ANTICIPATION AND VIOLIN STRINGS

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Keywords: expectations, intersubjectivity, conversation analysis, cognitive science, affordances, anticipation, opportunism, initiative, power, linguistic labelling, expert–novice, recipient design, constructive interaction

Abstract: The overall framework of this article concerns the social stabilization of linguistic meaning in the no-man's land between pragmatics and semantics. I show how some fundamental dimensions – power, initiative, anticipation, all related to expectations – contribute to this stabilization. The result of this empirical investigation of an easy expert–novice instruction task – how to change violin strings – is a typology of instruction strategies. The analysis of these strategies is based on expectations. The strategies fall into three different analytic domains: recipient design, anticipation and labelling. The main contrast found is between on one hand opportunism – minimal knowledge, only for the current purposes –, and on the other hand anticipation – the use of present knowledge for future purposes.

1. INTRODUCTION

Picture yourself in a boat on a river, or on an unknown road on a misty night. As long as the road is straight, you can just continue, but when you come to a crossing road or a fork, you'll need some advice. Fortunately, you have an expert to guide you. She knows the road by having walked it many times, but now she is only there on your cellular phone.

If, however, it is the case that she does not know the road that well she will need *your* eyes – *you* will have to tell her what you see, and she is dependent on you for the success of the task. If, on the other hand, she knows the way very well, she will only need to give you very detailed descriptions, and if you follow them, your guide will not have to get so many cues from what you see and will be less dependent on your incomplete knowledge.

On the other hand, if she does not know *you* very well, the *intersubjectivity* that will give stability to your linguistic interchange will not work very well, as it depends in part on our modelling of each other's knowledge. If we compare different guides, they will use different strategies, depending on knowledge and communication style.

I have studied a setting that is metaphorically similar to this in many respects – an expert instructing a novice how to change a string on a violin. For the unacquainted novice, the task itself can be seen as a road where some sections of the task are obvious, corresponding to going along a straight road, and other moments resemble road forks, where the novice will need advice from the expert on how to continue.

Another aspect of this metaphor concerns what the participants *see*. In my made up example above, the guide will use her inner sight to guide you right, and her view will extend far beyond what *you* see in front of you. Similarly, the expert violinist will see totally different things in her head from what the novice sees with the violin in front of him.

The experts will use different strategies to instruct the novices, strategies that I will attribute to a few analysis dimensions concerning *expectations*, *power*, *initiative* and *labelling*.

In a larger context, this is connected to a general study of *linguistic intersubjectivity*: what characteristics are necessary to have an intersubjectively stabilized linguistic meaning? In earlier work I have studied expectations in different domains of cognitive science (Winter, 1994) and power and expectations in the coding of modal verbs. (Winter and Gärdenfors, 1995) These factors are of course not alone sufficient, but are significantly less studied than other important variables, like conceptual and lexical structure. The goal is to construct a launching pad for a voyage into a constructivist semantic space.

One of the expectation phenomena that is in focus in this work is *anticipation* – I anticipate when I bother *now* with something that I will use *later*, for example when I buy food now to eat tonight.[1] This aspect of cognition has been studied in planning research, for example Gulz (1991), but while she is more interested in the cognitive *ability* to anticipate, I will focus on different *strategies* used by the participants in instructional interactions. As humans, we have the ability to anticipate, but we do not always use it when it is possible.

Another phenomenon is what is sometimes called 'recipient design' – our modeling of the other participants in our interactions. This modeling builds upon unsure information, but has certain cognitive economic advantages. A general formulation of the advantages of expectations could be: if we, from a limited set of cues, can draw conclusions about other parameters with a certain degree of accuracy, we only have to check these cues to gain knowledge of the rest.

The model of the pragmatic instruction strategies that I am outlining in this paper applies to our construction of the future – anticipation, as well as to the construction of the mental model of the individuals with whom we interact – recipient design.

1.1. Strategies and dimensions

The analytic space that I have concentrated on consists mainly of three dimensions and three application areas. The deeper significance of the dimensions (time, recipient design and knowledge type) will be discussed in the Conclusions section in relation to my analysis. Here, I will content myself with an overview of the strategies emerging in the three application domains, all related to expectations.

In figure 1 I have summarized my model. The overall purpose of the paper is to provide an empirical verification of this model.

1. My first aim is to model *recipient design* from the point of view of *initiative* and *power relations*. As earlier work has shown, expectations and power relations are closely linked together: The 'obedient' in the interaction is supposed to check the expectations of the 'one in power,' i.e., the power governs the point of view. See Winter and Gärdenfors (1995) and Andersson (1994).

The initiative structure in the figure below will reveal strategies used by the experts – the first dichotomy in the first part of the figure will reflect a possible choice between *knowledge of the task* and *knowledge of the other subject*. If the expert's strategy is to use her knowledge of the task, the second dichotomy will not be applicable. If the task knowledge is *not* used, the strategy choice is between an elaborated recipient design, and a superficial one.

Much of the work of the participants is to *coordinate* their representations and reference bases. In the current experiments I have enhanced this part of the linguistic interaction by placing a screen between the subjects to prevent coordination by gesture and gaze.

2. My second aim has been to study expectation strategies that represent a choice between concentration on *anticipation* – building a knowledge basis for *future* use–, and *opportunism* – the conviction that I can concentrate now on what I want to do now, and that all future problems will be solved when the time comes with the information available at that moment.

3. The third step is an investigation into the interface between pragmatics and semantics – *linguistic labelling*. The domain I have chosen to study – violins – has a distinct vocabulary comprising some parts of the violin and some other terms, like bridge, nut, scroll (see figure 3). These labels were of course known to all the experts in the tasks, and the experts use certain strategies to figure out what labels they may use.

In a larger context, this will have a bearing on the problem of intersubjectively stabilized linguistic *meaning*. In short, as the 'meaning' in your mind is unknown to me, I can use a linguistic label, the use of which will be easier to agree upon than it is to check whether our mental models are similar. This must be considered one of the major features of linguistic labels – to even out the differences between the mental models of the participants in the linguistic interaction *in the very moment of the interaction.* By using the same label, the language users *signal* that they mean the same thing, even if they have very limited possibilities to *check* that their conceptual models are 'similar' at all. And the 'same thing' that they are referring to is not to be understood as a real object, but rather as 'I agree to the terms in this contract, whatever they are.'

Here too we have two levels of strategies, largely corresponding to the recipient design strategies above. *Either* the expert concentrates only on the task at hand, and in that case it is seldom worth the trouble to introduce labels that are new to the subject, *or* she anticipates a future use, and as a specialized vocabulary will be more information efficient in the long run, she tries to introduce some parts of the violin vocabulary.

In introducing new labels, there are two strategies available. The rough way is to use the labels one is accustomed to irrespective of the knowledge one has of the other's linguistic level. The other way is to use different cues to gain knowledge of the other subject to be used when choosing level of labelling.

[1] I use the term 'anticipation' to denote an expectation in time, and the term 'expectation' as the general term.

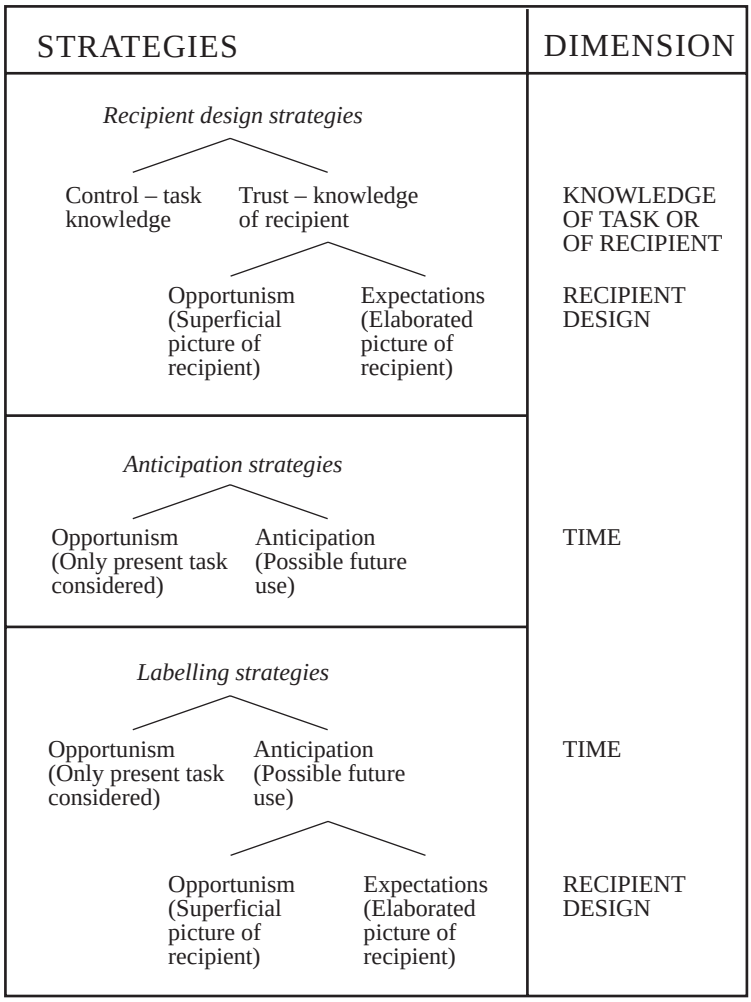

Figure 1. Expectation strategies and dimensions.

