

# The use of demonstratives in Dutch telephone conversations

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# Foreword

This thesis was written as part of the master program Cognitive Artificial Intelligence at the University of Utrecht. I would like to thank my mentor Robbert-Jan Beun for his patience and support. I greatly appreciated the help with my English I got from my father, Bert Klijs. The corpus that will be used was made by Arnout Terpstra, Cliffred van Velzen, Robbert-Jan Beun and Rogier M. van Eijk, working for the department of information science of the University of Utrecht, it saved me a lot of work, therefore I'm thankful to them.

# Abstract

Words like “deze” (“this”) and “die” (“that”) are part of a group of words called demonstratives. Demonstratives may refer to objects within a text or to objects inside an accessible world. Moreover, demonstratives can be classified as proximal or distal, i.e. in folk language respectively indicated as nearby and far away. In this thesis we will investigate the criteria for using one of the two forms in a dialogue. It will be shown that the nearby/far away distinction is insufficient to explain the syntax of those forms, and therefore, cannot be used as an unambiguous criterion to choose one of the two forms in a language generation application. This will be done by comparing two views on demonstratives, the traditional and the alternative view. The traditional view is based on linking the meaning the form with distance, this may be a metaphorical distance. The alternative view looks at how hard it is to find the referent, and how important the referent is. The alternative view turned out to be more in line with our data which is based on telephone conversations. We compared the two views by measuring the relative usage of proximals and distals in relation to certain properties related to the referent. For example the distance between the use of the referent and the demonstrative, and the importance of the referent.

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# Chapter 1

## Introduction

Imagine some time in the future. Because the work of policemen was becoming more and more dangerous, androids were deployed together with policemen to do the most dangerous tasks. To do this the androids have a very good accuracy with a laser gun, used to kill criminals when needed. They communicate with policemen using natural language, and they have some decent artificial intelligence to help them performing the desired actions.

Policeman Fry Hook is just about to break into a house where a terrorist is supposed to hide. He asks the android to break open the door, while he follows. They enter a room where a man is tied to a chair. Fry asks the man who he is, and whether he knows the owner of the house. “I don’t know.” says the man, “I just woke up when you entered the room, I don’t know how I got here, and don’t know this place.” Then they hear a voice telling them to drop their weapons, or a bomb will explode. Fry, trusting the superior sensors of the android, hopes the android will be able to determine where the sound is coming from, and shoot him before the terrorist explodes the bomb. Fry says to the android: “Quick, shoot this man.”

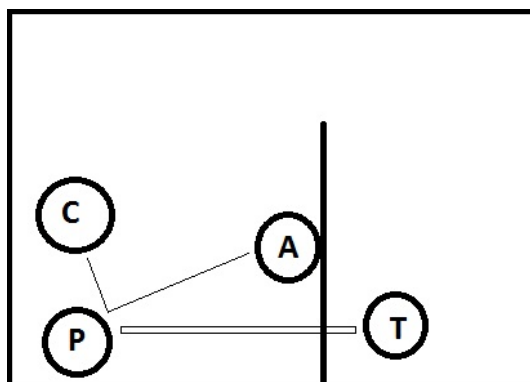


Figure 1.1: The situation in the house, just before the Android (A) shoots the man tied to the chair (C), with the police man (P) and the terrorist(T)

Unfortunately the android does not shoot the terrorist, but the man tied to the chair. Before Fry can realize what went wrong, the terrorist let the bomb go off, causing Fry to die. An oversight of the situation just after the terrorist announces himself can be seen in figure 1.1. Note that the location of the terrorist can only be inferred from him speaking, because a wall is preventing seeing him.

By making a couple of assumptions it can be explained what went wrong. The first

thing to consider is that both the android and the police man can refer to both the man in the chair and the terrorist, because they are part of their domain, as can be seen in figure 1.2. They can refer directly to objects in their shared physical domain by pointing, or indirectly by using language.

The reference the policeman makes by using “this man”, has to be interpreted by the android from the position of the policeman, the speaker. The android uses a classic interpretation of demonstratives. Since “this” is a proximal and the man in the chair is the men nearest to the police man, he takes the men on the chair to be the referent. The police man however uses demonstratives in another way. He wants to point attention to the terrorist, because he is about to blow them up. Therefore he uses “this man” to refer to the terrorist rather than “that men”. Although knowing the outcome it may be obvious the terrorist should be the one who should be shot, it may be that the police agent saw something, which might have given a reason to kill the man on the chair.

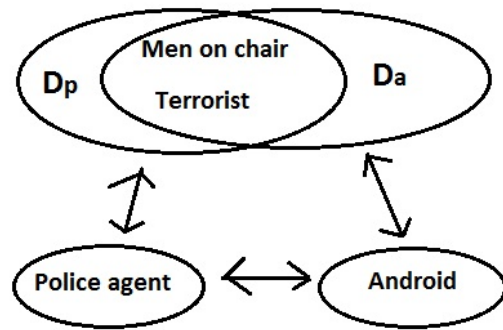


Figure 1.2: The android and the policeman each have a domain to which they can refer,  $D_p$  and  $D_a$ . The man on the chair and the terrorist are both part of their domains.

In this particular case a couple of human lives are lost who could have been saved, if only our understanding of demonstratives would have been better. The example may be a little far-fetched, and it probably takes some time before we could build such androids. Androids are however already used to assist people. For example in taking care of the elderly in Japan. It is possible that miscommunication between humans and artificial systems about what is meant by “this” or “that” can lead to a lot of frustration.

Words like “this” and “that” are part of a group of words called demonstratives. All known languages seem to have these kinds of words (Diessel, 1999). What all demonstratives have in common is that they refer to something. The most basic use is using a demonstrative while pointing, for example, when a child asks his mother “What’s that?”. In this example the physical context is needed to determine the referent of “that” in order for the mother to give an appropriate answer. The referent is the object to which is referred. Demonstratives can also be used to refer to other things than objects visible in the physical surroundings. They can be used to refer to objects not directly visible to the participants, or even to objects that don’t exist. Demonstratives can also be used to refer to geographical places, points in time, events, propositions and speech acts depending on the language.

All languages have different forms of demonstratives for at least what is called nearby, named proximals and far away, named distals (Diessel, 1999). Some languages also have separate forms for between nearby and far away, or for other properties. The typical way

English demonstratives are used can be seen in Figure 1.3. Here 'this' and 'these' are used for one item or multiple items which are close. For items further away, 'that' and 'those' are used. For example, "I like this book much better than that book." when the first book is closer to the speaker than the latter book.

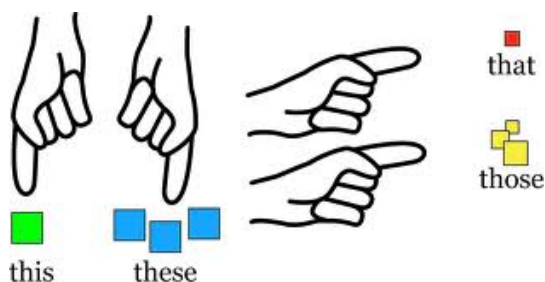


Figure 1.3: Some English demonstratives  
English Teacher (2012)

The difference in meaning between proximals and distals is problematic for several reasons. First of all, it is unclear at what distance proximals are preferred over distals and whether a preference to use proximals at closer distances really exists. The second problem is that proximals are sometimes used for items that are far away and distals are sometimes used for items that are close. The third problem is that when a speaker does not refer to something in physical space, the meaning of near and far is unclear.

The trouble with the different forms of demonstratives cause several problems for artificial agents. When analyzing human speech, it is hard to determine why a proximal or a distal was used. This could hold valuable clues in determining the meaning. For example when someone says: "I would like to make an appointment this Monday". Even on a Tuesday it has to be interpreted as the next Monday, and not the Monday closest to the present. A correct analysis of the used meaning is necessary for an artificial agent in order to get a good understanding. The android from the example has to know that "this man" refers to the terrorist, and not to the guy on the chair. To be able to do this properly the context has to be taken into account.

There are roughly two views on the use of demonstratives. One claims the proximal form is used for items that are the most easy to access (Ariel, 1988), (Gundel et al., 1993), (Byron and Stoia, 2005), (Rooij, 2006). This could be because they are physically close, but also because they were just mentioned. This will be called the traditional view. This name is chosen for it, because it is the standard way of seeing it. When demonstratives are not used in relation to a physical distance, the distance is understood metaphorically. Close in physical space to 'here' then becomes close in time to 'now'. Distals are instead used when the referent is not close.

The other view on demonstratives claims proximals are used to make them stand out (Kirsner, 1979), (Kemmerer, 1999). This idea is rather new, therefore it is called the alternative view. This view is based on research on the actual use of demonstratives. There are a couple of reasons why something can be chosen to stand out. For example because it is considered important, or because special attention is needed to see the referent.

The android is programmed by the traditional view, the police agent acts in line with the alternative view. This is why the android 'thinks' the man in the chair needs to be shot, because it is the closest. The policeman wants to point the attention to the

terrorist, which can't be seen. Because of this, extra effort is needed and he is using "this" to refer to him.

The goal of this thesis is to get a better understanding of the pragmatics of demonstratives. We will investigate the use of proximal and distal demonstratives in spoken dialogue and focus in particular on the two views, i.e. the traditional and the alternative view. *Most importantly we will try to determine which of the two views on the meaning of demonstratives best describes the actual use.*

The difference in meaning between proximals and distals will play a role in the generation as well as in the interpretation of demonstratives. When generating a demonstrative yourself you must be able to pick the 'right' form. When interpreting a demonstrative someone else uttered you need to find the referent, and the form used may help you find the referent quicker. It is assumed a proximal or a distal is chosen because it has a certain meaning, which is also used when the demonstrative is interpreted. In the example we focus on the interpretation of language, it is the android who wrongly interprets the words of the police agent. For our research it is easier to focus on the generation, since it often subjective how a demonstrative is interpret. In the conclusion we will come back to this issue.

A reference to an object can be made by a speaker by using a verbal expression. A demonstrative may be part of this expression, or the expression might be just the demonstrative. The verbal form used is called the referring expression. The referring expression can refer to different kinds of objects in the world. For example other words, physical objects or geographical locations can be object to which the referring expression refers. If a referring expression refers to another expression, this is called the antecedent.

Three theories about how to choose the right referring expression to make a reference will be briefly discussed. These are the Accessibility theory from (Ariel, 1988), the theory of Givenness by (Gundel et al., 1993), and a theory of gradient focus by (Strauss, 2002). The first two use the traditional view. Strauss' is more in line with the alternative view. The three theories are discussed in order to get a better understanding of the problem of picking the 'right' form. The difference in approach between the two views also becomes clear.

In chapter two also other literature will be reviewed which tries to determine the variables for choosing between the distal and the proximal form. Some variables which are supposed to be of influence are how well-known the referent is, how important the referent is and how much the object stands out. Some of these variables will be tested in this research. This is done to increase the understanding of what is or isn't playing a role when choosing between proximals and distals, and how it is of influence. Some of these theories will fit the traditional view, and some the alternative view. This chapter will start with some general information about demonstratives, the syntaxis, and the pragmatics.

In order to do research on the actual use of demonstratives, a corpus will be used which was made based on telephone conversations. The conversations were between a help desk operator from an internet provider and their clients. It will be described in detail in the third chapter. The third chapter will also contain definitions and methods concerning

the hypotheses. What will be done here is linking each view to certain properties related to the demonstrative and referent.

The results of this research can be found in the fourth chapter. Here the relative difference between proximals and distals is shown related to different properties. The fifth chapter is the conclusion, we will explain why we think the alternative view better fits the data than the traditional view. The discussion can be found in the sixth chapter. A big part of the discussion is about the problems defining importance. To get a better idea of the used corpus, one dialogue is included in the appendix A. The raw data is also included in appendix B and C, listing all the attributes mentioned in the third chapter.

## Chapter 2

# Overview of the literature on demonstratives

Demonstratives are interesting for their role in the evolution of language. According to Diessel (2006) demonstratives are a special class of words with unique features. Research has not been able to find the origin of demonstratives, like has been achieved with a lot of other grammatical categories. Sometimes a demonstrative may evolve into another syntactic type of word. A demonstrative can for example change into a definite article. This syntactic type exists in a lot of the languages over the world and almost always originates from a demonstrative Diessel (2006).

Demonstratives are used in all known languages, unlike some other types of words Diessel (2006). Also, demonstratives are among the first words children learn (Diessel, 1999). If the language has special forms for proximals and distals, the distals are learned earlier. For example the word “that” is an average among the first twenty words English children learn. Proximals are learned later, when the child has more experience. According to the alternative view the use of proximals is more complicated, which could explain them being learned later. Despite demonstratives seeming very basic, they appear to be more complex than one might expect.

This overview will start with the syntax of demonstratives. All the common Dutch and English forms will be discussed. More specific meanings are brought forward in the section about the different pragmatic uses of demonstratives. Here four different categories will be explained. Since the dialogue corpus studied in this thesis will be in Dutch, and most discussed research is in English, the differences in syntax and semantics are explained in separate sections. Three theories are introduced which are about choosing the right referring expression to make a reference. This is both done to get a better understanding of this problem, and to give more information on differences between the traditional and the alternative view.

The traditional view relates the meaning of demonstratives to distance, or a metaphor of distance, for example time. In a few papers the degree of importance is related to the use of either proximals or distals Kirsner and Heuven (1988), Piwek and Cremers (1996). Since this is an important issue for the alternative view, a large part of the section about

the alternative view is about importance. The chapter will end by giving a summary of the information together with the hypotheses following from it. These hypotheses will be further worked out in the next chapter.

## 2.1 The syntax of demonstratives

In this section we will mostly refer to the work by Holger Diessel. His book on demonstratives is the product of a broad research on the use of demonstratives in eighty-five languages (Diessel, 1999). The focus of his research was on finding the semantic and syntactic differences between different languages.

There are a couple of syntactic categories in which a demonstrative can be used. Diessel describes four different kinds. These will all be discussed, but the research will focus on the two categories that are most often used. Not all categories are used in all languages.

Sometimes a demonstrative occurs as an pronoun. A pronoun is used to substitute for a noun or noun phrase. For example, “it” can be used to replace a noun just mentioned. The replaced noun is called the antecedent of the pronoun. The referent of the pronoun is the object it refers to. When only a demonstrative without the help of other words like nouns is used as a pronoun it is used as an independent pronoun. When demonstratives are used as independent pronouns in argument positions of verbs and adpositions they are called *demonstrative pronouns*. For example in: “I would like that.”

If demonstratives occur together with a noun in a noun phrase they are called *demonstrative determiners*. For example, in “I would like that ice-cream.(1)” Some languages don’t have demonstrative pronouns or demonstrative determiners. If one of these two is missing in the language, it is replaced by some grammatical construction using the other type. For example, in English one could say instead of example (1): “I like that, it’s ice-cream.” When “I would like that.” is not possible because a language has no demonstrative pronouns, one could say: “I would like that one.”

When demonstratives function as locational adverbs modifying a co-occurring verb, they are called *demonstrative adverbs*. For example in: “I left it here.” Almost all languages have demonstrative adverbs, and in most of them they have a special form, while the other syntactic categories often have the same form.

When demonstratives are being used in copular and nonverbal clauses, they are called *demonstrative identifiers*. For example in: “This is ice-cream.” They sometimes have a special form, and in some languages have inflectional features. This is for example the case in French, where ‘-ci’ is used behind the noun for proximals and ‘-là’ for distals. Demonstrative identifiers occur less than demonstrative adverbs.

Not all syntactic forms in all languages have separate forms for distals and proximals. A syntactic form is the actual word used for a syntactic category. The syntactic form which is almost always distance-marked is the form used for the demonstrative adverb. This means the word which is used as demonstrative adverb also gives information about the distance of the referent. For example: “I would like to have the box placed there/here.”

In languages where the other syntactic forms are distance-neutral, demonstrative adverbs are sometimes used in combination with other syntactic categories of demonstratives. This is done in order to add the distance contrast, and is called reinforcing. Diessel gives examples from Alambalak (a language spoken in Papua New Guinea), French, and German to support this (Diessel, 1999). In the examples the only demonstratives that are distance-marked are adverbs. Even in languages where not all the demonstratives are distance-marked, the use of demonstratives that do make a distance demarcation is quite common.

The two most used forms in English and Dutch are demonstrative pronouns and demonstrative determiners. They are also called *pronominal* and *adnominal* demonstratives respectively. Often these are the only two types described, when reading about demonstratives on the net, for example (Miln, 2012). When used adnominal, the words added to the demonstrative to form a referential expression could be a noun or a noun and an adjective. In Dutch it may also consist of just a demonstrative and an adjective, this cannot be the case in English. For example the Dutch sentence, “Die rode zijn lekker”, would translate as, “Those red ones are tasty.” The addition of “ones” is needed to make a grammatically correct sentence.

In addition to using a demonstrative there may be an act of pointing. Children can use a demonstrative together with a pointing act to refer to anything they don’t know the word for. Pointing can also be a great help when learning a language, and when the object one is referring to is hard to see.

A special construction that is sometimes used in combination with the use of a demonstrative is left dislocation. Here the subject of a sentence is first introduced, and is later referred to. For example: “My red glasses, give those to me please.” Another special construction which is also used, but only in speech, is right dislocation. With this use, the referent is repeated with a demonstrative within the same sentence. For example, “I want you to get my glasses, those red ones.” It seems to put extra emphasis on the referent. The same information from the example can be put in the shorter sentence: “I want you to get my red glasses.”

### 2.1.1 The syntax of Dutch and English Demonstratives

Both English and Dutch have separate forms for the demonstrative adverb. The Dutch “daar” and “hier” and the English “there” and “here” are exclusively used as demonstrative adverb. The three other syntactic categories all have the same forms. Thus the actual words used for expressing the three other categories are the same. For all four syntactic types a proximal and a distal form exists. Sometimes the form also depends on the gender and/or number of the referent.

The English language has six different demonstrative forms which are commonly used. Of these there are three proximals and three distal forms. Two forms exist which are only exceptionally used, “yon” and “yonder”, used for items far away. Since they are almost never used they are not included in table 2.1. For the proximals, “this” is used for single items, “these” for multiple items, and in the position of adverb “here” is used. The distals are, “that” for single items, “those” for multiple items and “there” in the adverb position.



The Dutch language also has six different forms which are commonly used, but there are slight differences in the way they are used. When referring to a single item the form also depends on the gender in Dutch, whereas in English the gender has no influence on the form. For single proximal use the form is either “dit” or “deze”. When the object is of neuter gender “dit” is used, when the object has a common gender “deze” is used. For multiple proximal items, “deze” is used. For single distal use the form is either “dat” or “die”. When the object is of neuter gender “dat” is used, when the object has a common gender “die” is used. For multiple distal items, “die” is used. For a table with the Dutch demonstratives, see table 2.2.

Table 2.1: English demonstratives

Form	Category of demonstrative	Number	Distance markation
this	non-adverb	single	proximal
that	non-adverb	single	distal
these	non-adverb	multiple	proximal
those	non-adverb	multiple	distal
here	adverb	single/multiple	proximal
there	adverb	single/multiple	distal

Table 2.2: Dutch demonstratives

form	Category of demonstrative	Number	Gender	Distance markation
dit	non-adverb	single	neuter	proximal
dat	non-adverb	single	neuter	distal
deze	non-adverb	single	common	proximal
	non-adverb	multiple	both	proximal
die	non-adverb	single	common	distal
	non-adverb	multiple	both	distal
hier	adverb	both	both	proximal
daar	adverb	both	both	distal

## 2.2 The semantics of demonstratives

In contrast to the syntax, this section will focus on the function of the demonstrative. You can also call this the meaning. There is some overlap, as depending on the language, the function may also influence the form used. The section about pragmatics will focus on the different ways demonstratives are used. It can be hard to separate the semantics from the pragmatics. This is especially true when one is talking about demonstratives. The reason is that some pragmatic uses in one language can only be separated by looking at the perceptions and intentions of the participants in the conversation. While in another

language they may have a separate syntactic forms to distinguish these uses. For example, in Montana Salish a different syntactic form is used for referring exclusively to visible object. For the sake of clarity the different semantic forms used here are based on English and Dutch. As semantic markers this means we only have the distinction between proximals and distals.

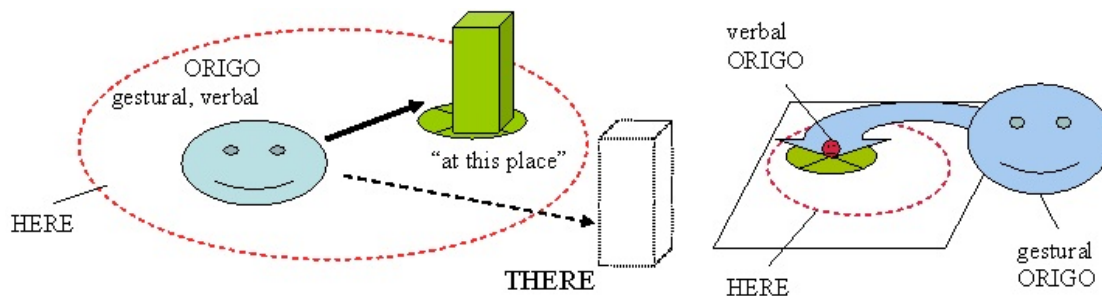


Figure 2.1: The deictic center (origo) according to Fricke (2007)

The main function or meaning of a demonstrative is to point to something in order to make a reference. The object or idea which is referred to is called the referent. The reference can be made directly to the object or idea, by pointing or giving a description. The reference can also be made by referring to the description, or an earlier pointing act. For example: "Do you see the blue building over there? I really like it. Here it is used to refer to the actual object, the blue building, which is the referent. The description 'the blue building over there' is the antecedent. Without the antecedent it would be almost impossible to use 'it' to refer to the blue building.

In most cases it is possible to relate some distance to the use of the demonstrative. The distance is between two points. One of them is the object which is referred to, the referent. The other point is the point from where the reference is made, the origo. In most cases the origo will be the speaker. The place from where the reference is made, the origo, is also called the deictic center.

Traditionally, the main division between demonstratives is that between the ones used for referents close to the deictic center, proximals, and demonstratives used to refer away from the deictic center, distals. In case of a physical object, the distance is the physical distance between the object and the location of the speaker. The deictic center can also be a point in time, using the time between two points in time as distance.

The deictic center could also be shifted, for example when the attention of both the speaker and the listener is already focused on some physical object. For example in "Get that blue block, which is next to the red one you just put into place." The deictic center may shift to the red block. It depends on the language and how the demonstrative is used what the deictic center is, but most often the deictic center is related to the speaker. The possible shift of the deictic center is suggested by several researchers. Picture 2.1 is taken from Fricke (2007), according to her view a pointing gesture semantically specifies the meaning of a demonstrative, in particular when using "hier" in German. The possibility of different deictic centers makes it sometimes unclear which physical distance is related

with the use of a demonstrative. A shift of the deictic center is called a displacement.

Diessel (2006) suggests that demonstratives serve two functions: besides indicating the location of a referent relative to the deictic center, they may serve to coordinate the interlocutors' joint attentional focus. By using an additional pointing gesture this is made easier, the pointing gesture is strongly associated with the use of demonstratives. The first use of demonstratives with children is also in combination with pointing. Also with other uses of demonstratives, for example when referring to linguistic contexts, they serve to focus the attention. In his conclusion he says about demonstratives: "They serve one of the most basic functions in language, i.e. they establish/manipulate joint attention, which is not only important to coordinate the interlocutors' communicative interactions, but they also play a key role in the internal organization of discourse and the diachronic evolution of grammar" (Diessel, 2006).

The distinction between proximals and distals is originally based on physical distance, but in many cases the referent of a demonstrative is not present in physical space. In telephone conversations direct referring to physical objects is rare, but possible. For example someone might say: "I will press this red button now.". It is sometimes possible to explain a preference for a proximal or a distal by using a metaphor. This depends on the situation. For example, events that happened close to present are near, and events that take a while till they take place, or happened some time ago are far. For example contrasting: "Are you going to this reunion?" with "I don't remember him attending that reunion." The first is referring to an event in the near future, the second to an event some time, possibly years, in the past. Time is seen as distance in the metaphor. Besides time other dimensions can also be used as a metaphor.

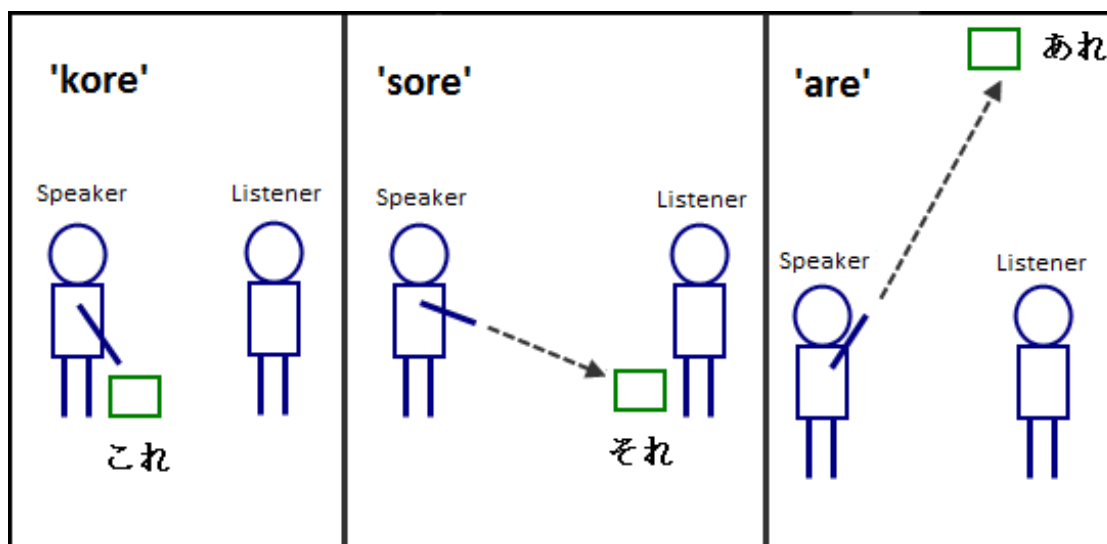


Figure 2.2: Some Japanese demonstratives by Koy (2012)

Some languages have more forms to make divisions. If they have another form this is most often used for objects between far and near. Something less common is a special

form for near the hearer, this is the case in Japanese, see figure 2.2. The most left picture views the use of “kore” which is used for referring to items close to the speaker. In the picture in the middle “sore” is used for referring to items close to the listener. To the right, “are” is used to refer to items which are at some distance from both the speaker and the listener. All three forms are used as demonstrative pronouns. For demonstrative determiners the same three meanings can be expressed, but the forms are different.

A few exceptional divisions are made to mark whether the referent is ahead of the river, down the hill or whether the item is visible. One could imagine that for example for hunting or fishing it was of importance whether something was up or down the river, it also makes clear in what direction to look for the referent. Other features besides distance features encoded by demonstratives are dependent on the properties of the referent. For example, the animacy, number, gender, type of use or precision of the antecedent can be coded into the demonstrative. By this information the form of the demonstrative helps in finding the referent.

