitously by the next speaker, but one that was cancelled along the way cannot. To illustrate, consider the following pair of examples.

- (59) A: *Sue went to Nepal for five months, before she finished her thesis.*
 <<pres>>
 B: <*She DIDn't finish her thesis.*>

The expression ‘before’ in the first utterance in (59) triggers the presupposition that Sue finished her thesis. The presupposition projects to top level and is felicitously corrected by participant B.

- (60) A: *Sue died before she finished her thesis.*
 # B: <*She DIDn't finish her thesis.*>

In contrast, in (60), the presupposition is not projected to top level, because we know that dead people do not normally write, or do anything else that may lead to the finishing of a thesis. Sue cannot have finished her thesis. There is no suitable antecedent available for the correction, and it cannot be accommodated either. Consequently, the correction is infelicitous. To further illustrate, here is a nonconstructed example, in which a presupposition is projected to top level out of a modal context and a disjunction:

- (61) A: “*You’re a ROTten driver*”, I protested.
 “*Either you ought to be more CAREful,*
 or you oughtn’t to drive at ALL.” <<pres>>
 B: <“*I AM careful.*”> (from: “*The Great Gatsby*”, accentuation ours)

The clause ‘you ought to be more careful’ presupposes ‘you are not careful’, and participant A believes this in conjunction with ‘either you ought to be more careful, or you oughtn’t to drive at all’. Hence, the presupposition can serve as the antecedent of a correction. What about a similar example in which the presupposition does not project to top level? Consider

- (62) A: “*This is dangerous!*”
 “*Either you ought to be more CAREful,*
 or there is something wrong with this CAR.”
 ? B: <“*I AM careful.*”>

In the case of (62), the presupposition is not projected to top level. Participant A assumes that the danger arises either because B is to blame (she is not careful) or for some other reason (she is careful, but there is something wrong with the car). Though he considers the possibility that B is not careful, he is not committed to the truth of that proposition.

What we expect is that the presupposition cannot be corrected felicitously. Surprisingly, the correction in (62) is more or less felicitous. This can be explained by pointing at the preceding section, in which we introduced the notion of ‘putting forward’ of component propositions. It can be assumed that in (62) A’s utterance puts forward for discussion ‘you ought to be more careful’, which presupposes ‘you are not careful’. Apparently, this makes the presupposition available as an antecedent for the correction as well. What explains the difference between this case, and (60), in which the presupposition is not available as an antecedent for the correction, however, is a matter for further investigation.

In sum, antecedents of corrections are regularly presuppositions triggered by the preceding discourse. Corrections of presuppositions have the effect of making the triggering utterance not sensible or inappropriate in the given context. Furthermore, they cannot occur with the speech act marker ‘no’. Anyone who wants to develop a theory of how antecedents of corrections are inferred during the interpretation process will have to adopt a theory of presupposing. The theory must both specify what linguistic expressions normally trigger what type of presuppositions, and handle the projection problem. That is, it should be able to predict what embedding context preserve, and what cancel, the presuppositions of a simplex proposition. Moreover, in developing a general theory of correction resolution, the interaction between presupposition projection and other forms of inference, such as putting forward, must be taken into account.

To end this section on the role of presupposing in the resolution of corrections, note that sometimes presuppositions may be cancelled as a side-effect of the interpretation of the correction. Consider the following example.

- (63) A: *<<The king of France is BALD.>>*
B: *<No, the PRESident of France is bald.>*

The assertion of participant B presupposes that there is a king of France. B’s utterance is a correction of the propositional content of A’s assertion, it means ‘the person who is bald is not the king of France, it is the president of France.’ If we know that ‘president’ is a term that is normally used to refer to the head of a republic, that a republic is not a monarchy, and that a king is the head of a monarchy, we can deduce from the correction that there is no king of France. Hence it is not just the propositional content of A’s assertion that is rejected, but also its presupposition. Clearly, this effect depends on the presence or absence of the relevant mutual background beliefs of the participants. If we don’t know anything about kings, presidents, republics and monarchies, the presupposition would be preserved.

10 Monitoring of the Interpretation Process

The type of corrections that featured in the preceding sections were all rooted in a disagreement between the participants about ‘what is the case’: the corrector’s

beliefs clashed with what the addressee previously claimed, and the corrector felt justified in correcting the addressee's claim. In this section we turn to corrections that are aimed at preventing or repairing (potential) miscommunications. These corrections are repairs of failing reference, or serve to disambiguate an expression previously uttered.