The aim of the paper is to suggest a possible typology of strategies. This typology will be a tool in the future analysis of intersubjective meaning in language. A claim that I make is that the strategies I have found are not limited to the task of changing violin strings, but applicable to any task with a similar structure, like assembling a computer, performing a complex operation in a computer application, or following a road.

1.2. Why do I let people change violin strings?

In this paper I use data from a series of conversation experiments that I have conducted with 'experts' acquainted with violins and violin playing, and 'novices' who have no such knowledge, paired together, with a screen between them so that they could easily talk but not see each other. The task for the expert was to tell the novice how to change the E string and tune the violin.

In doing this, my subjects produced a manageable quantity of linguistic data that I recorded and transcribed, for the purpose of doing an analysis on a conceptual and information dynamic level. I have adjusted the level of transcription to the level of analysis, which is rather coarse compared to most linguistic work, but the more coarse the transcription is, the more transparent it will hopefully seem to the reader. Furthermore I have supplied analytic tags to the utterances. (See section 5.)

I had several reasons for choosing this task. First, the task of changing a violin string is connected with some physical constraints that impose an objective order on the experiment. For example, the old string must be removed before substituting with the new string. This constrains the task and facilitates the formation of anticipations for the expert. A concrete task will also focus the problems of *reference* to the violin.

Second, handling a violin is difficult and risky for the novice. This will prevent the novice from proceeding too far ahead of the expert's instructions. As the process starts with removing the old string, and the replacement in many respects is the mirror of the

removing, this is an obvious risk: there is a lot of information available in the context. And of course – many unexperienced people would actually just change the string reasonably well if it were necessary and if no one were there to give instructions. And, in one sense, the mere presence of the the expert is an indicator for the novice that the expert is needed. 'The expert presupposes its own relevance,' to paraphrase Sperber and Wilson (1986).

Third, to be able to comment on the use of linguistic labels, it is necessary to have a task with a specialized vocabulary. The conventionalized labels will constitute a standard of labeling and accentuate the power relations discussed in section 6.

Fourth, unlike many linguistic and psychological experiment settings, I consider my setting rather realistic or 'ecological.' It is easy to imagine a violin novice getting telephone instructions of how to change a string for the first time when he[2] is at home practicing and the string breaks or is damaged.

Furthermore there are some non-scientific advantages of the setting that I appreciate. It is a low-cost experiment leaving the subjects with a rather high degree of satisfaction.

1.3. Overview of the paper

First (in Sections 2 and 3) I contrast the quasi-rational 'objective' way of performing my string-changing task with the subjective agent-oriented way.

This is necessary in order to be able to analyze the relevance of the linguistic output. For example, to be able to detect an anticipation, we must have a model of the 'normal course of events.' This consists of, on the one hand, objective, physical characteristics, such as the necessity of removing the old string before replacing with the new one, and on the other hand the subjects' mental representations of the task.

This description is 'presupposed' in many linguistic–pragmatic studies. I have however chosen to focus on it rather than presuppose it. One reason for this is that the contrast between the subjective and the objective view will be ignored as long as we think of ourselves as rational beings. But as we have reason to believe that we are not always rational, the objective representation alone will not do any more.

Section 4 is dedicated to the experiment, including the experiment setting, transcription and data conventions. Section 5, categories of the analysis, contains an overview of the tags used and samples of data for each category.

The results are discussed in section 6 through 8. These sections correspond to the three levels of analysis above: power and initiative, anticipation and linguistic labelling.

In the conclusions section I return to the theoretical issues discussed in the Introduction in the light of my analysis.

2. THE OBJECTIVE WAY OF CHANGING STRINGS

My task, and any task performed by humans for that part, can be regarded from different perspectives. One way is to look at it from the point of view of a specific person – the subjective way. The other one, that I call the objective way, can be represented by the hierarchical task analysis in figure 2. It corresponds to the point of view of an all-knowing bystander, a third person perspective.

If the subjective perspective corresponds to what I presented above as an unknown road a misty night, the objective perspective is rather like a road map with the dangerous crossings marked as nodes in the hierarchy. Here it is mainly used for the benefit of the reader and to get a clear contrast with the subjective perspective.

The vocabulary in figure 3 is 'objective' in the same way. The fact that the label 'bridge' refers to the bridge of the violin is an objective and correct fact. It is also a fact that a violin novice when told that the bridge is the 'bridge' will know more than the moment before, but from this 'objective' third-person perspective we are not able to say anything about *what* he knows. To do this we must consider the task from a subjective point of view.

Since there is a big difference in the knowledge of the expert and the novice in my task, there will also be a big difference in what they will perceive with the violin in front of them. Determining the subjective perspective equals determining what the subject *sees*.[3]

[2]To facilitate pronominal reference, experts are always female and novices male in the text (but not in the experiments).

[3]This visual conception of the two perspectives is of course metaphorical to a large extent. To get a flavor of the difference in vision of differently skilled people in front of the same stimulus, consider for example the case of a radiologist in front of an X-ray with a fracture, often not visible to the untrained eye.

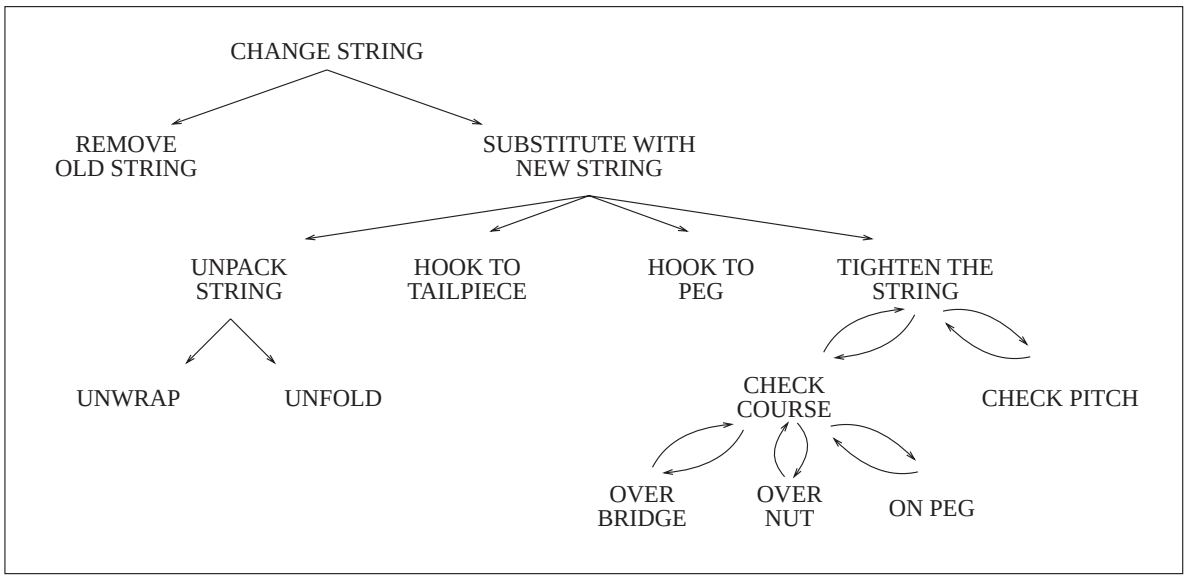

Figure 2. Hierarchical task analysis (HTA) of violin string change. Cf. Preece (1994:413)

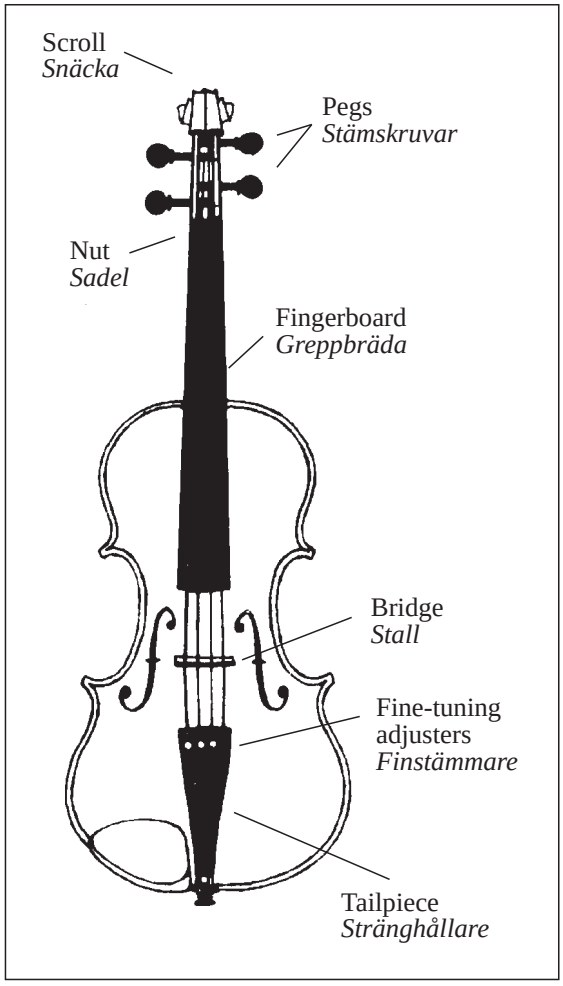

Figure 3. Violin vocabulary

3. THE SUBJECTIVE WAY OF CHANGING STRINGS

While the objective way of performing a task corresponds to a description from a third person perspective, the subjective way of changing strings deals with how the subjects perceive the task. To understand this, we might need to look at Gibson's theory of affordances (Section 3.2), and the theory of trial and error (3.3).