### 2.2.1 Differences in the use of Dutch and English Demonstratives

There are examples where the English use of demonstratives is clearly different from the Dutch use. Kirsner (1993) gives an example in which for the anaphoric use a distal can be used in Dutch, whereas it would be wrong in English. This happens when a word is repeated, and is first mentioned with the proximal. For example, when someone first says while pointing to a lamp: “Yesterday I bought this lamp on the market.” It is strange to refer to it with “that lamp” in a following sentence. For example, to have a next line: “I really like that lamp.” If one does this, it seems like it is about another lamp. In Dutch it’s fine to make a second reference with a distal, when the first reference was made using a proximal, but in English it is wrong or at least strange. A proximal is preferred for making a reference when a proximal was already used before to refer. an item referred to before by a proximal.

Another difference is that there is no “new-this” use in Dutch. This is the use of a demonstrative in a place where you would expect an indefinite article. In other words you can use a demonstrative even if it’s not clear to the other person what particular item you’re referring to in English. For example in: “After the fight this man came in, and it became quiet again.” The differences between the languages form only a small part of the use of demonstratives. Since in most cases the distinction between proximals and distals is the same, we assume that all hypotheses will apply to all languages using a proximal and distal form of demonstratives, which is the majority. In the next section I will go into more detail on the different uses of demonstratives, and state some hypotheses.

## 2.3 The pragmatics of demonstratives

In this section the different pragmatic categories of demonstratives will be discussed. A lot of research on demonstratives focusses on one or a few categories. Sometimes only one category of demonstratives is used to investigate the meaning of demonstratives. Here

first the four categories from Diesel are introduced, and then the four categories from Himmelman are discussed in more detail. For the traditional view different metaphors may be applicable to explain the meaning dependent on the category. For the alternative view dependent on the category there may be different reasons to put attention to the referent.

Diessel (1999) describes four different types of usage of demonstratives. The first is *anaphoric use*, used to refer to objects which are mentioned before. Anaphoric demonstratives serve to keep track of objects during discourse. They refer back to an earlier mentioning of a referent. For example: “I would like to talk more about that later.” A referent used for tracking typically is referred to couple of times, and typically is a physical object.

The second use is *discourse deictic use* which links two discourse units by referring to propositions or speech acts. The referent usually is not repeated later on, since it is no longer relevant. For example: “I’m just going to ignore that last sentence of you.” Discourse deictic use can be used to refer back as well as forward. For example: “Let me just say this: I really appreciate your help.”

The two other uses Diessel describes are *exophoric use* and *recognitional use*. Exophoric use is when referring to something in the physical space, often using a pointing gesture as well. For example: “I like that sweater.” Exophoric use is used mostly to introduce referents. It can also be used to refer to a referent already introduced.

Recognitional use is when referring to something that needs to be remembered. This can be because the last reference made was some time ago, because the referent is part of common knowledge or because the referent is part of shared knowledge. For example: “Do you remember that strange fellow we saw biking last week?”. It either introduces a new referent, if the subject has not been talked about in the current conversation, or reintroduces a referent which was not talked about for some time.

A slightly different way of dividing demonstratives in different types is proposed by Himmelmann (1996). Overall the classification by Himmelmann is more strictly defined than by Diessel. The way of dividing the pragmatic uses of Himmelmann is therefore chosen for this research. Below we will describe the four classifications used by Himmelmann: situational use, discourse deictic use, tracking use and recognitional use.

The proposed classification is based primarily on discourse function or, more precisely, on interaction goals. The distinction is further supported by formal evidence. He has examples from different languages on all uses (Himmelmann, 1996). Each of the examples has at least one demonstrative element or construction linked to its specific use. Since the notion distance means different things to all these categories, it is interesting to take it into account. For example for the recognitional use, the degree of familiarity could be seen as deciding whether something is close or far.

### 2.3.1 Situational use of demonstratives

The first classification by Himmelman that will be explained is *situational use*. The use involves a notion of relative distance to some deictic center. The deictic center is most times the speaker, but may also be some other point using displacement, see section 2.2.

The reference is usually made to something in physical space, but could also refer to something pretended to exist in physical space. Situational use is used with referents who are not yet introduced.

Self-reference is part of situational use both for linguistic units and acts. As for example in the sentence: “This is a story from the medieval period.” (Himmelman, 1996). A proximal is expected with self-reference, since the deictic center and the referent are the same. In Dutch and English one can’t use self-reference with distals. Self-reference does not happen very often and since for English and Dutch the difference between proximals and distals is clear on this point, it was not part of a hypothesis.

There is another type of use which is also part of situational use. It is called *new-this*, and was already introduced in section 2.2.1. it is used like other situational uses, except the referent isn’t physically present and isn’t known to the hearer. This use serves to introduce a referent which is new to the hearer. There is no substitute with a distal, like “that” in English with which this can also be done. Rather when in a similar situation “that” is used in it seems to be recognitional use. Compare for example: “Remember that car we saw last week?” and “I tried to get a good look at this car.” In the first sentence it is expected the hearer remembers what the car looked like. The second sentence could introduce an item not known to the hearer in the right context. This particular situational use has no physical distance related to its use, since the referent is not part of the shared physical domain. It should be possible for an artificial agent to recognize this use, in order for him to stop searching for the referent when interpreting language. He could on occasion also use it in the generation of language, but an indefinite article will also work in the situation were “new-this” is used. Using “new-this” instead of an indefinite article is putting more attention to the referent than an indefinite article.

From the traditional view physical distance is the most straightforward variable in determining whether a proximal or a distal should be used with situational use. The distance is taken from a deictic center, commonly the speaker, to the referent. There are two ways to make a distinction between close to the deictic center and not close to the deictic center. The first possibility is when the difference is determined by the absolute distance. The second is using a relative distance, related to the context.

The distance the arms can reach seems the best candidate to mark an absolute boundary. This is because items within arm reach trigger different parts of the visual system, and make a functional difference between close and far, according to some research done (Kemmerer, 1999). While saying it might be that the physical difference and the linguistic difference between close and far is the same, Kemmerer gives some good arguments why it probably is not so. The fact that not all languages divide space in two is one of them. Another important one is that the reason to divide the space is different. With demonstratives the difference is made to make it easier to find the referent, by making a contrast between items close and far, whereas for our perceptual system it is important to ‘know’ whether an object can be grasped, and the relative distance is less important.

So there does not seem to be a sharp border dividing the space, but maybe the distance should be regarded in relation to the context. To some degree, what seems close or far has to do with how many other possible referents are near. For example: “Here

comes my mother.” is valid when in some open space and the mother is 100 meters away. But in a crowded room one can say: “There is my mother.” when she is only 10 meters away (Kemmerer, 1999). Testing whether the relative difference is part of the meaning of demonstratives, is hard to do. This is because the subjective nature of relative distance seems almost impossible to explicate. This makes it also hard to use it for an artificial agent. If we want an artificial agent to better understand these type of demonstratives, a better understanding of what makes something relatively close or far is needed.

### 2.3.2 Discourse deictic use of demonstratives

The second use to be explained is *discourse deictic use*, it is used for referring to a discourse segment or a point in time. A discourse segment can be one word, but more often it's a sentence, or a couple of sentences; occasionally it can also be a complete story. This discourse segment can be a proposition, a speech act or a point in time. When a demonstrative is used to point to a discourse segment, it is often placed just after or before that statement. If the distance would be longer it would not be clear to which discourse segment it refers. For example when someone is saying: “That’s true.” it is expected it refers to what was said just before. It is also hard to try to refer to discourse segments at larger distances because it is hard to make a reference to them. Discourse deictic use can be used as a cataphor, referring to a discourse segment which has yet to come. For example: “I now would like to say this to you: ...” using the demonstrative before the referent.

Discourse deictic use can also have a point in time as its reference. Demonstratives that refer to a point in time are put in the discourse deictic use because for their meaning they depend on the context of the discourse. For example: “this moment” points to some specific time at the moment it is spoken. Here the difference between using a proximal or a distal seems to have a relation to the time between the event and the present. Proximals are used for points in time or events about to happen, or currently happening. Distals seem to be used for events and point in time have happened some time ago or will take place some time in the future. For example: “This week I worked hard.” and “I was sick that week, so I didn’t do much.” So for discourse deictic use the distance as a metaphor depends on the referent being a point in time/event or a proposition/speech act.

### 2.3.3 Tracking use of demonstratives

The third is the *tracking use*, which is used to keep track of entities already introduced. Tracking use serves to make references to something recently mentioned. Using a demonstrative instead of repeating the name of the referent may be more efficient. It is possible to use the demonstrative in a noun phrase to tell something new about it. For example a particular apple may later be referred to as “that rotten apple”.

Tracking use can also be used to refer to a part of a whole that was already mentioned. This can only be done when one is talking about multiple items of the same kind, and then picks out one of them. For example, when first talking about “those two files”, and

after a short while referring to one with “that file”. When referring to a part of a whole which was mentioned earlier it is not tracking use.

Since tracking use is used for repeating the same items, it is interesting to see if there is any influence of who mentioned the item last. With discourse deictic use it was assumed that proximals more often are used to refer to propositions last mentioned by the speaker. Since speaking is a more active process than listening, objects last mentioned by the speaker can be seen as being closer to him. It is expected with tracking use that proximals are used more often than distals to refer to objects last mentioned by the speaker. The distance between the current and last mentioning is tested in relation to the demonstrative used.

#### 2.3.4 Recognitional use of demonstratives

The fourth use is the *recognitional use*, used for entities which are assumed to be known by the speaker, but have not yet been named explicitly. It is also used when the last time the referent was mentioned is too distant for using tracking use. It is possible the hearer needs a clarification to know exactly what is meant. Since it is harder to guess what an other person knows than what an other person can see, the chance for misunderstandings is higher with recognitional use.

In the case of recognitional use the referent is not found in the direct physical space, and the referent was not mentioned recently. We can still make use of some distance metaphor, however. Some memories are closer to us than other memories, because they are more vivid. Since recognitional demonstratives refer to part of memory, this could be of influence. A speaker may for example use a proximal when he introduces a referent he thinks the listener knows and a distal when he is less sure. One factor of influence can be the time that has passed by since the antecedent was seen or talked about.

The difference with tracking use when referring to items mentioned before is that tracking use is supposed to work with the short term memory, and recognitional use with long term memory. The traditional view would claim that proximals are more often used with referents which are closely related to items just mentioned, making them more accessible. Another way a referent can be ‘closer’ is because it was recently on the news, or in case of an event it took place close to the present. The alternative view would link proximals to items that deserve more attention. This could be because the referent is important, or because the referent is hard to remember. When something is harder to remember more ‘force’ is needed to get to it. This could be when referring to an event that took place long ago.

#### 2.3.5 The relevance of the pragmatic use for the meaning of demonstratives

Dividing the use of demonstratives into different pragmatic uses seems useful for a couple of reasons. For example, the distance between the referent and the speaker could be measured by different ways dependent on how the demonstrative is used. It may be the case that depending on pragmatic use, different characteristics are involved in the



meaning of the demonstrative. For example, with discourse deictic use, the question whether one is referring to words spoken by himself originally may be important.

The type of referents also vary with different pragmatic uses. When referring to speech acts or events, there is no physical distance between the speaker and the referent. With situational use, referring to an object, there is a physical distance. By distinguishing on pragmatic uses, it becomes more clear why some characteristics can't be used with some demonstratives. A table with an overview of the different categories can be found in section 3.4 where the categories will be uniquely defined.

## 2.4 The process of referring

In the following we will discuss three theories that may explain the choice of a particular referential expression to make a reference to a referent. Roughly, the first theory focusses on the accessibility of the referent; the second theory focusses on the givenness of the referent; the third theory focuses on the importance and the force by which the referent has to be put into short term memory.

The assumed correct referential expression is based on the work of Grice (1975). He gives four maxims in this paper which are thought to play an important role in the pragmatics of language. Of these four maxims there are two which play a major role in choosing the right way to refer, in particular the maxim of quantity. This maxim can be shortly described as: make your contribution as informative as is required, and do not make your contribution more informative than is required. To a lesser degree the maxim of manner is also of influence; this comes down to avoiding ambiguity and obscurity of expressions. The right referential expression based on these maxims is the one which makes clear what the referent is with the least effort needed.

There are many ways to convert the maxims into rules or guidelines for particular cases. For example one could focus on the effort of the speaker to find the right referential expression, looking around for pointers, pronouncing the words. Another point of focus could be the effort of the hearer to find the right referent. The hearer must interpret the referential expression and search for the right referent. For example, when "the queen of the Netherlands" has already been introduced, a next reference could just be "the queen". When she was just mentioned, only "she" might do, but only in the absence of other possible referents for "she". If there are other possible referents, the referential expression would become ambiguous.

The first two theories focus on the effort needed to find or recall the referent. The first theory focuses on how accessible the referent is, and the second on how or where the referent is found. A third theory is based on focus, it is more in line with the alternative view of the use of demonstratives. We limit our view to what the theories predict about demonstratives, focusing on the difference in proximals and distals.

### 2.4.1 Accessibility theory

Accessibility theory links the expression used to make a reference with the effort needed to retrieve the antecedent (Ariel, 2001). For example: something just mentioned is recalled more easily than something mentioned some time ago. There are more variables which influence accessibility besides the distance to the last mentioning. For example how well one knows the referent, and the degree to which the referent stands out among similar objects. Certain words or combination of words are suggested to be used for a certain degree of accessibility. A diagram with eight degrees of accessibility can be seen in table 2.3. Demonstratives can be found at level five and six. Only pronouns and possessive noun phrases are considered to be more accessible. The figure was made based on (Ariel, 1990) by (Ho-Dac and Péry-Woodley, 2009). In general it means that if the expression gets longer, the accessibility becomes less. Ariel claims that demonstratives together with a noun, so when used as a determiner, are used for less accessible referents than when used as pronoun, without noun. In short, pronominal use marks a more accessible item than adnominal use. According to Ariel for each group the proximals are used for the more accessible items.

There are four factors according to (Ariel, 1990) that determine the accessibility of a referent. The first factor is *distance*. This can be the physical distance when referring to something in physical space. It can also be a metaphorical distance. For example close in time is more accessible than far away in time. The second factor is the *saliency*. This is when the object has something inherent to it that makes it stand out. For example, when a baby starts crying someone can say: “I hope it will end soon, I already got a headache.”, without first introducing the baby or the sound it makes, since it kind of introduces itself. It introduces itself by being prominent. The third factor is *unity*. When there is a paragraph break, anything before the break becomes less accessible. A new chapter has an even stronger effect on accessibility. These are examples for written text. In conversations there is also some form of unity. For example, before and after the bell rings marks the start of class in college. The last factor is the *competition* between different referents. When referring to the Queen of the Netherlands for example, once named and if the distance does not get more than a few sentences “she” will probably be enough to refer. But as soon as another female is introduced this is no longer the case.

Research on demonstratives has shown conflicting results which of the demonstrative forms, proximals or distals, are used for more accessible items. Because proximals are supposed to be used for items which are close, and thus physically more accessible than distals, proximals seem to be more accessible. This also seems to be the reason why they are more accessible according to Ariel. One of the factors making it more complex is that as the referential expression gets bigger, by adding a noun for example, the suggested accessibility goes down. Another problem is that there are many aspects that could play a role in determining the accessibility, making it sometimes hard to determine. A way to exclude as many as possible factors is by looking only at the situational use in a physical context.

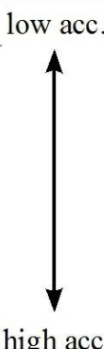
indefinite description or special construction	0	 low acc.
proper name without lexical reiteration	1	
long definite description without lexical reiteration	2	
definite description with lexical reiteration or short	3	
reiteration of a proper name (“redenomination”)	4	
long demonstrative description without lexical reiteration	5	
demonstrative description with lexical reiteration or short	6	
pronoun or possessive NP	7	

Table 2.3: Degrees of accessibility and the connected referential expressions Ho-Dac and Pèry-Woodley (2012) adapted from Ariel (1990)

### 2.4.2 Givenness theory

Another model, close to Ariel’s theory about reference and form, is Gundel’s model based on states of givenness Gundel et al. (1993). They claim that the referential expression used gives information about the cognitive status of the referent. All the states and some expressions best fitting the state can be seen in figure 2.3. There are six different states, each having a type of word that fits best. The higher the state, the more clearly it is given. In focus is the highest state, it is something that has just been mentioned, and is the current center of attention. Referential expressions associated with a certain state can be used for higher states, but not for lower states. This is because a certain state also has all the states which are lower. For example, a referent which is ‘in focus’ also has all the other states, a referent which is ‘activated’ has all other states except ‘in focus’. Because of this “it” can only be used when the state of the referent is ‘in focus’, but “this” may also be used when the referent is ‘in focus’.

Gundel et al. (1993) use the maxims of Grice (1975) to explain why even though it is possible to use different referential expressions for different states, in most cases the highest possible referential expression is used. The first part of the maxim of quantity recommends to make a contribution as informative as is required. This means that according to the maxim the referential expression best matching the state of givenness should be used. Not doing this may lead to misunderstandings, but is not ‘wrong’, according to the givenness theory. When for example, someone wants to refer to a referent which is ‘in focus’ the use of a different referential expression, containing more information than when using “it” can cause the listener to look for another referent.

The hierarchy of states is both a strength and a weakness of this theory. The strength is that the same referent can become in focus, and after some time becomes activated and familiar again. It also helps to make the theory clearer than the accessibility theory which does not name and describe the different classes, but only relies on a degree of accessibility. The weakness is that because the words can also be used for words of higher states, it does not predict much. For exceptions there seem to be ad hoc explanations.

Another problem with the theory is that the different states of givenness are not clearly defined. This makes it almost impossible to test the theory.

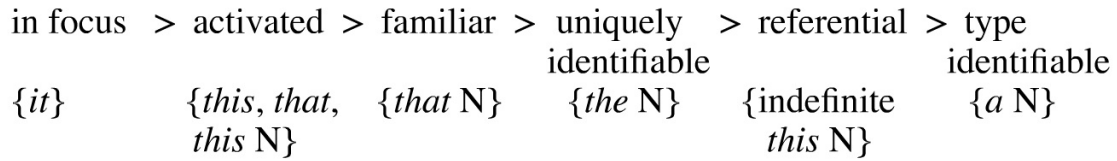


Figure 2.3: States of givenness with associated linguistic forms Gundel et al. (1993)

As we can see in figure 2.3 there are three states that are linked to referential expressions using demonstratives. These are referential, familiar and activated. The indefinite use of ‘this’ is applied when using the ‘new-this’, as described in section 2.3.1. Being *referential* means there is a certain referent which is mentioned, but it does not need to be unique, nor does it need to be identifiable by the listener. The state of being *familiar* looks a lot like recognitional use as defined by Himmelman. In contrast to referential items, it is clear to the listener what the referent is. The referent is known either from memory or from the physical context. It is used in combination with the distal adnominal demonstrative. The last state used with demonstratives is *activated*. The referent must be available in the working memory of the listener to be of the activated state. When the referent is also in focus, it is more likely ‘it’ is used to refer to the referent.

A familiar entity can be retrieved from long term memory or short term memory. According to the givenness theory there is no other demonstrative than the distal adnominal demonstrative which can be used for this function. It is therefore expected that all recognitional uses will be distal adnominal demonstratives according to givenness. The problem is that the givenness theory does not explicitly describe what ‘familiar’ means.

In a couple of ways the theory of givenness looks less like the traditional view compared to the accessibility theory. The link with proximals being related to items which are close is stronger with the accessibility theory. Another aspect is that the focus lies more on the listener than the speaker. They both look at the present state of the referents, which makes them in line with traditional use. The last general theory about reference will also say something about what the status of the referent should become.

### 2.4.3 A demonstrative system of gradient focus

The last theory that links the use of the demonstrative form to the ease of finding the referent is Straus’ theory of gradient focus. The theory of gradient focus is based on a classification into three scales of different focus (Strauss, 2002). This alternative analysis of the demonstrative system also incorporates the use of “it” besides demonstratives. The three scales are called high, middle and low focus. Focus can be needed depending on different properties such as how the referent relates to the speaker and the hearer and the importance of the referent. References made by “it” are considered to be low focus,

distals are middle focus and proximals are used for high focus.

One connection often made is between proximals and new, non-shared information. This can happen by using a pointing gesture: “‘This’, then, is proposed as the demonstrative used to call a particular referent into the consciousness of the hearer. It is the most powerful of forms, since it can convey meaning for brand new and previously unknown information.”(Strauss, 2002, p. 141). Since the proximal form is the most powerful, according to Strauss, it is also favoured for the more important items, whereas distals are used for given information.

Here we see a combination of the traditional and the alternative view. A high focus can be given because something is important, but also because it’s new or non-shared. This brings us to the alternative view, namely that proximals are used to give a strong ‘force’ to look for the referent, while distals are used for a neutral ‘force’. This is roughly the theory of Kirsner, which will be explained in section 2.6.

#### **2.4.4 The relevance of the three theories of referring for the research on proximals**

All three theories share a couple of features. When determining the meaning of demonstratives, other things apart from the physical proximity are considered to be of influence to the form used. The two things that are of importance are how easy it is for the referent to find the referent, and what the importance of the referent is, in relation to other referents. In all three theories proximals are used for referring to the lesser known, harder to see, more important items compared to the ones for which distals are used.

It is too bad none of the three theories have an algorithm to determine which word should be used to make the reference. It thus provides clues, but no solutions. The accessibility theory does claim that if the distance between the last mention of a referent is longer, the item becomes less accessible. The average distance is expected to be higher for distals, because they are used with less accessible items (Ariel, 1990). When a modifier is used in combination with a demonstrative, the distance should be larger, because the term becomes associated with less accessible items. In section 2.6 more information about importance will be given, because it seems to play an important role in the choice of referent. The ease with which the referents are found, probably also plays a role, but this is not investigated any further.

Both the accessibility theory and the givenness theory focus on the current state of the referent. In other words: the choice of the referential expression is determined by the current relation between the listener and the referent. The theory of gradient focus also takes into account what the relation between the referent and the listener should become. Proximals help to focus on certain things. In this respect Strauss can be placed along with Kirsner, claiming importance has a big influence on the choice of referent.

## 2.5 The traditional view

To get a better understanding of the traditional view on demonstratives, some research is discussed which can be placed within that view. The traditional view focusses on the notion of distance, and different related metaphors. Most of the research in this section will be about the using demonstrative to refer to things in the physical space. According to this view proximals are used for referring to items which are close, and distals are used for referring to other items.

Research has been done on the references children made to different pictures (Rooij, 2006). There were different kinds of pictures at various distances from a child. There were always two pictures shown at a time with several small differences in the pictures, figure 2.4 shows an example. The children had to tell what the differences were. It showed significantly that proximals are more often used for pictures that are closer by, in contrast to pictures further away (Rooij, 2006). So when one picture was closer than another picture, the closer one was referred to with proximals more often. In some cases the demonstratives may not be situation use, since sometimes they got clues in order to find the differences in the pictures, turning it into tracking use. The relation between proximals and items close by is consistent with the vision of Kirsner, that if a proximal can mean nearby in spatial terms, this is the meaning used. It is however not certain if the relative or absolute distance matters. For example, proximals are used more when closer, but does the object for this have to be at a certain absolute distance or does it need to be close relative to something further away? So the question remains if proximals are used to make a contrast between items close by and further away, or if they are preferred within a certain distance. The research by Rooij was not developed to answer that question.

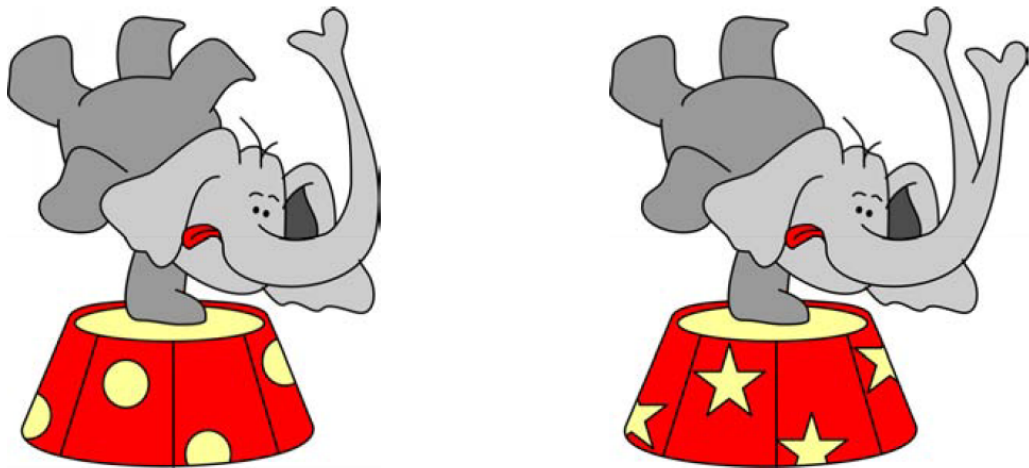
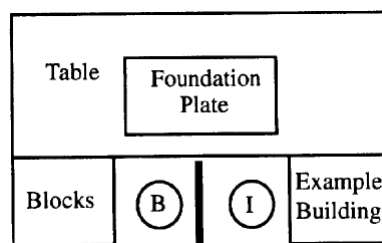


Figure 2.4: Example of two pictures with differences (Rooij, 2006)

Another research on distances and demonstratives makes use of virtual surroundings (Byron and Stoia, 2005). For this research they used a treasure-hunt problem. There

were two participants each controlling an avatar, and looking through the eyes of the avatar at the virtual world. One of the participants took the role of leader, and was given a list of tasks. The other participant took the role of follower, and did not know of the tasks. Not all uses of demonstratives were situational, but given the tasks the majority probably was. They got significant results proving that proximals tend to be used more when the speaker is closer and distals more when the hearer is closer. The place of the speaker and the hearer is to be interpreted as the space in the virtual space where the controlled avatar is. Proximals also are used more when the distance to the referent from the speaker is less, and not when the distance is large. Distals are also used when the distance to the speaker is very close (Byron and Stoia, 2005). These results are all based on references made to objects. When referring to rooms, proximals are used exclusively to refer to the room one is in. This is showing that the type of the object referred to, influences how strictly proximals are related to references close by.

