Cognitive Dynamics and Indexicals

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Abstract: Frege held that indexical thoughts could be retained through changes of context that required a change of indexical term. I argue that Frege was partially right in that a singular mode of presentation can be retained through changes of indexical. There must, however, be a further mode of presentation that changes when the indexical term changes. This suggests that indexicals should be regarded as complex demonstratives; a change of indexical term is like a change between 'that φ' and 'that ψ', where 'φ' and 'ψ' pick out relational properties that may nonetheless be conceived of by the thinker as intrinsic.

1. Introduction

As we move through space and time our relations to objects, places and times change continuously. A place that was *here* becomes *there*. A time that was *present* becomes *past*. Our thoughts remain coherent only because we are able to keep track of objects, places and times as their relations to us change.

According to Frege, it is sometimes possible to retain the very same indexical thought while the context changes:

> 'If someone wants to say the same today as he expressed yesterday using the word "today", he must replace this word with "yesterday". Although the thought is the same, its verbal expression must be different in order that the change of sense which would otherwise be affected by the differing times of utterance may be cancelled out' (1956, p. 296).

Frege explicitly extended this claim to transitions between 'here' and 'there' and presumably would have said the same about a transition between any two co-referring indexical terms insofar as the reference was kept track of through the change of context.

Gareth Evans took up Frege's theme, arguing for the existence of *dynamic thoughts*:

> 'Frege's idea is that being in the same epistemic state may require different things of us at different times; the changing circumstances force us to change in order to keep hold of a constant reference and a constant thought - we must run to keep still' (1985, p. 308).[1]

Frege and Evans advocated what I shall call the *strong dynamic view*, according to which the very same thought can be retained through a change of indexicals. This can be distinguished from the *weak dynamic view*, according to which tokens of different indexical terms can express a common thought component but sentences containing them can never express the same complete thought. In this paper I shall argue that either the weak or strong dynamic view is correct. Which one of the two is correct depends, however, on the details of the account of indexicals adopted. This, in turn, depends on the account of complex demonstratives (noun phrases of the form 'that φ') adopted because, as I shall argue, the dynamic view requires an account of indexical thoughts according to which indexical terms are best thought of as complex demonstratives masquerading as unstructured terms. Indexicals differ from other complex demonstratives only in respect of the property picked out by the nominal term (the 'φ' component in 'that φ').

My argument proceeds as follows. Firstly I argue that some version of the dynamic view is required in order to explain why predications tend to be retained through changes of context. Secondly, however, I argue that the Frege-Evans view cannot be accepted without qualification because it fails to account for the systematic psychological differences associated with different indexicals; an objection that has been surprisingly neglected by its advocates. I then develop an account of indexical thought that reconciles these claims. Some preliminary issues must be dealt with first.

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[1] The relevant passage is reproduced in Evans, 1982, pp. 192-196. Like Frege, Evans included 'here', 'there' and other indexicals in his account (Evans, 1985, pp. 310-311).

2. Modes of Presentation

Frege intended modes of presentation to perform more than one function: they captured cognitive significance, they determined reference and they composed to form thoughts with truth values. Many philosophers now doubt that a single entity can perform all of these functions. Many, for example, reject Frege's single level of content and instead adopt a two-level account (e.g. Kaplan, 1989; Perry, 1977).

I shall, however, use the expression 'mode of presentation' (henceforth MOP) in a way that is intended to be neutral with regard to most of these issues. What is essential to MOPs is that they are individuated in such a way as to make maximum rational sense of the thinking subject. I leave it open what other properties MOPs have, though the arguments to follow may place constraints on this. Given this broad definition, a Fregean mode of presentation counts as a MOP but so, for example, do Kaplan's (1989) notion of *character* (insofar as it is applicable at the level of thought), Perry's (1997) notion of *doxastic character* and Recanati's (1993) notion of a *psychological mode of presentation*.[2] The syntactic difference between symbols in a Language of Thought would also constitute a difference in MOP if that were all that distinguished co-referring symbols.[3] In recent years the word 'concept' has also sometimes been used in the same general way that I am using MOP (Peacocke, 1992; Fodor, 1998).[4]

In section 9 I briefly sketch an account of MOPs to illustrate that there are possible accounts of MOPs consistent with the dynamic view. That account is not, however, essential to the main arguments of the paper.

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[2] I discuss the relation between psychological and linguistic MOPs below.

[3] See Fodor, 1998, pp. 15-22 for an explicit use of 'MOP' diverging from Frege's in all but the psychological respect.

[4] Some philosophers (e.g. Stalnaker (1999)) describe propositional attitudes in terms of sets of possible worlds rather than structured propositions. Such views are often held to encounter difficulties in capturing the fineness of grain of psychological states; but see below.

3. Perceptual and Non-Perceptual Tracking

We often use perception to help us keep track of objects and places. By focusing perceptual attention on whatever one is thinking about as one moves relative to it one can engage in temporally extended trains of thought about it. One looks at a particular spot on a featureless hillside and thinks: 'it is foggy there now'. Perhaps if one took one's eye off the place in question one would have no way of re-identifying it. But by using perception to keep track one can walk to the place and think: 'it is not foggy here any more'. The ability to keep track is, of course, fallible; one can find oneself inadvertently thinking about a different place after a period of time because of an unnoticed slip. Fortunately, however, keeping track of something does not require one to be certain that one has kept track of it.