Previously I described the subjects' points of view as a road in the mind, where every fork or crossing road will be the subject of discussion. As long as it is *obvious* how the task proceeds – when the road is straight – no discussion is needed, and hence no linguistic output is produced. In other words, "the obvious goes without saying." The linguistic labels we have in language will reflect the potential forks and road crossings – we don't have to talk about what is completely obvious to all of us, and hence we will have no words for it.

In my task, the differences in experience between novices and experts will make their mental maps and roads look quite different, and hence their uses of linguistic labels will reflect very different conceptual realities.

3.1. Four stages of human task performance

There are different levels of knowing how to perform a task. In the example at the very beginning of the paper, your guide had a much deeper knowledge of the road than you had, and we may distinguish four rather

discrete stages in the acquisition of a task (table 1). Of course we don't necessarily go as far as stage 4 for every task, or even as far as 2. There are many examples of things we can do but where we cannot instruct another person to do the same thing.[4]

1. Being able to perform the task.

2. Being able to perform the task, pointing out difficult moments in the task, non-verbally.

3. Being able to perform the task, pointing out difficult moments in the task, verbally.

4. Being able to perform the task, and to *anticipate*, when instructing another subject.

Table 1. Four stages of human task performance

These stages largely correspond to the rather superficial distinction between procedural and declarative knowledge, but from the subjective perspective of the task. Also, in the procedural–declarative dichotomy, we have only two steps and the stages 2, 3, 4 are collapsed into one.

Observe that already stage 2, the ability to point out difficult points in the task, requires some kind of feed-back from earlier trials: to be able to know what might go wrong, either this must have gone wrong already, or we have a sixth sense telling us what *might* go wrong – a sense for difficulty... For example, if you don't fasten the peg, the string will unwind. Therefore it is necessary to point out the necessity of pressing the peg tightly into the hole.

Stage 3, in turn, requires a vocabulary of a special kind: to be cognitively efficient, I claim that a vocabulary needs to be able to distinguish between the *subjectively* perceived alternatives, i.e., the vocabulary will reflect our purposes. So, already stages 2 and 3 reflect a kind of expectation – when we give instructions we anticipate what might go wrong in the process.

Stage 4 is most important for the anticipation analysis in this paper In addition to this recognition of potential difficulties, it requires an ability to compare *chunks* of the task. This comparison is done to see if the chunks are similar and to see if there is information to be obtained in an earlier chunk that will be needed but gone in a later chunk. If this is the case, the subject may choose to draw the other subject's attention to these features. For example, as is the case in my violin experiments, the replacement of the string is in many senses a mirror of the removal, there are many characteristics worth noticing when the novice is removing the string that will be gone when the corresponding moment in the replacement phase comes.

Most often it is the expert subject who produces these anticipations, as she is the one who knows how to take advantage of the present for future purposes. To be able to do this, she must have a rather clear image of how the task will proceed, not only having a knowledge of how to do the task step by step in the head, but also being able to see similarities between different parts of the task, to use transfer effects.

3.2. Affordances

Of course I will not in this limited article be able to perform a task analysis from the perceptual level up to the linguistic. However, the theory of affordances is necessary as a theoretical background but is not widely known in the field of linguistics and pragmatics. If this is familiar, please proceed to the next section.

To understand the gradual construction of the mental models, there must be something in the environment to guide perception. We must have a theory of what is *visible* to be able to have a theory about what is *obvious*. Above I noted that what is *obvious* for one of the subjects is not necessarily obvious for another one. What is considered obvious has to do with what is *visible* in a broad sense, comparable to the view of Norman (1988). What we must focus on is what the novice *is able to* see without specific experience of violins to understand the differences between his mental model and the mental model of the expert.

Norman's theory of visibility builds upon the theory of *affordances* of Gibson (1979). Neisser (1987:21) characterizes this theory as:

> *Affordances*, as J. J. Gibson (1979) defined them, are relations of possibility between animals and their environments. A particular environment has a given affordance if and only if it makes a given kind of action possible, whether that action is actually executed or not. The claim that a given affordance exists is an objective claim, always either true or false: I may or may not be able to walk on that surface, for example.

Affordances can be seen as the bridge between reality and perception, the claim that there is something out there *for us* to perceive. Furthermore, to make this a subjective theory rather than an objective one, "[t]he affordance of an object is what the infant begins by noticing."[5] Thus, Gibson's theory is not only a

[4] In fact, this is the case for violin playing for many violinists, especially for those who are technically skilled by nature. In these cases, their instructions will not go deeper than 'Just do it!'.

[5] It must be noted here that the affordances are to a large extent species- and individual-specific.

theory of objectively existing affordances, but also a theory of perception – the affordances are the features of the environment that are most easily picked up by the subject.

As I stated above, the "obvious" will also serve as a ground for presupposition and shared knowledge.

3.3. Trial, error and the building of mental models

Now, let us return to the subjective way of changing a violin string. Let us first consider the asymmetry between the expert and the novice. This is necessary to understand the *direction* of the flow of informationas well as the *power* of the expert over the novice.

When you learn a concrete task, like walking, opening a can or handling a video recorder, you tend to fail a certain number of times. If you don't die, these failures give you additional knowledge that helps you to get on track again: you fall when you learn to walk, but on the other hand you learn what to do when you lose your equilibrium.[6] This is the traditional trial–and–error concept, but unlike the traditional conception that only considers the final ability of the subject, I am interested in the the enrichment of the mental model of the subject, allowing him to have a certain *preparedness* for what will happen.

In fact, this preparedness makes it possible for an individual to attain the higher stages of task performance mentioned above – to be aware of the difficulties in the task.

After this theoretical survey, let us enter the laboratory.

[6]The importance of negative feedback is beautifully illustrated in the following, from (Watzlawick, et al., 1967:39), referring to a personal communication with Alex Bavelas:
"Each subject was told he was participating in an experimental investigation of "concept formation" and was given the same gray, pebbly card about which he was to "formulate concepts." Of every pair of subjects (seen separately but concurrently) one was told eight out of ten times at random that what he said about the card was correct; the other was told five out of ten times at random that what he said about the card was correct. The ideas of the subject who was "rewarded" with a frequency of 80 per cent remained on a simple level, while the subject who was "rewarded" only at a frequency of 50 per cent evolved complex, subtle, and abstruse theories about the card, taking into consideration the tiniest detail of the card's composition. When the two subjects were brought together and asked to discuss their findings, the subject with the simpler ideas immediately succumbed to the "brilliance" of the other's concepts and agreed that the latter had analyzed the card accurately."

4. THE EXPERIMENT

4.1. The experiment setting

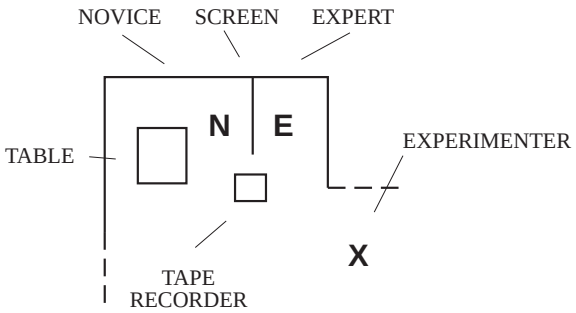

Figure 4. The experiment setting

The experiment is arranged to stimulate maximal linguistic output from the subjects without explicitly encouraging it. Therefore, a screen is placed between them to prevent pointing, gestures and deictic expressions *referring* to physical pointing. The table on the novice's (N) right is needed for his 'external representations' – the violin, and the string in its cover. The expert (E) is not allowed any external representation.

In order to keep the subjects from worrying, the experimenter (X) was always present during the experiments, within earshot, but out of sight, so that the subjects could always ask him questions if the experiment conditions were unclear. (2 of the 6 subjects used this possibility.)

The experts were 3 amateur violinists in a student orchestra, and the 3 novices were people with no hands-on experience of string instruments. The instructions to the subjects were limited to a minimum, and they were not told anything about the nature of the task in advance. When they had taken their seats, the experimenter handed the violin and the supplementary string to the novice telling them: "Your task is for you (addressing the expert) to give instructions to you (addressing the novice) about how to change the E string on this violin."

4.2. The transcription and the data

As I mentioned above, the transcription of the subjects' discussions is rather coarse. I have used spoken language forms of common words, marked hesitations, pauses, emphatic stress and overlapping speech. The transcription is of course always dependent on how the data will be used but must always be sufficiently rich as to allow the discovery of new categories in the data.

In the excerpts below, the first number denotes the subject pair, the second number the line in the dialogue, and the letter in parentheses marks the participant. E is for expert and N is for novice. In the few tagged lines that I have quoted in the paper, the tagging comes before the numbering.

```
3.1.    (E) okej, har du sett en fiol innan
        höll jag på att säja
3.2.    (N) mm.. men de e inte så mycke mer

3.1.    (E) OK, have you seen a violin
        before, I was near saying
3.2.    (N) mm.. but not much more
```

The English translation tries to conserve the Swedish wording in order to to give a flavor of the Swedish spoken language, but it should be comprehensible even by a native English speaker. This is done do avoid the double translations used in many linguistic contexts. The English lines are numbered in **boldface**.

The number of dialogue items, called Total, varies for the different pairs. See table 2.

Pair number	Total	Age and sex of expert	Age and sex of novice
1	402	30 M	30 F
2	168	26 F	29 M
3	168	24 F	24 F

Table 2. Quantity of output, age and sex of subjects.