Research has also been done into the situational use of demonstratives in dialogues (Piwek et al., 2008). They only looked at the initial identification of single objects. The dialogues they use are from a block-building game. For this game one participant takes the role of instructor (i), and the other one takes the role of builder (b). Only the instructor can see the building of



which a copy needs to be made, but he isn't allowed to move the blocks forming the building. The set-up can be seen in figure 2.5. The instructor has to instruct the builder on how to make a copy of the original building. The research focused on the assumed link of the choice of referent with both importance and accessibility. To test for accessibility they used two factors. The first factor was whether the object was in an area to which the speaker explicitly directed the attention of the hearer to. This is a form of foregrounding making the objects in the area of focus more accessible. The second factor was whether the object was in the area of focus, because it was adjacent to an object which was manipulated or talked about before. Importance is a little harder to check, but the game makes it possible to link a goal with importance. The blocks that the builder told should be manipulated at a certain time, are important at that time. It was found that less accessible items were used more in combination with proximals, and more accessible items were used more often with distals. On importance no significant effect was found, but that was probably due to the used definition. Only a couple of times blocks were mentioned for other purposes than manipulating them.

The same block building game was used in earlier research, to find out whether proximals are used in combination with more accessible items than distals (Piwek and Cremers, 1996). This time it was done by a different approach. It was assumed an object is more accessible if it either has an exceptional shape, lies in an area where the speaker

explicitly directed the attention of the speaker to or is adjacent to the object discussed or manipulated immediately before the referral. So when it stands out, or is in focus, it is deemed accessible. It is found out that in this case proximate demonstratives are preferred for the items that are less accessible. All the proximate demonstratives are combined with pointing.

Piwek et al. did account for this, as pointing also happened in combination with distal demonstratives. But it is my experience that pointing in combination with a proximate demonstrative, tends to be more precise than pointing in combination with a distal demonstrative. Proximals are used to point to specific objects, while distals in combination with pointing serve to show in what direction to look for the referent. The precise pointing act which is combined with a proximal could make an item more accessible, reversing the outcomes as all proximate demonstratives are used with accessible items then. Pointing is a different way of making something accessible, it's a form of foregrounding. Because there are many ways that can make an object more accessible or less accessible, it is very hard to determine the degree of accessibility of an item.

Piwek et al. (2008) looked only at the situational use in physical context to get a better understanding of demonstratives. To determine the accessibility they made use of the domain focus. For an object to be part of the domain focus, it has to satisfy at least one of two criteria. The first criterion has to do with attention. When a reference to an object is made in an utterance, the referred object and the objects immediately surrounding it, are in domain focus in the next utterance. The other criterion has to do with focusing expressions. They are used to change the point of attention, by stating where to look. If such an expression is used, the objects in the directed location become part of the domain focus. In contrast to what is expected from the accessibility theory, distals were shown to be used significantly more often with more accessible items (Piwek et al., 2008).

From Piwek et al. (2008) it follows that distals are being used with more accessible items instead of proximals, which seemed more straightforward. This was also their working hypothesis which they based on the data from (Kirsner, 1979). According to Kirsner proximals signal high deixis. The listener is thus urged to look harder, so the referent is harder to find. For this research it will be assumed that distals are associated with the more accessible items. So distals are expected to be used more often for items that are, close, more salient, within units and where there is no or few other possible referents. The accessibility theory is in line with the traditional view, more metaphors are used however.

The research talked about before which used cooperation in a virtual surrounding also looked at references made to events (Byron and Stoia, 2005). They marked almost three hundred demonstratives on being about the past, about the present, or being stative. They found a significant relation between proximals with events after speech time, and distals with events before speech time. In other words: when talking about the future, proximals were more often used, and when talking about the past, distals were used more frequently. Since this attribute is only applicable to events, its value is little in predicting the preferred form. But it was a relative strong effect, so it should be included in the



model if possible. If there are a lot of references to events, it would be interesting to see if the same effect is measured.

Research has shown that proximals are used more often for received information (Glover, 2000). Received information is information regarded as common knowledge, so not subject to the point of view. In that research there were different groups with different views on a problem. They tended to use proximals with the points they agreed on, and use distals to refer to points they did not agree on. In contrast to proximals, distals are more often used for information that is negotiable. Statements you tend to agree on are in a way closer than other statements. It is therefore expected with discourse deictic use proximals are used more often when referring to one's own actions or propositions than the actions or propositions of other persons. This is because you tend to stay with the point you yourself have made. At the same time, distals are expected to show the opposite.

Therefore testing whether the reference made was to one's own words or to someone else's words is only relevant for this use. It will be tested whether the reference is made by the original speaker to see if the results from (Glover, 2000) can be repeated. It is expected that proximals are used more often than distals when one is referring to one's own words. This is not precisely what Glover did, which was looking very close to the use of demonstratives in a discussion and then try to explain why they use proximals or distals, but may be enough to get results.

We have seen a couple of ways to relate the form of the demonstrative used with distance. With situational use proximals indeed seem to be used more than distals when the distance is close. In other situations the evidence is less convincing. Which gives room to the alternative view, in the next section.

## 2.6 Alternative view

In contrast to the last section, here we will discuss research which is more in line with the alternative view. Instead of looking for a relation between distance and the form of demonstrative used, another kind of relation is searched for. Central to this view is that proximals are used to put more attention to the referent than a distal would. The reason a speaker would like to put more attention to the referent can vary. It could be that the referent is hard to see, or that the referent is important. For example the referent may be needed to solve a problem, which is the topic of the discussion.

Research by Kirsner and Heuven (1988) provided clues that the importance of the referent might be explaining the difference between proximals and distals. The research was done on non-new uses of demonstratives in written texts. In their paper they also mention that the situational use, which opposites close and far, could be seen as a special case of the role of importance. The items at close range are more important, because they can be directly manipulated. They have done their research on written texts because the sentence boundaries are a lot clearer than with discourse. They are interested in clear sentence boundaries because their research demands to tell with certainty what the position of the demonstrative in the sentence is. This is because they want to know if

there is a difference in the position of proximals and distals within a sentence. For the position of the demonstrative in the sentence, they count it as one when it is the first word of the sentence, two if it is the second, and so on. Marking sentence boundaries in spoken language is hard because there are false stops, corrections along with other errors making it sometimes unclear where the sentence break is. Another problem is that only a small portion of the demonstratives are proximals in spoken language. Only 5% of all demonstratives were proximals in a sample that they analyzed for their research.

In an earlier research by Kirsner, proximals were also found to form a small part of the demonstratives used in discourse. Also the Dutch definite marker “de” was being used a lot less in dialogues compared to written texts. In contrast demonstratives, especially “die”, were used a lot more in dialogues (Kirsner, 1979). At the same time “die” is used more often in dialogues. He gives two reasons for these phenomena. The first reason is that spoken language doesn’t need to be as precise as written language. This is because it is possible to correct or clarify when needed. In dialogues, a demonstrative without a modifier is often used for making references.

In some cases there might be a physical distance which affects whether a proximal or a distal is used. In other situations the time or distance between the last mentioning of the referent and the current referral may influence the demonstrative. Another option is that some possible referents may be remembered better and therefore appear closer. This could be because the referent is needed to complete a task or because it was used in subject position when last mentioned. Objects which are needed to complete a task are more important than other objects. Kirsner got some clues that importance is related to proximals. Proximals are therefore expected to refer more often to important items than distals. Antecedents in subject-position are considered more accessible, but it is unclear whether proximals or distals are more accessible in this case for Dutch. There is some research that found a statistical significant result showing that proximals are used for referring to the subject of the former sentence more often than distals (Byron and Stoia, 2005), (Poesio, 2008), (Garnham and Cowles, 2008). There has not been done a lot research on the subject because the influence of the effect is small in other research, and sentences lack clear boundaries in spoken language. Other kinds of words like personal pronouns and noun phrases may also be used to track referents.

Kirsner and Heuven (1988) found a significant difference in the average position within the sentence between demonstratives. Proximals tend to occur earlier in the sentence than distals do. The question is what the cause of this effect is. A reinterpretation takes place when a different referential expression is used, by using an adjective for example. It is assumed that distals are associated more with repeating items just mentioned, and proximals with the reinterpretation of items over longer distances. This explains why proximals tend to occur earlier, as they are more likely to refer to another sentence; unlike distals that have their reference more often within the same sentence. Three written texts are used to prove that proximals are more likely to refer within the sentence, and that this causes them to appear later in the sentence on average.

They also got data indicating that proximals are more likely to be reinterpreted. For example when an introduction is made by “that device over there” and at a later time,

after running into some troubles, the same referent is mentioned with “this piece of trash”. A reinterpretation that takes place in the same sentence of the antecedent is exceptional. The combined effect of reinterpreting demonstratives being more likely a proximal, and reinterpreting demonstratives being more likely in a new sentence explains why proximals occur earlier to a small degree. When they excluded the reinterpreting demonstratives, proximals still occurred earlier in the sentence on average, however. They think this is because proximals are used for more important items. More important items are more likely to be referred to when they were last mentioned a few sentences ago than less important items. This is because less important items typically ‘live’ only for a short while. Kirsner and Heuven present the link of proximals with important items as an suggestion; they don’t actually prove it, since it is difficult to decide objectively what an important item is.

Kirsner also worked on another experiment, in which they asked fifty students to fill in a proximal or distal in the place of asterisks (Kirsner et al., 1987). They were first asked to do the task showing only the original sentence, and then with the sentence put into context of a few sentences. The prediction of proximals got better with context. This is the so-called context effect. With distals the prediction did not get better when the context was offered so no context effect was found this way. This is mainly caused by the fact that proximals on average refer more often to another sentence. Another effect influencing the difference out of context was the tense of the sentence. The simple present tense is more likely to be associated with proximals. It is shown that the context effect causes a significant portion of sentences in the past tense using proximals to be correctly identified. There seems to be a strong bias to choose distals for past tenses. When the sentences are placed in a context, the bias becomes less. The amount of demonstratives chosen that corresponded with the original text was quite low, even with the context. It was 67,6%. Because this is not very high, one wonders what performance will be acceptable for a computer. A lot of times it will not really be wrong to use another demonstrative than the one used in the original sentence. And in the full text, more cues will be available than just the few sentences around it. Since important items are more often repeated, this is another clue for proximals being used with important items.

Another surprising outcome of this research was that there is quite a difference between different kinds of texts in the distribution of demonstratives. The distance over which a demonstrative refers can be described in sentence boundaries. If referring within the same sentence, the sentence boundaries are zero: if the reference is to the previous sentence the number of sentence boundaries is one, and so on. The average distance in sentence boundaries also varies quite a lot (Kirsner et al., 1987, Pg. 128). This is one of the factors making it hard to compare research done on different texts, or to draw universal conclusions from research. They tested six types of written language in this research. These were quite diverse: from novels, an analytical philosophical text and newspapers. They also showed that the demonstrative that was chosen to some degree was based on what sort of text it was. Sentences from novels, which use distals to a relative high degree, also got a lot more distals in the experiment. They also used two sentences containing words very typical for spoken language, and then almost everyone

guessed a distal. This makes sense since with spoken language only about 5% of the demonstratives are “deze”. If the same referent is mentioned a couple of times in the sentences used for the context, it is considered to be important. It is then more likely to be referred to by a proximal. When the demonstrative to be filled in is mentioned a couple of times, a context effect is measured. This provides clues that important items are linked with proximals.

It was troublesome for Kirsner to objectively decide what was considered to be important. The only clues he used were indirect ones, making the suggested link between proximals and important items a bit weak. The trouble was in part due to the material he used. What seems to be an important item in a story is subjective. Even though they used different kind of texts like a novel, a magazine and a technical philosophical text, none provide an easy answer as to what is important. When a task needs to be completed, like in the building game, it is a lot clearer what is important. The game will later be explained in more detail. What matters is that because the main goal is to complete the task, anything related to completing that task is important. Piwek et al. (2008) define an important block, as a block that is instructed to move at that time. The blocks need to be moved in order to finish the game, by making a copy of some build. The manipulated blocks are contrasted with blocks used for specifying which block to move, or how to move it. No significant result was found on the relation of proximals with important items. A significant relation was found ad hoc between pointing and important items. Because pointing is done significantly more when it is combined with proximals than when combined with distals, they did establish an indirect link. A task related definition of importance does look promising. It will be interesting to do more research on importance in relation to demonstratives. It is expected that proximals are used more with more important items.

The difference between the two views on demonstratives puts the emphasis on different aspects. The traditional view would expect proximals to be used with items just mentioned. In a way, the alternative view might claim the opposite. Something which has just been mentioned is still in focus, so there is no need to use a proximal to give it more focus. When the reference was longer ago, or when in the meantime other referents came into focus, a proximal is expected.

## 2.7 Summary of the literature

The context in which a demonstrative is used has influence on the meaning. Depending on the way it is used, other metaphors may be applicable. This is why a difference is made in semantics and pragmatics. Since there are many ways to look at demonstratives, two ways are contrasted. The traditional view, which looks at the current status of the demonstrative, for example whether it's close and if it has just been mentioned. The alternative view takes into account what should become the status of the referent. So whether the referent is deserving more focus, because it is important, or whether it takes more effort to find the referent. These two views thus ascribe a different value to proximals and distals. This can be simplified by saying the proximal is used for

close items in the traditional view, and for important items in the alternative view. The question is which of the views best describes actual use. It may be that depending on the context or pragmatic use, one view may be better than the other, hence the separation.

It is hard to draw general conclusions from the literature about demonstratives. There seem to be few points about demonstratives all research agrees on. With situational use, when referring to the physical context, there are little differences. In most cases proximals are almost exclusively used for items that are close, and distals are used for items close and far. Sometimes they contradict each other, like whether more accessible items are more often used with proximals or with distals. This is probably because a lot of factors play a role, and only a few factors have been tested.

A more promising approach seems to be the one by Kirsner and Heuven (1988). If importance turns out to be the major difference in meaning between proximals and distals, it would explain the mixed results relating accessibility to the use of demonstratives. Because if proximals are more often used with important items, the average distance between last mention and reference would be more than the distance for distals. The link between importance and proximals is strengthened by research from Piwek et al. (2008) and Strauss (2002). It is also in line with the accessibility theory by Ariel (1990) because importance is a form of saliency. Ariel calls this factor “importance of topicality in antecedent assignments” (Ariel, 1988). The problem is what importance then exactly is. In the next chapter a definition will be given, and it will be tested whether in this case proximals tend to occur more often with important items than distals.

Some of the indirect checks on importance, done by Kirsner and Heuven (1988) will be repeated. A hypothesis resulting from this is that proximals are more often expected to have modifiers, since more important items are more often reinterpreted. Another hypothesis is that the distance between antecedent and anaphor is expected to be larger for proximals. This is because less important items only get referred to over short distances.

The theory from Glover (2000) is tested for a couple of reasons. First of all, it is easy for an artificial system to save who said what first. So if it is true, it is easy to be implemented. It is only applicable to discourse deictic use, since only then you refer to the actual words.

It will also be tried to repeat the research done by Byron and Stoia (2005) on events. In line with that research, it is expected that proximals refer more often to the future, and distals more often to the past.

The main hypothesis will be whether the traditional or the alternative view best predicts actual use. As far as possible, this is tested for the different pragmatic types.

## Chapter 3

# The methods and hypotheses used for the research

### 3.1 Introduction

This chapter will start by giving a description of how the conversations were gathered which were used to test the hypotheses discussed section 2.7. After that it will be explained how to determine which of the four uses of demonstratives from Himmelmann (1996) was being used for each demonstrative. This will be done for all other variables used to test hypotheses as well. The hypotheses that are going to be tested are also numbered. In order to get to the results, all hypotheses will be related to the data. The hypotheses are based on the literature in the previous chapter. An example of one of the dialogues from the conversations can be found in appendix A. In the next chapter the results will be given and discussed.

### 3.2 The origin of the help-desk conversations

The transcriptions of the dialogues were made by Terpstra et al. (2009). The transcriptions contain conversations from telephone calls recorded at the technical help-desk of the ADSL provider Telfort. We call these the ‘help-desk conversations’. The conversations took place in June 2008. A total of 24 conversations were transcribed, of which the first 10, numbered 1 to 10, were used for getting the data used in this research.

For all conversations a few properties were noted in the transcription document. These were: the original date, the length of the conversation, the gender of the client, the name of the help-desk employee, the file-name of the conversation and the name of the one who made the transcription. The conversations were not collected with this research in mind.

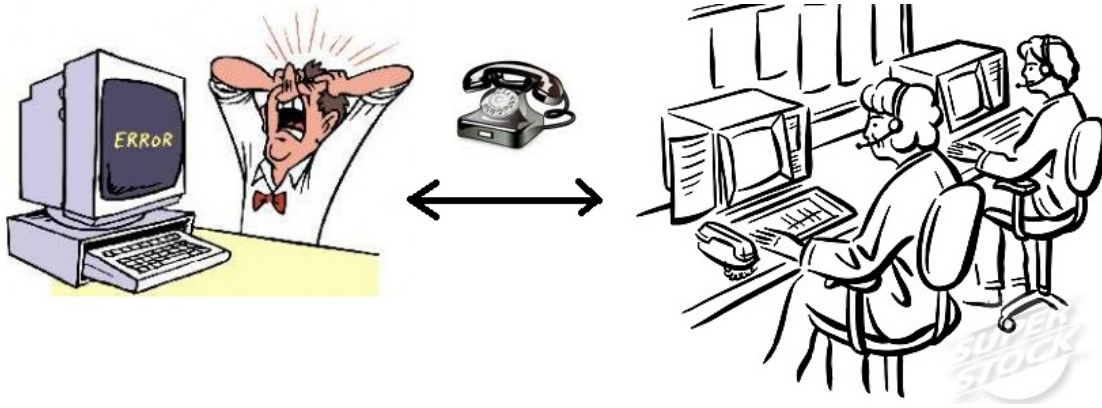


Figure 3.1: client and operator communicating

### 3.3 The domain of the help-desk conversations

The help-desk conversations can be viewed as a dialogue game. It has all the properties of a dialogue game. These are: participants, an initial state, a joint public goal, a role function, and an environment. By describing the dialogues in this way, we focus on the aspects related to complete a task. The completion of this task, reaching the goal, is the most important aspect for both participants (see figure 3.1).

- Participants: All conversations are between two people. One of them is the operator of whom there are two, with initials A.T. and B. The other participant is the client, these are ten different persons. It is not known whether they are all native speakers, a few probably are not. This can be noticed because sometimes the wrong form is used based on the gender of the word. This kind of mistake is typical of non-native speakers. It is assumed that it does not affect the choice between proximal or distal. This is because whereas only some languages have different forms of demonstrative based on gender, the majority of languages have different forms for near and far.
- An initial state: the client has some kind of problem related to the internet service from Telfort. This could be a broken modem, problems with the internet connection or with the email-service. The operator knows the client has some kind of problem, but doesn't know what this is. The first step in each dialogue is thus for the operator to find out what the problem of the client is.
- A joint public goal: the goal of the operator and the client is to solve the problem as fast and efficiently as possible. They may think different about how to do this. In one of the dialogues someone wants to get his modem fixed right away. It has already been filed that he has a problem with his modem however, and he needs to wait till it is his turn to investigate. Sometimes the operator initially fails to grasp the problem of the client. When this turns out to be the case, he has to go back in order to find out what the problem of the client is.

- A role function: the operator has knowledge of the system, and how it should work. He also has access to a file system. In the system he can for example see when a crash has occurred or read about previous problems reported by the client. The client has a problem related to the internet connection. The client either doesn't know what is wrong, or does know it but needs the operator to fix it.
- An environment: the operator and the client are in different places and have no shared physical space. They sometimes do have something which comes close. When they both go to the same internet page to change settings, they kind of share a virtual space. Besides this, the operator knows what the modem looks like, and how it should be connected. He also makes predictions about the environment of the clients, and sometimes makes mistakes. One time he thinks the client has to go upstairs to go to the computer, but the client also has a computer downstairs.

There are different ways the participants can reach the goal. First the operator needs to know what the problem is. When he knows the problem, he tries to solve it. This involves asking information from the client, for example how the modem is connected, or what the client wants as his new e-mail address.

In some cases the operator asks the clients to take certain actions. It could be that the modem needs to be reset, or that the settings for the email need to be changed. Sometimes it is possible to fix the problem on the phone. The conversation is then ended by a thank you from the client. Sometimes action is needed by other persons, and the operator needs to write a file with information about the problem. The confirmation of the filing of the problem is then the end of the conversation.

Most of the time the problem is having no or a bad internet connection. For the internet an Asymmetric Digital Subscriber Line (ADSL) is used. For it to work properly, a modem needs to be connected to a copper phone wire. Because sometimes this wire is also used for the phone, this can cause interference. The cable between the modem and the place where the telephone cable enters the house can also be too long, giving a bad connection. Other things that can cause a bad or no connection are the software on the modem, and the software on the pc. The modem has a couple of signal lights. This way one can see if the modem is powered and which connections are used or connected. It can be reset, which is sometimes needed when an error has occurred or the settings need to be changed.

The ADSL line can also be used for making phone calls by using voice over internet protocol (VoIP). In this case when the internet connection fails, the client also loses his wired phone connection. Because of this the help desk is sometimes called using a mobile phone. Since this may be expensive some clients are impatient and want to rush things.

The following is a fragment from dialogue nine. The client has trouble with the internet connection, it sometimes fails for a few seconds. The demonstratives are underlined, the second demonstrative in Dutch is better translated as a pronoun in English, and is also underlined.

- A: En trouwens voordat we dat doen nog even benieuwd naar hoe uw modem is aangesloten.



- K: Hoe bedoelt u?
- A: De kabel tussen uw modem en het KPN aansluitpunt hoe lang is dat?
- K: Nou een meter hooguit

Translation:

- A: Besides, before we do that, I'm curious how your modem is connected.
- K: What do you mean?
- A: The cable between your modem and the KPN connection point, how long is that?
- K: Well, a meter at most.

The first demonstrative refers to connecting to the internet on the pc.

### 3.4 The extraction of the data

De raw data of the research can be found in appendix B and appendix C. For the first ten conversations all demonstratives were numbered. If it was unclear what a demonstrative referred to, it was left out. This happened about ten times. There were a few occasions when people were reading from their screen, including demonstratives, these were excluded. For example: "It says do you want to install it on this computer." This was done because these demonstratives were not used in the context of a dialogue. A few times a demonstrative was used in combination with a false start. The participant then says a few words, which is not a sentence, and then starts a new sentence. When someone had a false start, it was also excluded, even if it was clear what the demonstrative referred to.

For each demonstrative the following information was noted:

- The number of the demonstrative, from 1 to 506, so consisting of 506 examples of demonstratives.
- The dialogue it was used in, from 1 to 10.
- The number of the turn within the dialogue it was used in.
- The number of the turn in which the referent was last named.
- The number of the turn the referent was first used in the dialogue.
- What demonstrative was used, "die", "dat", "deze" of "dit".
- If a modifier was used, what it was or no modifier at all.

- Whether there was no modifier(0), only a noun(1), or multiple words(2).
- Whether the demonstrative used was a proximal(p) or a distal(d).
- What the antecedent was of the referent, for example, the user's name or the telephone connection.
- What type the antecedent was: an action, a message, a concept, a human, a proposition, software, a speech act, a technical object, a technical type or a point in time.
- Whether the reference was explicit(e), implicit(i), or in between(e-i), this was not used in the research, because there were a lot of cases where it was unclear.
- Whether the speaker was the operator/agent(a) or the client(k),
- Who the speaker was of the previous reference, a or k,
- Who the speaker was of the first use of the referent,
- Whether the speaker had already mentioned the referent before, yes(y) or no(n),
- The distance in turns to the previous referent, number in turns or not named before(x), or left dislocation(-1). The distance in turns was chosen because it is the most clear in discourse. Sometimes four turns are not more than four words, and sometimes four turns contain more than ten sentences, so the distance in turns is not the same as the distance in time or words. 'Left dislocation' was a special case since there is not even a word between the referent and the anaphor.
- The distance again, but this time divided into 6 groups: new items(0), items referring to the same turn(1), one to five turns(2), six to ten turns(3), eleven to fifteen turns(4), sixteen to twenty turns(5), and more than twenty turns(6).
- Once more the distance, but this time divided into just two groups: the ones referring to the same turn, or one back(0), and the ones referring more than one turn back(1), new uses are left out(n/a).
- What the type of the use of demonstrative was: situational(s), discourse deictic use(d), tracking use(t), or recognitional use(r). The difference between recognitional use and tracking use was made based on turns between the use and the previous use. If more than ten turns were passed, it was considered recognitional use. Another problem was deciding whether a new referent was being introduced or not, in case the referent was called differently. When the referent was only given another name, but it was exactly the same referent, it was considered a continuation. When only a part of a referent introduced before was referred to, it was considered introducing. For example when a modem was already introduced and then was referring to a button on the modem. It was also introducing when the earlier reference referred to multiple items of which one was picked out. These rules

are needed to make clear whether it is discourse deictic or situational use, with a new referent, or tracking or recognitional use when continuing. The difference between situational and discourse deictic use depends on the type of referent. If the referent is a point in time, an event or a proposition, it is discourse deictic use, otherwise it is situational use. An schematic interpretation of the uses described by Himmelmann can be found in table 3.1.

Table 3.1: Different pragmatic uses, simplification from Himmelmann

Last usage/type of referent	Object	Time, event or proposition
New use	Situational use	Discourse deictic use
Recently used	Tracking use	Discourse deictic use
Used before but not recently	Recognitional use	Recognitional use

- Whether the referent was considered important(i) or trivial (t). The referent is considered important if it is needed to solve the problem. For example when there are complaints about the internet connection, some of the first things to check is the cable connecting the modem to the telephone line. The cable is then considered important. If the referent is not directly related to solving the problem, it is considered trivial. It is possible to decide what is important because the operator tends to follow a pattern, and by using knowledge about how to solve problems related to ADSL modems. This way of considering importance is almost the same as Piwek et al. (2008). In the block building game, the way to get from the beginning to the end state is clear. Solving problems related to ADSL modems are less strait forward to solve. It would be weird if only the items needed to solve the problem would be important, and not the items that during the conversation are considered to be needed to solve the problem, but turn out not to be the problem. For discourse deictic use this way of deciding what is important is not applicable. When referring to a sentence, or for example when using “this moment”, it is impossible to say whether it is important or trivial. This is because the way we treat importance only objects can be considered important. The referent is important when at the moment the reference is made, the referent is considered as part of the solution to solve the problem at hand, and trivial otherwise. Only situational, recognitional and tracking use are checked for importance.

### 3.5 Hypotheses that will be tested

With all the data available a lot of hypotheses are possible. But it only makes sense to look for effects already proven to have an influence, or look at effects that might exist according to past research. The most important hypothesis, following the paper by Kirsner, is that proximals are linked to important items. For this hypothesis I will only look at the situational, tracking, and recognitional use. The other hypotheses are

based on the special properties of the uses, and on properties affecting the choice of demonstratives according to the accessibility theory.

Proximals will be relatively more related to important items and distals relatively more with trivial items. This can be expected given the clues that Kirsner and Heuven (1988) got. But it is also an aspect of the accessibility theory, important items are more accessible, and proximals are used for more accessible items (Ariel, 1988). Important items in this context are items directly related to the problem that needs to be solved. The theory of gradient focus also links important items to proximals (Strauss, 2002).