One can also keep track of places and times without perception, albeit in a more limited way. It has been shown, for example, that blindfolded subjects are remarkably precise when attempting to walk to a target up to twenty meters away after first previewing the target in a well-lit environment (see Corlett, 1992; Elliott, 1987; Loomis, Da Silva, Fujita, and Fukusima, 1992; Philbeck and Loomis, 1997; Rieser, Ashmead, Talor, and Youngquist, 1990; Steenhuis and Goodale, 1988 and Thomson, 1983). One can easily verify for oneself that it is possible to retain a sense of where something is relative to oneself in a dark room despite moving around the room at random for a number of seconds. This suggests that one has an ability to keep track of a location over a limited but not insignificant period of time just by compensating for one's own movements. Something similar happens with times; when an event occurs one can judge how long ago it occurred with reasonable, if not perfect, accuracy for some time. A loud bang is heard; five minutes later one can judge that a loud bang occurred about five minutes ago. One can do this even if one perceives nothing but the bang. None of these tracking abilities require the subject to make any conscious calculations or inferences.

4. The Dynamic View

Evans (1985, pp. 306-11) argued for the strong dynamic view by claiming that anyone who holds one of a series of thoughts expressible using indexical terms must have a propensity to hold the next thought in the series as the context changes:

> 'Our ability to think of a place as 'here' is dependent upon our general ability to keep track of places as we move about (which requires, in general, the ability to know when we are moving), so…there could not be thoughts interpretable as "It's ψ here", if they were not entertained by a subject who had the propensity to entertain, as he moves about, thoughts expressible in the words "It's ψ there"' (1985, pp. 310-11).

It certainly seems true that some such propensity must generally exist for, as Evans (1982, p. 235) points out, it is a precondition of rationality that one's thoughts at a given time are related to one's earlier thoughts in certain systematic ways. One might perhaps wonder whether an immovable subject with no such propensity might nonetheless be capable of 'here' (or 'there') thoughts.[5] I suspect, however, that Evans believed that indexical thinking requires an appreciation of the systematic relation between the indexical term and the context. Thus someone who did not understand what it would be for somewhere *else* to be *here* or for the same place to be *there* would not really be thinking a 'here'-thought at all; and it would make little sense to say that someone had this understanding but had no propensity, under any imaginable circumstances, to manifest it (even though there might be circumstances in which they would fail to manifest it).

Having made this point, Evans then claimed that the interdependence of indexical thoughts across changes of context refuted the notion that 'here'- and 'there'-thoughts could be separate 'atoms' existing independently of one another and that they must instead be seen as 'cross-sections of a persisting belief-state'. This argument, however, does not seem to be valid. As far as I can tell from Evans's rather brief exposition, it has the form: anyone who thinks '*a* is *F*' must have a propensity, when the context changes

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[5] My thanks to an anonymous referee for raising this issue.

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in a certain way, to think '*b* is *F*'; therefore '*a*' and '*b*' express the same MOP.[6] Evans thus seems to have thought that since neither '*a*' nor '*b*' could be conceived of as existing entirely independently of one another they could only be conceived of as parts of a single persisting entity (the MOP expressed by '*a*' at t_1 and '*b*' at t_2). But at most this only shows that the MOPs expressed by '*a*' and '*b*' are interdependent, not that they are identical; nothing in the argument seems to rule out thinking of the diachronic belief state as involving two *different* interdependent MOPs, one after the other.

Evans's argument is, however, preceded by a brief hint at a different argument.[7] When spelled out, I believe this argument is valid. Suppose that at t_1 Smith believes that:

      (1)   Cicero was a great orator

If Smith undergoes no change of opinion and suffers no lapse of memory then Smith will retain this belief. Now, Smith's retained belief is expressible at t_2 using a sentence containing 'Cicero', and not by the sentence:

      (2)   Tully was a great orator

Why is this? The obvious answer is that a token of 'Cicero' at t_1 expresses the same singular MOP as a token of 'Cicero' at t_2 whereas a token of 'Tully' at t_2 does not. The only way for (1) to lead to (2) would be via an identity 'Cicero = Tully'. If Smith does not believe this identity, Smith will have a propensity to retain the predicate 'was a great orator' attached to 'Cicero' but will have no propensity whatsoever to retain the same predicate attached to 'Tully'. The general principle, then, is that in the absence of identity beliefs, changes of opinion or lapses of memory a predicate will be retained and attached to a singular MOP if and only if the same singular MOP to which the predicate was originally attached is itself retained.

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[6] I have assumed here, for the purposes of exposition, that 'here'- and 'there'-thoughts are of simple subject-predicate form; though in fact I shall question this below. Strictly speaking many indexicals are adverbs; I shall not assume, however, that this is a reliable guide to their logical form.

[7] See Evans, 1985, pp. 309. John Campbell (1987, 1994, pp. 73-88) gives a highly illuminating discussion of a similar argument for demonstratives. Further, related arguments in support of the Frege-Evans position are given by Michael Luntley (1997, 1998, 1999) and by Christoph Hoerl (1997). The issue of retained indexical modes of presentation had already been raised by David Kaplan under the heading 'cognitive

To object that the tokens of 'Cicero' at t_1 and t_2 could instead express different MOPs that are related via a kind of primitive updating such that the predication at t_1 is always carried over to a particular MOP at t_2 would be somewhat unmotivated and would in any case miss the point. It would be analogous to claiming that when one infers '*a* is both *F* and *G*' from the premises '*a* is *F*' and '*a* is *G*' the different tokens of '*a*' could express different MOPs related in such a way that one is disposed to form the conjunctive belief given the two premises. Such a claim would miss the point of individuating MOPs, which is to individuate the attitudes in such a way as to make rational sense of the subject's thought processes.

