# Paper 1

# Demonstratives on Pictures

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Kaplan's theory of demonstratives and deicticals can be briefly stated as follows. Expressions of this kind depend for their interpretation on the context of utterance and in a context of utterance they refer directly to whatever they refer to.

Direct reference in turn consists in two properties. The first property is the absence of a Fregean sense. The context does its work once and for all and the reference is not influenced by a counterfactual circumstance in which something else is pointed at (in the case of demonstrative) or somebody else is speaking (in the case of deictical "I"). The second property is the rigidity of the reference: if the reference is direct, it is the same in all possible worlds. It is rigid in a sense slightly stronger than Kripke's, because even in worlds where the object does not exist, the reference is still to the object referred to in the context of utterance. Demonstratives or deicticals can fail to refer when the utterance is abnormal. Consider e.g. a demonstrative without an accompanying pointing gesture (an incomplete demonstrative, in the terminology of Kaplan) or one with a pointing gesture that fails to point to anything. For deicticals we need slightly more imagination: consider an inscription in the beach sand of *I am the greatest* or an utterance coming from outside of space-time of *I am here now*. In such cases we have a defective context of utterance.

One class of counterexamples to this theory is important in the context of dialogue systems incorporating the facility of pointing in a graphical representation visible on the computer screen: demonstratives used to refer to objects represented in a picture. Kaplan discusses his pointing to a picture of Spiro T. Agnew hanging on the wall behind him which people have put up in place of Carnap's portrait, while saying: that man is the greatest philosopher of the 20th century.

That is not yet a counterexample to Kaplan's theory, as pointing to Carnap's portrait is a way of pointing to Carnap himself, and pointing to a portrait of Agnew is pointing to Agnew. But pictures can lie: something can seem to be a portrait of somebody without actually being a portrait of anybody and we can portray objects in pictures which do not actually exist, have never existed and will never exist. It seems even feasible to draw impossible objects such as the golden mountain or the most perfect island (but not the square circle).

One can stand in front of a picture of Pegasus and say things such as: *That is a winged horse*, *That horse does not exist* or even *You do not exist*.

It would seem that all of these are meaningful and even true, while Pegasus could not even turn out to exist, following the reasoning of Kripke about unicorns. And this entails that also in these cases that stands for something. The something is not the picture or a graphical object in the picture because of these it is clearly the case that they do exist and that they are not winged horses. A similar case arises with spoken language dialogue systems. Suppose you ask it for the departure of the train to Groningen and it says: I do not know what you are saying. Who is the I in the system's utterance? Is it your computer (the vocaliser), the computer program, your CPU, the programmer, the copyright owner of the system? Are you being lied at? And what if it says: I do not have that information here right now? Yet, the whole situation seems remarkably

like calling an information telephone number with a human operator. Also in thais case we seem totally unconcerned with the identity of the voice on the other side.

Problems of this kind can efficiently and elegantly be solved by switching to a slightly modified version of DRT. We just have to add a perspective to the DRSs of Kamp & Reyle (1990) and a particularly easy way to do so is to consider pairs of DRSs and one of their event markers. The special event marker is representation of the utterance now under interpretation. We have to require that a proper pair also knows that e is an utterance. An utterance DRS is a pair $< K, e >$ such that K is a DRS, $e \in U_K$ and $utterance(e) \in Con_K$. Further we make the natural assumption that all our DRSs know that utterance (normally) have a time, a place, a cause (the speaker) and a goal (the addressee). This can be implemented by assuming that our DRSs contain suitable axioms to that effect. Moreover, utterances can have an accompanying pointing, if there is an $e'$ that is a pointing, that is contemporaneous with e and also shares its cause.

This allows us then to treat deicticals and demonstratives by means of the binding theory of presupposition. Deicticals and demonstratives are treated a presupposition triggers triggering presuppositions such as $< x; goal(e, x) >$, $< x, e'; accpointing(e', e), theme(e', x) >$, etc.

Here $accpointing(e, e')$ is an abbreviation of

$utterance(e), time(e, t), time(e', t), agent(e, x), agent(e', x), pointing(e')$

Deicticals typically identify an object that is functionally related to the utterance under interpretation and so do not give rise to accommodation that goes beyond the actual positing of the visually related object: that the utterance itself is accommodated is ruled out by the way we set up the utterance DRSs. The same appears to apply to the pointing events: we can accommodate a theme, but we do not seem to be prepared to accommodate the pointing itself, if in fact we can see that no pointing took place[1]

This is probably the way in which all definite (or even all eferential) expressions should be treated: as presupposition triggers using a variety of devices to identify objects that are given or that can be functionally related to objects that are given. E.g. names would trigger the presupposition of somebody being socalled $(< x; called(x, " john'') >$ would be presupposition generated by John) (Geurts 1999) pronouns would trigger the presupposition satisfied by any of the antecedents they can have, etc.

Let us look at the examples we considered before.