*Hypothesis 1 is that the proportion of proximals referring to important items is higher than the proportion of distals referring to important items.*

Another mark of important items is that they often contain modifiers as was shown by Kirsner and Heuven (1988). They claim this is because they are more often reinterpreted. Proximals are expected to contain relatively more modifiers than distals. This holds both for simple noun phrases that contain only a noun, and more complex constructions. *Hypothesis 2 is that adnominal demonstratives are more often proximals in relation to pronominal demonstratives.* At the same time pronominal demonstratives are more often distals than adnominal demonstratives.

It is not easy to give a good prediction on the relation between the demonstrative being a proximal or a distal and the distance between the demonstrative and the previous mentioning of the referent. This is because importance interferes with being close. Important items are typically referred to over longer stretches of time. They can be referred to from a larger distance because they are more accessible than trivial items. Trivial items are typically referred to just after they are mentioned, and then no more. Therefore it is also interesting to look at the relation for important and trivial separately. The expected outcome for both groups is the same, since the separation only eliminates the bias of more important items for proximals. Based on the accessibility theory, distals should be used with items that are more accessible. However, there is evidence for Dutch proximals marking low accessibility Piwek et al. (2008). Because accessibility is about more than just distance, it is not against the accessibility theory to claim proximals are used more often to refer over larger distances. It is expected that proximals tend to refer to referents further away than distals because proximals refer more often to important items. When looking at distances it is also expected that proximals are more often used for new items (Strauss, 2002).

There are a couple of ways in which one can compare the distance in turns between distals and proximals. This can be done by looking at the mean distance, but in that way a few large distances will have a big impact on the outcome. That is the reason why they were divided into multiple groups. Two separate divisions are made. Division (a) contains six groups, namely: new items, items used referring within the same turn, items referring one to five turns away, items referring six to ten turns away, items referring eleven to fifteen turns away and items used more than fifteen turns away. The other division (b) contains two groups, namely: references made within the same turn or the previous turn, and references further away. New uses are excluded from this division. It is expected that the proportion of proximals referring to the same or the previous turn

is bigger than the proportion of distals referring to these items.

*Hypothesis 3a is that proximals are used relatively more often than distals for new items. Hypothesis 3b is that proximals are used relatively more often to refer further away (more than 1 turn) than distals.*

While distance is maybe most related to a distance relation, accessibility is another one. One possible objection to the last hypothesis is that by including references to the previous turn as referring close, one is including references which although close are not very accessible. If someone mentions an item, it is said to become more accessible to him. So it is expected that proximals are more often used to refer to items one has already mentioned in the dialogue in relation to distals. So for all demonstratives that have a previous reference, proximals are expected to have relatively more references to items one has mentioned himself earlier than distals, whereas distals are expected to be used to refer to words not mentioned by the speaker himself before. Since this is especially about words, this is also checked for only the group of discourse deictic uses. The effect is expected to be bigger in comparison to all the uses because propositions are more personal. Propositions are also the only items which may have a negotiable or received orientation (Glover, 2000).

*Hypothesis 4a is that the proportion of proximals referring to items mentioned by the speaker before, is larger than the proportion of distals to such items. This hypothesis is based on all the items. Hypothesis 4b is the same as 4a, but this time only for discourse deictic uses since with this use it seems more relevant who the speaker was.*

# Chapter 4

## Results

### 4.1 Introduction

In this chapter the results will be shown on the hypotheses which were formulated in the previous chapter. All of the graphs that are shown in this chapter display the relative frequency of proximals and distals. This is done because the amount of proximals(41) was far less than the amount of distals(467). This is the same reason why all hypotheses use the relative frequency. In some cases a clear difference can be shown. A chi squared test is done whenever possible to know whether the effect is significant.

Table 4.1: Type of use and Semantic type cross tabulated

Type of use	Proximal	Distal	Total
Discourse Deictic Use	199	7	206
Recognitional Use	30	2	32
Situational Use	20	15	35
Tracking Use	216	17	233
Total	465	41	506

In table 4.1 the numbers of the different types of demonstrative adopted by Himmelmann can be seen. The distinction between the categories was made using the criteria described in section 3.4. I will now give an example with the translation of each of the uses, in the discussion I will go into more detail about the criteria.

*Example of discourse deictic use, dialogue 6, turn 21* The operator responses to the client who asks how it can be possible that he was misinformed.

Dutch Ja dat weet ik niet.

English Well, I don't know that.

*Example of recognitional use and tracking use, dialogue 7, turn 97* The operator gives a summery of what needs to be done, making a reference to the laptop which was

mentioned a while back(turn 67) the second reference to the laptop is made in the same turn, and therefore is tracking use.

Dutch Ja, nou dan staat dat verder goed, dan zou ik adviseren om 't even opnieuw in te stellen, dus even alle accounts verwijderen uit windows mail, even opnieuw toevoegen als 't dan nog steeds niet werkt ja dan zit er ergens in die laptop een extra programma misschien een extra virusscanner of iets anders, misschien zit u toch op 't verkeerde draadloze netwerk waardoor 't niet goed werkt en dat kan ik vanaf hier niet voor u oplossen want dat zit in die laptop.

English Well, that is entered correctly, I would advise you to configure it again, by deleting all account from windows mail, and add them again afterwards, if it doesn't work after that, then there may be some program installed on that laptop, maybe a virus scanner, or something else, maybe you are connected to the wrong wireless network after all, and is it not working because of it, that is something I can' solve from here, because that is configured inside that laptop.

*Example of situational use, dialogue 2, turn 4* The client describes his problem, like he is standing next to the modem at the moment. It is the first mention of the lights. The operator is asking what is wrong with the modem.

Dutch Dat weet ik ook niet. Hij uhh, die al die lampjes die gaan niet meer ahh...

English I don't know that either. It, uhh, those, all those lights, they don't go...

## 4.2 Hypothesis 1: Importance

Deciding whether an item was important was done using the criteria described in section 3.4. The conversations start with a determination of the problem of the client, once this becomes clear, the objects which help to solve the problem are important. To determine if it was important I used my own experience with these kind of problems and often the same steps were taken trying to solve a problem. There are different reasons to talk about trivial items. For example the client may come back on something which according to the operator was already handled. Another reason is the client who talks about how he feels about the situation, without giving information to solve the problem. This happens for in the example underneath. The client often has moments the phone connection fails, losing the connection. and last time this was when talking to someone from the taxes department:

*Example, dialogue 1, turn 86*

Dutch Maar het is ie-de-re keer wat. En dan denk ik, oh het gaat wel weer goed, 't zal wel landelijk zijn, maar vanmorgen, toen met die belastingen, ik denk, godsamme nou.. Daar ben ik toch ook weer klaar mee, want voordat 'k je weer aan de telefoon heb...

English But it is something e-ve-ry time. And then I think, oh well, it's getting all-right, it probably is something country wide, but this morning, with the taxes, I think damn you.. I'm done with this, cause before I get them on the phone again...

Sometimes a new and an old version of an item was used, where the new one had more to do with solving the problem. As was the case in dialogue 6, where someone wants a new email address because his neighbours took notice of this address by opening his mail. In this case the new address is important, but the old address is trivial. It can however sometimes be hard to know whether the old or the new address is meant. In the example it is not clear whether the email address is the present one. *Example from dialogue 6, turn 31 to 34*

Dutch A: Gebruikt U dit E-mailadres ook?

K: Maakt toch niet uit?

A: Nee, meh maar ik bedoel

K: ik ben van plan nu te gebruiken

English A: Do you use this email address?

K: Is doesn't matter, right?

A: No, but I mean.

K: I am planning to use it now.

Table 4.2: Importance and Syntactic type cross tabulated

Degree of importance	Proximal	Distal	Total
Important	29	148	177
Trivial	5	118	123
Total	34	266	300

Taking a good look at the context removed most of the doubts in these cases. Discourse deictic use was not checked for importance. This is because when referring to events or propositions it becomes a lot harder to tell if it is connected to a solution of the problem or not. Since only the tracking, recognitional and situational uses were marked for being important or trivial, not all demonstratives were included. A total of 300 were used. Of these, 266 were distals and 34 were proximals. From the distals, 148 were marked important, and 118 trivial. From the proximals, 29 were marked important and only 5 trivial. See table 4.2 for all the numbers. The relative difference can be seen in figure 4.1. Both the Pearson Chi-Square and Fisher's Exact Test gives a P-value of less than 0.001 making it highly significant.

When looking at the importance within the dialogues, dialogue nine stands out. In dialogue nine all marked demonstratives are used for important items. A possible explanation for this is the way the conversation went. Nobody took long turns, and the



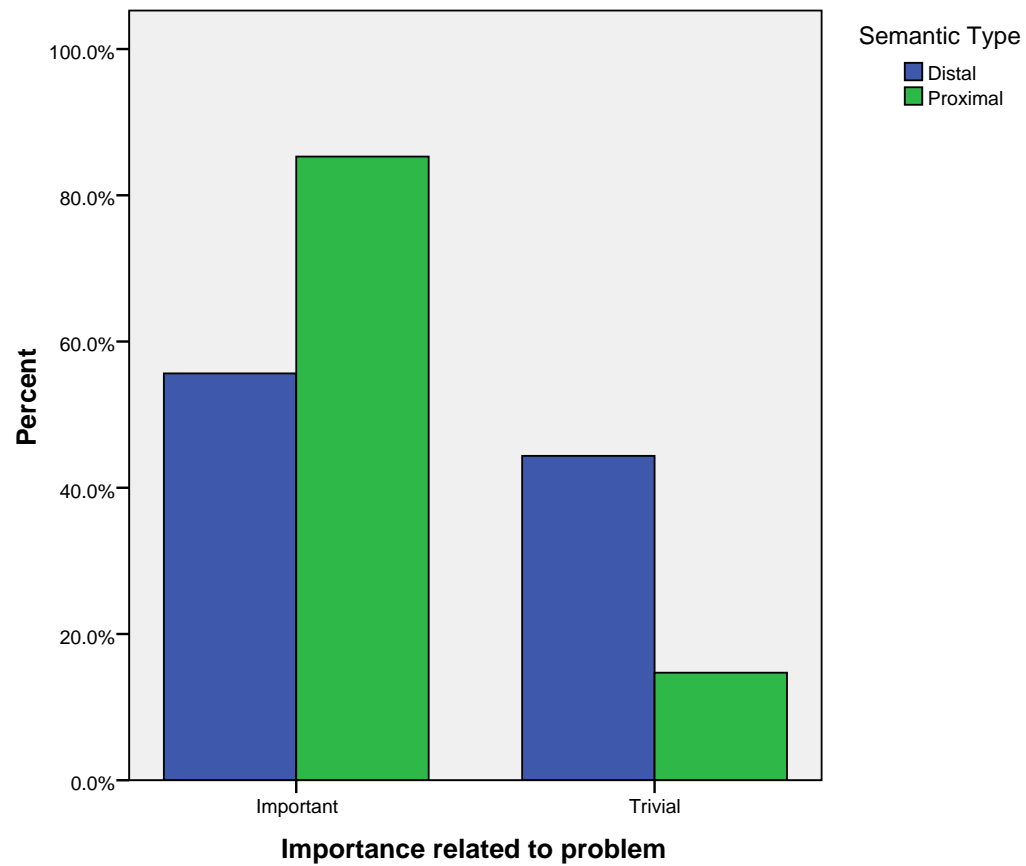


Figure 4.1: The relative difference between proximals and distals in their distribution of important items versus trivial items.

Table 4.3: Number of Dialogue and Semantic type with Speaker cross tabulated

Dialogue	Important		Trivial		Total		Total
	Agent	Client	Agent	Client	Agent	Client	
1	9	8	1	12	10	20	30
2	11	10	3	1	14	11	25
3	2	0	2	1	4	1	5
4	7	4	9	7	16	11	27
5	1	2	4	1	5	3	8
6	26	20	11	21	37	41	78
7	15	4	8	7	23	11	34
8	7	6	6	13	13	19	32
9	14	9	0	0	14	9	23
10	12	10	7	9	19	19	38
Total	104	73	51	72	155	145	300

client was doing what the operator was asking for, without asking many questions. See table 4.3 for the other dialogues.

When only looking at the use of demonstratives by the operator for the first seven dialogues, the same results appear. Almost 90% of proximals are used for important items and 60% of the distals are used for important items by him. The other operator, from the last three dialogues, only uses five proximals, all of them referring to important items. From his distals almost 70% is used for important items.

Of the ten clients there are only four who used proximals. In all four cases the percentage of proximals referring to important items is higher than the percentage of distals referring to important items. When a client used only distals, the percentage referring to important items was usually low, being less than 55%. In Dialogue 5 it was 67%, but there were only three distals. The only dialogue showing a result different from what was expected based on the hypothesis is dialogue nine. All nine distals are used for referring to important items, and no proximals are used. But since this dialogue only contains important items it does not make the hypothesis less acceptable.

### 4.3 Hypothesis 2: Are proximals more often used in combination with adnominal use?

It was expected that pronominals are less often used in combination with a proximal compared to distals. At the same time, proximals are expected to be more often used with adnominal use of demonstratives. This would provide an indirect link to our main hypothesis. Giving more information about an object makes it easier to find, and puts more attention to it. This can be done for a couple of reasons, but may be done because the object is important.

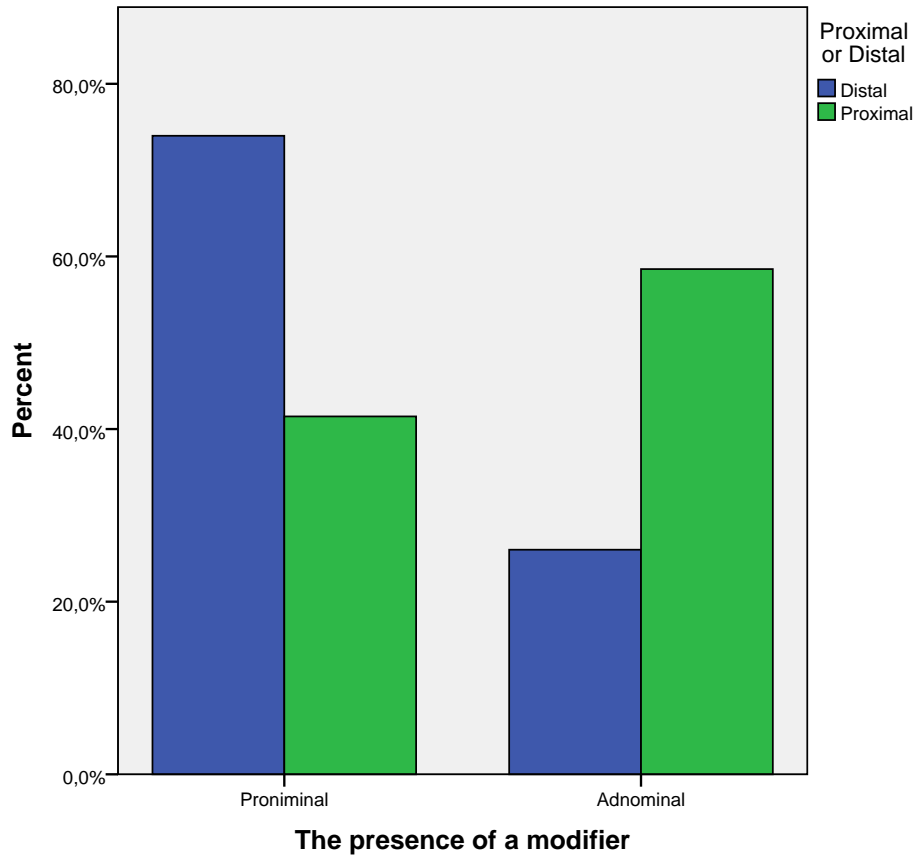


Figure 4.2: The relative difference between proximals and distals depending on whether they were used pronominal or adnominal.

Table 4.4: Syntactic type and Semantic type cross tabulated

Syntactic type	Distal	Proximal	Total
Pronominal	344	17	361
Adnominal	121	24	145
Total	465	41	506

The relevant cross table can be seen in table 4.4. As shown, pronominal use takes place more than double the times adnominal use does.

The relative differences can be seen in figure 4.2. The link of proximals with demonstrative determiners was again quite strong. From the proximals, 59% were used together with a modifier of some kind, from the distals value was 26%. The effect is highly significant, both PearsonChi-Square and Fisher's Exact test give a significance of less than 0.001. Proximals are thus more often used as adnominals than distals.

#### 4.4 Hypothesis 3: Distance

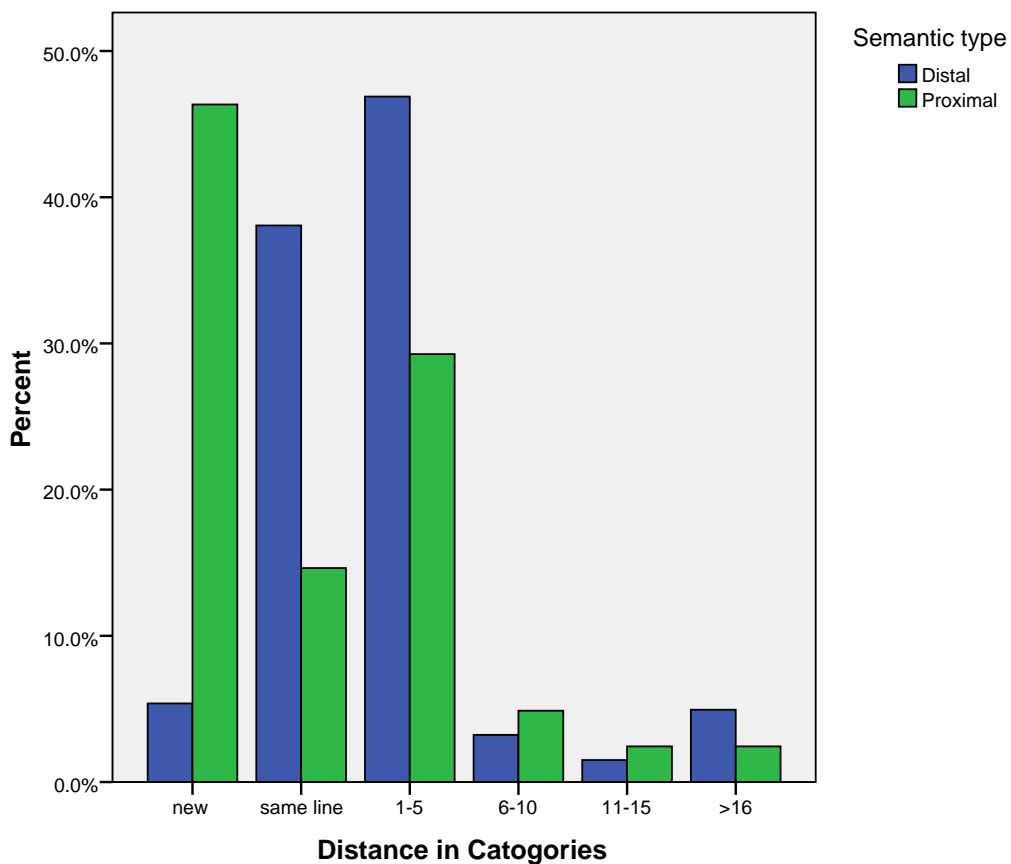


Figure 4.3: The relative differences between proximals and distals in their distribution of different distances.

The referring distance is close when the antecedent can be found in the same, or the former turn. When the antecedent can be found more than one turn ago, the distance

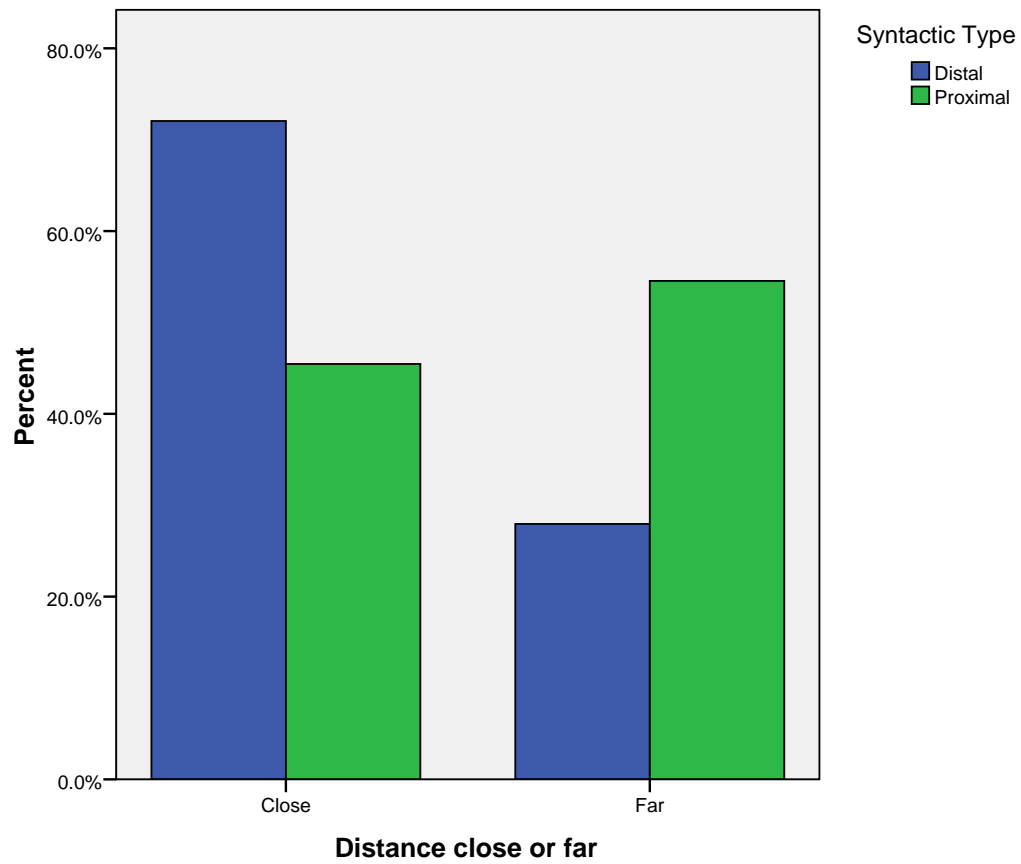


Figure 4.4: The relative differences between proximals and distals when referring to the same or one turn back, and further away.

Table 4.5: Distance \* Semantic type Cross tabulation

Distance	Distal	Proximal	Total
Close	317	10	327
Far	123	12	135
New	25	19	44
Total	465	41	506

was far. For new items don;t really have a distance. They are included in table 4.5 in order to get to the total of 506 demonstratives.

According to hypothesis 3a proximals are more often used for referring to new items. While according to hypothesis 3b they are more often used to refer further away. As figure 4.3 shows proximals are used a lot more for new items then distals. The chance that a referential expression containing a proximal refers to a new item is about nine times as big as the chance for a referential expression containing a distal to be a new item. Both referring within the same turn as referring one to five turns back happens a lot more with distals. Referring to items more than five turns back has about the same frequency for proximals and distals.

When doing a test on all 462 demonstratives that had a non-new referent, 10 out of 22 proximals (45%) were referring to items mentioned in the same, or the previous turn. This can be seen by the numbers in table 4.3 and more graphical in figure 4.4. From the distals, 317 of 440 items were close (72%). This is a significant difference. Pearson Chi-Square gives a p-value of 0.007, well below 0.010. Fisher’s Exact test gives a one-sided p-value of 0.010. This clearly shows that distals tend to refer closer than proximals.

Table 4.6: Distance and Semantic type Cross tabulated split on importance

Importance	Distance	Distal	Proximal	Total
Discourse deictic	Close	159	2	161
	Far	35	1	36
	Total	194	3	197
Importance	Close	86	7	93
	Far	57	9	66
	Total	143	16	159
Trivial	Close	72	1	73
	Far	31	2	33
	Total	103	3	106

When only looking at the items that are marked as important, the picture is slightly different, see table 4.6. From the distals, about 60% (86 from the 143) has a close referent. About 44% (7 from the 16) from the proximals has a close referent. This is both less than the average for each category. This shows that important items are referred to less close on average. The difference between distals and proximals is still big, however. It is not a significant difference, but this could be due to there being only 159 items marked as important, of which only 16 were proximals.

When only looking at the items marked trivial, it was expected to see higher percentages for referring close to the demonstrative. For distals this is true as almost 70% of them refer within the same or the previous turn, more than on average. But only 33% from the proximals referred to items close by, being a lot less than the average per-

centage. This is probably because there are only three instances of proximals, which are not-new and trivial. Since for the important items the percentage of proximals close by was also less than average, it has to be higher for the items not marked for importance, discourse deictic use items. Non-new discourse deictic use tends to refer to large passages of text, which end just before the reference is made. So whereas they seem to refer close, they really refer both close and far. An ad-hoc analysis showed that there are three proximal discourse deictic uses, of which two refer close. The percentage of distals used for discourse deictic use that referred close is also higher this time, almost 82%. Distals thus are used more often to refer within the same turn, or to the previous turn.

#### 4.5 Hypothesis 4: Are proximals more often used when the speaker is the same who last used, or introduced the referent?

Table 4.7: Add caption

Same speaker	Distal	Proximal	Total
No	162	6	168
Yes	278	16	294
Total	440	22	462

Examining if the speaker was referring to something he made the last reference to, in relation to the demonstrative used, did not produce significant results. Proximals are used slightly more by the speaker when the last reference was also made by the speaker, see figure 4.5. From the proximals, 73% of the time the speaker was the same person as the one who made the last reference. For distals, this was 63%. The percentages agree with the hypothesis. The result is not significant because there are only 22 uses of non-new proximals and because of the small size of the effect. The absolute numbers can be found in table 4.7.

When looking at situational use, one would expect a stronger effect, since the relation with the actual words is stronger. It shows that all non-new proximal discourse deictic uses refer to words the speaker has last spoken. However, this happened only three times, and is not significant. From the discourse deictic distals, 56% was referring to words last mentioned by the speaker.