Moreover, there is no thinkable identity statement that could relate the different tokens of 'Cicero' to one another. The identity statement 'Cicero = Tully' only serves its purpose because it relates *all* tokens of 'Cicero' to *all* tokens of 'Tully' (it would serve no purpose at all if it concerned only the tokens that occurred in the identity statement). An identity statement 'Cicero$_1$ = Cicero$_2$' (where the subscripts pick out individual tokens at t_1 and t_2) would not be a possible object of thought because the tokens do not occur at the same time, and would in any case be useless because the tokens of 'Cicero' that it contains are not the same tokens that occur in (1) and its successor at t_2.[8]

A parallel argument can be applied to transitions between indexicals. Suppose that at t_1 Smith believed that:

> (3)   Jones fell in love while standing here

Suppose Smith then moved away from the place but kept track of it (either perceptually or non-perceptually) while moving. Assuming no changes of mind or lapses of memory, Smith would believe, at t_2, that:

> (4)   Jones fell in love while standing there

An argument of exactly the same form as the one given above for 'Cicero' suggests that 'here' in (3) and 'there' in (4) express the same singular MOP. If 'here' and 'there'

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dynamics' in his 'Demonstratives' (1989, pp. 537-8. See also pp. 588-90 for a related difficulty with demonstratives).
[8] Cf. Campbell, 1987.

expressed different MOPs of the place it would be a mystery why Smith retains what is believed about the place. It could not be explained in terms of an identity 'here = there' because this would not be a possible object of thought (as soon as the place became 'there' it would cease to be 'here', so the two MOPs could not be entertained at once).

There are, of course, occasions on which one re-identifies a place after losing track of it, perhaps via some distinguishing features. In such cases 'here' and 'there' might well express different MOPs. If one remembers the properties of the place encountered earlier one might infer that the place thought about now has the same properties. In doing so, one would make use of a meta-linguistic identity such as 'the place referred to now as "there" = the place referred to earlier as "here"'. It is implausible, however, that keeping track of a place normally involves a conscious process of meta-linguistic inference from one moment to the next.[9] (Even in making such an inference one would probably need to make use of multiple tokens of 'there' at slightly different times. They could not all be related meta-linguistically, for fear of an infinite regress.[10] So at some point, a MOP must be retained between different tokens and if the subject were in motion these could be tokens of different indexicals if the subject possessed a sufficiently large and fine-grained stock of indexical terms).

Finally, note that it cannot be objected that at t_2 the subject might know: 'the place referred to at t_1 as "here" = there' simply because the place has been kept track of. For this implies that keeping track allows the thinker to know that 'there' satisfies 'the place referred to at t_1 as "here" = x' simply by having known, at t_1, that it was satisfied by the place then referred to as 'here'. This assumes precisely the kind of predicate retention that it was supposed to dispense with.

So far we have only considered thoughts about places; but the same arguments apply to any situation in which it is possible to keep track through a change of indexical terms such that predications tend to be retained. If, for example, one thinks 'it is F now' one has a propensity to think, a moment later, 'it was F a moment ago'. Given the arguments

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[9] Perhaps one's perceptual machinery can sometimes be construed as making 'inferences' at a sub-personal or sub-conscious level. This would not, however, be relevant to the individuation of MOPs, which are intended to capture one's personal-level psychology. In any case, one's computational capacity is finite, whereas it would surely require an infinite computational capacity in order to re-identify a place at every instant.

[10] Cf. Campbell, 1987.

above, this implies a retained MOP of a time.[11] Indexicals that refer to persons, on the other hand, do not lend themselves to dynamic transitions between different terms in the same way that spatial or temporal indexicals do. In particular, since one cannot become someone other than oneself, there are no circumstances in which one could keep track of oneself while exchanging indexical terms between 'I' and, for instance, 'you'.[12] This does not show that the conclusions to be drawn below for spatial and temporal indexicals do not apply to personal indexicals; it just shows that further arguments are required in order to settle the matter (I shall not attempt this here). The hypothesis that the conclusion applies to all categories of indexicals should, however, merit consideration.

The moral of all this is that if an account of the individuation of MOPs yields the conclusion that tokens of different indexicals necessarily express different singular MOPs then that account should be rejected. A number of popular accounts do indeed yield that conclusion though, as I shall explain below, it might be possible to repair some of them without rejecting everything that they get right.

5. A Problem for the Frege-Evans View

Despite the arguments in its favour, the dynamic view – at least as advocated by Frege and Evans – is vulnerable to a simple objection, one that few of its advocates seem to have noticed. The objection relates to the fact that each indexical term has a special significance for inference and action. To borrow an example from John Perry (1977, p. 494), if you believe that:

> (5)   A bear is about to attack me

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[11] Cf. Evans, 1985, p. 309. I am not certain that quite the same arguments can always be applied to the case of 'today' and 'yesterday', which strike me as a special case; it may be that re-identifications and meta-linguistic inferences are sometimes associated with transitions between these terms. But this is not an admission that the argument never applies to such terms; it is merely an observation that the notion of 'keeping track' has less application here and consequently the circumstances in which a MOP could be retained do not frequently arise.

you should roll up in a ball and try to keep still. But if I understand and believe what you said I express my belief using the sentence:

(6)   A bear is about to attack you

This belief should lead me to run and get help, not to roll up in a ball and try to keep still. Similarly, consider the following pairs of sentences, uttered in different contexts such that the same time or place is referred to in each case:

(7)   It is rainy now… It was rainy earlier
(8)   It is rainy here… It is rainy there

Given a suitable set of background beliefs and desires the believer of the first sentence in each pair has a reason to carry an umbrella, but the believer of the second does not. Now, a difference in intentional actions implies a difference in overall psychological state. Since a difference in the indexical term is sufficient to give rise to a differences in action, the above pairs of sentences express (or at least manifest the presence of) different thoughts. (If any thoughts additional to those expressed are involved in bringing about the different actions, this can only be because the different indexical terms bring different additional thoughts into play).