Borrowing a term from [Lev89], we shall call the type of reasoning necessary to make this kind of corrections *monitoring*. We assume that the participants in a conversation monitor the communication process permanently, in order to check whether utterances are articulated in the manner intended by the speaker, and whether they are understood by the addressee as they were intended to be. We will focus here on monitoring of the interpretation process; for monitoring of the articulation process we refer the reader to the literature on self-corrections, slips of the tongue, etc.²⁸.

In monitoring the interpretation process, each participant keeps track of, first, what has been said, second, the relevant contextual information for the interpretation of what has been said, third, the reference or meaning of what has been said as it was intended by the speaker, and fourth, the reference or meaning of what has been said as it was understood by the addressee. The intended- and the understood meaning or reference of an uttered expression ought to be identical. If they are not, a communication failure has taken place. Since it is of the greatest importance to prevent or repair miscommunications, participants will do something about it as soon as they have reason to believe that the intended- and the understood meaning or reference of an expression are possibly not identical.

A communication failure may have been caused by a misperception (by either of the participants) of what has been said, of what the relevant contextual information is, or of what reference or meaning follows from the utterance in the given context. Depending on his diagnosis of the problem, a participant will formulate a suitable correction, or utter a request for clarification. In all cases, however, the understood meaning or reference is erroneous information, because it does not represent what the speaker meant to convey. Whether the communication failure was caused by some misperception on the speaker's or on the hearer's part does not matter: the erroneous understood meaning or reference must be rejected and replaced by the intended one. We shall assume that, correspondingly, the correctum of a correction in the case of miscommunications is the erroneous understood meaning or reference of an expression.

Before turning to some examples, we still want to point out that many corrections in this category are specificational corrections, i.e., they reject a previous claim because it is not informative enough rather than because it is incorrect. The lack of information results in ambiguity, vagueness or reference failure, and the correction repairs this by giving additional information. Let us now go through some examples.

- (64) A: *I've done the A.I. and the psychology part
now I'm doing the linguistic side of it*
B: *«Which is the hardest?»*
A: *No it's not actually...no it's*

²⁸See e.g. [Lev89], [Fin96].

B: /*laugh*/
 <*I meant a question*
WHICH is the hardest?>
 A: /*laugh*/
There you are... a misunderstanding
 B: *Mmm*
 A: *The A.I. was the hardest.* (*Humphrey-Jones, in CFDAD 1987*)

In (64), participant B intends to convey a question: which of the sides of the problem under discussion was the hardest, the A.I., the psychology or the linguistic side? He is not aware of the fact that his utterance is actually ambiguous between the intended interrogative meaning and an indicative meaning, being ‘the linguistic side is the hardest’. Participant A’s reply, however, makes him aware of this, and he utters a correction of his previous utterance that disambiguates it. The correction is complex: first it refers to the problematic utterance itself by ‘I meant a question’, then it rephrases the utterance in such a way that it is no longer ambiguous.²⁹

The correctum can be assumed to be the meaning of the culprit utterance as it was understood by B. A corrects it by specifying the meaning he had intended the utterance to have. Since intended- and understood meaning must be the same, this should have been the understood meaning as well.³⁰ The antecedent is produced on the basis of B’s monitoring of his own utterance and the way in which it was understood by A.

B’s utterance in (64) is a clear case of ambiguity. A chose one of the readings and the correction replaces that reading by the intended one. Instead of ambiguous, an utterance, or a sequence of utterances may be simply unclear, that is, it can occur that the addressee cannot construct the intended meaning with sufficient certainty. In such cases, the correction is specificational. This is the case in the following example.

(65) A: <<*When you go right from the old mill, go right and just where, eh, that ... you start ... you come to the beginning of that drawing on the right. Go straight up round the abandoned cottage.*>>
 B: <*You’re saying you go from the the old mill to the fenced meadow?*>
 A: *No. You go* (*MT,Q1NC1,107*)

Clearly, A’s description of the route in (65) is vague or indefinite. Though the starting point of the route is clear, it is not clear to participant B where he is to go (let alone how to get there). He proposes a correction that pins down the place where the route should go. As in the previous example, the correction first picks up the problematic sequence of utterances (you’re saying ...) and then rephrases it (you go from the old mill to the fenced meadow). The correctum can

²⁹This is done by stressing, and hence, focussing, of the question word ‘which’. This makes the predicate of the question into given information: the speaker presupposes that one of the sides mentioned is the hardest. The focus represents the new information B is requiring after: which of the sides is the hardest?

³⁰Alternatively, it could be assumed that the antecedent of the correction is the ambiguous semantic content of B’s original utterance, since B recognises that this is the actual meaning of the utterance in the given context.

be assumed to be the range of possible meanings of A's sequence of utterances as B understands them. The correction reduces the range to one element.