Table 4.8: Speaker introduced the referent and Semantic type Cross tabulation

Introduced by speaker	Proximal	Distal	Total
No	11	187	198
Yes	11	253	264
Total	22	440	462

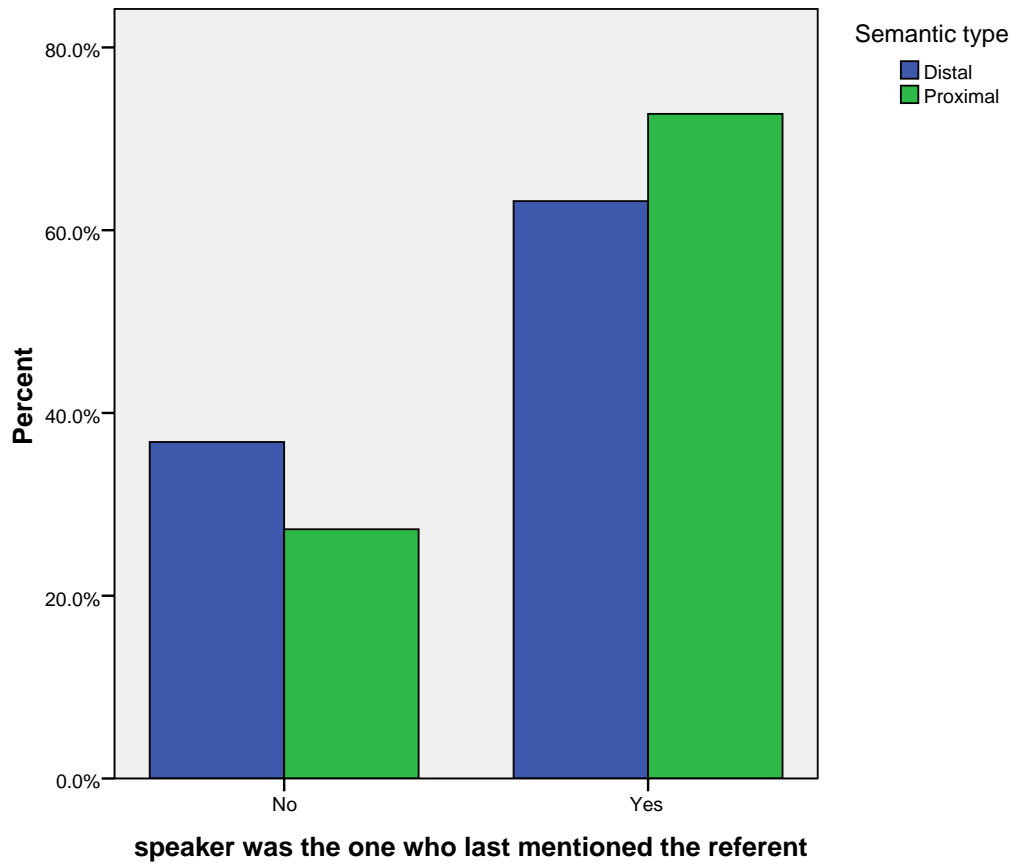


Figure 4.5: The relative differences between proximals and distals in relation to whether the speaker was also the one who made the last reference.



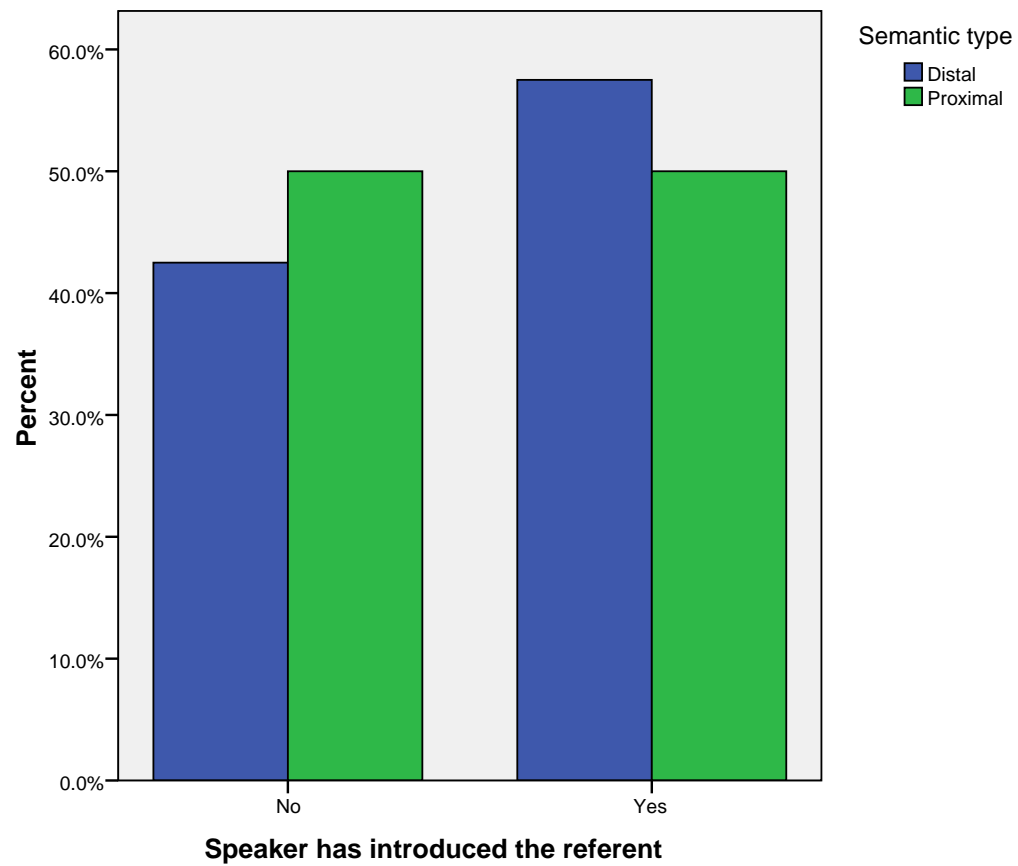


Figure 4.6: The relative differences between proximals and distals in relation to whether the speaker was also the one who made the first reference to the same object.

When looking whether the speaker was referring to something he mentioned first, all values were about 50%, see figure 4.6. Distals were slightly more used if it was the original speaker. This is probably because distals are used quite a lot with left dislocation (43 out of 467), and because distals on average are used more often within the same turn. The absolute number can be found in table 4.8

## Chapter 5

# Discussion

In this chapter we will show the results. We will follow the order of the hypotheses, and explain the difficulties we encountered trying to validate them. We also link the outcomes with the literature.

We categorized the demonstrative by use in four different categories. To separate recognitional and tracking use we used the rather arbitrary chosen limit of ten turns. This limit set to differentiate recognitional use and tracking use lead to plausible results. The recognitional uses by this limit were used as such as and the tracking uses were also used as tracking use.

As expected there were very few cases of situational use, because there was no shared physical space. Recognitional use was also scarce, this is probably because the conversations did not take very long, and because the operator and the client did not know each other, so they had little shared knowledge. Tracking use occurred slightly more often than discourse deictic use. When looking at the proximals and distals for each type, only the relative high proportion of situational use with proximals stands out. This is probably because situational use is often used with new items.

### 5.1 Hypothesis 1: Importance

As was shown in chapter 3, proximals are significantly more often used with important items. To come to this finding we defined importance, as something which is needed to complete a task. Because of this we also were unable to classify discourse deictic uses of demonstratives. Kirsner et al. (1987) did not give a definition of importance, and did not research this link directly. The results do agree with what he expected, giving room to his explanation of proximals being used to put extra attention to objects. Ariel (1990) also did not give a definition of importance. The results do agree with her predictions, but the reason why is different.

Sometimes it was a little difficult to tell if the referent was important. As was the case for demonstrative 142 in dialogue 6. Here a proximal was used to refer to the problem the client has, and how this was handled by the helpdesk.

Dutch Ja ik ga hier sowieso een klachtenmelding van maken, want ik vind dit niet meer kunnen...

English I am going to make a complaint about this, because I don't agree with the way it's going...

It was decided the item was important, cause it is needed to know the problem to solve it. At this point in the conversation it did not help to come closer to a solution however, which might be a reason to consider it trivial. Another example is when they are talking about the cable between the modem and the connection point. A bad or long connection may cause problems, and it is one of the first they look into. The example is from dialogue 8, it was numbered 372.

Dutch Daar zit dat kabeltje van jullie ehmmm.

English That cable from you is located between ehmmm.

It turns out the cable was not a cause of the bad connection the client complained about. But at the moment of asking this was not sure, and it might have been the cause of the problem. Therefore the referent was considered important.

Most items considered trivial only play a small role in the conversation. They are used as example or as direction to important items. In the following example from dialogue 7, turn 41, numbered 321, a hypothetical item is used.

Dutch Nee, maar dan kunt u wel even testen en dan even tijdelijk zonder beveiliging als u dan verder de mailtjes niet opent eh als u vermoedelijk een gevaarlijk mailtje ontvangt, dan moet u die gewoon weer weggoeien.

English No, but by temporary putting off the security you can test if it works without it, just don't open any email messages, if you receive a email you suspect being dangerous, you have to throw that away again.

The suspicious email is not part of the solution to the problem, which is an error in receiving mail. It is therefore considered trivial.

Instead of an item being important for the problem to solve, it may be important for other reason. For example because someone feels strong about it. As is the case in dialogue 6, turn 106, for demonstrative 233 and 234(deze and die). In this dialogue the client keeps persisting he wants to change

Dutch Alles wat is aangemaakt kan ook eh kan ook 2E keer aangemaakt worden, waarom nemen jullie dit niet deze nu die ik jullie nu geef, waarom niet?

English Everything which is created can also be created again, why don't you use this one, that I just gave you, why not?

Here the client is expressing his frustration about not being able to change the head email address which is used with his internet account. This is not part of getting to a

solution, since it was already clear this email could not be changed. Both demonstratives used were therefore considered to refer to trivial items. The original Dutch sentence also contained a demonstrative, "deze", which was not counted as an actual use since the speaker corrected himself.

As we have seen there is some evidence the alternative view has some predicting power for demonstratives. Especially importance seems related to the use of proximals. Even though the first hypothesis was highly significant, its predictive power is small. For example 5 of the 34 proximals are used for items trivial to solving the problem. This may have several causes. A significant cause might be that there are more reasons to select a proximal than marking importance. Another reason might be that if something is just mentioned with a proximal, it already is in focus, and it doesn't need to be referenced by with a proximal again. So even though it might be an important item it is then referred to by a distal.

A problem with importance is that it is hard to determine. There are different theories, but none of them seems to hold without exception. For example the subject of a sentence might be considered important. Depending on the context some solution may be found, like with the block building game Piwek et al. (2008). But even then there may be different reasons for an item to be considered important.

Discourse deictic uses were not used to determine importance. When proximals are used for discourse deictic there are several possibilities. If they refer to time they refer to something close, like "this moment" referring to now, at this time. If they refer to text, they tend to refer to large chunks of text. In some cases they are used to refer to put emphasis on what is going to be said. When proximals are used in relation to something in the physical context, they are referring to items relative close to the speaker. This was not seen here but has been proved in other research (Rooij (2006), Kemmerer (1999), Byron and Stoaia (2005)).

## 5.2 Hypothesis 2: Are proximals more often used in combination with adnominal use?

The second hypothesis was also accepted. Proximals were used more often as adnominal, so with the help of a noun. This suggests an indirect link with importance, which was also seen in the work of (Kirsner et al., 1987). This is because with important items adverbs are used more often than with trivial items, to give the referent more attention. Also important items may be referred over longer lengths, and adverbs may then be needed to make a correct identification.

While according to the alternative view the results are explainable, it is harder for the traditional view to explain the results. None of the literature discussed gives an explanation. Both the theory of Ariel (1990) and Gundel et al. (1993) can't explain this, because they consider the adnominal and pronominal uses different for proximals and distals. In such a way there is nothing to explain, since there may simply be a difference in the different ways demonstratives are used.

### 5.3 Hypothesis 3: Distance

From the third hypothesis it follows that proximals are used both more often for new items, and when the last mention of the referent was longer ago. This is in line with the alternative view. Because something is new, or has not been mentioned for some time, more attention is needed to get the referent in focus. Because of the item getting more attention with the use of a proximal, proximals are also used more with important items (Piwek et al., 2008). The traditional view does not have an explanation for both effects.

When looking at distance, proximals tend to have their referent further away than distals. It was assumed this was because proximals are used for less accessible items by (Ariel, 1988). This claim controversial and there is other evidence it might be wrong, as research specifically on the relation between accessibility and type of demonstrative has shown ?

### 5.4 Hypothesis 4: Are proximals more often used when the speaker is the same who last used, or introduced the referent?

We can tell very little from the research done on the forth hypothesis. It does not seem to matter much for the demonstrative to use whether the speaker is the same as the one who introduced the referent. Whether the speaker was also the one who made the last reference to the referent also didn't seem to affect the choice of the referent. Where we did not find a significant effect, Glover (2000) did in his research. This could be because of an important difference in the used dialogues. While in the conversations we studied both participants try to work together to solve a problem, Glover used dialogues in which the participants each wanted to convince the others of their belief. In the dialogues from Glover the attitude towards propositions play a more prominent role then the dialogues we used. So while in this research we did not fond a significant effect, it the choice of demonstrative form may depend on one's attitude towards a proposition.

Another reason we did not find a significant result may be the way in which we try to measure the attitude of the speaker towards the referent. Indeed whether one introduced the referent may say little about his attitude towards it. Also if it was not the speaker who made the last reference, this does not mean the speaker thinks different about the referent then the one who did last mention the referent.

## Chapter 6

# Conclusion

The goal of this thesis was to get a better understanding on the pragmatics of demonstrative. We looked at two contrasting views on the use of demonstratives, the traditional and the alternative view. The traditional view explains the difference in meaning between proximals and distals by using distance. Proximals are used to refer to items close by in physical space, or a metaphorical equivalent, for example close to the present in time. The alternative view explains the difference by the effect they have on the listener. Proximals are used to put more attention to the referent than distals. This could be done for several reasons, for example, because the referent is important or because the referent is hard to find. The alternative view seems to have little explanatory power as long as the references are not made in relation to physical space, because often different metaphors are possible to explain the meaning. In this research Dutch telephone conversations were used to determine which view best describes the actual use of demonstratives.

It was found that the alternative view better explains the use of demonstratives than the traditional view. The most significant result supporting this conclusion was the relation between proximals and importance. It was found proximals are used significantly more often with important items than for trivial items. A problem is finding the right workable definition for importance. The definition used here, by linking an item to a problem which needs to be fixed, made it impossible to classify some referents, such as propositions, for importance. It is also hard to apply this definition objectively, because you then need to specify what does and does not help to solve a problem, and it is also not always clear what the problem is. A possible objection for using the result on important items as an argument in favour of the alternative view could be that being important, is also in some way close, but this seems far-fetched. If importance can be used as metaphor in the traditional view, the problem of selecting the right demonstrative becomes one of selecting the right metaphor to use, since there will always be multiple metaphors possible.

Using the alternative view it is still hard to predict the use of demonstratives. Considering the results from this research and earlier research it seems exceptional when the meaning of a demonstrative is clear. For example "this moment" is about the present, and also puts emphasis on the moment. In other cases, importance has a big influence

on the choice, but some other factors may play a role. Two of the straightforward cases where the use is clear are when demonstratives are used to refer to things in physical space or points in time. The uses where the meaning of a demonstrative is clear seem easy to distinguish. An artificial agent would need to recognize them to understand their meaning. When it is not a use with a clear meaning, the best guess is to link proximals with important items and trivial items with distals. The model on what is important or not should be based on the task that needs to be completed. Using this guideline leads to a better understanding between the artificial agent and the human being interacting with it.

There is some room for improvement for the research done for this paper. It would for example be nice to see if the same items would be regarded as important by another person using the same definition, and also when the demonstrative themselves are removed. It could be the case that proximals are associated with importance, without them being used more with important items.

The most obvious step is to do the same research, but with another language. English will be an obvious choice, since some research in English claims that the proximal form is linked to the more accessible items. Since there are a lot of languages showing a distinction between proximals and distals, it will be interesting to see to what degree the same rules apply. It would also be interesting if the same effect can be seen in an English conversation, or a Dutch conversation of a different kind. The better the participants know each other the more shared knowledge they have. Having more shared knowledge makes it possible to refer to more items. Another thing which might be done is testing hypothesis 4a and 4b on a dialogue which is more personal. Hypothesis 4a and 4b are based on the relation between being in agreement or not and the use of proximals or distals. Following (Glover, 2000) we expected that proximals would be used more often when the speaker introduced the referent, or was the last one who referred to the referent. We could not accept these hypotheses with our data. It is possible the effect found by (Glover, 2000) was not found here possibly because of the distance towards the topic. Unlike the research of Glover there are not two groups with different goals in the data that we used. It is almost the opposite, because the client and the operator try to work together to solve the problem.

If more research is done, it may turn out that, depending on the type of conversation, some distance metaphor may be more prominently used than others. For example in a conversation in a debate, how close a standpoint is to one's own standpoint may say more about which demonstrative to use than how long ago it was last mentioned.

Some of the speakers were not native speakers. Sometimes the participants made error using the wrong form, but this happened only when they got the gender wrong. So instead of "die" they use "dat" or the other way around. There is never a use of a proximal or a distal, where the other is clearly better. This could be because no errors were made, or because the chance of such an error is small. It seems the difference between proximals and distals is somehow easier than the difference in gender.

Another way of looking at it is viewing proximals as marking high deixis, i.e. important items are being lifted up so to speak to make them more prominent. High deixis



also helps when referring further away, as more effort is needed to find the referent. Also modifiers may help along with proximal to bring extra attention to a referent. But it is hard to use the theory of difference in deixis for all uses. Why for example should high deixis only be possible for items close by, and not also for items far away which deserve a lot of attention. Even if I want to refer to a castle we've been searching for all day, and I think I see it far away, I can't refer to it using a proximal. For example, "Do you also think this is the castle we have been looking for." seems incorrect as long as the castle is not close in physical distance.

In the introduction we introduced the topic with an android misunderstanding the police agent who was giving him instructions. It will probably take a lot of research to get an android to same level of understanding natural language as humans do. I hope this research is a small step in the right direction. Adopting the alternative view brings with it some problems, such as a good definition of importance, but I believe the traditional view is inadequate to make an android 'understand' the difference between proximals and distals.

Always giving the right prediction for a demonstrative will be impossible. A lot of times both proximal and distal are possible. The goal should be to understand the use of demonstratives to such a degree that it is impossible to distinguish between a human and an artificial agent when using demonstratives. For reaching this goal, more research will be needed.

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# Appendix A

## Example of a dialogue

Here is an example of one of the dialogues, to get some inside in how it went. Only the original Dutch version is included. All the demonstratives are underlined.

### A.1 dialogue 4

Nummer: 4  
Datum: 02-06-2008  
Agent: A. T.  
Transcribent: Cliffred  
Geslacht K: V  
File: at\_08.mp3  
Duur: 6:31

1. A: Goede middag, Telfort technische helpdesk, u spreekt met A T, waarmee kan ik u helpen?
2. K: Goede middag met I uit Heerle, meneer! Ik eh heb een paar dagen geleden gebelde, onze modem zou kapot zijn, eeuh, 't zou doorgestuurd worden en bekeken worden en een nieuwe modem zoude zouden we krijgen
3. A: Oke, wat is uw postcode?
4. K: \*\*\*\*
5. A: En 't huisnummer?
6. K: \*\*
7. A: Op naam van I?
8. K: Jah
9. A: Oke, 'k zal even kijken
10. K: Jah (7)
11. A: Ik zie niet staan dat uw modem defect is, ik zie wel dat eh staan dat er een probleem is met uw adsl-verbinding, maar of dat nou komt door een defect modem of door iets anders dat kan ik dat eh dat is nog niet helemaal duidelijk

12. K: Maar ze hebben mij gezegd dat waarschijnlijk dat de modem kapot zou zijn en ik zou een nieuwe krijgen binnen 8 werkdagen en ik heb nog steeds geen internet geen huistelefoon niets, ik zit hier zonder en ik moet wel betalen
13. A: Ja, dat u dus sowieso een nieuw modem krijgt dat eh is nog helemaal duidelijk, dus eh dat klopt niet dat mijn collega dat heeft gezegd
14. K: Ja?
15. A: Het kan zijn dat u een nieuw modem krijgt, maar 't kan ook zijn dat er een ander probleem is. Eh dat gaan wij nu dus onderzoeken en aan de hand daarvan komt er een oplossing naar voren, of d'r zit ergens een kabel verkeerd of er is ergens iets kapot of inderdaad uw mo... of het ligt aan uw modem, dat gaan we eerst onderzoeken eh en aan de hand daarvan zullen wij eh de oplossing aankaarten en dit duurt bij mekaar
16. K: Ja maar eh meneer, t'wordt 't zou een week geleden ook onderzocht worden en wanneer gebeurt wordt er nou eens actie ondernomen?
17. A: Nou ik zie dus dat die storing is op 29 mei gemeld en vanaf 29 mei kunt u aanhouden dat 't wel ongeveer 5 a 10 werkdagen gaat duren. Dus eh ja, ik zie dat er nog niks mee gebeurd is en dat komt omdat 't ook pas net aangemaakt is, dus we zullen helaas even moeten eh eh wachten tot uw probleem aan de beurt is en vervolgens gaan wij die oplossing eeh, die gaan wij aankaarten en uhm dan zult u vanzelf merken dat of uw verbinding weer gewoon goed werkt doordat dat rode lampje weg is of u zult inderdaad een nieuw modem ontvangen, of u wordt gebeld omdat er een monteur lang moet komen. EÃIn van die dingen zal het zijn.
18. K: Ja, maar dat er ergens een kabeltje wat u net zegt niet goed zit, die heeft 't daarvoor wel gedaan, dan zou die 't helemaal niet gedaan moeten hebben, dat klopt dan niet.
19. A: Nou, 't kan toch zijn dat er een kabel kapot gaat, dingen gaan nou eenmaal kapot, dus ja..
20. K: Dat kan
21. A: Daar zou 't aan kunnen liggen
22. K: Dat kan
23. A: Ja
24. K: Ja, de rooie lamp blijft gewoon branden op 't modem dus..
25. A: Ja precies, dus eh of d'r zit ergens een kabeltje niet goed, of dat is kapot gegaan, of eh of misschien inderdaad 't modem is kapot of iets anders is aan de hand, dat zullen we eerst moeten onderzoeken
26. K: Maar krijgen we ook geen vervangende modem of wat ik ben telefonisch niet bereikbaar via internet niet bereikbaar, wat moet ik hier
27. A: Nee dat klopt, omdat al uw adsl-verbinding niet werkt dan doet uw telefoon 't ook niet als u telefonie van ons heeft en jah als u een vervange.. of u een vervangend modem krijgt dat weet ik nu nog niet, dan moeten we eerst gaan onderzoeken of het inderdaad aan het modem ligt, als het niet aan het modem ligt, dan krijgt u ook geen nieuw modem, want dat heeft u dan niet nodig
28. K: Ja dat snap ik wel, maar u moet begrijpen dat ik totaal niet bereikbaar ben op dit moment en zelf ook zelf ook niet eeh verder kan op internet

29. A: Ja, ja dat begrijp ik
30. K: Dat hier dan spoed ehh iets mee wordt gedaan, want ik vind dit niet meer leuk
31. A: Ik eh ik kan helaas geen prioriteiten toekennen aan eh problemen, dus 't is gewoon een kwestie van afwachten tot u aan de beurt bent. Voor ons is iedereen gelijk
32. K: En hoe lang gaat dat duren?
33. A: Nou eh u kunt aanhouden 5 a 10 werkdagen
34. K: Word ik dan terugge... hebben ze mijn telefoonnummer dan?
35. A: Als het goed is staat die erbij ja, en u wordt alleen gebeld als er een monteur langs moet komen of iets dergelijks, anders zult u gewoon merken dat het rooie lampje verdwenen is.
36. K: Ja, ja maar ze hebben er nog niet naar gekeken dus
37. A: Dat klopt inderdaad (2) Want d'r zijn ook mensen, d'r zijn nog meer mensen met problemen die eh die eh ja die problemen al hadden voordat u uw probleem had en die zijn natuurlijk eerst aan de beurt (4)
38. K: Ja
39. A: Dus we moeten even afwa...
40. K: Ja ik ga hier sowieso een klachtenmelding van maken, want ik vind dit niet meer kunnen, dit is eh, ik heb van het begin af aan van tijd tot tijd problemen gehad met eh met bellen dat ik niet bereikbaar was of niet kon bellen en toen hebben ze me ook gezegd u collega dus de vorige keer van eh dat waren dus blijkbaar al de voorseinen dat de modem stuk aan 't gaan was
41. A: Oke, nou dat zou kunnen, als dat zo is en wij zien dat hier dan krijgt u een nieuwe uiteraard
42. K: Ja, oke, ik wil u naam nog even noteren hier
43. A: Dat mag, dat is A (3)
44. K: A, nou goed, is dit alles wat ik kan doen? Verder echt niets meer?
45. A: Nee, het is even afwachten eht eh wij gaan 't onderzoeken waar het aan ligt en u zult dan vanzelf merken wat er wat de oplossing zal worden
46. K: Ja, en als ik 't niet merk eh word ik gebeld?
47. A: Nou ja, u zult 't sowieso merken, dus of uw internetverbinding die werkt weer doordat het rode lampje weg is, of u zult een nieuw modem ontvangen, of d'r komt een monteur langs, of tenminste u wordt gebeld.
48. K: De modem kunnen ze dus wel eh per post toesturen eh voordat ze me bellen of wat dan ook dus die kan dan eigenlijk met de post aankomen?
49. A: Als u een nieuw modem krijgt, dan wordt u daarover niet gebeld inderdaad, die wordt gewoon naar u toe gestuurd en wor.. dan ontvangt u die gewoon die wordt bij u bezorgd
50. K: Oke (3) eh zou u nogmaals kunenn controleren of die klopt
51. A: We.. wat zegt u?
52. K: Mijn telefoonnummer, of die klopt, zou u die nog even kunnen controleren?
53. A: Ja zeker, ik heb hier staan 06\*\*\*\*\*
54. K: Correct

55. A: Die staat erbij dus als u gebeld moet worden wordt u op dat nummer gebeld en tijdens kantooruren ook, dus mijn advies is sowieso om 'm ook goed in de gaten te houden en eventueel als u een voicemail heeft dan wordt daarop ingesproken als we u niet kunnen bereiken

56. K: Nou m'n man zegt geef die van mij ook door, want stel dat ik 'm met werk eh uit moet zetten dan ben ik in ieder geval bereikbaar

57. A: Geeft u die maar

58. K: Jah, dat is 06\*\*\*\*\*

59. A: Ja, oke die heb ik d'rbij gezet ook, dus dan eh wordt u eh beide nummers worden geprobeerd

60. K: Is goed, we wachten het af dan

61. A: Yes, succes

62. K: Dag



## Appendix B

# The raw data, first half

The raw data used for the research is divided in two halves else it won't fit. Both have the same numbering in the most left column. The meaning of the abbreviations are shown below

- *Number*: number of the demonstrative, from 1 to 506.
- *Dia*: number of the dialogue the demonstrative was found in.
- *Tur*: number of the turn the demonstrative was found in.
- *Las*: number of the turn of the previous mention of the referent.
- *Fir*: number of the turn of the first mentioning of the referent.
- *Dem*: the actual demonstrative used.
- *Modifier*: optionally the modifier of the demonstrative.
- *Mt*: the type of modifier, none(0), only noun(1) or more than a noun(2).
- *PD*: whether the referent is a proximal(p) or a distal(d).
- *Antecedent*: a description of the object which was referred to.
- *AntType*: which type of object was referred to.