5. CATEGORIES OF THE ANALYSIS

In this section I will only give brief examples of data to illustrate the categories of the analysis. The following sections on power and initiative, anticipation, and labels and concepts will constitute the focus of the analyses proper. I want to stress that the tags I have used are not based on formal (syntactic or morphological) criteria, as in most linguistic analyses. Rather they are functional or teleological, showing the relevance of the utterance to the task at hand.

I have tagged every utterance on a one tag – one utterance basis, with the following classification:

Tag	*Application conditions*
Requested action (A)	some kind of action is requested
Break (!)	a break in the normal course of events
Acknowledgment (=)	affirmative remark, closure of current initiative
Coordination (C)	request or offer of coordination of mental representations to states of affairs
Question (?)	question
Explanation (E)	an explanation, with or without preceding request or question
Label (L)	explicit mention of the problem of linguistic labels for the concepts denoted

Table 3. Tags

5.1. Requested action (A):

```
3.100.  (E) aa spela lite på den så

3.100.  (E) aa play a little on it then
```

This tag is typically used at a fork on the mental road to get the other to take one route rather than the other. The requested action category will be used mainly as a basis for measurements of *initiative*.

5.2. Break (!):

```
1.149.  (N) .. oj, vänta, då har jag då har
        jag nog gjort för mycke här.. vänta
        nu får jag gå tillbaka igen

1.149.  (N) .. oops, wait, then I have
        probably done too much here.. wait
        now I have to go back again
```

The break is a break of initiative, a break in the normal course of events. If the expert does not coordinate her mental representation and the clash becomes too big, the novice will feel the need to break.

5.3. Acknowledgment (=):

```
2.12.   (E) ja lossa den.. försiktigt
2.13.   [N lossar strängen]
2.14.   (N) gjort

2.12.   (E) yes undo it.. carefully
2.13.   [N loosens the string]
2.14.   (N) done
```

The acknowledgment represents the closing of an initiative or simply a signal that the subject is active and listening. This latter group is probably a bit over-represented in my data due to the presence of the screen, which blocks the normal gaze exchange that often has this function.

5.4. Coordination (C):

3.71. (E) .. men har du fått fast den där nere.. i den härа.. va den nu heter.. hehe

3.71. (E) .. but have you got it tight down there.. in this.. whatever it's called.. hehe

The coordination category is an interesting one. As the subjects cannot see each other, they are repeatedly forced to check that they are 'talking about the same thing.' Another formulation of the function of the coordination category is: 'I am not sure that my conception of the world conforms to the world.' As the expert has no access to the 'external representations' – the violin – she can only access the situation through the novice's incomplete representation.

5.5. Question (?):

1.157. (N) ...vad är de jag ska göra till vänster om vadå alltså

1.157. (N) ...what is it I should do to the left of what then

Used for example to clarify the instructions from the expert. From an initiative-dynamic point of view seen as a minor break.

5.6. Explanation (E):

3.58. (E) de e en liten plastgrej på.. den ska va på **stallet**...

3.58. (E) there is a little plastic thing on.. it should be on the **bridge**...

Explanations are never explanations 'out in the air' and this category is perhaps the most unclear of the tagged categories. Explanations often represent a 'unnecessary' but socially relevant surplus of information, sometimes near an anticipation – information to be used in an unspecified future.

5.7. Label (L):

1.18. (E) då kan du hålla fiolen med ssstallet uppåt
1.19. (N) ...ehe...
1.20. (E) du vet vad stallet e
1.21. (N) näe..ehe [skrattar]

1.18. (E) then you may hold the violin with the bbbridge facing upwards
1.19. (N) ...uhu...
1.20. (E) you know what the bridge is
1.21. (N) nope..ehe [laughs]

Most cases of negotiation of linguistic labels take place implicitly, like in 1.18, where the expert (E) hesitates on the word 'stall' (bridge), a typical signal that he is unsure that the novice (N) knows the label that denotes bridge. The more than ambiguous 1.19 is here clear, as both subjects are aware of the hesitation in 1.18, and 1.20 is the explicit Label line.

5.8. Tag groups

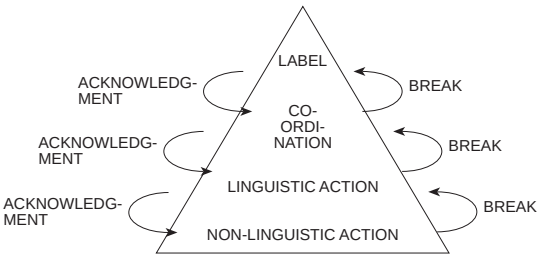

Figure 5. Dialogue dynamics

Since "the obvious goes without saying," the mere utterance of linguistic elements will be seen as a break in the normal course of events: As long as the mental road is straight in the mind of the subject, he will not have to produce any task-related linguistic output.[7] The relation between the course of events and the linguistic output is studied in section 7. Above the level of physical actions we find the three levels of linguistic output, that I have tagged. The tags divide into three groups reflecting their functional level. On the lowest (and most efficient) level, the linguistic actions take place. Here we find the pure instructions. As long as the novice understands the instructions, he will acknowledge that it is OK to continue. When the communication fails, this is often due to the mismatch of the subjects' representations. The coordination level consists of re-matching these, so that communication can continue on the action level. If communication fails on the coordination level, this can be due to the mismatch of the subjects' respective vocabularies, and the label level functions as a meta-linguistic level to handle this.

At least in some cases, the linguistic labels function as "mind-openers." The existence of a specific label to denote a concept will signal that this concept is important in some respects.

6. POWER, INITIATIVE AND THE COURSE OF EVENTS

The ultimate goal of the tags is to find *patterns* in the data *on the tag level*. This would reduce the data to the

[7] As we all know, language also has a large social function.

string of tags, and it would ideally be possible to build up a syntax of dialogue. This is of course impossible, in much the same way that it has proven impossible to base a syntax of language on a string of word class tags.

As for syntax of language, this puts enormous demands on the tagging, demands that are of course necessary if we want a fully computational and automatic pattern generation. Until then, I will be here to do the analysis, and it will suffice to show a few typical patterns, like in the following excerpt.

```
A   3.100.  (E) aa spela lite på den så
C   3.101.  (E) e de den strängen som du
        spelar på nu..
=   3.102.  (N) mm

A   3.100. (E) aa play a little on it then
C   3.101. (E) is that the string that you
        are playing on now..
=   3.102. (N) mhm
```

The Requested Action is followed by a Coordination to check if everything is OK, and the novice acknowledges that this is the case. Here it is the expert herself that generates a level change.

6.1. Properties of initiatives

There are some properties that make the example above so typical.

1. Regarding the direction of the information, from expert to novice – the expert has the *initiative*. I would even argue that the expert has the *power*, due to the imbalance between the knowledge of the expert and the novice.[8] This is in accordance with Givón (1989:164):

> [...] the purely epistemic modes shade gradually into socio-manipulative modes. These connections may be summarized as the following one-way inferences:
>
> (61) a. truth ⊃ knowledge
> b. knowledge ⊃ certainty
> c. certainty ⊃ status
> d. status ⊃ power
>
> None of these inferences is logically necessary. Rather, they are **pragmatic norms** associated with the communicative contract.

2. It is very hard for the expert to know how her initiative will be interpreted, but she nevertheless uses expressions that have a very broad significance: both 'spela' '*play*,' 'lite' '*a little*' and 'den' '*it*'are very vague. But instead of using more specific words, like 'pluck,' 'once' and 'the E string,' she uses the next phrase to check if something has gone wrong.

3. The novice uses his Acknowledgment to signal that he accepts the initiative and to confirm the Coordination.

Of course there are exceptions to this. When the expert progresses too fast, the novice will signal with a break.

```
!   1.14..  (N) mmm nu ska vi se här.. ett
        ögonblick så ska jag öppna
        kuvertet.. hrm

!   1.14.  (N) mmm now let's see here..
        one moment and I'll open the
        envelope.. hrm
```

There is of course always the opposite possibility, that the novice has gone further than the expert thinks, like in 1.41.

```
1.41.   (N) okej, ja, det har jag redan
        upptäckt.. ehe

1.41.   (N) OK, yes, I already discovered
        that.. ehe
```

6.2. Requested action as initiative measure

To get an overview of the initiative distribution, I have designed some simple measures. The first one is computed as

$$AP = \frac{\#\text{ of Novice A} + \#\text{ of Expert A}}{\text{Total}}$$

where AP is Action proportion, Total is the sum of utterances in the dialogue and A is number of Requested Actions. (Cf. table 2)

This measure, plotted in the diagram below, shows the expert's Requested actions (in white) and the novice's Requested actions (in black). The ideal would be to design a measure of the proportions between the two participants, like I have done for the breaks below, but this measure is not applicable in the total absence of Requested actions for some of the participants.[9]

[8] I presented a study of this kind of micro-power in Winter and Gärdenfors (1995). In that paper, we studied the semantic coding of power and expectations in the field of modal verbs.

[9] On the other hand, a measure is of course not needed for a property that is so clearly visible...