It happens very often that an expression is vague, unspecific, or not informative enough for the purpose of the conversation at the given point. Usually, the addressee will then conclude that what the speaker intended to convey was in fact definite, less vague, or more informative than what the addressee understood from the expression he used, and utter a (proposal for) a correction or a request for clarification.

In the following example, the expression 'go past a pine on your left' is not sufficiently informative for the task the participants are executing, because it does not specify on which side the pine is to be passed, and according to the addressee, this has not been established yet in the preceding discourse. On the other hand, the speaker must have intended to refer to a certain side of the pine, because otherwise his instruction to B would not have been executable.

- (66) A: *then back up again and <<you ... go past ... um ... a pine on your right.>>*
B: *<Down below that?>*
A: *Up above it* (MT,Q1EC4,15)

Consequently, participant B proposes a correction that specifies the side on which the pine is to be passed. The antecedent of the correction can be assumed to be the underspecified passing, referred to in the preceding utterance. Participant B makes the wrong guess, and is then, in turn, corrected by A.

Similarly, in the following example, the description 'the chimney', used by participant A, is not specific enough for participant B to determine its reference:

- (67) A: *Uh-huh, the right-hand side. Go down, right.*
<<See where they've they've got the chimney, right?>>
B: *Chimney, no. I don't have a chimney.*
A: *<No, see where the chimney is on the abandoned cottage?>*
B: *Oh, yes. [laugh]* (MT,Q1NC7,84)

The description 'the chimney' makes participant B look for an item which is a chimney on his map. He does not realise that the chimney is only a part of an item on the map. Probably, B's reply (I don't have a chimney) makes participant A realise that this is so. In any case, A corrects his previous utterance by offering one which contains a more informative description of the object he intends to refer to. Now, what is the antecedent of the correction in this case? Again, we assume that the antecedent of the correction is the understood meaning of A's question, including the failing reference of the expression 'the chimney'.

Note that a reference failure may consist in conveyance of the wrong reference, rather than no reference:

- (68) A: *Uh-huh, and <<the flat rocks are in the middle of the page.>>*
B: *No, they're more like to the right-hand side.*
A: *<Ah, halfway up, I mean.>* (MT,Q1NC3,211)

To participant A 'in the middle of the page' refers to the centre of the page, both viewed from left to right and from top to bottom. Participant B only meant

to refer to the middle of the page, viewed from top to bottom. The correction (halfway up) unambiguously conveys this.

Finally, note that, as with nonspecificational corrections, the resolution of the correction to the correctum may involve the inference of additional information in order to establish parallelism. In the following example the relevant extra information must be deduced on the basis of general background knowledge.

- (69) A: *«I've now got three lines on my page » but I know the one that ...*
B: *Well, it's meant to be a sort*
A: *that will ... that would just*
B: *of continuous curve is it not?*
A: *<No but I mean ... that's, that's like ... this is the third attempt*
sort of thing.> *(MT,Q1NC1,147)*

Participant A means to convey that he has three alternative lines on his map, all candidates for one and the same part of the route. What B understands, however, is that A has three lines on his map covering consecutive parts of the route. A's utterance conveys this to B. Then B realises that his utterance was not sufficiently informative and utters a correction that contains additional information, namely that the three lines on his map are 'the third attempt sort of thing'.

On the basis of our specific knowledge about the task which the participants are executing we deduce that the lines on A's map are the result of A's attempts to execute the instructions given by B. Further, we know that when people speak of a 'third attempt', this normally means the third attempt at doing one and the same thing. Supposing that each of the three lines is the result of one of the three attempts at drawing a particular part of the route, they cannot be three consecutive lines describing different parts of the route. Thus, B's interpretation of A's utterance is excluded, and it must be assumed that A means 'three alternative lines' when he says 'that's like this is the third attempt sort of thing'. The correction is produced on the basis of general and specific background knowledge and with the help of customary forms of inference.

To conclude, in this section we considered corrections that serve to prevent or repair a miscommunication. These corrections occur when one of the participants has detected a divergence between the meaning or reference of an utterance as it was intended by the speaker, and as it was understood by the addressee. The correction replaces the erroneous understood meaning or reference by the proper one, which is identical to the intended one. The antecedent of the correction is produced through monitoring of the interpretation process, which consists in reasoning about the actual discourse situation (who said what, what happened when), and epistemic reasoning (who believes what as a consequence of which utterance, and on the basis of what background beliefs did he come to believe it). Corrections of this kind are often specificational.