Table B.1: Raw data from the ten dialogues, first half

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
1	1	4	2	2	die		0	d	iemand	human
2	1	6	4	4	die		0	d	een P.	human
3	1	6	6	6	dat		0	d	het resetten	action
4	1	10	8	8	dat		0	d	P te pakken krijgen	action
5	1	28	25	25	dat		0	d	het telefoonnummer opnieuw instellen	action
6	1	28	4	4	die	jongen	1	d	P.	human
7	1	32	1	1	die	telefoon	1	d	telefoon van K	techn obj
8	1	32	28	4	die	jongen	1	d	P.	human
9	1	32	23	6	dat	hele modem	2	d	het modem	techn obj
10	1	33	32	32	dat		0	d	het niet goed-zijn van het modem	prop
11	1	34	34	24	die	man	1	d	iemand van de belasting	human
12	1	34	34	1	die	telefoon	1	d	de telefoon	techn obj
13	1	34	34	1	die		0	d	de telefoon	techn obj
14	1	36	n/a	n/a	dat		0	d	de geldbesparing	concept
15	1	39	39	39	die		0	d	de telefoonlijn met ADSL	techn obj
16	1	42	39	39	dat		0	d	vertellen waar de tel. binnenkomt	speech act
17	1	44	42	42	die		0	d	de telefoon boven	techn obj
18	1	54	53	53	dat		0	d	het erop staan van KPN of PTT	prop
19	1	61	59	59	die	aansluiting	1	d	de telefoonaansluiting	techn obj
20	1	62	61	59	die	aansluiting	1	d	de telefoonaansluiting	techn obj
21	1	62	62	59	die		0	d	de telefoonaansluiting	techn obj
22	1	66	65	65	dat		0	d	de afstand modem-aansluiting	concept
23	1	75	75	75	dat		0	d	het optreden van wegvallende momenten	action
24	1	77	75	75	dat		0	d	het wegvallen van ADSL	action
25	1	78	78	78	dat		0	d	dat de telefoon niet altijd wegvalt	prop
26	1	83	82	81	die	computer	1	d	de computer	techn obj
27	1	84	83	81	die		0	d	de computer	techn obj
28	1	86	34	34	die	belasting	1	d	het gesprek met de belasting	concept
29	1	90	32	4	die	jongen	1	d	P.	human
30	1	90	90	4	die		0	d	P.	human
31	1	91	91	91	dat		0	d	de tips	concept
32	1	91	91	91	dat		0	d	of de tips de oplossing zijn	prop
33	1	92	91	91	dat		0	d	het testen	action
34	1	94	92	91	dit	allemaal	0	p	het geven van tips en testen	action
35	1	95	92	92	dat		0	d	hoe lang het geven van tips en testen duren	speech act
36	1	95	95	95	die	kabel	1	d	het kabeltje tussen aansluiting en modem	techn obj
37	1	95	95	95	die		0	d	het kabeltje tussen aansluiting en modem	techn obj
38	1	95	95	95	dat		0	d	het inkorten en er tussen zetten	action
39	1	101	99	99	dat		0	d	welke lampjes branden of uitvallen	prop

Continued on Next Page...

Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
40	1	107	107	107	dat		0	d	de gegevens	concept
41	1	109	95	95	dat	kabeltje	1	d	het kabeltje tussen aansluiting en modem	techn obj
42	1	109	109	95	dat		0	d	het kabeltje tussen aansluiting en modem	techn obj
43	1	109	109	95	dat		0	d	het inkorten en er tussen zetten	action
44	1	109	99	99	die	lampjes	1	d	de lampjes van het modem	techn obj
45	1	110	92	91	dat		0	d	het testen	action
46	1	110	110	110	die		0	d	de mannen	human
47	1	112	110	110	die		0	d	de mannen	human
48	1	112	110	91	dat		0	d	het testen	action
49	1	113	112	112	dat		0	d	dat de mannen inkorten etc.	prop
50	2	4	3	3	dat		0	d	wat er defect aan is	prop
51	2	4	n/a	n/a	die	lampjes	1	d	de lampjes van het modem	techn obj
52	2	4	4	4	die		0	d	de lampjes van het modem	techn obj
53	2	9	8	8	dat		0	d	dat het een draadloze router is	prop
54	2	9	9	9	die		0	d	het modem	techn obj
55	2	10	9	9	dat		0	d	het aansluiten van het modem	action
56	2	10	9	2	dat	ding	1	d	het modem	techn obj
57	2	10	10	2	dat		0	d	het modem	techn obj
58	2	12	10	2	dat		0	d	dat het modem het niet doet	prop
59	2	13	12	2	dat		0	d	dat het modem het niet doet	prop
60	2	13	13	13	dat		0	d	het langslopen van dingetjes	action
61	2	17	9	9	dat		0	d	modem boven aansluiten	action
62	2	17	17	17	dat		0	d	het resetten	action
63	2	17	17	17	die	beide dingen	2	d	het resetten en het boven aansluiten	action
64	2	17	17	17	dat		0	d	het resetten en het boven aansluiten	action
65	2	23	22	22	dat		0	d	het op een andere groep zetten	action
66	2	24	9	9	dat	hele spul	2	d	de stekkers, het modem en de adapter	techn obj
67	2	25	24	24	dat		0	d	het loshalen van het hele spul	action
68	2	27	27	27	die		0	d	het powerlampje	techn obj
69	2	31	29	9	dat		0	d	het modem testen	action
70	2	32	31	9	dat		0	d	het modem testen	action
71	2	41	41	41	die		0	d	het aan-uit knopje	techn obj
72	2	41	41	41	die		0	d	het aan-uit knopje	techn obj
73	2	41	41	41	die		0	d	het aan-uit knopje	techn obj
74	2	42	41	41	dat	schakelaartje	1	d	het aan-uit knopje	techn obj
75	2	44	42	41	die		0	d	het aan-uit knopje	techn obj
76	2	45	38	37	die	omgebogen paperclip	1	d	de paperclip	techn obj
77	2	45	45	45	die		0	d	het resetgaatje	techn obj
78	2	46	45	45	dat	knopje	1	d	het resetgaatje	techn obj
79	2	46	46	45	dat	resetknopje	1	d	het resetgaatje	techn obj

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
80	2	47	46	45	die		0	d	het resetgaatje	techn obj
81	2	49	29	27	dat	powerlampje	1	d	het powerlampje	techn obj
82	2	51	50	50	dat		0	d	het neerleggen	action
83	2	77	75	13	dat		0	d	ervoor zorgen dat een nieuw modem ?	action
84	2	77	n/a	n/a	dit	probleem	1	p	het defect-zijn van het modem	concept
85	2	84	83	83	dat		0	d	het netnummer	concept
86	2	87	86	86	die	laatste	1	d	het laatstgenoemde getal	concept
87	2	91	n/a	n/a	dit	alles	1	p	de besproken informatie	concept
88	2	91	91	91	dit		0	p	de besproken informatie	concept
89	2	97	95	95	dat		0	d	dat de garantie in het 2de jaar zit	prop
90	2	105	102	102	deze		0	p	het type router	techn type
91	2	107	105	102	die		0	d	het type router	techn type
92	2	109	108	108	dat		0	d	het uitvallen van de router	action
93	2	113	112	112	dat		0	d	Dat het probleem in de router zit	action
94	2	113	n/a	n/a	dit		2	p	het nieuwe modem	techn obj
95	3	10	2	2	die	nieuwe modem	1	d	dat er meerdere klanten uitgegooid zijn	tijdstip
96	3	11	10	10	dat	donderdagavond	0	d	donderdagavond	prop
97	3	13	n/a	n/a	dit	moment	1	p	dit moment	tijdstip
98	3	13	13	13	dat		0	d	dat het telefoonnummer niet is ingelgd	prop
99	3	13	13	13	dat		0	d	het probleem dat het nummer er niet (goedl) in staat	concept
100	3	15	13	13	dat		0	d	het indrukken van het resetgaatje	action
101	3	23	23	23	dat		0	d	het aanzetten van het modem	action
102	3	24	24	24	die		0	d	anderen	human
103	3	27	11	11	die		1	d	de storing	concept
104	3	29	29	29	die		0	d	het telefoonnummer	concept
105	3	41	39	39	die		0	d	het ene telefoonnummer	concept
106	3	45	44	44	dat		0	d	telefoonnummer 322*****	concept
107	3	47	46	45	die		0	d	phone 1	techn obj
108	3	48	48	48	dat	storing	0	d	het knipperen van het internet	action
109	3	49	49	48	dat		0	d	het knipperen van het internet	action
110	4	11	11	11	dat		0	d	het probleem met de adsl-verbinding	concept
111	4	11	11	11	dat		0	d	waardoor er een probleem is met de adsl-verbinding	prop
112	4	13	13	12	dat		0	d	dat K een nieuw modem krijgt	prop
113	4	13	13	13	dat		0	d	dat A's collega dat heeft gezegd	prop
114	4	13	13	12	dat		0	d	dat K een nieuw modem krijgt	prop
115	4	15	15	15	dat		0	d	of er een ander probleem is	prop
116	4	15	15	15	dat		0	d	of er een ander probleem is	prop
117	4	15	15	15	dit		0	p	het onderzoek	concept
118	4	17	n/a	n/a	die	storing	1	d	de storing	concept
119	4	17	17	17	dat		0	d	dat er niks mee is gebeurd	prop

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
120	4	17	17	15	die	oplossing	1	d	de oplossing van het probleem	concept
121	4	17	17	15	die		0	d	de oplossing van het probleem	concept
122	4	17	n/a	n/a	dat	rode lampje	2	d	het rode lampje op het modem	techn obj
123	4	17	17	17	die	dingen	1	d	K's verbinding werkt weer goed en ? en ...	prop
124	4	18	15	2	die		0	d	de kabel	techn obj
125	4	18	18	2	die		0	d	de kabel	techn obj
126	4	18	18	15	dat		0	d	dat er een kabel verkeerd zit	prop
127	4	20	19	19	dat		0	d	dat er een kabel kapot is gegaan	prop
128	4	22	21	21	dat		0	d	dat het daar aan ligt	prop
129	4	25	25	25	dat		0	d	een kabeltje	techn obj
130	4	25	25	25	dat		0	d	wat er kapot is gegaan	prop
131	4	27	26	26	dat		0	d	dat K niet bereikbaar is	prop
132	4	27	27	27	dat		0	d	of K een vervangend modem krijgt	prop
133	4	27	27	27	dat		0	d	een nieuw modem	techn obj
134	4	28	27	27	dat		0	d	dat K geen nieuw modem krijgt als ?	prop
135	4	28	n/a	n/a	dit	moment	1	p	dit moment	tijdstip
136	4	29	28	28	dat		0	d	dat K niet meer verder kan	prop
137	4	30	n/a	n/a	dit		0	p	het hele gedoe, niet bereikbaar zijn	concept
138	4	32	31	31	dat		0	d	de wachttijd	tijdstip
139	4	35	34	34	die		0	d	K's telefoonnummer	concept
140	4	37	36	36	dat		0	d	dat ze nog niet hebben gekeken	prop
141	4	37	37	37	die		0	d	meer mensen met problemen	human
142	4	40	n/a	n/a	dit		0	p	de manier waarop de klacht wordt afgehandeld	concept
143	4	40	40	40	dat		0	d	dat K niet kon bellen	prop
144	4	41	40	40	dat		0	d	dat er voorseinen waren	prop
145	4	41	41	40	dat		0	d	dat er voorseinen waren	prop
146	4	41	41	40	dat		0	d	dat er voorseinen waren	prop
147	4	43	42	42	dat		0	d	het noteren van A's naam	action
148	4	43	42	42	dat		0	d	A's naam	concept
149	4	44	n/a	n/a	dit		0	p	alles wat K heeft gedaan	concept
150	4	47	47	47	die		0	d	K's internetverbinding	techn obj
151	4	48	48	41	die		0	d	het nieuwe modem	techn obj
152	4	49	49	49	die		0	d	een nieuw modem	techn obj
153	4	49	49	49	die		0	d	het nieuwe modem	techn obj
154	4	49	49	49	die		0	d	het nieuwe modem	techn obj
155	4	50	34	34	die		0	d	K's telefoonnummer	concept
156	4	52	52	34	die		0	d	K's telefoonnummer	concept
157	4	52	52	34	die		0	d	K's telefoonnummer	concept
158	4	55	53	34	die		0	d	de waarde van K's telefoonnummer	concept
159	4	55	55	53	dat	nummer	1	d	de waarde van K's telefoonnummer	concept

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
160	4	56	n/a	n/a	die	van mij	2	d	het telefoonnummer van de man	concept
161	4	57	56	56	die		0	d	het telefoonnummer van de man	concept
162	4	58	57	56	dat		0	d	het telefoonnummer van de man	concept
163	4	59	58	58	die		0	d	de waarde van het nummer van de man	concept
164	5	2	1	1	dat		0	d	wat A gezegd heeft	action
165	5	16	16	16	dat		0	d	dat de telefoon het nog doet	prop
166	5	21	19	8	die		0	d	het emailadres	concept
167	5	21	21	12	die		0	d	het emailadres	concept
168	5	21	21	12	dat	emailadres	1	d	het emailadres	concept
169	5	22	11	8	dat		0	d	de mail van het emailadres	concept
170	5	25	24	24	dat		0	d	dat ze van xs4all komen	concept
171	5	26	26	26	die		0	d	het zyxel modem	prop
172	5	29	27	26	dat	modem	1	d	het zyxel modem	techn obj
173	5	34	34	34	dat		0	d	dat K's telefoonaansluiting werkt	techn obj
174	5	35	n/a	n/a	dit		0	d	dit moment	prop
175	5	37	35	35	dat	moment	1	p	het actief maken van K's telefoonnummer	tijdstip
176	5	38	37	37	die	tijd	0	d	het moment dat de telefoon actief wordt	action
177	5	41	38	38	dat		1	d	het bellen via KPN	tijdstip
178	5	47	45	26	dat	modem	0	d	het belten via KPN	tijdstip
179	5	48	47	47	dat		1	d	het zyxel modem	techn obj
180	5	50	4	4	dat	internet	0	d	dat er een telefoniepoortje op zit	prop
181	5	51	50	50	dat		1	d	het internet van Telfort	techn obj
182	6	6	6	6	dat		0	d	dat het internet werkt	prop
183	6	14	n/a	n/a	die	collega	0	d	de internetaccount van K	concept
184	6	15	14	14	dat	emailadres	1	d	de collega van A	human
185	6	17	15	15	dat		0	d	het emailadres	concept
186	6	19	15	14	dit		0	d	wilt u van uw emailadres af?	speech act
187	6	19	19	14	dit	emailadres	1	p	het emailadres (hoofd)	concept
188	6	19	19	14	die		0	p	het emailadres (hoofd)	concept
189	6	19	19	19	dat		0	p	het emailadres (hoofd)	concept
190	6	19	19	19	dat		0	d	het hoofdemailadres	concept
191	6	19	19	19	die		0	d	het adres dat erbij moet staan	concept
192	6	19	19	19	die		0	d	het hoofdemailadres	concept
193	6	20	19	19	dat		0	d	dat het hoofdemailadres	concept
194	6	21	20	20	dat		0	d	het hoofdemailadres	concept
195	6	22	6	4	die	gegevens	0	d	dat K dat nu pas hoort	prop
196	6	29	22	14	dit	emailadres	1	d	de gegevens van het emailadres	prop
197	6	31	29	14	dit	emailadres	1	p	het emailadres (hoofd)	concept
198	6	35	29	14	dit	emailadres	1	p	het emailadres (hoofd)	concept
199	6	47	35	14	dit	emailadres	1	p	het emailadres (hoofd)	concept

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
200	6	47	47	47	dit	nieuwe wachtwoord	2	P	het nieuwe wachtwoord	concept
201	6	49	47	47	dit	wachtwoord	1	p	het nieuwe wachtwoord	concept
202	6	52	n/a	n/a	die	instructies	1	d	de instructies om een nieuwe account te maken	concept
203	6	55	54	53	dat		0	d	het wachtwoord	concept
204	6	58	58	58	die		0	d	letter	concept
205	6	67	60	60	dat	emailadres	1	d	het nieuwe emailadres	concept
206	6	67	47	14	die		0	d	het (hoofd) emailadres	concept
207	6	68	67	53	dat	wachtwoord	0	d	het wachtwoord van de hoofdemail	concept
208	6	68	68	53	dat		1	d	het wachtwoord van de hoofdemail	concept
209	6	69	68	47	dat		0	d	het wachtwoord van de hoofdemail veranderen	action
210	6	71	70	70	dat		0	d	het nu doen	action
211	6	74	73	73	die	site	1	d	www.telfort.nl	techn obj
212	6	78	74	73	die	site	1	d	www.telfort.nl	techn obj
213	6	80	79	79	dat	banners	0	d	het knopje email	techn obj
214	6	80	n/a	n/a	die		1	d	de banners op de website	techn obj
215	6	81	81	81	dat		0	d	dat K een andere moest hebben	prop
216	6	81	81	81	dat		0	d	de button wachtwoordbeheer	techn obj
217	6	93	88	87	dat		0	d	het wijzigen van het wachtwoord	action
218	6	94	67	60	die	s****	1	d	het nieuwe emailadres	concept
219	6	95	94	53	dat		0	d	huidig wachtwoord	concept
220	6	95	95	53	die	****	1	d	het wachtwoord van de hoofdemail	concept
221	6	96	95	53	die		0	d	het wachtwoord van de hoofdemail	concept
222	6	98	97	47	die	nieuwe	1	d	het nieuwe wachtwoord	concept
223	6	100	99	14	die	s****	1	d	het hoofdemailadres	concept
224	6	100	100	14	dat		0	d	het hoofdemailadres	concept
225	6	102	100	14	die	s****	1	d	het hoofdemailadres	concept
226	6	103	103	19	dat		0	d	het verwijderen van de hoofdemail kan niet	prop
227	6	103	102	14	die		0	d	het hoofdemailadres	concept
228	6	105	103	19	dat		0	d	het verwijderen van de hoofdemail	action
229	6	105	103	14	dat		0	d	het emailadres met z**** (hoofdemail)	concept
230	6	105	105	14	die		0	d	het hoofdemailadres	concept
231	6	105	105	105	dat		0	d	het emailadres dat telfort minimaal moet hebben	concept
232	6	105	105	105	die		0	d	het emailadres dat telfort minimaal moet hebben	concept
233	6	106	102	60	deze		0	p	de nieuwe naam	concept
234	6	106	106	60	die		0	d	de nieuwe naam	concept
235	6	107	107	107	dat		0	d	het wijzigen van het wachtwoord van s****	action
236	6	107	107	107	dat		0	d	hoe het wachtwoord veranderd moet worden	action
237	6	118	117	117	dat		0	d	het gewenste nieuwe wachtwoord	concept
238	6	120	120	120	deze	afpraak	1	p	de afspraak dat ?	speech act
239	6	121	120	120	dat		0	d	dat A het oude wachtwoord intoetst	action

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
240	6	123	122	122	dat		0	d	het gespelde wachtwoord	concept
241	6	128	n/a	n/a	dit	soort dingen	2	p	computervaardigheden	concept
242	6	129	129	107	dat		0	d	het wijzigen van het wachtwoord van s****	action
243	6	129	n/a	n/a	deze	pagina	1	p	de pagina waarop nu wordt gewerkt	techn obj
244	6	133	132	53	dat		0	d	het huidige wachtwoord	concept
245	6	133	133	53	die	****	1	d	het huidige wachtwoord	concept
246	6	141	n/a	n/a	die		0	d	het systeem/site	techn obj
247	6	146	n/a	n/a	dit	probleem	1	p	het probleem waarover wordt gesproken	concept
248	6	148	147	147	dat		0	d	het wijzigen van het wachtwoord van s****	action
249	6	149	129	14	die	andere	1	d	het emailadres met z****	concept
250	6	158	157	14	die		0	d	het emailadres met z****	concept
251	6	161	160	160	dat		0	d	een andere mogelijkheid	concept
252	6	161	161	161	dat		0	d	de andere mogelijkheid uitvoeren, pw veranderen	action
253	6	161	161	161	dat		0	d	dat s op de pagina wachtwoord wijzigen zit	action
254	6	162	161	47	dit		0	p	de andere mogelijkheid uitvoeren, pw veranderen	action
255	6	163	157	53	dat	huidige wachtwoord	2	d	het wachtwoord met de 'sterretjes'	concept
256	6	176	174	174	dat		0	d	dat het wachtwoord is gewijzigd	concept
257	6	176	167	14	die	z****	1	d	het emailadres met z****	prop
258	6	177	177	177	die		0	d	het zelfbedachte wachtwoord	concept
259	6	178	177	177	dat		0	d	het wachtwoord voor s**** hetzelfde maken	concept
260	6	178	177	60	die	s****	1	d	het emailadres met s****	concept
261	6	179	179	179	die		0	d	het wachtwoord voor s****	concept
262	6	180	179	60	die		0	d	het emailadres met s****	concept
263	6	182	180	177	dat		0	d	een ander wachtwoord	concept
264	6	186	184	177	dat		0	d	een ander wachtwoord	concept
265	6	186	n/a	n/a	dit	soort echt privacy gevoelige gegevens	2	p	de gegevens die eerder zijn genoemd	concept
266	6	187	187	6	dat		0	d	dat de post verkeerd was bezorgd	prop
267	6	189	188	188	dat		0	d	dat K zo keurig is om ?	prop
268	6	193	n/a	n/a	die	twee jaar	2	d	de 2 jaar dat a daar werkt	tijdstip
269	6	195	195	4	die		0	d	de burens van K	human
270	6	195	195	177	dit	nieuwe wachtwoord	2	p	het andere wachtwoord	concept
271	6	195	195	177	die		0	d	het andere wachtwoord	concept
272	6	196	195	195	die	brief	1	d	de brief die A zal versturen	bericht
273	6	198	196	195	die	brief	1	d	de brief die A zal versturen	bericht
274	6	202	200	199	dat		0	d	de naam van A	concept
275	6	205	n/a	n/a	dat		0	d	het vinden van A	action
276	6	207	205	205	dat		0	d	de achternaam van A	concept
277	6	208	180	60	die	s****	1	d	het emailadres met s****	concept
278	6	208	149	14	die	andere	1	d	het emailadres met z****	concept
279	6	208	208	14	die	z****	1	d	het emailadres met z****	concept

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
280	6	210	198	196	die	post	1	d	de brief die A zal versturen	bericht
281	6	212	212	212	die	s****	0	d	mailtjes van Telfort	bericht
282	6	214	208	60	die	s****	1	d	het emailadres met s****	concept
283	6	216	212	212	die	mailtjes over marktonderzoek	2	d	de mailtjes van Telfort	bericht
284	6	217	216	212	dat	mailtjes over marktonderzoek	0	d	de mailtjes van Telfort	bericht
285	6	217	217	217	dat	mailtjes over marktonderzoek	0	d	het toesturen van de email	action
286	6	218	217	94	die	volledige s****	2	d	het emailadres met s****	concept
287	6	218	217	217	dat	volledige s****	0	d	het automatisch toesturen naar s****	concept
288	6	219	218	218	dat	emailadres	0	d	het wijzigen van het emailadres s****	action
289	6	219	218	14	dat	emailadres	1	d	het emailadres met s****	concept
290	6	219	219	219	dat	emailadres	0	d	het aannemen van een extra mailbox	action
291	6	219	219	219	dat	emailadres	0	d	het zenden van de email naar ander adres	action
292	6	219	219	219	dat	emailadres	0	d	het zenden van de email naar ander adres	action
293	6	220	219	60	die	s****	1	d	het emailadres met s****	concept
294	6	221	220	220	dat	s****	0	d	dat A het emailadres s**** aanhoudt	action
295	6	221	220	60	dit	s****	0	p	het emailadres met s****	concept
296	6	224	223	223	dat	s****	0	d	mail voortaan ontvangen op z****	action
297	6	224	221	60	die	s****	1	d	het emailadres met s****	concept
298	6	226	225	225	dat	gedoe	0	d	het doorverbinden	concept
299	6	226	n/a	n/a	dit	gedoe	1	p	het gesprek	concept
300	6	226	14	14	die	vorige collega	2	d	de collega van A	human
301	7	6	n/a	n/a	dat	vorige collega	0	d	het moment dat problemen begonnen	tijdstip
302	7	6	n/a	n/a	die	eerste vijf	2	d	de eerste vijf berichtjes	bericht
303	7	6	n/a	n/a	die	eerste vijf	0	d	outlook/computer	software
304	7	6	6	6	die	eerste vijf	0	d	de eerste vijf berichtjes	bericht
305	7	7	n/a	n/a	dit	eerste vijf	0	p	de problemen met email	concept
306	7	7	6	4	die	antivirussoftware	1	d	de antivirussoftware van de email	software
307	7	10	7	4	dat	pcbeveiliging totaal	2	d	pcbeveiliging totaal van telfort	software
308	7	12	10	10	dat	pcbeveiliging totaal	0	d	de aanbieding van pcbeveiliging totaal	action
309	7	18	18	18	die	pcbeveiliging totaal	0	d	outlook	software
310	7	27	26	6	dat	probleem	1	d	het door K vertelde probleem	concept
311	7	28	27	27	dat	probleem	0	d	of het probleem bestaat bij uitgeschakelde software	prop
312	7	28	27	4	dit	probleem	0	p	pcbeveiliging totaal van telfort	software
313	7	29	28	27	dat	probleem	0	d	of het probleem bestaat bij uitgeschakelde software	prop
314	7	29	27	n/a	dat	probleem	1	d	het door K vertelde probleem	concept
315	7	29	24	6	die	mailtjes	1	d	de eerste vijf berichtjes	bericht
316	7	29	29	4	dat	programma	1	d	pcbeveiliging totaal van telfort	software
317	7	30	29	29	dat	programma	0	d	het uitschakelen van pcbeveiliging	action
318	7	32	32	32	die	ene code	2	d	een van de twee codes	concept
319	7	34	32	32	dat	ene code	0	d	het blauwe driehoekje onderin de balk	software