Observations of this kind have led many philosophers to abandon the Fregean idea that communication involves the sharing of thoughts, at least where indexicals are concerned (see for example Perry, 1977; Kaplan, 1989; Evans, 1982, pp. 40, 315-6; McDowell, 1984, p. 290). Many have also felt that these difficulties were at the root of Frege's rather problematic view of the first person according to which 'I' has both a private and a public sense, the former being principally relevant to action while only the latter is communicable.

A corresponding problem arises for dynamic thoughts. Given a suitable set of background beliefs and desires Smith's belief 'it is rainy now' would result in Smith bringing an umbrella when going outside. But at a later time Smith's belief 'it was rainy

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[12] It might, however, be possible to keep track of someone who changes between 'he' and 'she'. The same arguments about retained MOPs would apply. 'He' and 'she' are sometimes claimed to be complex demonstratives (see Corazza, 2002 for discussion of them).

earlier' would not result in Smith bringing an umbrella even when combined with the same set of background beliefs and desires. Something similar can be said about 'here' and 'there'. By the argument given above, a difference in indexicals implies a difference in thoughts. Consequently the Frege-Evans view is not correct.

Evans (1985, pp. 307-8) seems to show some awareness of this difficulty but responds only by pointing out that since the thoughts containing different indexicals cannot occur at the same time it is impossible for the subject to hold differing epistemic attitudes to them at the same time. But this is clearly an inadequate response, for the examples given display systematic differences in psychological roles. These differences stand in need of an explanation

6. Outline of a Theory of Indexicals

I shall now outline a theory that reconciles the conclusions of the last two sections. In brief, the theory states that indexical terms such as 'here' are best thought of as complex demonstratives (noun phrases of the form 'that ϕ') masquerading as unstructured terms. The nominal term (the 'ϕ' component) picks out a relational property that has the thinking subject as one of the relata though, as I shall explain below, the subject need not always conceive of the property of as relational.

Complex demonstratives can reconcile our seemingly conflicting conclusions because of their structure. They can plausibly be thought of as involving two different MOPs, one of which is singular while the other picks out the property associated with the nominal term. I shall make a few remarks about the cognitive dynamics of complex demonstratives then I shall discuss indexicals. Suppose Smith sees a sheep running on a hillside at t_1 and forms the belief:

(9)   That black sheep can run fast

While Smith observes the sheep, keeping track of it perceptually, it slowly changes colour from black to white (it does not matter why). Even if the sheep had stopped running shortly after t_1, Smith would be disposed at t_2 to believe:

(10)   That white sheep can run fast

Here we have another case of predicate retention, which by the arguments of section 4 implies a retained singular MOP. Now, suppose Smith was frightened of white sheep but not of black ones. Given a suitable set of background beliefs and desires, (10) would result in Smith running away whereas (9) would not. So (9) and (10) have different psychological roles, which implies a difference in MOP. But this can easily be explained in terms of the change in the MOP expressed by the nominal component ('black sheep' is exchanged for 'white sheep') without any need to deny that there is also a retained singular MOP of the sheep.

Different theories of complex demonstratives yield slightly different accounts of the transition from (9) to (10). Some philosophers, for example, hold that the nominal term does not contribute to the truth conditions of an utterance containing a complex demonstrative (see for example Schiffer, 1981; Perry, 1997a; Corazza, 2002; Kaplan, 1978, 1989, 1989a; McGinn, 1981; Peacocke, 1981; Davies, 1982; Recanati, 1993; Richard, 1993; Braun, 1994 and Borg, 2000. The first three also hold that an utterance containing a complex demonstrative can be true even if designated object does not have the property picked out by the nominal term; the others disagree.[13]) Consider, for example, the 'multiple proposition' view (Perry, 1997a, 2001; Dever, 2001; Corazza, 2002), according to which more than one proposition is associated with an utterance containing a complex demonstrative.[14] Assuming that these propositions are believed by the speaker, Smith's utterance of (9) manifests a combination of two beliefs (only the second of which corresponds to 'what is said'):

(9a)   That is a black sheep
(9b)   That can run fast

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[13] There is much to be said about the significance of error in the nominal term for indexicals, particularly in relation to the phenomenon of immunity to error through misidentification. I intend to discuss this in a further article.

[14] On Dever's (2001) version the nominal can be understood as contributing to truth conditions (though this may be ambiguous), but the following analysis of transitions still applies.

The 'that' term expresses the same singular MOP in both (9a) and (9b). Similarly, (10) becomes:

(10a)   That is a white sheep

(10b)   That can run fast

Again the 'that' term expresses the same singular MOP in both (10a) and (10b) and, moreover, there is no reason to deny that this would be the same singular MOP that occurs in (9a) and (9b) if Smith has kept track. All that changes is the predication in (9a) and (10a); the belief (9b) is retained and rewritten as (10b). Consequently on the multiple proposition view the strong dynamic view is correct for complex demonstratives.

Some other philosophers, however, argue that the nominal term does contribute to truth conditions. Lepore and Ludwig (2000) and King (2001), for example, argue that complex demonstratives should be analysed as quantifiers. On Lepore and Ludwig's version (9) is analysed as follows (the description is to be understood along Russellian lines):

(9c)   (the $x : x = $ *that* & x is a black sheep) can run fast

The word '*that*' expresses a singular MOP. Similarly, (10) would become:

(10c)   (the $x : x = $ *that* & x is a white sheep) can run fast

Given the above arguments, the occurrences of '*that*' in (9c) and (10c) would express the same singular MOP if Smith kept track, but no overall thought would be retained. So according to a quantifier analysis the weak dynamic view is correct for complex demonstratives. I leave it open which view of complex demonstratives is correct.