11 Summary and Future Research

In this report, starting from the idea that corrections can be viewed as anaphors, which refer to certain contextual information and effect a change in it, we investigated what sort of reasoning plays a role in producing the antecedent of a

correction. Presumably, our findings can be generalised to the inference process that helps to produce the correction itself whenever it is not stated explicitly.

To begin, we introduced three types of inference that are relevant: entailment, default inference and accommodation. Then we proceeded to list different sorts of inference according to the sort of information the inference process can be applied to. We distinguished inferencing on the basis the features of- and relations between concepts, on the basis of world knowledge, on the basis of the beliefs, goals, and intentions of the participants, implicating, putting forward, presupposing, and monitoring of the interpretation process. All of these were exemplified by both constructed, and real-life data taken from the Map Task corpus or the BNC.

Clearly, the sorts of inference that were listed here all help to infer the correctum, in case it was not explicitly asserted in the discourse preceding the correction. However, what has been the reason for distinguishing exactly those, and not any other kinds of inference? It must be admitted that we have no underlying criterium that defines these types of inference as all, and the only relevant ones there are. We simply looked at the data and distinguished the types of inference that appeared to us to be occurring regularly, and to be of sufficient generality to cover a particular field of research in linguistics. More types could be added, if need be.

It is not generally the case that each type of inference characterises a specific type of correction, which can be distinguished from other types of corrections on the basis of its linguistic features. As we have argued elsewhere, the main linguistic characteristic of corrections is that they trigger parallelism by their information structure. Parallelism constrains the relation between the correction and its antecedent. This characteristic is shared by all corrections.

In our review, we came across one case, namely corrections of presuppositions, in which we proposed a test that distinguished between these, and other types of corrections: corrections of presuppositions cannot be preceded by the speech act marker ‘No’. Especially for practical applications, e.g. automated information retrieval systems or automated translation systems, it will be worthwhile to find out how reliable this test is,³¹ and to investigate in general which speech act marker can be used for what purpose.³²

Furthermore, it may be useful to investigate whether there is a relation between specific types of focusing and specific types of corrections³³, or whether deletion (as opposed to VP-ellipsis and deaccentuation) is used more often with certain types of corrections (e.g. monitoring cases) than with others. Thus, the categorisation of corrections provided in this report helps to direct further research into the semantics or pragmatics of speech act markers, the interpretation of information structure, and the way they interact in determining the relation between correction and antecedent.

In previous papers, the relation of parallelism existing between corrections

³¹Are there other cases in which the speech act marker ‘No’ cannot be used, what about implicatures, antecedents that cover a sequence of utterances rather than only one, or antecedents that link up to some discourse topic that is no longer active or ‘open’ at the time of utterance of the correction? And what is the effect of varying the prosodic features (type of accentuation, length of pause succeeding it) of the speech act marker?

³²[Lev89] provides a categorisation of several speech act markers and distinguishes between the ones that mark error repairs, and the ones that mark appropriateness repairs.

³³For example, corrections of presuppositions seem to make use very often of polarity focus/verum focus. See [Höh92], [KL93].

and their antecedents was modeled through higher order unification (HOU) and two variants of HOU, namely HOU combined with logical equivalence ([GKL96]) and HOU combined with logical entailment ([Gar97]). We will abbreviate the last variant as HOUE. Both extensions of the HOU formalism are proposed and discussed in [Koh95]. If it is supposed that HOUE properly models the relation between correction and antecedent, we have a theory that predicts that a correction will be satisfied (i.e., an antecedent is present) in any context which entails information that unifies with the information which is given according to the information structure of the correction.

An interesting future line of investigation will be to check in howfar the HOUE theory fits the linguistic facts as they were presented in this report. It is obvious, without much consideration, that it is not a perfect fit: HOUE does not implement default inference or accommodation, nor does it incorporate theories of implicature, presupposition, or putting forward. The exercise will, however, increase our understanding of the linguistic data, and sharpen our view of what a formal theory of parallelism must account for.

Finally, the report, and especially the discussion in section 8 on putting forward, helps to evaluate our basic assumption that corrections can be viewed as anaphors. We have seen that they behave rather differently than ‘normal’ anaphors, in that embedded information domains that are not normally accessible for reference to anaphors, are accessible to corrections. We concluded that this is possible because corrections are non-monotone anaphors. Having introduced the term, we have made ourselves responsible for giving an account of the properties of this type of anaphor. What are the differences and correspondences between monotone and non-monotone anaphora? How does non-monotone anaphoric reference relate to parallelism, can we motivate the distinction between the two? All this awaits further research.

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