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
320	7	40	n/a	n/a	dat	moment	1	d	het moment van verwijderen	tijdstip
321	7	41	41	41	die		0	d	een gevaarlijk mailtje	bericht
322	7	41	35	4	dit	programma	1	p	pcbeveiliging totaal van telfort	software
323	7	42	42	42	die		0	d	het zoontje van K	human
324	7	42	n/a	n/a	dat	moment	1	d	het moment van verwijderen	tijdstip
325	7	43	35	29	dat		0	d	het uitschakelen van pcbeveiliging	action
326	7	45	41	4	dat	pakket	1	d	pcbeveiliging totaal van telfort	software
327	7	47	46	4	dit	programma	1	p	pcbeveiliging totaal van telfort	software
328	7	47	47	47	dat		0	d	wat er niet goed aan pcbeveiliging is	prop
329	7	47	47	4	dat	programma	1	d	pcbeveiliging totaal van telfort	software
330	7	47	47	4	dat	programma	1	d	pcbeveiliging totaal van telfort	software
331	7	47	47	47	die		0	d	de juiste afdeling	concept
332	7	47	47	4	dat	programma	1	d	pcbeveiliging totaal van telfort	software
333	7	47	47	47	dat		0	d	het probleem	concept
334	7	49	47	47	dat		0	d	dat het probleem ontstaat is op het moment dat ?	prop
335	7	49	47	4	dat	programma	1	d	pcbeveiliging totaal van telfort	software
336	7	49	49	49	dat	programma	0	d	dat het aan pcbeveiliging ligt	prop
337	7	49	49	4	dat	programma	1	d	pcbeveiliging totaal van telfort	software
338	7	60	58	58	die	foutmelding	1	d	de foutmelding	concept
339	7	60	60	60	dat		0	d	het foutnummer	concept
340	7	63	56	56	die	laptop	1	d	de laptop van K	techn obj
341	7	67	60	58	dat		0	d	de fout	concept
342	7	67	67	67	die		0	d	de mailservers	techn obj
343	7	67	n/a	n/a	dit	moment	1	p	dit moment	tijdstip
344	7	67	63	63	dat	account	1	d	het emailaccount	concept
345	7	67	67	67	dat		0	d	het verwijderen van het account	concept
346	7	68	68	68	dat		0	d	wat K er in heeft gezet	concept
347	7	69	68	68	dat		0	d	of A dat kan zeggen	prop
348	7	76	75	75	dat		0	d	de info over de uitgaande mailservers	concept
349	7	77	76	75	dat		0	d	de info over de uitgaande mailservers	concept
350	7	84	n/a	n/a	dit		0	p	een menubutton	concept
351	7	90	89	89	dat	tabblad	1	d	het tabblad servers	techn obj
352	7	97	96	96	dat		0	d	de gegevens	concept
353	7	97	67	56	die	laptop	1	d	de laptop van K	techn obj
354	7	97	97	97	dat		0	d	het probleem	concept
355	7	97	97	97	dat		0	d	het probleem	concept
356	7	97	97	56	die	laptop	1	d	de laptop van K	techn obj
357	7	99	97	97	dat		0	d	het probleem	concept
358	8	10	10	2	die		0	d	het internet	techn obj
359	8	18	16	16	dat		0	d	de modem gereset	action

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
360	8	22	22	22	die		0	d	de vader van K	human
361	8	28	28	28	die		0	d	de telefoon van K	techn obj
362	8	28	n/a	n/a	die	zelfhulp center	1	d	het zelfhulp center	concept
363	8	30	29	29	dat		0	d	de naam van de software (firmware)	concept
364	8	31	30	29	dat		0	d	de firmware	software
365	8	32	29	29	dat		0	d	dat er oude firmware op staat	prop
366	8	33	32	29	dat		0	d	dat de oude firmware op staat	prop
367	8	33	31	29	dat		0	d	de software van de modem	software
368	8	33	33	29	dat		0	d	de software van de modem	software
369	8	39	39	29	die		0	d	de firmware	software
370	8	39	39	39	dat		0	d	de naam van de modem	concept
371	8	39	39	39	dat		0	d	dat de oude firmware nog wordt gebruikt	prop
372	8	42	n/a	n/a	dat	kabeltje	1	d	de kabel tussen modem en aansluitpunt	techn obj
373	8	43	42	42	dat	kabeltje	1	d	de kabel tussen modem en aansluitpunt	techn obj
374	8	50	43	42	die		0	d	de kabel tussen modem en aansluitpunt	techn obj
375	8	52	n/a	n/a	die		0	d	de kabel tussen telefoon en aansluitpunt	techn obj
376	8	53	52	52	dat		0	d	de verdeelplug	techn obj
377	8	53	52	42	dat		0	d	de kabel tussen modem en aansluitpunt	techn obj
378	8	62	62	61	die		0	d	dsl internet	techn obj
379	8	63	62	62	dat		0	d	dat het internetlampje knippert	prop
380	8	65	64	64	dat		0	d	dat de netwerkkabel niet is aangesloten	prop
381	8	82	80	80	dat		0	d	de lanverbinding die aanstaat	prop
382	8	91	90	90	dat		0	d	het vastzetten	action
383	8	91	61	31	ditt	modem	1	p	het modem	techn obj
384	8	92	91	90	dat		0	d	het vaststaan van het modem	prop
385	8	96	93	93	dat		0	d	het uitzetten van het modem	action
386	8	96	n/a	n/a	die	nummers	1	d	de nummers van het modem (I.P.-adres)	concept
387	8	96	93	31	die		0	d	het modem	techn obj
388	8	96	96	31	die		0	d	het modem	techn obj
389	8	109	108	108	die		0	d	het veld alternatieve configuratie	techn obj
390	8	110	109	108	die		0	d	het veld alternatieve configuratie	techn obj
391	8	117	117	117	dat		0	d	het veld automatisch metric	techn obj
392	8	121	119	119	die		0	d	het veld dns	techn obj
393	8	127	126	126	die		0	d	netbios instelling	techn obj
394	8	127	127	127	dat		0	d	knop uitschakelen	techn obj
395	8	135	134	130	die		0	d	het veld tcip filtering	techn obj
396	8	140	140	140	die		0	d	het veld eigenschappen	techn obj
397	8	141	140	140	dat		0	d	dat de eigenschappen op toestaan staan	techn obj
398	8	144	79	79	dat		0	d	eigenschappen van de verbinding	prop
399	8	146	145	145	die		0	d	icoon lan verbinding	techn obj

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
400	8	146	146	39	dat		0	d	de firmware	software
401	8	146	n/a	n/a	dat		2	d	telfort klantenservice	software
402	8	155	154	154	dat	mijn hulp service ding	0	d	het herstellen	action
403	8	158	n/a	n/a	dat		0	d	het knopje op de achterkant van het modem	techn obj
404	9	4	2	4	dat		0	d	dat internet af en toe uitvalt	prop
405	9	17	17	17	die		0	d	het zyxelmodem	techn obj
406	9	19	18	18	dat		0	d	dat er vandaag instabiliteit is	prop
407	9	20	20	20	dat		0	d	het luisteren naar de radio en gamen	action
408	9	22	21	21	dat		0	d	speedtouch firmware	software
409	9	26	24	24	dat		0	d	dat het een speedtouch modem is	prop
410	9	30	24	24	die	speedtouch	1	d	het speedtouch modem	techn obj
411	9	30	30	24	dat		0	d	het speedtouch modem	techn obj
412	9	32	30	24	dat		0	d	het speedtouch modem	techn obj
413	9	34	32	24	dat		0	d	het speedtouch modem	techn obj
414	9	34	34	24	dat		0	d	het speedtouch modem	techn obj
415	9	36	34	24	die		0	d	het speedtouch modem	techn obj
416	9	47	45	45	dat		0	d	het speedtouch modem	techn obj
417	9	49	49	49	dat		0	d	het naar internet gaan	action
418	9	55	54	38	dat		0	d	de kabel tussen modem en aansluitpunt	techn obj
419	9	56	55	55	dat		0	d	de feiten dat ?	prop
420	9	89	89	89	dat		0	d	het naar boven gaan	action
421	9	93	89	89	dat	bestand	0	d	de fabrieksinstellingen	techn obj
422	9	97	93	93	dat		1	d	het bestand dat in beeld verschijnt (firmware)	software
423	9	97	97	97	dat	bestand	0	d	het bestand is gedownload naar de computer	prop
424	9	99	97	97	dat		1	d	het bestand dat in beeld verschijnt	software
425	9	101	99	97	dat		0	d	het nieuwe bestand dat in beeld verschijnt	software
426	9	103	101	24	die		0	d	het bestand dat in beeld verschijnt	techn obj
427	9	103	97	87	die	firmware	1	d	het speedtouch modem	software
428	9	103	101	93	dat	bestandje van firmware	2	d	de firmware	software
429	9	103	103	103	dat		0	d	na de reset firmware draaien, niet de andere	prop
430	9	105	103	89	dat		0	d	de firmware	software
431	9	112	107	105	die	vier twee zeven	2	d	het bestand dat in beeld verschijnt	software
432	9	113	101	24	dat	modem	1	d	het speedtouch modem	techn obj
433	9	118	117	97	die	510r427config	1	d	het nieuwe bestand dat in beeld verschijnt	software
434	9	121	118	97	die		0	d	510r427config	software
435	9	131	131	131	dat		0	d	dat de splitter defect is geraakt	prop
436	9	132	49	49	dat	kabeltje	1	d	de kabel tussen modem en aansluitpunt	techn obj
437	9	133	n/a	n/a	dit		0	p	resetten en firmware updaten	action
438	10	5	4	4	dat		0	d	dat K met B spreekt	prop
439	10	8	8	8	die		0	d	de broer van K	human

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
440	10	10	10	10	dat		0	d	de klantcode en wachtwoord	concept
441	10	10	10	10	dat		0	d	de brief die K's broer heeft gehad	bericht
442	10	11	11	11	dat		0	d	een postcode invoeren	action
443	10	20	10	8	die		0	d	de broer van K	human
444	10	23	22	22	dat		0	d	het wachtwoord dat makkelijk kan worden onthouden	concept
445	10	29	27	27	dat		0	d	dat er 9 karakters zijn ingetikt	prop
446	10	31	30	22	dat		0	d	het gecorrigeerde wachtwoord	concept
447	10	33	32	32	dat		0	d	de extra nul erbij	prop
448	10	34	33	32	dat		0	d	de extra nul erbij	prop
449	10	34	34	34	dat		0	d	het raampje	techn obj
450	10	36	34	34	dat		0	d	dat het raampje verschijnt	prop
451	10	40	39	39	dat		0	d	webmail, e-mail	software
452	10	44	44	44	die		0	d	de schoonzussen van K	human
453	10	44	34	34	dat	kleine raampje	2	d	het raampje	techn obj
454	10	46	46	46	dat		0	d	dat het raampje in haar gezicht verschijnt	prop
455	10	47	46	46	dat		0	d	dat het raampje in haar gezicht verschijnt	prop
456	10	48	46	34	dat		0	d	het raampje	techn obj
457	10	48	48	34	dat	gekke ding	2	d	het raampje	techn obj
458	10	50	50	39	dat		0	d	telfort punt nl	concept
459	10	55	55	55	dat		0	d	het verschil tussen inloggen via pc of internet	concept
460	10	60	59	58	dat		0	d	de email op de laptop	software
461	10	61	60	60	dat		0	d	dat windows mail automatisch komt	prop
462	10	61	61	61	dat		0	d	dat windows mail het mailprogramma van vista is	prop
463	10	61	61	61	dat		0	d	het instellen van windows mail	prop
464	10	62	48	34	dat	gekke raampje	2	d	het raampje	action
465	10	73	70	70	die	eerste	1	d	het veld pop3	techn obj
466	10	73	73	70	die	pop3 punt t*	1	d	het veld pop3	techn obj
467	10	75	73	70	die		0	d	het veld pop3	techn obj
468	10	76	75	70	dat		0	d	het veld pop3	techn obj
469	10	80	80	80	dat		0	d	dat wat K zei	speech act
470	10	97	n/a	n/a	dit		0	p	de instellingen van de email	techn obj
471	10	101	97	97	dit		0	p	de instellingen van de email	techn obj
472	10	102	62	34	dat	gekke internetaccount	2	d	het internetaccount	concept
473	10	108	n/a	n/a	die	ex	1	d	de X in de rechterbovenhoek	techn obj
474	10	117	116	116	die		0	d	de naam	concept
475	10	127	127	127	dat		0	d	het hoofdaccount	concept
476	10	129	128	112	dat		0	d	T*	bericht
477	10	132	130	112	die		0	d	T*	bericht
478	10	141	140	140	dat		0	d	dat wat K heeft getypt	prop
479	10	144	144	143	die		0	d	ads ***@telfort.nl	concept

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Table B.1 – Continued

Number	Dia	Tur	Las	Fir	Dem	Modifier	Mt	PD	Antecedent	AntType
480	10	145	144	144	dat		0	d	het veranderen van de hoofdaccount	action
481	10	145	145	144	dat		0	d	hoe dat veranderd kan worden	prop
482	10	145	145	144	dat		0	d	hoe dat veranderd kan worden	prop
483	10	147	147	70	dat		0	d	dat K pop3 ziet staan	prop
484	10	149	149	149	dat		0	d	pop3 of imap server :	bericht
485	10	169	169	169	dat		0	d	dat bij inkomende mail pop3 staat en ?	prop
486	10	170	n/a	n/a	dat		0	d	in de server voor uitgaande	techn obj
487	10	173	172	170	dat		0	d	het veld server voor uitgaande ?	techn obj
488	10	175	173	170	dat		0	d	het veld server voor uitgaande ?	techn obj
489	10	181	179	179	dat		0	d	de emailgebruikersnaam	concept
490	10	183	182	182	dat		0	d	5*****	concept
491	10	183	22	22	dat	wachtwoord wat u net vertelde	2	d	het wachtwoord dat makkelijk kan worden onthouden	concept
492	10	185	32	29	die	nul	1	d	de extra nul	concept
493	10	195	n/a	n/a	die	ene die wij ?	2	d	het nieuwe hoofdaccount	concept
494	10	195	195	195	dat		0	d	dat er nu 2 in staan	prop
495	10	199	198	70	die	tiscali	1	d	de account van tiscali	concept
496	10	199	199	70	die		0	d	de account van tiscali	concept
497	10	203	203	127	dat		0	d	het nieuwe hoofdaccount	concept
498	10	208	102	34	dat	gele driehoekje	2	d	het gele driehoekje	techn obj
499	10	213	213	213	dat		0	d	het aanmaken van een nieuwe emailaccount	action
500	10	215	145	125	dat	adsl	1	d	de naam met adsl	concept
501	10	217	216	216	dat		0	d	de gebruikersnaam	concept
502	10	219	218	218	dat		0	d	t*****	concept
503	10	219	219	218	dat		0	d	t*****	concept
504	10	219	217	70	dit	emailadres	1	p	het nieuwe emailadres	concept
505	10	219	219	219	dat		0	d	dat het er niet onder valt	prop
506	10	222	208	34	dat	gekke raampje	1	d	het raampje	techn obj

## Appendix C

# The raw data, second half

The raw data used for the research is divided in two halves else it won't fit. Both have the same numbering in the most left column. Below is an explanation of the abbreviations used in the table.

- *Number*: the number of the demonstrative, same as the previous table.
- *ie*: whether the reference is implicit(i), explicit(e), or something in between(i-e).
- *Sp*: by which speaker this mention of the referent was done, client(k) or agent(a).
- *Fs*: by which speaker the former mention of the referent was done, client(k) or agent(a).
- *Os*: by which speaker the original mention of the referent was done, client(k) or agent(a).
- *Ub*: uttered before by the speaker, yes(y) or no(n).
- *Dn*: the distance between the turn the demonstrative is used and the last mentioning in turns. The value '-1' denotes right dislocation.
- *Dc*: the distance in categories as described before from same turn(0) to more than 20 turns(5).
- *Rd*: the same as *Dn*, the distance in turns, but the value '-1' is changed to '0'.
- *Ss*: whether the current speaker is the same as the former speaker, yes(y) or no(n).
- *Ty*: the pragmatic type of the demonstrative, situational(s), tracking(t), discourse deictic(d) or recognitional(r).
- *Im*: whether the referent is considered to be trivial(t) or important(t) in order to solve the problem.

- *Db*: whether the demonstrative refers to the same or former line(0) or farther away(1).
- *M*: whether there is a modifier(1) or not(0), so adnominal(1) or pronominal use(0).
- *Or*: whether the speaker is also the speaker that first mentioned the referent(1) or not(0).



Table C.1: Raw data from the ten dialogues, second half

Number	ie	Sp	Fs	Os	Ub	Dn	Dc	Rd	Ss	Ty	Im	Db	M	Or
1	e	k	k	k	j	0	1	0	y	t	t	0	0	1
2	e	k	k	k	j	-1	1	0	y	t	t	0	0	1
3	e	k	k	k	j	-1	1	0	y	d		0	0	1
4	e-i	k	k	k	j	0	1	0	y	d		0	0	1
5	e	k	a	a	n	3	2	3	n	d		1	0	0
6	e	k	k	k	j	22	5	22	y	r	t	1	1	1
7	e	k	a	a	n	31	5	31	n	r	i	1	1	0
8	e	k	k	k	j	4	2	4	y	t	t	1	1	1
9	e	k	a	a	j	9	3	9	n	t	i	1	1	0
10	e-i	a	k	k	n	1	2	1	n	d		0	0	0
11	e	k	k	k	j	0	1	0	y	t	t	0	1	1
12	e	k	k	a	j	0	1	0	y	t	i	0	1	0
13	e	k	k	a	j	-1	1	0	y	t	i	0	0	0
14	i	k			n	n/a	0	n/a		s	t	n/a	0	n/a
15	e	a	a	a	j	0	1	0	y	t	i	0	0	1
16	e-i	k	a	a	n	3	2	3	n	d		1	0	0
17	e	k	k	k	j	0	1	0	y	t	t	0	0	1
18	e-i	k	a	a	n	1	2	1	n	d		0	0	0
19	e	a	a	a	j	2	2	2	y	t	i	1	1	1
20	e	k	a	a	n	1	2	1	n	t	i	0	1	0
21	e	k	k	a	j	0	1	0	y	t	i	0	0	0
22	i	k	a	a	n	1	2	1	n	t	i	0	0	0
23	e-i	a	a	a	j	1	2	1	y	d		0	0	1
24	e-i	a	a	a	j	2	2	2	y	d		1	0	1
25	e	k	k	k	j	1	2	1	y	d		0	0	1
26	e	a	k	a	j	2	2	2	n	t	i	1	1	1
27	e	k	a	a	n	1	2	1	n	t	i	0	0	0
28	i	k	k	k	j	52	5	52	y	r	t	1	1	1
29	e	k	k	k	j	58	5	58	y	r	t	1	1	1
30	e	k	k	k	j	0	1	0	y	t	t	0	0	1
31	e	a	a	a	j	0	1	0	y	t	i	0	0	1
32	e-i	a	a	a	j	0	1	0	y	d		0	0	1
33	e-i	k	a	a	n	1	2	1	n	d		0	0	0
34	e	k	k	a	j	2	2	2	y	d		1	0	0
35	e-i	a	k	k	j	2	2	2	n	d		1	0	0
36	e	a	a	a	j	-1	1	0	y	t	i	0	1	1
37	e	a	a	a	j	-1	1	0	y	t	i	0	0	1
38	e-i	a	a	a	j	1	2	1	y	d		0	0	1
39	e-i	a	a	a	j	2	2	2	y	d		1	0	1
40	i	a	a	a	n	0	1	0	y	t	t	0	0	1
41	e	a	a	a	j	14	4	14	y	r	i	1	1	1
42	e	a	a	a	j	0	1	0	y	t	i	0	0	1
43	e-i	a	a	a	j	1	2	1	y	d		0	0	1
44	e	a	a	a	j	10	3	10	y	t	i	1	1	1
45	e-i	k	a	a	n	1	2	1	n	d		0	0	0
46	e	k	k	k	j	0	1	0	y	t	t	0	0	1
47	e	k	k	k	j	2	2	2	y	t	t	1	0	1
48	e-i	k	k	a	j	2	2	2	y	d		1	0	0
49	e-i	a	k	k	j	1	2	1	n	d		0	0	0
50	e-i	k	a	a	j	1	2	1	n	d		0	0	0
51	e	k			n	n/a	0	n/a		s	i	n/a	1	n/a
52	e	k	k	k	j	-1	1	0	y	t	i	0	0	1
53	e-i	a	k	k	n	1	2	1	n	d		0	0	0
54	e	a	a	k	j	1	2	1	y	t	i	0	0	0
55	e-i	k	a	a	n	2	2	2	n	d		1	0	0
56	e	k	a	k	j	1	2	1	n	t	i	0	1	1
57	e	k	k	k	j	-1	1	0	y	t	i	0	0	1

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Table C.1 – Continued

Number	ie	Sp	Fs	Os	Ub	Dn	Dc	Rd	Ss	Ty	Im	Db	M	Or
58	e-i	k	k	k	j	2	2	2	y	d		1	0	1
59	e-i	a	k	k	n	1	2	1	n	d		0	0	0
60	e-i	a	a	a	j	0	1	0	y	d		0	0	1
61	e-i	a	a	a	j	7	3	7	y	d		1	0	1
62	e-i	a	a	a	j	-1	1	0	y	d		0	0	1
63	e-i	a	a	a	j	0	1	0	y	d		0	1	1
64	e-i	a	a	a	j	0	1	0	y	d		0	0	1
65	e-i	a	k	k	n	1	2	1	n	d		0	0	0
66	e	k	a	a	j	15	4	15	n	r	i	1	1	0
67	e-i	a	k	k	j	1	2	1	n	d		0	0	0
68	e	a	a	a	j	-1	1	0	y	t	t	0	0	1
69	e-i	a	a	a	j	2	2	2	y	d		1	0	1
70	e-i	k	a	a	j	1	2	1	n	d		0	0	0
71	e	a	a	a	j	-1	1	0	y	t	i	0	0	1
72	e	a	a	a	j	0	1	0	y	t	i	0	0	1
73	e	a	a	a	j	0	1	0	y	t	i	0	0	1
74	e	k	a	a	n	1	2	1	n	t	i	0	1	0
75	e	k	k	a	j	1	2	1	y	t	i	0	0	0
76	e	a	k	a	j	7	3	7	n	t	i	1	1	1
77	e	a	a	a	j	0	1	0	y	t	i	0	0	1
78	e	k	a	a	n	1	2	1	n	t	i	0	1	0
79	e	k	k	a	j	0	1	0	y	t	i	0	1	0
80	e	a	k	a	j	1	2	1	n	t	i	0	0	1
81	e	a	k	k	j	20	5	20	n	r	i	1	1	0
82	e-i	a	k	k	n	1	2	1	n	d		0	0	0
83	e-i	a	a	a	j	2	2	2	y	d		1	0	1
84	i	k			n	n/a	0	n/a		s	i	n/a	1	n/a
85	e	k	a	a	n	1	2	1	n	t	t	0	0	0
86	e	a	k	k	n	1	2	1	n	d		0	1	0
87	i	a			n	n/a	0	n/a		s	i	n/a	1	n/a
88	e	a	a	a	j	0	1	0	y	t	i	0	0	1
89	e-i	a	a	a	j	2	2	2	y	d		1	0	1
90	e	a	k	k	n	3	2	3	n	t	t	1	0	0
91	e	a	a	k	j	2	2	2	y	t	t	1	0	0
92	e-i	a	k	k	n	1	2	1	n	d		0	0	0
93	e-i	k	k	a	n	1	2	1	y	d		0	0	0
94	e	a			n	n/a	0	n/a		s	i	n/a	1	n/a
95	e	k	k	k	j	8	3	8	y	d		1	1	1
96	e-i	a	k	k	j	0	1	0	n	d		0	0	0
97	i	a			n	n/a	0	n/a		d		n/a	1	n/a
98	e-i	a	a	a	j	0	1	0	y	d		0	0	1
99	e-i	a	a	a	j	-1	1	0	y	d		0	0	1
100	e-i	a	a	a	j	2	2	2	y	d		1	0	1
101	e-i	a	a	a	j	-1	1	0	y	d		0	0	1
102	e	k	k	k	j	-1	1	0	y	t	t	0	0	1
103	e	a	a	a	j	16	5	16	y	r	i	1	1	1
104	e	a	a	a	j	-1	1	0	y	t	t	0	0	1
105	i	a	a	a	j	2	2	2	y	t	t	1	0	1
106	e	a	k	k	n	1	2	1	n	d		0	0	0
107	e	a	k	a	j	1	2	1	n	t	i	0	0	1
108	e-i	k	k	k	j	0	1	0	y	d		0	0	1
109	e-i	a	a	k	j	0	1	0	y	d		0	0	0
110	e	a	a	a	j	0	1	0	y	d		0	0	1
111	i	a	a	a	j	0	1	0	y	d		0	0	1
112	e-i	a	a	k	j	0	1	0	y	d		0	0	0
113	e-i	a	a	a	j	0	1	0	y	d		0	0	1
114	e-i	a	a	k	j	0	1	0	y	d		0	0	0
115	e-i	a	a	a	j	1	2	1	y	d		0	0	1

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Table C.1 – Continued

Number	ie	Sp	Fs	Os	Ub	Dn	Dc	Rd	Ss	Ty	Im	Db	M	Or
116	e-i	a	a	a	j	-1	1	0	y	d		0	0	1
117	i	a	a	a	j	0	1	0	y	d		0	0	1
118	i	a			n	n/a	0	n/a		s	i	n/a	1	n/a
119	e-i	a	a	a	j	0	1	0	y	d		0	0	1
120	i	a	a	a	j	2	2	2	y	t	i	1	1	1
121	e	a	a	a	j	-1	1	0	y	t	i	0	0	1
122	i	a			n	n/a	0	n/a		s	t	n/a	1	n/a
123	e-i	a	a	a	j	1	2	1	y	d		0	1	1
124	e	k	a	k	j	1	2	1	n	t	t	0	0	1
125	e	k	k	k	j	3	2	3	y	t	t	1	0	1
126	e-i	k	k	a	j	0	1	0	y	d		0	0	0
127	e-i	k	a	a	j	1	2	1	n	d		0	0	0
128	e-i	k	a	a	j	1	2	1	n	d		0	0	0
129	e	a	a	a	j	0	1	0	y	t	i	0	0	1
130	e-i	a	a	a	j	0	1	0	y	d		0	0	1
131	e-i	a	k	k	n	1	2	1	n	d		0	0	0
132	e-i	a	a	a	j	-1	1	0	y	d		0	0	1
133	e	a	a	a	j	0	1	0	y	t	t	0	0	1
134	e-i	k	a	a	n	1	2	1	n	d		0	0	0
135	i	k			n	n/a	0	n/a		d		n/a	1	n/a
136	e-i	a	k	k	n	1	2	1	n	d		0	0	0
137	i	k			j	n/a	0	n/a		s	i	n/a	0	n/a
138	i	k	a	a	n	1	2	1	n	d		0	0	0
139	e	a	k	k	n	1	2	1	n	t	t	0	0	0
140	e-i	a	k	k	n	1	2	1	n	d		0	0	0
141	e	a	a	a	j	0	1	0	y	t	t	0	0	1
142	i	k			n	n/a	0	n/a		s	i	n/a	0	n/a
143	e-i	k	k	k	j	0	1	0	y	d		0	0	1
144	e-i	a	k	k	n	1	2	1	n	d		0	0	0
145	e-i	a	a	k	j	0	1	0	y	d		0	0	0
146	e-i	a	a	k	j	0	1	0	y	d		0	0	0
147	e-i	a	k	k	n	1	2	1	n	d		0	0	0
148	e	a	k	k	n	1	2	1	n	t	t	0	0	0
149	i	k			j	n/a	0	n/a		s	i	n/a	0	n/a
150	e	a	a	a	j	-1	1	0	y	t	t	0	0	1
151	e	k	k	a	j	0	1	0	y	t	i	0	0	0
152	e	a	a	a	j	0	1	0	y	t	i	0	0	1
153	e	a	a	a	j	0	1	0	y	t	i	0	0	1
154	e	a	a	a	j	0	1	0	y	t	i	0	0	1
155	e	k	k	k	j	16	5	16	y	r	t	1	0	1
156	e	k	k	k	j	0	1	0	y	t	t	0	0	1
157	e	k	k	k	j	0	1	0	y	t	t	0	0	1
158	e	a	a	k	j	2	2	2	y	d		1	0	0
159	e	a	a	k	j	0	1	0	y	t	t	0	1	0
160	i	k			n	n/a	0	n/a		s	t	n/a	1	n/a
161	e	a	k	k	n	1	2	1	n	t	t	0	0	0
162	e	k	k	k	n	1	2	1	y	t	t	0	0	1
163	e	a	k	k	j	1	2	1	n	t	t	0	0	0
164	e-i	k	a	a	n	1	2	1	n	d		0	0	0
165	e	k	k	k	j	-1	1	0	y	d		0	0	1
166	e	a	k	k	j	2	2	1	n	t	t	1	0	0
167	e	a	a	k	j	0	1	0	y	t	t	0	0	0
168	e	a	a	k	j	0	1	0	y	t	t	0	1	0
169	e-i	k	a	k	j	11	4	11	n	r	t	1	0	1
170	e-i	a	k	k	n	1	2	1	n	d		0	0	0
171	e	k	k	k	j	0	1	0	y	t	i	0	0	1
172	e	a	a	k	j	2	2	2	y	t	i	1	1	0
173	e-i	k	k	k	j	0	1	0	y	d		0	0	1