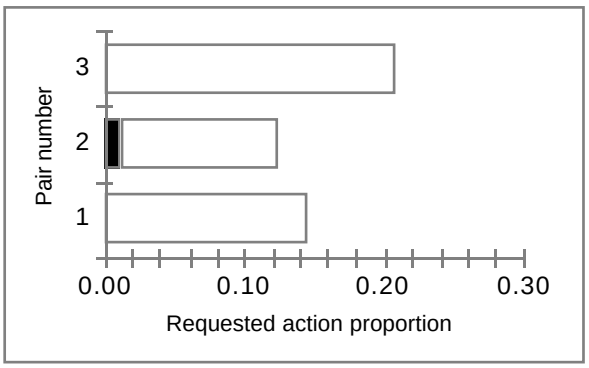

Diagram 1. Requested action proportion for the different pairs. White = expert's Requested actions. Black = novice's Requested actions.

The interpretation of this measure deserves some comments. In one sense, every Requested action – or rather every utterance – is a failure from an information dynamic point of view. One way of measuring information efficiency is to measure the amount of information that passes from one subject to the other. Ideally, to complete this task smoothly and efficiently, this amount should be held on a low level. Then, either the task should be self-explanatory, or the expert should be maximally concise and clear in her instructions. However, as we have already seen, some subjects tend to be vague and check afterwards, rather than making their best in being precise and clear.

6.3. Breaks as initiative measure

Another way of getting a picture of the initiative is to go the other way around and look at the opposition to the initiatives. This equals a counting of *breaks*. First, I calculated the break rate, in the same manner as for the Requested action rate above and plotted in diagram 2:

$$\text{Break rate} = \frac{\text{\# of N breaks + \# of E breaks}}{\text{Total}}$$

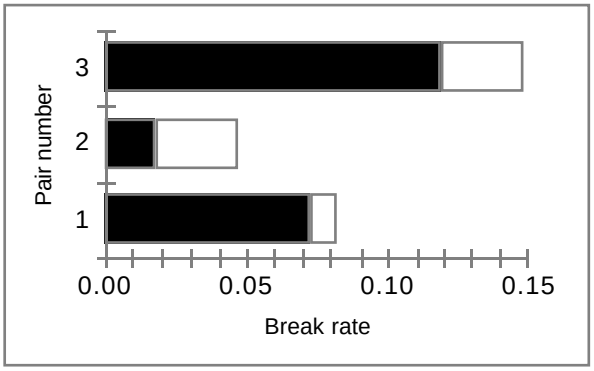

Diagram 2. Break rate in the string change interactions. White = expert, black = novice

From the same data it is possible to draw further conclusions, based on the proportions between the breaks of the novice and the expert. Therefore, I designed another measure, the Initiative opposition measure, that is computed as

$$\text{Initiative opposition} = \log\frac{\text{\# of N breaks}}{\text{\# of E breaks}}$$

It has the advantage of clearly displaying the *proportions* of the number of breaks of the participants centered around zero, i.e., that a positive value *x* and a negative value *-x* will correspond to the same situations, with the only difference that the figures are reversed. Another characteristic is that it evens out big differences and overaccentuates small ones. One of the disadvantages is that it is not defined when either of the participants does not display any breaks. As the norm is expected to be more breaks from the novice, this normal situation will yield positive figures.

What this measure shows is how much one of the participants *opposes* the power of the other, to defend himself, but as the amount of opposition can be said to indicate the amount of power to oppose, I use this measure as a measure of initiative.[10]

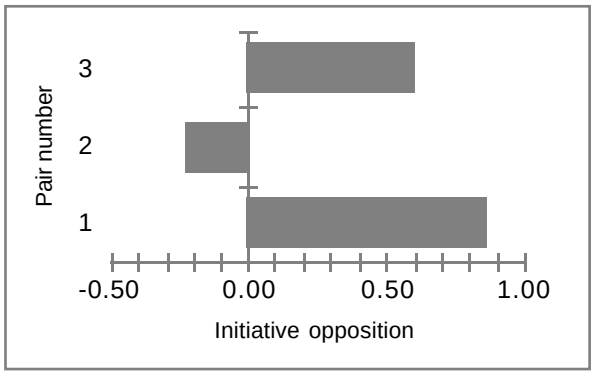

Diagram 3. Initiative opposition in the string change interactions

One prediction that I made when constructing these measures was that the Requested action rate and the Break rate would covary, so that a high Requested action rate (in relation to the other pairs) would be countered by a high Break rate, which is clearly visible in Diagrams 1 and 2.

When comparing the Requested actions and the Initiative opposition, pair number two not only displays Requested actions from the novice, but also a *negative* Initiative opposition, indicating that the defense is bigger from the expert than from the novice.

[10] In Michel Foucault's elegant wording: "[...] et pourtant vous gardez du principe du pouvoir-loi la conséquence pratique essentielle, à savoir qu'on n'échappe pas au pouvoir, qu'il est toujours déjà là et qu'*il constitue cela même qu'on tente de lui opposer*." (1976:108, emphasis added)

At first sight, a negative Initiative opposition would predict a bigger proportion of novice initiatives than of expert initiatives, which clearly isn't the case in Diagram 1. Instead the expert in the second pair has opposed non-linguistic initiatives – the novice in this pair has simply been much more autonomous than in the other pairs, like in 2.50.

2.50. (N) ssså.. jag har dragit igenom den genom stallet... jaha **så** ska den sitta.. nu förstår jag

2.50. (N) ssso.. I have threaded it through the bridge... oh **that**'s the way it should be.. now I understand

In short, a low break rate will indicate smooth information flow in the interaction.

Another sign of the power in the relations is the expert's sensitivity to the novice's breaks. If the expert is not sensitive, the novice may try to break, but if the expert is sure enough, she will of course go on and ignore the break. This surely works in some cases, but if the novice really wants to break, he has to repeat himself, like in 1.139–1.143.

1.139. (E) ... så ska du vrida ... medurs.. devillsäga man kan säga bort från dej.. stämskruven
1.140. (N) ..mm
1.141. (N) men
1.142. (E) å långsamt.. först få en knäck på strängen så den inte halkar ur igen
1.143. (N) ... ja, men nu sticker ju hela den här långa ändan ut

1.139. (E) ... and you should turn ... clockwise.. that is to say one can say away from you.. the peg
1.140. (N) ..mm
1.141. (N) but
1.142. (E) and slowly.. try to get a break on the string so that it won't slip out again
1.143. (N) ... yes, but now this whole long end sticks out

In 1.140 and 1.141, the novice hesitatingly tries to oppose, but the expert only continues and provokes the more explicit break in 1.143. This would perhaps not have been needed if the expert had been aware of the possibility that she had proceeded too fast already in 1.139.

Another parameter that is important but impossible to compute on the tag level is the relation between general and specific utterances. The most general Requested action that I found in the data is 3.43, where the expert gives only one instruction for what will become the remaining 75 % of the task! The novice of course opposes this... Still, no one can say that it is incorrect of the expert – the novice has finished removing the string, and the replacement is in many respects the mirror of this, but as the novice says: it is not that easy.

3.41. (E) så tar du fram den andra strängen!
3.42. (N) mm
3.43. (E) som ser ut som den första ungefär.. å gör tvärtom!
3.44. (N) ha.. tror du du ska komma undan så lätt

3.41. (E) now you take the other string!
3.42. (N) mm
3.43. (E) that looks more or less like the other one.. and reverse the action!
3.43. (N) ha.. do you think you will get out of it so easily

A more general Requested action, like the one in 3.43 can be said to give more *cognitive action space* to the novice. Also, if it worked, it would be very information efficient. On the other hand, a specific utterance like 1.99 says it all, but perhaps too much.

1.99. (E) i näsans riktning.. så ska den här gummigrejen sitta.. precis.. en halv till en millimeter framom.. med sin fram.. med sin framkant en liten liten bit framom.. och det mesta bakom.. mot dig

1.99. (E) where the nose points.. this rubber thing will be.. exactly.. a half to one millimeter on the other side.. with its front.. with its front edge a tiny tiny bit on the other side.. and most of it backwards.. towards you

There is no need for the novice in pair 1 to start contemplating the function of the little black tube. It will be enough to follow the instructions 'blindly.' It could of course be that this detailedness is necessary to complete the task, but if we compare with the other pairs, we find that the corresponding instruction is completely missing in the second pair and much more general in the third (3.86).

3.86. (E) å så se till att dendär plastgrejen kommer på stallet nu

3.86. (E) and make sure that that plastic thing is placed on the bridge now

One of the reasons for this is that there is a corresponding tube on the A string, but the expert in pair 1 does not check this to be able to use this information.

6.4. Control sequence

In view of the preceding discussion of general vs. specific instructions, let me state the general principle: it is more efficient to give general instructions *if* there is a way to coordinate and check where on the cognitive road the novice turns out to be.[11]

This is a clear case of two distinct strategies, a trust strategy and a control strategy. If we once more see the task as a path in a cognitive space, the trust strategy corresponds to 'Just go along, nothing dangerous will happen, and if something happens, we'll be able to handle it together afterwards.' The control strategy on the other hand could be paraphrased as 'Just carefully follow my instructions.'