*That is a winged horse.* (pointing to a picture of Pegasus)

"That" generates the presupposition that the object is pointed by the speaker of the sentence while the utterance is made. It thereby picks out (for an interpreter) the discourse referent that represents the horse in the picture, a representation constructed as a response to the perception of the picture. This representation can be accompanied by further recognitions: the horse can be identified with the mythological figure Pegasus, in which according to the interpreter the Greeks believed, or in a more confused interpreter, with a horse from an exotic country. Minimally, it is what the part of the picture representing the horse represents.

One can wonder whether the sentence is literally true. If one holds it is, it is much like

*Bats are mammals*

i.e. a sentence expressing a relation between concepts. If one holds it is not, one takes the subject place of the verb "to be" (in this reading) as presupposing existence.

Notice that it is hard to say what the sentence means on this particular view. It falls in the class of sentences that crucially depend on the context of utterance for having a proper interpretation. (like: *He beats it.* in the discourse: *Pedro owns a donkey. He beats it.*) Our presuppositional theory of deicticals and demonstratives (and possibly of all referential expressions) predicts that not just sentences with anaphoric pronouns but also any sentence with a deictical or demonstrative aspect to any word in it has this property. It is not hard to argue that all sentences suffer from this property, e.g. by noting the deixis in tense, or by the not unnatural assumption that any content word refers to an abstract entity like a kind, activity, colour, etc.

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[1] This fact needs a further explanation. Perhaps we strengthen the presupposition by asking that the pointing is a proper part of our utterance event. This would prevent the following counterexample. *It is possible that that is a horse*, without an accompanying pointing, where it would otherwise be possible to accommodate the missing pointing in the context of the possibility.

The oldest answer in the DRT tradition to this problem is to say that true and false apply not to the individual sentences but to DRSs as a whole. It follows from this answer that DRSs as a whole and not the individual sentences can be thought of as propositions. And we can ask ourselves what happens to the deicticals and demonstratives if we proceed in this way.

The answer is that things go wrong rather dramatically, even for less exciting examples like the following. Assume you and your interlocutor enter into room with a fishpond in which a single black fish is swimming around. You can then say:

*That fish is hungry.*

and your interlocutor has to resolve that fish to the fish perceived by her as well. We obtain a DRS in which the results of the perception are represented and the further condition that the fish is hungry. Now that DRS is true in many possible worlds in which similar but different fishes are swimming around. Typically the sum of the perception provides a description of the fish. The net result is that the reference is not direct (we have a description derived from the perception) and non-rigid. Both properties that for Kaplan are constitutive of deictical reference do not apply.

One option here is saying that Kaplan has got it wrong. Demonstrative reference is not direct, but employs a description that is picked up by the interpreter from her previous experience. But this does not seem to be a very easy option. It clearly is the case that something else could have the properties that the interpreter has perceived in her perception of the fish. But it clearly is not the case that that something else could have been the fish in question.

It is also not the theory as such that disagrees with Kaplan. We deny with Kaplan that demonstratives and deicticals are synonymous with descriptions like: the speaker of the sentence, the object pointed at by the speaker, etc. Those descriptions are important since they give the content of the presupposition by means of which we identify the referent. But they are not the way in which the referent is given to the subject. The way the referent is given is determined before the use of the demonstrative or deictical and varies in content with the interpreter and her experience. So, while the DRS as a whole associates a way in which the object is given with the discourse referent (in fact it is always the sum total of the information about the object contained in the DRS) this way in which the referent is given cannot be associated with the linguistic expression as its meaning. So with Kaplan we hold that demonstratives and deicticals refer without any intervening description that is associated with the deictical or demonstrative as its Fregean sense. And this agreement should come out in our predictions about the sentences in which they occur.

To do this we must develop a notion of proposition for sentences that crucially depend on the preceeding DRS. And the first line to explore here is Kamp's idea of the extensional anchor (Kamp & Reyle 1990). This can be seen as a partial function from discourse referents to objects and is like the DRS itself a dynamic parameter of the interpretation process. Kamp has defended that for proper names like Mary we add a discourse referent $x$ and a condition $Mary(x)$ to the DRS and a tuple $< x, Mary >$ to the anchor. Anchors are cashed out in the definition of truth for DRSs by demanding that a truthful embedding of the DRS is an extension of the anchor.

Now it seems to be that with anchors we obtain a way of defining our propositions. E.g. *He beats it*, will after the resolution of the pronouns in the development process be interpreted as a condition $beat(x, y)$. If we drop the old DRS, but keep the anchor and if also both $x$ and $y$ are in the domain of the anchor $<; beat(x, y) >$ is the proposition that the objects $x$ and $y$ are mapped to by the anchor stand in the *beat*-relation. This is a singular proposition, just as Kaplan would have it. All that we need to do is to add to our definition for the treatment of deicticals and demonstratives the requirement that the discourse referent found by presupposition resolution is anchored to the object pointed at (or the relevant constituent of the utterance situation).