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Table C.1 – Continued

Number	ie	Sp	Fs	Os	Ub	Dn	Dc	Rd	Ss	Ty	Im	Db	M	Or
174	i	a			n	n/a	0	n/a		d		n/a	1	n/a
175	e-i	a	a	a	j	2	2	2	y	d		1	0	1
176	e-i	k	a	a	n	1	2	1	n	d		0	1	0
177	e-i	a	k	k	n	3	2	3	n	d		1	0	0
178	e	a	a	k	j	2	2	2	y	t	t	1	1	0
179	e-i	k	a	a	n	1	2	1	n	d		0	0	0
180	e	k	k	k	j	46	5	46	y	r	i	1	1	1
181	e-i	a	k	k	n	1	2	1	n	d		0	0	0
182	i	k	k	k	j	0	1	0	y	t	i	0	0	1
183	e-i	k			n	n/a	0	n/a		s	t	n/a	1	n/a
184	e	a	k	k	n	1	2	1	n	t	i	0	1	0
185	e	a	a	a	j	2	2	2	y	d		1	0	1
186	e	a	a	k	j	4	2	4	y	t	i	1	1	0
187	e	a	a	k	j	0	1	0	y	t	i	0	0	0
188	e	a	a	k	j	0	1	0	y	t	i	0	0	0
189	e	a	a	a	j	0	1	0	y	t	i	0	0	1
190	e-i	a	a	a	j	0	1	0	y	d		0	0	1
191	e	a	a	a	j	0	1	0	y	t	i	0	0	1
192	e	a	a	a	j	0	1	0	y	t	i	0	0	1
193	e-i	k	a	a	n	1	2	1	n	d		0	0	0
194	e-i	a	k	k	n	1	2	1	n	d		0	0	0
195	i	k	k	k	j	16	5	16	y	r	i	1	1	1
196	e	a	k	k	j	7	3	7	n	t	i	1	1	0
197	e	a	a	k	j	2	2	2	y	t	i	1	1	0
198	e	a	a	k	j	4	2	4	y	t	i	1	1	0
199	e	a	a	k	j	12	4	12	y	r	i	1	1	0
200	e	a	a	a	j	0	1	0	y	t	i	0	1	1
201	e	a	a	a	j	2	2	2	y	t	i	1	1	1
202	i	k			n	n/a	0	n/a		d		n/a	1	n/a
203	e	a	k	a	j	1	2	1	n	t	t	0	0	1
204	e	k	k	k	j	0	1	0	y	t	t	0	0	1
205	e	a	k	k	j	4	2	4	n	t	t	1	1	0
206	e	a	a	k	j	20	5	20	y	r	i	1	0	0
207	e	k	a	a	j	1	2	1	n	t	i	0	0	0
208	e	k	k	a	j	0	1	0	y	t	i	0	1	0
209	i	a	k	a	j	1	2	1	n	d		0	0	1
210	e-i	a	k	k	n	1	2	1	n	d		0	0	0
211	e	k	a	a	n	1	2	1	n	t	t	0	1	0
212	e	k	k	a	j	4	2	4	y	t	t	1	1	0
213	e	k	a	a	n	1	2	1	n	t	t	0	0	0
214	i	k			n	n/a	0	n/a		s	t	n/a	1	n/a
215	e-i	a	a	a	j	0	1	0	y	d		0	0	1
216	e	a	a	a	j	0	1	0	y	t	t	0	0	1
217	e-i	a	k	a	j	0	1	0	n	d		0	0	1
218	e	k	a	k	j	27	5	27	n	r	t	1	1	1
219	e	a	k	a	j	1	2	1	n	d		0	0	1
220	e	a	a	a	j	0	1	0	y	t	i	0	1	1
221	e	k	a	a	j	1	2	1	n	t	i	0	0	0
222	e	k	a	a	j	1	2	1	n	t	t	0	1	0
223	e	k	a	k	j	1	2	1	n	t	i	0	1	1
224	e	k	k	k	j	0	1	0	y	t	i	0	0	1
225	e	k	k	k	j	2	2	2	y	t	i	1	1	1
226	e-i	a	a	a	j	0	1	0	y	d		0	0	1
227	e	a	k	a	j	1	2	1	n	t	i	0	0	1
228	e	a	a	a	j	2	2	2	y	d		1	0	1
229	e	a	k	k	j	2	2	2	n	t	i	1	0	0
230	e	a	a	k	j	0	1	0	y	t	i	0	0	0
231	e	a	a	a	j	0	1	0	y	d		0	0	1

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Table C.1 – Continued

Number	ie	Sp	Fs	Os	Ub	Dn	Dc	Rd	Ss	Ty	Im	Db	M	Or
232	e	a	a	a	j	0	1	0	y	t	i	0	0	1
233	e	k	k	k	j	4	2	4	y	t	t	1	0	1
234	e	k	k	k	j	0	1	0	y	t	t	0	0	1
235	e-i	a	a	a	j	-1	1	0	y	d		0	0	1
236	e-i	a	a	a	j	0	1	0	y	d		0	0	1
237	e	k	a	a	n	1	2	1	n	d		0	0	0
238	e	k	k	k	n	0	1	0	y	d		0	1	1
239	e-i	a	k	k	n	1	2	1	n	d		0	0	0
240	e	a	k	k	n	1	2	1	n	d		0	0	0
241	i	k			n	n/a	0	n/a		s	t	n/a	1	n/a
242	e	a	a	a	j	0	1	0	y	d		0	0	1
243	i	a			n	n/a	0	n/a		s	i	n/a	1	n/a
244	e	a	k	a	n	1	2	1	n	t	i	0	0	1
245	e	a	a	a	j	0	1	0	y	t	i	0	1	1
246	i	a			n	n/a	0	n/a		s	t	n/a	0	n/a
247	i	k			j	n/a	0	n/a		s	i	n/a	1	n/a
248	e-i	k	a	a	n	1	2	1	n	d		0	0	0
249	e	a	a	a	j	20	5	20	y	r	i	1	1	1
250	e	k	a	a	j	1	2	1	n	t	i	0	0	0
251	e	a	k	k	n	1	2	1	n	d		0	0	0
252	i	a	a	a	j	-1	1	0	y	d		0	0	1
253	e	a	a	a	j	0	1	0	y	d		0	0	1
254	e	k	a	a	n	1	2	1	n	t	i	0	0	0
255	e	a	a	a	j	6	3	6	y	t	i	1	1	1
256	e	k	k	k	j	2	2	2	y	d		1	0	1
257	e	k	a	k	j	9	3	9	n	t	i	1	1	1
258	e	a	a	a	j	0	1	0	y	d		0	0	1
259	e	k	a	a	n	1	2	1	n	d		0	0	0
260	e	k	a	k	j	1	2	1	n	t	t	0	1	1
261	e	a	a	a	j	0	1	0	y	t	t	0	0	1
262	e	k	a	k	j	1	2	1	n	t	t	0	0	1
263	e	k	k	a	j	0	1	0	y	t	t	0	0	0
264	e	k	k	a	j	2	2	2	y	t	t	1	0	0
265	i	k			j	n/a	0	n/a		s	i	n/a	1	n/a
266	e-i	a	a	k	j	0	1	0	y	d		0	0	0
267	e-i	a	k	k	n	1	2	1	n	d		0	0	0
268	i	a			n	n/a	0	n/a		d		n/a	1	n/a
269	e	a	a	k	j	0	1	0	y	t	t	0	0	0
270	e	a	k	a	j	0	1	0	n	t	t	0	1	1
271	e	a	a	a	j	0	1	0	y	t	t	0	0	1
272	e	k	a	a	n	1	2	1	n	t	t	0	1	0
273	e	k	k	a	j	2	2	2	y	t	t	1	1	0
274	e	k	k	a	j	2	2	2	y	d		1	0	0
275	i	a			n	n/a	0	n/a		s	t	n/a	0	n/a
276	e	a	a	a	j	2	2	2	y	t	t	1	0	1
277	e	k	k	k	j	28	5	28	y	r	t	1	1	1
278	e	k	a	k	j	59	5	59	n	r	i	1	1	1
279	e	k	k	k	j	-1	1	0	y	t	i	0	1	1
280	e	k	k	a	j	12	4	12	y	r	t	1	1	0
281	e	k	k	k	j	0	1	0	y	d		0	0	1
282	e	k	k	k	j	6	3	6	y	t	i	1	1	1
283	e	k	k	k	j	4	2	4	y	t	t	1	1	1
284	e	a	k	k	n	1	2	1	n	t	t	0	0	0
285	e-i	a	a	a	j	0	1	0	y	d		0	0	1
286	e	k	k	k	j	1	2	1	y	t	i	0	1	1
287	e	k	k	k	j	1	2	1	y	d		0	0	1
288	e-i	a	k	k	n	1	2	1	n	d		0	0	0
289	e	a	k	k	j	1	2	1	n	t	i	0	1	0

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Table C.1 – Continued

Number	ie	Sp	Fs	Os	Ub	Dn	Dc	Rd	Ss	Ty	Im	Db	M	Or
290	e-i	a	a	a	j	0	1	0	y	d		0	0	1
291	e-i	a	a	a	j	0	1	0	y	d		0	0	1
292	e	a	a	a	j	0	1	0	y	d		0	0	1
293	e	k	a	k	j	1	2	1	n	t	i	0	1	1
294	e-i	a	k	k	j	1	2	1	n	d		0	0	0
295	e	a	k	k	j	1	2	1	n	t	i	0	0	0
296	e-i	k	a	a	n	1	2	1	n	d		0	0	0
297	e	k	a	k	j	3	2	3	n	t	i	1	1	1
298	e-i	k	a	a	n	1	2	1	n	d		0	0	0
299	i	k			n	n/a	0	n/a		s	i	n/a	1	n/a
300	e	k	k	k	j	212	5	212	y	r	t	1	1	1
301	e	k			n	n/a	0	n/a		d		n/a	0	n/a
302	e	k			n	n/a	0	n/a		s	t	n/a	1	n/a
303	i	k			n	n/a	0	n/a		s	i	n/a	0	n/a
304	e	k	k	k	j	0	1	0	y	t	t	0	0	1
305	e-i	a			n	n/a	0	n/a		s	i	n/a	0	n/a
306	e	a	k	k	n	1	2	1	n	t	i	0	1	0
307	e	k	k	k	j	3	2	3	y	t	i	1	1	1
308	e-i	k	k	k	j	2	2	2	y	d		1	0	1
309	e	k	k	k	j	0	1	0	y	t	i	0	0	1
310	e-i	a	k	k	n	1	2	1	n	t	i	0	1	0
311	e-i	k	a	a	n	1	2	1	n	d		0	0	0
312	e	k	k	k	j	1	2	1	y	t	i	0	0	1
313	e-i	a	k	a	n	1	2	1	n	d		0	0	1
314	e-i	a	a	k	j	1	2	1	y	t	i	0	1	0
315	e	a	k	k	n	5	2	5	n	t	t	1	1	0
316	e	a	a	k	j	0	1	0	y	t	i	0	1	0
317	e-i	k	a	a	n	1	2	1	n	d		0	0	0
318	e	k	k	k	j	0	1	0	y	t	t	0	1	1
319	e	k	k	k	j	2	2	2	y	d		1	0	1
320	e-i	k			n	n/a	0	n/a		d		n/a	1	n/a
321	e	a	a	a	j	0	1	0	y	t	t	0	0	1
322	e	a	a	k	j	6	3	6	y	t	i	1	1	0
323	e	k	k	k	j	-1	1	0	y	t	t	0	0	1
324	e	k			n	n/a	0	n/a		d		n/a	1	n/a
325	i	a	a	a	j	8	3	8	y	t	i	1	0	1
326	e	a	k	a	j	4	2	4	n	t	i	1	1	1
327	e	a	k	k	j	1	2	1	n	t	i	0	1	0
328	e-i	a	a	a	j	0	1	0	y	d		0	0	1
329	e	a	a	k	j	0	1	0	y	t	i	0	1	0
330	e	a	a	k	j	0	1	0	y	t	i	0	1	0
331	e	a	a	a	j	0	1	0	y	t	t	0	0	1
332	e	a	a	k	j	0	1	0	y	t	i	0	1	0
333	i	a	a	a	j	0	1	0	y	d		0	0	1
334	e	a	k	k	n	1	2	1	n	d		0	0	0
335	e	a	a	k	j	2	2	2	y	t	i	1	1	0
336	e-i	a	a	a	j	0	1	0	y	d		0	0	1
337	e	a	a	k	j	0	1	0	y	t	i	0	1	0
338	e	k	k	k	j	2	2	2	y	t	t	1	1	1
339	e	k	k	k	j	-1	1	0	y	d		0	0	1
340	e	a	k	k	j	0	1	0	n	t	t	0	1	0
341	i	a	k	k	n	7	3	7	n	t	t	1	0	0
342	e	a	a	a	j	-1	1	0	y	t	t	0	0	1
343	i	a			n	n/a	0	n/a		d		n/a	1	n/a
344	e	a	a	a	j	4	2	4	y	t	i	1	1	1
345	e-i	a	a	a	j	0	1	0	y	d		0	0	1
346	e-i	k	k	k	j	0	1	0	y	d		0	0	1
347	e-i	a	k	k	n	1	2	1	n	d		0	0	0

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Table C.1 – Continued

Number	ie	Sp	Fs	Os	Ub	Dn	Dc	Rd	Ss	Ty	Im	Db	M	Or
348	e-i	k	a	a	n	1	2	1	n	d		0	0	0
349	e	a	k	a	j	1	2	1	n	d		0	0	1
350	i	k			n	n/a	0	n/a		s	t	n/a	0	n/a
351	e	k	a	a	n	1	2	1	n	t	t	0	1	0
352	e-i	a	k	k	n	1	2	1	n	d		0	0	0
353	e	a	a	k	j	30	5	30	y	r	t	1	1	0
354	e-i	a	a	a	j	0	1	0	y	d		0	0	1
355	e	a	a	a	j	0	1	0	y	d		0	0	1
356	e	a	a	k	j	0	1	0	y	t	t	0	1	0
357	e	a	a	a	j	2	2	2	y	d		1	0	1
358	e	k	k	k	j	0	1	0	y	t	i	0	0	1
359	e	k	k	k	j	2	2	2	y	d		1	0	1
360	e	k	k	k	j	0	1	0	y	t	t	0	0	1
361	e	k	k	k		0	1	0	y	t	t	0	0	1
362	e-i	k			n	n/a	0	n/a		s	t	n/a	1	n/a
363	i	k	k	k	n	1	2	1	y	t	i	0	0	1
364	e	a	k	a	j	1	2	1	n	t	i	0	0	1
365	e-i	k	a	a	n	3	2	3	n	d		1	0	0
366	e	a	k	a	j	1	2	1	n	d		0	0	1
367	e	a	a	a	j	2	2	2	y	t	i	1	0	1
368	e	a	a	a	j	-1	1	0	y	t	i	0	0	1
369	e	a	a	a	j	0	1	0	y	t	i	0	0	1
370	e	a	a	a	j	0	1	0	y	d		0	0	1
371	e-i	a	a	a	j	0	1	0	y	d		0	0	1
372	e	k			n	n/a	0	n/a		s	i	n/a	1	n/a
373	e	a	k	k	n	1	2	1	n	t	i	0	1	0
374	e	k	a	k	j	7	3	7	n	t	i	1	0	1
375	e	k			n	n/a	0	n/a		s	t	n/a	0	n/a
376	e	a	k	k	n	1	2	1	n	d		0	0	0
377	e	a	a	k	j	1	1	1	y	t	i	0	0	0
378	e	k	k	a	j	-1	1	0	y	t	t	0	0	0
379	e-i	a	k	k	n	1	2	1	n	d		0	0	0
380	e-i	a	k	k	n	1	2	1	n	d		0	0	0
381	e	k	k	k	j	2	2	2	y	d		1	0	1
382	e-i	a	k	k	n	1	2	1	n	d		0	0	0
383	e	a	a	a	j	30	5	30	y	r	i	1	1	1
384	e-i	k	a	k	j	1	2	1	n	d		0	0	1
385	e-i	k	a	a	n	3	2	3	n	d		1	0	0
386	i	k			n	n/a	0	n/a		s	t	n/a	1	n/a
387	e	k	a	a	j	3	2	3	n	t	i	1	0	0
388	e	k	k	a	j	0	1	0	y	t	i	0	0	0
389	e	a	k	k	n	1	2	1	n	t	t	0	0	0
390	e	k	a	k	j	1	2	1	n	t	t	0	0	1
391	e	a	a	a	j	0	1	0	y	t	t	0	0	1
392	e	a	a	a	j	2	2	2	y	t	t	1	0	1
393	e	a	k	k	n	1	2	1	n	t	t	0	0	0
394	e	a	a	a	j	0	1	0	y	t	t	0	0	1
395	e	a	k	k	n	1	2	1	n	t	t	0	0	0
396	e	k	k	k	j	-1	1	0	y	t	t	0	0	1
397	e-i	a	k	k	j	1	2	1	n	d		0	0	0
398	i	k	a	a	n	65	5	65	n	r	t	1	0	0
399	e	k	a	a	n	1	2	1	n	t	t	0	0	0
400	e	k	k	a	j	0	1	0	y	t	t	0	0	0
401	e	k			n	n/a	0	n/a		s	t	n/a	1	n/a
402	e-i	a	k	k	n	1	2	1	n	d		0	0	0
403	i	k			n	n/a	0	n/a		s	t	n/a	0	n/a
404	e-i	k	k	k	j	2	2	2	y	d		1	0	1
405	e	a	a	a	j	0	1	0	y	t	i	0	0	1

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Table C.1 – Continued

Number	ie	Sp	Fs	Os	Ub	Dn	Dc	Rd	Ss	Ty	Im	Db	M	Or
406	e-i	a	k	k	j	1	2	1	n	d		0	0	0
407	e-i	k	k	k	j	-1	1	0	y	d		0	0	1
408	e	k	a	a	n	1	2	1	n	d		0	0	0
409	e-i	k	k	k	j	2	2	2	y	d		1	0	1
410	e	k	k	k	j	6	3	6	y	t	i	1	1	1
411	e	k	k	k	j	-1	1	0	y	t	i	0	0	1
412	e	k	k	k	j	2	2	2	y	t	i	1	0	1
413	e	k	k	k	j	2	2	2	y	t	i	1	0	1
414	e	k	k	k	j	0	1	0	y	t	i	0	0	1
415	e	k	k	k	j	2	2	2	y	t	i	1	0	1
416	e-i	a	a	a	j	2	2	2	y	d		1	0	1
417	e	a	a	a	j	0	1	0	y	t	i	0	0	1
418	e-i	a	k	k	n	1	2	1	n	d		0	0	0
419	e-i	k	a	a	n	1	2	1	n	d		0	0	0
420	i	a	a	a	j	-1	1	0	y	t	i	0	0	1
421	i	a	a	a	j	4	2	4	y	t	i	1	1	1
422	e-i	a	a	a	j	2	2	2	y	d		1	0	1
423	e	a	a	a	j	0	1	0	y	t	i	0	1	1
424	e	a	a	a	j	2	2	2	y	t	i	1	0	1
425	e	a	a	a	j	2	2	2	y	t	i	1	0	1
426	e	a	a	k	j	2	2	2	y	t	i	1	0	0
427	e	a	a	a	j	6	3	6	y	t	i	1	1	1
428	e	a	a	a	j	-1	1	0	y	t	i	0	1	1
429	i	a	a	a	j	0	1	0	y	d		0	0	1
430	e	a	a	a	j	2	2	2	y	t	i	1	0	1
431	e	k	a	a	j	5	2	5	n	t	i	1	1	0
432	e	a	a	k	j	12	4	12	y	r	i	1	1	0
433	e	k	a	a	j	1	2	1	n	t	i	0	1	0
434	e	a	k	a	j	3	2	3	n	t	i	1	0	1
435	e-i	a	a	a	j	0	1	0	y	d		0	0	1
436	e	k	a	a	j	83	5	83	n	r	i	1	1	0
437	i	a			j	n/a	0	n/a	s	i	n/a	0	0	n/a
438	e-i	a	k	k	n	1	2	1	n	d		0	0	0
439	e	k	k	k	j	-1	1	0	y	t	t	0	0	1
440	e	k	k	k	j	0	1	0	y	d		0	0	1
441	e	k	k	k	j	0	1	0	y	t	t	0	0	1
442	i	a	a	a	j	0	1	0	y	d		0	0	1
443	e	k	k	k	j	10	3	10	y	t	t	1	0	1
444	e	a	k	k	n	1	2	1	n	d		0	0	0
445	e-i	a	k	k	j	2	2	2	n	d		1	0	0
446	e	a	k	k	n	1	2	1	n	t	i	0	0	0
447	e-i	a	k	k	n	1	2	1	n	d		0	0	0
448	e-i	k	a	k	j	1	2	1	n	d		0	0	1
449	e	k	k	k	j	-1	1	0	y	t	i	0	0	1
450	e-i	k	k	k	j	2	2	2	y	d		1	0	1
451	e	k	a	a	n	1	2	1	n	d		0	0	0
452	e	k	k	k	j	-1	1	0	y	t	t	0	0	1
453	e	k	k	k	j	10	3	10	y	t	i	1	1	1
454	e-i	k	k	k	j	0	1	0	y	d		0	0	1
455	e-i	a	k	k	n	1	2	1	n	d		0	0	0
456	e	k	k	k	j	2	2	2	y	t	i	1	0	1
457	e	k	k	k	j	0	1	0	y	t	i	0	1	1
458	e	k	k	a	j	0	1	0	y	t	t	0	0	0
459	e-i	a	a	a	j	0	1	0	y	d		0	0	1
460	e	k	a	k	j	1	2	1	n	t	i	0	0	1
461	e-i	a	k	k	n	1	2	1	n	d		0	0	0
462	e	a	a	a	j	-1	1	0	y	d		0	0	1
463	e-i	a	a	a	j	-1	1	0	y	d		0	0	1

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Table C.1 – Continued

Number	ie	Sp	Fs	Os	Ub	Dn	Dc	Rd	Ss	Ty	Im	Db	M	Or
464	e	k	k	k	j	14	4	14	y	r	i	1	1	1
465	e	a	k	k	n	3	2	3	n	t	i	1	1	0
466	e	a	a	k	j	-1	1	0	y	t	i	0	1	0
467	e	a	a	k	j	2	2	2	y	t	i	1	0	0
468	e	k	a	k	j	1	2	1	n	t	i	0	0	1
469	e	k	k	k	j	-1	1	0	y	d		0	0	1
470	i	a			j	n/a	0	n/a		s	i	n/a	0	n/a
471	i	a	a	a	j	4	2	4	y	t	i	1	0	1
472	e-i	k	k	k	j	40	5	40	y	r	i	1	1	1
473	e-i	k			n	n/a	0	n/a		s	t	n/a	1	n/a
474	e	a	k	k	n	1	2	1	n	t	t	0	0	0
475	e	a	a	a	j	0	1	0	y	t	t	0	0	1
476	e	a	k	k	n	1	2	1	n	t	t	0	0	0
477	e	k	k	k	j	2	2	2	y	t	t	1	0	1
478	e	a	k	k	j	1	2	1	n	d		0	0	0
479	e	k	k	a	j	-1	1	0	y	t	t	0	0	0
480	e-i	a	k	k	n	1	2	1	n	d		0	0	0
481	e-i	a	a	k	j	0	1	0	y	d		0	0	0
482	e-i	a	a	k	j	0	1	0	y	d		0	0	0
483	e-i	a	a	k	j	-1	1	0	y	d		0	0	0
484	e	a	a	a	j	-1	1	0	y	d		0	0	1
485	e	a	a	a	j	0	1	0	y	d		0	0	1
486	i	k			n	n/a	0	n/a		s	t	n/a	0	n/a
487	e	a	k	k	n	1	2	1	n	t	t	0	0	0
488	e	a	a	k	j	2	2	2	y	t	t	1	0	0
489	e	a	a	a	j	2	2	2	y	d		1	0	1
490	e	a	a	a	j	1	2	1	y	d		0	0	1
491	e	a	k	k	j	161	5	161	n	r	i	1	1	0
492	e	a	k	a	j	153	5	153	n	r	i	1	1	1
493	e	a			n	n/a	0	n/a		s	i	n/a	1	n/a
494	e	a	a	a	j	0	1	0	y	d		0	0	1
495	e	a	k	k	j	1	2	1	n	t	t	0	1	0
496	e	a	a	k	j	-1	1	0	y	t	t	0	0	0
497	e	a	a	a	j	0	1	0	y	t	i	0	0	1
498	e	k	k	k	j	106	5	106	y	r	i	1	1	1
499	e-i	a	a	a	j	-1	1	0	y	d		0	0	1
500	e	a	a	a	j	70	5	70	y	r	i	1	1	1
501	e	a	k	a	j	1	2	1	n	d		0	0	1
502	e	a	k	k	n	1	2	1	n	d		0	0	0
503	e	a	a	k	j	0	1	0	y	d		0	0	0
504	i	a	a	a	j	2	2	2	y	t	i	1	1	1
505	e-i	a	a	a	j	0	1	0	y	d		0	0	1
506	e	k	k	k	j	14	4	14	y	r	i	1	1	1