In fact, the expert in pair number one is typical for this strategy. Not only the detailed statement 1.99 quoted just above stems from her, it is also that pair that has the highest scores on the Action proportion, Break rate and Initiative opposition scales. This expert also explicitly makes clear the strategy from the beginning, and the novice accepts...

```
1.1.    (E) gör, du gör ingenting som inte
        jag säger, va,
1.2.    (N) nää, jag bara tittar, än så
        länge.
1.3.    (E) ja de e bra,
1.4.    (N) mmm

1.1.    (E) don't, you don't do anything
        that I don't tell you, do you,
1.2.    (N) noo, I'm just looking, so far.
1.3.    (E) yeah that's fine
1.4.    (N) mmm
```

6.5. Summary

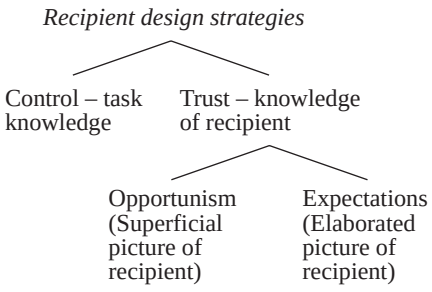

Figure 6. Recipient design strategies

There is an interesting difference between these strategies if we consider the recipient design, i.e., what the subjects need to know about each other in contrast to what they must know about the physical properties of the task. In the control strategy, the knowledge of the task is crucial, but there is hardly any need to model the other subject's state of mind.

The situation for the trust strategy is more complicated. As I said above, it corresponds to 'You are safely on the road, I will guide you.' This situation divides into two cases – the one where the expert really knows the state of mind of the novice and his capabilities, and the other where the signals from the expert are just fake – false security, but a security that can be very effective.

In fact the division in the trust strategy will correspond to the strategies in the next section – opportunistic or anticipatory. The difference is between on the one hand being opportunistic – letting time tell and solving the problems when they come – and, on the other hand, forming expectations for future use.

7. ANTICIPATION IN CONTEXT

In this section I will examine expectations in a larger information-dynamic context. As I said above in the sections on the objective and subjective way of changing strings (Sections 2 and 3), there are some physical constraints that determine the natural order of things (from a third-person objective perspective). But the dialogue is of course not materially fixed to the action sequence – it is possible for us to talk about things that are totally unrelated to what we do. What is interesting here is where one of the subjects (normally the expert) departs from the normal course of events and starts talking about a stage of the task that is still in the *future*.

```
1.117.  (N) det får jag justera längre fram
        antar jag
1.118.  (E) precis

1.117.  (N) that I'll have to adjust
        further on I suppose
1.118.  (E) correct
```

In order to visualize the difference between now and the future I have tried to linearize the hierarchical task analysis in figure 2 by traversing the tree depth-first. The 300 first lines of the first subject pair are plotted in diagram 4.

[11] This is to be compared with the old Danish proverb "Tillid er godt, kontroll er bedre" – Trust is good, control is better.

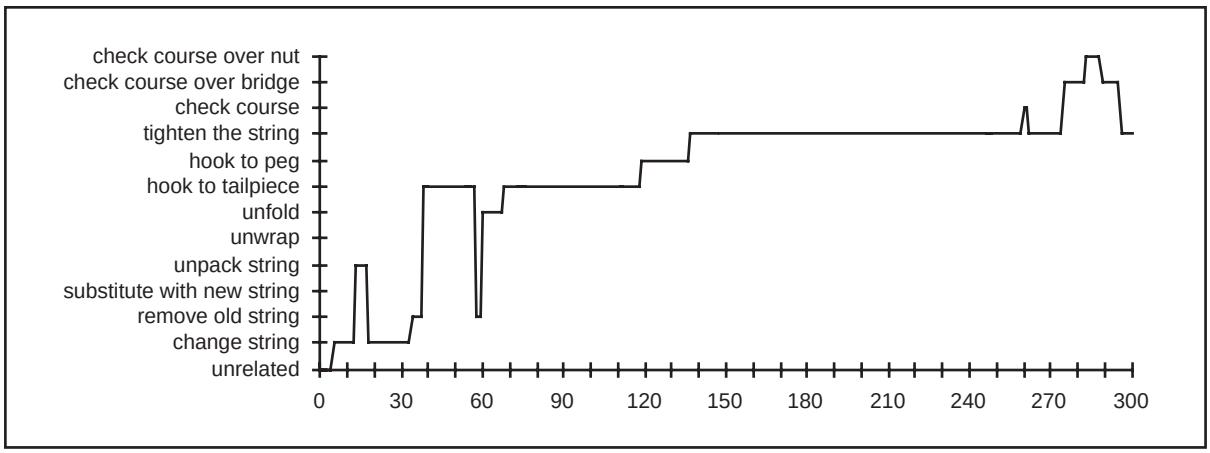

Diagram 4. The course of events. Pair 1:1–300.

Observe that the diagram shows the *dialogue* and not the actions. Ideally, every progression that falls back to an earlier stage should be an anticipation, but this is not the case due to several factors: 1. the corrections of mistakes will display the same pattern, as well as the iterative steps 11 through 14. 2. as I have lineraized a hierarchical task description, this linearization will in itself contain some natural jumps when shifting between general and specific concerns.

One clear and neat case of real anticipation is seen in 1.38 – 1.59 (and also in Diagram 4.)

1.38. (E) å sen i andra ändan av strängens infästning
1.39. (N) ..mmm
1.40. (E) så sitter det en
1.41. (N) okej, ja, det har jag redan upptäckt.. ehe
1.42. (N) liksom en liten
1.43. (E) denhär ja
1.44. (N) en liten ring här nere som man kan den faller av utav sej själv här
1.45. (E) e de en liten ögla.. på den i den ändan... eller e de en liten knopp,
1.46. (N) mmhm ja de e liksom som en liten kort cylinder
1.47. (E) just de.. en metallcylinder..
1.48. (N) mm
1.49. (E) med sådär 3 mmillimeters diameter
1.50. (N) ja..
1.51. (E) och ett hål igenom
1.52. (N) ja.
1.53. (E) de e en kula.. kallar vi de
1.54. (N) jaha
1.55. (E) ...och den sitter i en liten gaffel
1.56. (N) ja.
1.57. (E) ja.
1.58. (E) å då kan du slänga bort den strängen
1.59. (N) mm [lägger strängen på bordet]

1.38. (E) an’ then in the other end of the attachment of the string
1.39. (N) ..mmm
1.40. (E) there is a
1.41. (N) OK, yes, I already discovered that.. ehe
1.42. (N) sort of a small
1.43. (E) this one yes
1.44. (N) a small ring down here that you can it falls out by itself here
1.45. (E) is it a small loop.. on it in that end... or a small ball,
1.46. (N) mmhm yes it is like a small short cylinder
1.47. (E) that’s it.. a metal cylinder..
1.48. (N) mm
1.49. (E) with like 3 mmillimeter diameter
1.50. (N) yes..
1.51. (E) and a hole through it
1.52. (N) yes.
1.53. (E) it is a ball.. we call it
1.54. (N) fine
1.55. (E) ...and it is placed in a small fork
1.56. (N) yes.
1.57. (E) yes.
1.58. (E) an’ then you can throw that string away
1.59. (N) uhu [puts the string on the table]

Here the expert in pair 1 uses information that is available during the removal of the old string but that will be gone when the time comes to mount the new string. This corresponds to stage 4 of human task performance discussed in section 3.1 above – it demands the ability to compare different parts of the task and to find similarities between them on a merely internal–mental level.

There is also an example from the corresponding situation in pair 2, where the novice has already removed the string and the expert realizes that there is some useful information that just has been lost...

2.31. (E) tittade du nu hur den var fäst där uppe förresten.. ööh.. jag vet inte hur den e..

2.31. (E) did you look now to see how it was attached up there by the way.. uuuh.. I don't know how it is..

These are examples of one of the strategies, the anticipatory one. Unfortunately, as the definition of the contrasting strategy is based on the *absence* of or *lower rate* of anticipations, it is not possible to give any positive examples of it. However, there are clearly many more examples of anticipation from the expert in pair 1 than from the other pairs.

Most anticipations emanate from the experts as the novices do not know very much about what will happen. There is one exception, the novice in pair 2, who has already in the initiative measures shown to be exceptional.

2.77. (N) va heter de där jag fäster de.. så vet vi de?

2.77. (N) what is it called where I attach it.. so that we know?

In addition to being an anticipation like the others above, this example has yet another property. Whereas most of the anticipations in the data *refer to a distinct moment* in the task, this utterance refers to the *establishment of a common knowledge base* to be used in an unspecific future.[12]

7.1. Different kinds of contexts

Previously I regarded the *mental model* or *mental map* of the expert as one of her sources of information. I would now briefly like to consider this and some other sources.

One major building block of intersubjectivity is *shared knowledge* – if we can take some information for granted in the linguistic intercourse, we don't have to bother with it. It will be obvious and hence we won't have to talk about it. In my experiments, however, the screen between the subjects has reduced the access to what Givón (1989:75) calls the deictic focus:

> (b) **The deictic focus: Shared speech situation**
>
> (ii) **Deixis**:
>
> The knowledge, shared by the speaker and hearer in a **particular speech act** and by virtue of being together on the **same scene** at the **same time**, of the immediate ('deictic') speech situation. This includes, among others, the shared reference for 'I' and 'you,' 'now' and 'then,' 'this' and 'that,' or 'here' and 'there.'
>
> (iii) **Socio-personal relations**:
>
> Knowledge, shared by the speaker and hearer, *in their respective* roles, of their respective socio-personal relation. This includes respective power, status, long-term social goals, obligations, entitlements, needs and **expectations**, most specifically as they are relevant to the communicative transaction *at hand*.
>
> (iv) **Speech-act teleology**:
>
> The shifting **goals** of the communicative transaction, clause by clause, primarily from the speaker's perspective. The more *localized*, linguistically coded **speech act** designation of clauses (declarative, interrogative, manipulative, etc.). This may or may not also include the speaker's **information-processing goals**, such as foregrounding vs. backgrounding, focus, emphasis or contrast, and the designation of **important topics**.