This is a great theory and our earlier examples about Pegasus should not unduly worry us, if they were all there is to worry about. The main problem with the theory as it stands is that it is not clear to the communicators whether or not a proper anchoring takes place. They consequently do not know whether or not the individual sentences express a proposition. It is after all a fact about the world which object meets the anchoring description and consequently speakers can be ignorant about it or mistaken about it. We predict that information stops flowing when either of these occurs and this seems to contradict our intuitions. Communication continues and continues to influence action under mistakes or ignorance. There is a second problem with theories of

extensional anchoring in that they make rather strong prediction about evaluation of a DRS over the belief alternatives of a person. Consider the typical Babylonian who believes that hesperus is not the same star as Phosphorus. Or consider the person who thinks the politician Paderewski is not the same guy as the piano player. It seems that it is not possible to have beliefs of this kind at all, following the theory of extensional anchoring.

These problems can be dealt with by the doctrine of intensional anchoring. An intensional anchoring is a function from discourse referents to partial individual concepts. We can maintain it as an extensional anchor by the dynamics of discourse. In principle, it is possible to have the same formulations as before. E.g. we can say of a name that it introduces a discourse marker $x$, a condition $name(x)$ and adds to the anchor the ordered pair consisting of the discourse marker and the function that maps possible worlds in which there is something socalled to that thing[2]. If we know how to anchor a discourse referent by an expression in one world, we know how to do it in any other world.

But there is no need anymore for the anchor as a separate device. It is much more natural to associate with new discourse markers a special box which contains the description under which it is introduced. Descriptions are just the syntactical counterparts of partial individual concepts. The idea now is that the subject of the DRS is fully aware of the description under which the marker is introduced: it is the way in which the object is given to the subject. Which descriptions should we choose? The problem of intentional identity is closely connected to the question which description and can be used to come up with good descriptions. For definites that have to be accommodated the descriptive content is an obvious candidate. For indefinites, the Evans description constructed from the larger sentence turns out to be useful.

*If an new object is introduced by a perception, the description is:* the object perceived in this perception. $(perceive(e), agent(e, s), theme(e, x))$
*If the new object is first referred to by an unknown name, it is* the object that bears that name.$(name(x, \alpha))$
*If the object is first referred to by a new definite description, it is the description itself that does the anchoring.*
*If the object is first referred to in an indefinite description the description is either the Evans' description constructed from S(an(n) N)* the N such that S(x) *or the object the speaker would pick out as the referent (the speaker's referent)* .

A full discussion is not possible here of the question why these are the right descriptions. Just two remarks. Short names (like short descriptions) are not suitable for introducing new objects by accommodation and I am not assuming that they work. My grandfather Tom, king Louis XVIII, the planet Venus are better candidates. Second, normally with indefinites we expect an identity between the Evans description and the speaker referent. Only where the Evans description is not available (e.g. when it does not appear in focus), or when the speaker clearly intends another object than the one intended by the Evans description, it is useful to keep them apart[3].

Let us go back to our example. Pegasus is grasped through the indirect perception provided by the picture. The object perceived in this perception (i.e the perception of the picture) is the object the picture represents. In those worlds where the picture represents something (worlds which have a Pegasus as in the picture) it refers to Pegasus, in other worlds, including ours, it does not refer.

We can therefore assign to the sentence the proposition that is true or false in those worlds depending on whether the Pegasus in the world is a winged horse. Given the way in which the winged horse is given to the subject, it cannot fail to be true. This is probably why it seems to be true in a similar way as the sentence: *Unicorns have a horn.*

But here we need to make some distinctions. Our new DRSs really have to be interpreted in a two dimensional way. One world-parameter indicates what object is denoted by the discourse referents by evaluating its associated description, the other gives the circumstance of evaluation of the conditions. A new-style DRS is true iff it is true with respect to the actual world in both

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[2] This procedure requires uniqueness, and this is normally not satisfied. We actually require stronger conditions.
[3] Speaker reference must be considered for definnites as well, when there is an obvious mismatch between how the speaker refers and what she intends, as in the Donnellan examples.

roles. A DRS is necessary (in the sense of Kaplan and Kripke) iff it is the case that it is true taking the actual world as the first parameter and varying the second parameter over the ways the actual world could have been. A DRS is analytically true iff it holds in all cases where we take the parameters to be the same. Our example is analytically true in the weaker sense that is true in all cases where we take the two parameters to be the same and where the DRS has a truthvalue.

The notion of proposition falls apart into two notions, one that in honor of the tradition we can continue to call the proposition: $\{i \in nec(a) : K$ is true with respect to $a$ and $i\}$ and another that we can call its informational content or the thought it expresses: $\{i \in W : K$ is true with respect to $i$ and $i\}$ It is the last notion and not the first that one should take as basic in the theory of communication and perception. It is the one that one (approximatively) obtains in DRT without anchoring.

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