My suggestion with regard to indexicals is that they can be analysed along similar lines. If Lepore and Ludwig's analysis of complex demonstratives is correct, for example, then Smith's belief: 'it is F here' should be analysed as:

(11)   (the $x : x = $ *that* & x is H) is F

The term '*that*' expresses a singular MOP of the place (nothing should be read into the use of the word 'that'; it just expresses a singular MOP). This MOP could be retained in thoughts expressible using other indexicals. The predicate 'is *H*' designates the property of *hereness* (a detailed description of this is given below). This would be exchanged for a different nominal term if there were a transition to a different indexical. Suppose, for example, that there were an indexical term 'midstraight' that the subject uses in designating a place at middle distance straight in front. Then if Smith's belief 'it is *F* here' were exchanged for 'it is *F* midstraight' (11) would be replaced by:

(12)   (the $x : x = $ *that* $\&$ x is midstraight) is F

The predicate 'is midstraight' picks out the property of being at middle distance straight in front. (If 'here' were exchanged for 'there' instead of 'midstraight' there would be a similar exchange of properties at the psychological level, though since there is no specific relational property associated with the word 'there' the property might only be relevant at the psychological level. A demonstration accompanying an utterance of 'there' would, however, give an indication of the relational property the speaker believed the place to have. The word 'here' also has a degree of flexibility (it can be used in designating different sized regions), and there is a corresponding variability of the property picked out by '*H*'. Pragmatic factors narrow this down). A different theory of complex demonstratives would yield a correspondingly different theory of indexicals, but in each case '*H*' would play the role of the nominal term in the account given for 'here'.

The account just given is slightly oversimplified because there will in fact be two different versions of each of the terms '*H*', 'midstraight' and so on, one relevant to linguistic meaning while the other is relevant to the individuation of thoughts. It will be helpful at this point to borrow François Recanati's (1993) distinction between *linguistic* and *psychological* MOPs. Recanati points out that in their earlier works Kaplan and Perry both tended to use one notion (Kaplan's *character*) for two purposes: firstly it was a rule that determined reference in a context but secondly it was intended to be the crucial notion in individuating propositional attitudes. This, as Recanati (1993, pp. 69-72) points out, cannot be quire right. The rule that determines the reference of 'here' in a given

context is typically assumed to be something like: 'a token of "here" refers to the location in which it is uttered'. But the belief that p is the location of an utterance of a token of 'there is a bomb here' has none of the special significance for action associated with the belief that there is a bomb here. Instead, Recanati distinguishes the linguistic MOP corresponding to the reference-determining rule from the psychological MOP relevant to individuating the attitudes. Clearly, however, there must be a systematic relation between the two.

In the theory that I am advocating the corresponding distinction for 'here' is marked by the difference between the terms 'H_{Ling}' and 'H_{Psych}'. The property H_{Ling} is derived from the linguistic rule for the use of 'here'.[15] It is the property of being the location of the uttered token of 'here', or at any rate some property along these lines. Thus when Smith says 'it is F here', Smith is talking about the place with property H_{Ling}; that is, the place where the utterance occurs. When Jones hears Smith's utterance, Jones is aware that Smith is talking about the place with the property H_{Ling} because Jones, too, knows the rule of use for 'here'. This account is not necessarily in conflict with standard accounts of indexical language, such as Kaplan's (1989); though it may depend on which theory of complex demonstratives one adopts.

At the psychological level, however, there is a difference. A subject who uses the word 'here' normally believes that the place referred to has the property H_{Ling} but, as Recanati observes, there must be more to their psychological state than this. This is captured by the thought component 'H_{Psych}'. Any place that is H_{Psych} will also be H_{Ling}; that is to say, any place that has the property of *hereness* (for a given subject at a given time) will be the location of any uttered token of 'here' (by the subject in question at that time). This must be the case if true sentences are to express true thoughts. I shall now discuss the nature of terms like 'H_{Psych}' in more detail. I shall refer to them collectively as *egocentric terms* and to the MOPs they express as *egocentric MOPs*.

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[15] There are, of course, uses of 'here' and other indexicals that ignore the rules that standardly constrain their use or involve different rules. One can, for example, point at a place on a map and say 'Jones is here'. Quentin Smith (1989) gives many further examples (another one can be found in the last sentence of this footnote). Perhaps, as Smith suggests, there is a 'meta-rule' determining the rule of use in a given situation. I shall say nothing about this; my concern here is only with 'standard' uses.

7. Egocentric Terms

The special psychological role of indexicals is connected with the fact that indexicals carry implications about the relation between the thinking subject and the designation of the indexical. This is brought out by David Lewis's (1979) example of two gods, each of whom knows exactly which possible world they are in but neither of whom knows who, where or when they are within that possible world. None of their beliefs are indexical. In order to acquire indexical beliefs they would have to locate themselves within the world. That is to say, they would have to discover which *centred* world they were in (a centred world is one in which the thinking subject is marked as the 'centre'). Lewis concludes that to have a belief is to ascribe to oneself the property of occupying one of a specific set of centred possible worlds.

According to the theory I am advocating the egocentric term, in effect, does the centring. To believe that a place is H_{Psych} is to place oneself, or more precisely a temporal part of oneself, in a certain relation to that place (the temporal part in question is at that place). The advantage of putting matters in terms of temporal parts becomes apparent when we consider temporal indexicals. One is located at many different times but one's temporal parts are not; so when one thinks of a time as *now*, *five minutes ago* etc. one places a temporal part of oneself (the one entertaining the thought) in a certain temporal relation to a time.[16] To think of a person as *I* is, in effect, to identify a temporal part of oneself with a temporal part of the person of whom one is thinking.