As this component is reduced, much of the shared knowledge will be based on what Givón calls 'shared prior text' (ibid., some typos corrected and footnotes omitted):

> (c) **The discourse focus: Shared prior text**
>
> (v) **Overt and covert propositions:**
>
> Knowledge, shared by the speaker and hearer in a particular communication transaction, of the **specific discourse** that has been transacted, in particular the **immediately** preceding discourse. This includes the specific propositions comprising the uttered text, but also whatever other entailed propositions the speaker assumes that the hearer can derive from the text by whatever means. It also includes such entailed propositions the speaker assumes

[12] I don't want to overtax this example, but there is a very specific difference between using expectations for a specific task on the one hand, and detaching the knowledge base from any existing support. This is studied in (Winter and Gärdenfors, 1995) in connection with the shift from deontic to epistemic modals, and is connected to the connection between the epistemic and the socio-manipulative modes discussed in Givón (1989:164) and quoted above. Cf. also Gärdenfors (1995).

that the hearer can derive from the thematic structure of the text, again by whatever means.

(vi) **Meta-propositional modalities**:

Knowledge, held by the speaker and hearer and shared to various degrees (and not always symmetrically) of the strength of their respective **belief**, **certainty**, **evidential support** or valuative **preferences**, all pertaining to the propositions comprising the specific discourse (or entailed from it). This also includes some **probabilistic assessment** of the strength of *each other's* beliefs and preferences.

In short, my subjects have three main sources of knowledge: their mental models, the external representations – the violin – and the 'shared prior text,' that from a more cognitive than linguistic point of view rather will be seen as 'mutually established information.'

But, and here we come to the core of the difference between the expert and the novice, the expert cannot see the violin, and the novice doesn't have the rich mental representations of the expert. And it would be reasonable to expect that the expert's mental model of the violin would be much richer than the knowledge that the novice can gain with the violin in hand. It turns out however that their knowledge is not comparable. This is shown by the *novice* referring to the other parts of the violin, like the other strings or the other pegs, like in 2.120–123, 2.93 and 1.292. My opinion is that the easiness of use of this information – reference to similarities between the string that is changed and the other strings – is not reflected in the data.

2.120. (E) å så börjar du skruva försiktigt.. **från** dej så att säja
2.121. (N) givetvis.. ja
2.122. (E) mm
2.123. (N) precis som dom andra

2.120. (E) an' then you start screwing carefully.. **away** from you so to speak
2.121. (N) of course.. yes
2.122. (E) mm
2.123. (N) just like the others

2.93. (N) jag ser nu hur dom andra.. e fästa

2.94. (N) I see now how the others.. are attached

1.292. (N) jaa, den e asså den e i alla fall lika lika mycke så som dom andra e om man säger

1.292. (N) yees, it is well it is anyhow as as much so like the others are if you say

The expert seems much more concentrated on the task at hand, the *scope of attention* in his mental model is not of the same kind as for the novice who easily looks at different parts of the violin.

But of course, there are also examples of this phenomenon in the expert's utterances, like in 1.298, but they are much more rare.

1.296. (E) då kan du börja.. då kan du **trycka** stämskruven **lite** till vänster.. å vrida långsamt... tills den **fastnar**
1.297. (N) tills den **fastnar**?
1.298. (E) aoo... dom andra sitter ju fast hela tiden

1.296. (E) then you can start.. you can **press** the peg **a little** to the left.. an' turn it slowly... until it **sticks**
1.297. (N) until it **sticks**?
1.298. (E) aoo... the others are stuck all the time

7.2. Summary

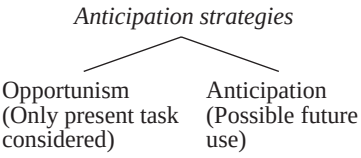

Figure 7. Anticipation strategies

We have in this section seen an opposition on the time dimension, between on the one hand subjects choosing opportunistic strategies, where they are only considering the present task, and on the other hand anticipatory strategies using presently available knowledge for future purpose.

8. LABELS AND CONCEPTS

I will now leave the pragmatic level that I have studied in the two preceding sections and show how the linguistic labelling also exhibits strategies corresponding to the anticipatory and opportunistic ones studied above in Section 7. I will also make some general remarks on other dimensions relevant in this context, like *tolerance*. Part of the analysis in this section also gains further significance in the larger context of *intersubjectivity* that I will not provide in this paper.

On the linguistic functional levels – pragmatics, semantics and syntax – the context-independence is growing from pragmatics to syntax. This means that the information conveyed by conventions in for example syntax is more context-independent than on the semantic level: whichever Swedish noun and verb we take, changing the word order from noun–verb to verb–noun will convey the meaning change from indicative to interrogative regardless of the context of use.

Context-independence is, of course, not necessarily something good in itself. On the reverse side of the same coin we find *information effectiveness*: to be able to provide information without much context means that the information effectiveness is high.[13]

In a similar way, the semantic conventions guarantee a certain context-independence that allows us to detach the meaning of a word from the situation where it is used. Thus, a linguistic label with a specific semantic convention attached to it will be more information-efficient than the corresponding multi-word paraphrase, the meaning of which is also determined on a pragmatic basis.

This is of course a continuum ranging from very specific and context-free labels to very vague ones where the efficiency depends on the specificity of the semantic conventions associated with the label. For example, the sense of the word 'Pope' or the word 'bridge' (in a violin context) will be totally unique, whereas the word 'thing' will need a very specified context to be usable.

Or to quote Rommetveit (1985:186):[14]

> Which of a set of possible verbal expressions will be used to refer to any particular object is clearly determined by *the range of objects from which the referent must be set apart.*

Thus, the *vocabulary* will be a valuable resource in itself, sometimes even without knowing what to use it for as in the already quoted 2.77.

2.77. (N) va heter de där jag fäster de.. så vet vi de?

2.77. (N) what is it called where I attach it.. so that we know?

This shows that some of the semantic conventions are treated as if they were 'real.' There *exists* a specific name that is associated with a certain referent, and the novice in 2.77 can also designate the tailpiece as *a reasonable candidate for having a specific name.*[15]

Different parts of the vocabulary will have different status. In my data, the names of the major functional parts of the violin are established rather quickly and easily despite the fact that these labels or at least their signification were unknown to all of the novices. There are however some exceptions to this smooth introduction of new labels, like in 2.50 – 2.58.

2.50. (N) ssså.. jag har dragit igenom den genom stallet... jaha **så** ska den sitta.. nu förstår jag
2.51. (E) mmm
2.52. [paus]
2.53. (N) sådärja
2.54. (E) sitter de en liten skruv där uppe, där du satte fast den där eller
2.55. (N) skruv.. ja de sitter en liten skruv ovanpå stallet
2.56. (E) eh.. va menar du med stallet, eller ja
2.57. (N) där jag fäster
2.58. (E) ja just de.. de e inte de som e stallet i å för sej

2.50. (N) ssso.. I have threaded it through the bridge... oh **that**'s the way it should be.. now I understand
2.51. (E) mmm
2.52. [pause]
2.53. (N) that's it
2.54. (E) is there a small screw up there, where you attached that one or
2.55. (N) screw.. yes there is a small screw on the bridge
2.56. (E) uh.. what do you mean by bridge, or well
2.57. (N) where I attach
2.58. (E) oh yes.. that's not the bridge in fact

The novice in pair 2 boldly uses the label for bridge as designating the tailpiece without really knowing what he is talking about. The curious thing is that the expert does not oppose this usage even though she was probably noticing it already in 2.50.

In the light of what has been said above about the interaction in pair two, this attitude of the expert is

[13] In some sense, information conveyed by word order is *parasitic* on the words themselves – it doesn't add to the *amount* of information, only restructures them to get its information through.

[14] See also the very interesting discussion about 'context of confusable alternatives' in Harnad, ed, (1987).

[15] Here we touch another interesting discussion, related to the discussion of affordances above: what makes a thing or phenomenon a candidate for having a label is determined by what is sometimes called 'constraints.' Objects, for example, are distinguished in early childhood. See work by Dare Baldwin and Ellen Markman, for example Markman (1991).

highly understandable: her novice is according to my initiative measures very autonomous and active. But notice also that this strategy is viable: the outcome of the quoted passage could have been different and the use of the label 'bridge' to designate the tailpiece could have passed without opposition from the expert.

Here, it would be possible to grade the tolerance of the expert into three stages: 1. always correcting when perceiving an incorrect use, 2. accepting incorrect use as alternative use, and 3. adaptation and use of an incorrect label against one's better judgement.

Observe here that this *revealed opposition* is the only intersubjectively stabilizing mechanism in the situation, *especially* when there is an expert present who clearly has the preferential right of interpretation. This means that the label 'bridge' will continue to mean tailpiece for the novice until this usage is opposed in a real context.[16]

As I said above, this holds for the main functional parts like 'bridge,' 'tailpiece' etc, but there are also other parts of the violin that are subject to discussion which lack a standardized label. In pair 1, for example, the 3 mm black plastic tube around the string that prevents the string from cutting into the bridge causes a veritable labelling confusion. The novice is trying a multitude of expressions without settling on any particular one: 'gummislang, *rubber tube*,' 'hölje, *envelope*,' 'svart liksom moj, *black sort of thingamabob*,' 'cylinder, *cylinder*,' 'gummipackning, *rubber gasket*,' 'gummigrej, *rubber thing*' (1.71, 72, 74, 92, 99) are all used consecutively. This is of course possible only in the absence of clear labelling signals from the expert.