It is sometimes possible to think of the relation between oneself and the reference explicitly, particularly in spatial cases. When thinking of a place as 'here', for example, one is usually aware that it is the place where one is currently located. One expresses this using the first person, which gives the thought a special psychological role not shared by the thought that the place in question is where S is currently located (where 'S' is a name for the subject). But if the present account applies to the first person as well as spatiotemporal indexicals then on pain of circularity not all egocentric terms can contain the first person. In fact it is not plausible that thoughts expressed using other indexicals

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[16] In putting things this way I am making assumptions about temporal metaphysics that are not uncontroversial. Terminological variations consistent with different views in temporal metaphysics (the endurance view, the A-theory, etc.) could, however, be adopted without very substantial changes to the account of indexical thoughts. The present way of putting things just makes matters clearer (though I do, as a matter of fact, believe the assumptions to be the correct ones).

can always be reduced to first person thoughts. Consider the content of spatial perception, for example. Each place is represented in perception as having a specific egocentric property (*here*, *straight in front*, *nearby to the left*, etc.) yet it is clear that this does not require the subject to be explicitly represented in the perception (an invisible person can have the same experience). One can judge which egocentric property a place has by paying attention only to the place; one does not have to look to see where the place is in relation to one's body. It is not even clear that one *could* locate places in this way; there would be little point in knowing that an object was to the right of one's body if one did not already know which direction that was (cf. Evans, 1982, pp. 153-157 and Campbell, 1993, pp. 71-76; 1994, pp. 8-16. The point just made is not in conflict with the possibility of learning the use of the *word* 'right' by being shown which side of one's body it applies to).

It is also questionable whether temporal indexical thoughts could be reduced to first person thoughts because, as mentioned above, persons exist at many times. It seems, in any case, implausible that temporal indexical thought generally involves any such articulation.[17] It is more plausible, then, to think of indexical thoughts as generally involving unstructured egocentric components (terms such as H_{Psych}, *near*, *midstraight*, *present* etc.), some but not all of which are understood by the subject as extensionally equivalent to certain first person articulations.[18]

John Perry (1986) provides some apparatus that can be used to make these claims a little more precise. Perry suggests that thoughts sometimes contain *unarticulated constituents*.[19] An utterance at time t in place p of 'it is raining' expresses the proposition *rain* (t, p) even though no part of the utterance designates p; hence p is an unarticulated

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[17] Advocates of the A-theory of time hold that properties like *pastness* and *presentness* are intrinsic properties of times rather than relational properties. If this is correct then the temporal equivalents of '*H*' pick out intrinsic properties rather than relations; otherwise the theory is unchanged. Quentin Smith (e.g. 1990, 1993) has argued for the A-theory by arguing for a view of temporal indexicals that has in common with the present one that temporal indexicals ascribe properties such as pastness and presentness. It seems to me, however, that a further argument is needed in order to show that the properties in question are intrinsic rather than relational (especially since, as I argue below, it is easy to explain why the properties in question might *seem* to be intrinsic). For more on the issue see Oaklander and Smith, 1994; Mellor, 1998 and Le Poidevin, 1998. For an argument against the A-theory that does not depend on assumptions about indexicals see Prosser, 2000.

[18] Cf. John Campbell (1998, pp. 130-1), who argues that there must be a 'two-stage construction' involved in understanding others, involving both monadic and relational notions in order to picture what it would be for one's own monadic notions to be someone else's.

[19] John Campbell (1993, 1994, 1998) has made use of a similar idea; see his discussions of monadic and relational notions and the notion of *causal indexicality*. See also Shoemaker, 1994, p. 28.

constituent of the utterance. Perry suggests that thoughts can also contain unarticulated constituents. Consider someone who remains permanently at p and never thinks explicitly about places. Such a person would have no use for articulated thoughts about places. If they thought 'it is raining' it would seem to them that rain was a property only of times, not of places. Yet the thought would be true if and only if it rained at t and p. In Perry's terminology, such a person entertains a propositional function *rain* (t) (in this case a function from places to propositions) that yields the proposition *rain* (t, p) because it is entertained by a subject in place p. Similarly, before the discovery of relativity theory people thought of simultaneity as a two place relation between events. In fact, without realising it, they entertained a two place propositional function that yielded a proposition about two events and a frame of reference.

Consider now H_{Psych} being predicated of a place. The subject entertains a propositional function H_{Psych} (p) that yields the proposition H_{Psych} (p, S_t), where 'S_t' is the temporal part of the subject at time t. This is the proposition that S_t is located at p. If one wished to avoid temporal parts one could replace the proposition H_{Psych} (p, S_t) with H_{Psych} (p, S, t). One might also prefer to replace the propositional function H_{Psych} (p) with H_{Psych} (p, t); but the principle would be the same. What matters is that the subject is an unarticulated constituent of many of her own indexical thoughts (and many of her perspectival experiences). The propositional functions, I suggest, have a special psychological role not shared by the equivalent articulated propositions (though articulation in terms of the first person, in those cases in which this is possible, may come close). These are the thought components that make indexicals 'essential' (Perry, 1979).

If it is applicable to the first person, the account implies that first person thought involves entertaining a propositional function I (S_t) that yields, presumably, the proposition that S_t is identical with the temporal part at t of a certain person. This may sound rather trivial but perhaps that is what we should expect; the proposition, after all, plays only a 'centring' role and does not convey substantive information. The propositional function I (S_t), however, has a special psychological role not shared by the corresponding articulated proposition. It is, of course, necessary to account for the unity of the self over time. Perhaps the fact that the same propositional function is entertained at all times, even though it concerns different temporal parts of S at different times, gives

rise to an illusion that the very same particular exists at many times (this would be a special case of the need for a temporal parts theorist to account for the impression that the same object is wholly present at many times).

We can now see that the present account has some similarities to Lewis's (1979) account. According to Lewis propositional attitudes are attitudes *de se*; they involve the self-ascription of properties. In particular, to have a belief is to self-ascribe the property of inhabiting one of a certain set of centred possible worlds. The present account says that attitudes expressed using indexicals involve relational beliefs about the thinking subject, who may be an unarticulated constituent of the belief state. Hence, in effect, the subject self-ascribes properties but may not be aware of self-ascribing them. To my mind, the notion that the subject may be unaware of the self-ascriptive element makes Lewis's way of putting things seem more plausible.

Finally I should make some remarks about the role of the egocentric nominal terms in indexical communication. Believing that a place is *here* (i.e. that it is H_{Psych}) is usually necessary in order to believe that it is the place that would be referred to by an uttered token of 'here' (i.e. that the place is H_{Ling}). So indexical thought and indexical communication generally match up (though there can be exceptions such as tokens of 'here' uttered in one's sleep). Now, suppose that Smith says 'it is F here' to Jones, who is located within the same region, p. Jones understands and believes what Smith says. So Smith and Jones share the belief that p is F. They also share the belief that p is where the token of 'here' was uttered; that is, they both believe that p is H_{Ling}. The latter shared belief plays a crucial role in indexical communication. But do Smith and Jones also share a common belief 'p is H_{Psych}'? No; for in Smith's case the property ascribed by 'H_{Psych}' is a relation between Smith and p whereas in Jones's case it is a relation between Jones and p. But what about the propositional *functions* entertained by Smith and Jones, in which the subject is unarticulated? Whether these are shared depends on how we individuate them. One option would be to say that the relevant propositional functions pick out whatever individual entertains them; in which case, for example, Smith and Jones both entertain the same propositional function $H_{\text{Psych}}(p)$ which yields the different propositions $H_{\text{Psych}}(p, \text{Smith}_j)$ and $H_{\text{Psych}}(p, \text{Jones}_j)$. This would capture the sense in which there is something common to the thoughts of different speakers using the same indexical. It would also explain the temptation to think that Smith and Jones ascribe the same

property to a time when they simultaneously describe it as *present*. Those who have found the two-level Kaplan-Perry view appealing will probably prefer this option. The other, perhaps more Fregean option would be to think of the propositional functions as having a particular subject built into them. Perhaps the notion of a function would not really be appropriate on this view; rather, we should say that Smith and Jones entertain different unstructured MOPs of the same type.

In any case, the present account makes possible an account of indexical communication in a broadly Fregean spirit because even though different speakers differ in respect of the property ascribed by the nominal term there is no obvious reason why the singular MOP could not be shared even by speakers in different contexts. This is the interpersonal equivalent of the dynamic view.

8. The Role of Perception

Philosophers often think of demonstratives as paradigmatically referring to perceived entities (even memory demonstratives typically relate to earlier perceptions). Indexical thoughts expressible using terms such as *I*, *here* or *now*, on the other hand, are possible even in sensory deprivation (Evans, 1982, pp. 161).

It would be a mistake, however, to believe that there are genuine differences between indexicals and complex demonstratives relating to the role of perception. It is true that many demonstrative thoughts are only possible while the thinker perceives the reference; in many cases perception provides the only means available to the subject for distinguishing the object thought about from others in the vicinity (consider a thought about *that sheep* concerning just one of a flock of qualitatively indistinguishable sheep). But a complex demonstrative can be independent of perception if it has a nominal term specific enough to pick out just one individual from the relevant domain, as in Jeffrey King's (2001, p. 3) example (said after hearing that there was precisely one student who scored one hundred in the exam):[20]

> (13) That student who scored one hundred on the exam is a genius

There seems to be no reason, in fact, why the very same complex demonstrative could not be used either perceptually or non-perceptually depending upon the circumstances. This, I suggest, is the case with indexicals; the nominal term determines a unique reference because only one place is currently *here*, only one time is *present*, and so on. Sometimes (when the subject is keeping track perceptually) the subject perceives the reference and refers to it qua perceived item (and is able to judge from the perception which egocentric property it has). But on other occasions (when the subject is keeping track non-perceptually) the reference is thought about qua unique satisfier of the nominal term. The latter kind of thinking is analogous to a use of Kaplan's (1978, 1989, 1989a) 'dthat' operator (in its demonstrative-surrogate guise (Kaplan, 1989a, p. 579)).

If one were to ignore the possibility of non-perceptual tracking it might appear that an alternative theory was possible, according to which keeping track perceptually involves a singular demonstrative MOP ('*that*') and a singular indexical MOP simultaneously. As the subject moves relative to the place the singular demonstrative MOP is retained while the singular indexical MOP changes. Thus it would be possible to retain the perceptual/non-perceptual distinction between demonstratives and indexicals, and indexicals need not be construed as complex demonstratives.

This theory will not work, however. Firstly, it is not clear how it could account for non-perceptual tracking. The arguments for the dynamic view apply equally to perceptual and non-perceptual tracking. In non-perceptual cases the proposed alternative theory would therefore require two different non-perceptual singular MOPs at once. It is hard to see what would motivate such a theory; and it is also hard to see what would distinguish the two singular MOPs epistemically from one another. In any case, secondly, the proposed theory cannot account for the retention of predicates though context changes without collapsing into the complex demonstrative view (regardless of whether the tracking is perceptual or not). In order to get from 'it is F there' to 'it is F here', for example, the subject would require two identities: 'that = there' at t_1 followed by 'that = here' at t_2 (where 'that' expresses the putative retained demonstrative MOP). But how is the subject to judge that the second identity holds? In order to judge that a perceived place is identical with an egocentrically identified place one must judge that the

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[20] King argues for non-perceptual cases at some length. One does not have to accept his quantificational

perceived place has the egocentric property of the egocentrically identified place (i.e. one must judge that the perceived place has the property of being H_{Psych}, or close and to the left, etc.). Hence in order to judge that 'that = here' at t_2 the subject would need to have judged that 'that is H_{Psych}'. But this collapses into the complex demonstrative view; the putative indexical MOP is redundant.