The next subsection will be devoted to some of these labelling signals and strategies for labelling corresponding to the anticipatory and opportunistic strategies discussed above.

8.1. Strategies for labelling

Above I have discussed the information efficiency of precise labels. I concluded that more specific and context-free labels are to be preferred over general multi-purpose ones. Thus, the expert in my experiments should want to use the specific violin vocabulary, the signification of which is unambiguous in this context. But, as I have also noted above, this vocabulary is not known to the novices.

This fact is of course not known to the experts, but they have some means of figuring it out. The first takes place at the very beginning of the dialogue:[17]

The active novice in pair 2 does it again, below.

2.1. (N) okej
2.2. (E) mmmh
2.3. (N) ja.. jag vet **ingenting** om fioler så jag vet inte vad e-strängen e.. okej

2.1. (N) OK
2.2. (E) mmmh
2.3. (N) well.. I don't know **anything** about violins so I don't know what the e-string is.. OK

3.1. (E) okej, har du sett en fiol innan höll jag på att säja
3.2. (N) mm.. men de e inte så mycke mer

3.1. (E) OK, have you seen a violin before, I was near saying
3.2. (N) mm.. but not much more

From these indications the experts may draw conclusions about the level of vocabulary of the novices. Here we may distinguish two potential strategies.

The first, *anticipatory* or *expectation-based*, consists in judging the level of the labels used, signalling or not signalling that 'here comes a new one,' and choosing a label based on the expectations.

1.18. (E) då kan du hålla fiolen med ssstallet uppåt
1.19. (N) ...ehe...
1.20. (E) du vet vad stallet e
1.21. (N) näe..ehe [skrattar]

1.18. (E) then you may hold the violin with the bbbridge facing upwards
1.19. (N) ...ehe...
1.20. (E) you know what the bridge is
1.21. (N) nope..ehe [laughs]

The second, opportunistic, consists in choosing a label, preferably the best one, and seeing what happens.[18] The expert in pair two uses this strategy

[16] Of course, he can be 'corrected' by reading a text about violins, but the relation of the written word to our cognition is *so* strange. Direct interactions must be considered much more basic. Cf. the work by David Olson (1993) and Winter and Gärdenfors (1995).

[17] For the first pair, it took place before I started the recording...

[18] There is evidence indicating that this choice is very culture-dependent. According to Alf Hornborg (pc), it is common among native Americans to choose the opportunistic strategy – even in a conversation with a total stranger, they will continue to use deictic expressions and other local references as if they were talking to a close friend. (Unfortunately it seemed as if they were not at all willing to adjust their level of

and after two consecutive failures gets a so strong opposition that she is obliged to apologize.

2.17. (E) aaa va försiktig med de.. em.. sitter den fast med en finstämmare där uppe eller
2.18. (N) finstämmare vet ja inte va de e
2.19. (E) nähä.. en sån här liten grej som man skruvar på.. uppe vid.. em.. stränghållaren
2.20. (N) hhh
2.21. (E) jaaa... förlåt... [skrattar nervöst] nej men kan du ta kan du ta bort den där uppe

2.17. (E) aaa be careful with it.. um.. is it attached with a finetuning screw up there or
2.18. (N) finetuning screw I don't know what it is
2.19. (E) ono.. this little thing that you can screw.. up there at.. um.. the tailpiece
2.20. (N) hhh
2.21. (E) weeell... sorry... [nervous laugh] no but can you remove it up there

These strategies involve expectations in the sense that they are concerned with expecting the other's state of mind – what I above called recipient design.

The two strategies are only applicable when the expert tries to optimize the information efficiency. The expert in the third pair escapes this choice by repeatedly choosing more general, context-dependent expressions:

3.9. (E) å så.. kollar du vart den går.. var den slutar nånstans.. där uppe.. bland dom stora skruvarna

3.9. (E) an' them.. you check where it leads.. where it ends.. up there.. among the big screws

3.36. (E) ja.. å sen sååö.. kan du bara liksom lyfta den så a säja så ser du var att den sitter fast i den här svarta grejen längst ner där.. å då kan du bara pillra ut den därur

3.36. (E) well.. an' thenuu.. can you only sort of lift it so to speak an' you'll see where that it is attached to this black thing down there.. and then you can just pick it off

She also in 3.84 indicates that she renounces some of the power over the labelling that she has as an expert by adding the disclaimer 'tror jag det heter,' 'I think it is called.'

3.84. (E) å så när du börjar spänna däruppe då liksom.. så ser du att de li finns en skåra.. längst uppe på.. **sadeln** tror jag de heter.. så den kommer på plats där längst upp.. närmast skruven

3.84. (E) and then when you start tightening up there sort of.. you see that there is a notch.. at the top of the.. **nut** I think it is called.. so it fits in up there.. next to the screw

8.2. Summary

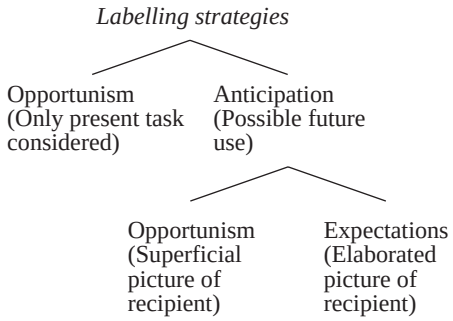

Figure 8. Labelling strategies

In fact, there are two distinct dimensions here. On the one hand we have the possibility of considering only the present task and therefore not introducing any labels that are new to the novice. The gains in information efficiency are not considered so important as to motivate the effort of such an introduction. In fact, if the labels that the experts try to use very often will require an explanation, it will be more efficient only to supply the explanation. The violin-specific labels will only be efficient when they can be used smoothly without requiring explanations. As the present task is rather narrowly defined, there is not much room in the task for repeated use of the labels.[19]

On the other hand, we have the strategy of striving to optimize the vocabulary, since, as we have seen, a specialized vocabulary will be more efficient in repeated use. This strategy divides into two sub-strategies: in the first, the expert introduces new labels without taking the linguistic level of the subject into account. In the second, the expert tries to adjust her

labelling, even after opposition from their interlocutor...)

[19]While the previous section concerned anticipation internal to one task, the anticipation in this section concerns anticipation from this task to possible future tasks.

linguistic level to the level of the subject trying to introduce the new labels in a smooth way.

9. CONCLUSIONS AND GENERAL DISCUSSION

Figure 9. From Leeper (1935).

Depending on our prior experience, our view of the world is different. An 'expert' and a 'novice' will not perceive the same things concerning for example the violin in front of them. With increasing experience, the details will fall in place, the functional parts will appear, much like the contours of the violin above that are hard to distinguish for most people if no context is supplied.

The performance of a task is similar to this – I have used the metaphor of an unknown road with limited sight that is gradually explored. The first time you perform the task you are unable to orient freely, but as you continue, your failures and your experience will make the details appear, and the forks and road crossings will be visible to you even before you reach them. And with some tasks, in the end you will perhaps have an overall view of the task so that you can explain it to another person. You have become an expert of the task.

The explanation of a task requires not only knowledge of the task but also of the knowledge of the persons with whom we interact. This is the problem of intersubjectivity which is my main interest in a larger context: knowledge of the other person makes the communication easier because we can then adapt our conceptual and linguistic level to the other person. But we can of course not gain direct experience of the other person's knowledge so we have to content ourselves with different cues.

This is the problem of expectations in a nut-shell. In many situations it will be useful to draw inductive conclusions from a rather limited set of perceptual cues. If we see a tiger tail, it is often healthy to expect the presence of the rest of the tiger instead of waiting to see it appear. But expectations also have important drawbacks. If we rely too heavily on knowledge built up in previous situations, our mental models will be too rigid to adapt to future purposes.

> Expectations are demands in two ways. Firstly, the person having the expectation has a demand on the external world that it conforms to his expectation. The reason for this demand is that he has invested cognitive effort in creating the expectation, and he may also have built other expectations on it. Secondly, his investment leads to a demand on himself to check with the external world whether his expectation is fulfilled. The reason for this is that we act as if our expectations were true, as if unknown values were known. (Winter and Gärdenfors, 1995)

In the task at hand, expectations are present in mainly two dimensions, already shown in the first figure. 1. Expectations in the time dimension, also called anticipations, play a role in our construction of the future. The experts who use this strategy pay attention to information available in the present situation that is to be used in future parts of the task. 2. The knowledge of the other person can be profound or superficial. If it is profound, the subjects use cues to get to know unobservable aspects of the other. If it is superficial, the subject places the other on a certain level without checking whether it is adequate or not. This is of course a very rough dichotomy, and I am not sure that we can find any subject who unequivocally displays any of these extremes.

What I have shown in this paper is rather the choice between different strategies on different levels: recipient design, anticipation and linguistic labelling. I have also designed some simple measures to show expectation strategy and its close relation to power and initiative. Knowledge of this field of human interaction is crucial to the further investigation of intersubjective linguistic meaning.

ACKNOWLEDGEMENTS

This project is financed by Lund University. Many thanks to my subjects, Peter Gärdenfors, Tom Givón, Tom Andersson, Paul Hemeren, and the Lund University Cognitive Science group for invaluable help with this project.

Figure credits: 2. Drawing by Mårten Belin.

More information about my projects is available at http://lucs.fil.lu.se/Staff/Simon.Winter/.

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