9. Consequences and Conclusions

The problem of cognitive dynamics was originally raised by Kaplan:

> 'Suppose that yesterday you said, and believed it, "It is a nice day today." What does it mean to say, today, that you have retained *that* belief? It seems unsatisfactory just to believe the same content under any old character – where is the *retention*?…Can we only *retain* beliefs presented under a fixed character?' (1989, pp. 537-8).

By 'fixed' character Kaplan means 'non-indexical'. The above arguments suggest that there is a problem with Kaplan's theory and indeed any theory that individuates indexical thoughts in a similar way. Consider Recanati's theory, for example. According to Recanati (1993, chapter 7) the psychological MOPs for indexicals are individuated in terms of special purpose dossiers of information. Each indexical term corresponds to an 'egocentric category' for which there is a buffer whose contents consist of information received in a particular way. The buffer for 'here', for example, contains information gathered from the current location of the subject. During an episode of indexical thinking an 'egocentric concept' (the psychological MOP expressed by a token of an indexical) is constituted by a dossier containing the information in the buffer at that time. When the subject moves to a different location, however, the buffer gathers information from a different location and the original egocentric concept is lost. The contents of the dossier might then be transferred to a different dossier but this will

theory of complex demonstratives in order to accept this point.

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correspond to a different MOP. Recanati's view is therefore inconsistent with the dynamic view.

Consequently Recanati's view, along with views expressed by Kaplan, Perry and numerous others, cannot be quite right. Nothing that has been said here implies, however, that there is anything fundamentally wrong with the content/character framework itself or with the general principles of two-dimensional semantics, of which Kaplan's view can be seen as an example. But at the very least an adjustment must be made concerning indexicals (the character of an indexical must be seen as structured, for example).

The dynamic view requires supplementation by an account of singular MOPs that are not individuated in terms of anything that is specific to just one indexical term. There are many possibilities. Someone who thinks of the attitudes purely in terms of a language of thought, for example, can simply say that in a transition between indexicals there is a symbol that is retained while another symbol is exchanged. Alternatively (or perhaps in addition) one might adopt a causal chain theory in which the same causal chain could be traced back through the series of different indexicals. The causal chain could be seen as the primary intension in a two dimensional modal semantics.[21] Before finishing, however, I shall very briefly outline what I think is a more promising account of the singular MOPs involved in indexical thought, though I stress that none of the argument up to this point depends on this account being correct. In my opinion Kaplan made a move in the right direction when discussing names:

> 'If words are properly individuated, by their world histories rather than by their sound or spelling, a name might almost serve as its own Fregean *Sinn*. The linguistic difference between "Hesperus" and "Phosphorus" - the simple difference between thinking of Venus qua *Hesperus* and thinking of it qua *Phosphorus* - may be all the difference in mode of presentation one needs in order to be able to derive the benefits of sense and denotation theory. Words are undoubtedly denizens of cognition. If, through their history, they also provide the worldly link that determines the referent, then except for serving as content, they

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[21] David Chalmers (2002) has suggested (though not endorsed) the possibility of a causal chain acting as the primary intension in a two dimensional theory of the semantics of names.

do all that Fregean *Sinn* is charged with. But they do it off-the-record, transparently and nondescriptively' (1989a, p. 599).

Kaplan subsequently provided an account of the metaphysics of words in which token utterances and inscriptions are regarded as '*stages* of words, which are the *continuants* made up of these interpersonal stages along with some more mysterious *intra*personal stages' (1990a, p. 98). According to Kaplan the spelling and pronunciation of a word can change over time; what makes it the same word is the intention of the speaker to continue to produce the same word and the intention of each new speaker to utter the word that was uttered to them. A word is created at a spatiotemporal location and can subsequently cease to exist. Propositional attitudes containing names are individuated in relation to the words they contain.

This account will not serve our purposes as it stands because different members of a series of indexicals cannot plausibly be construed as different temporal stages of the same word. Tokens of 'here' and 'there' are manifestly tokens of different words. But perhaps we can think in terms of *concepts* that are not tied to a particular word in a spoken language but are nonetheless individuated in roughly the way that Kaplan thinks words are individuated.[22] In terms of Kaplanian words, one might think of a concept as corresponding to a token of 'that' contained in the analysis of an indexical as a complex demonstrative; but the token is never articulated in speech because of the truncated linguistic expression of an indexical (perhaps something similar would have to be said about other complex demonstratives). When Smith starts thinking indexically about a place, p, a new concept is created. This can be thought of in terms of a dossier of information about p; the information in the dossier constitutes Smith's set of beliefs about p. Smith's ability to keep track ensures a stable epistemic relation to p so that new information added to the dossier normally concerns p. The concept is retained through changes of context provided Smith keeps track. If Smith loses track of p and has no

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[22] There is a point of contact here with Stalnaker's (1999, 2001) 'metasemantic' version of two-dimensional semantics. Stalnaker construes cognitive significance in terms of the *diagonal* proposition: roughly, the proposition that the uttered sentence token is true. It seems to me that if the uttered sentence token is to be individuated (across worlds or times) just in terms of the word tokens that compose it then Stalnaker's proposal will fail to give the right account of cognitive dynamics. But if the proposal were re-expressed in terms of token *thoughts* (composed from concepts individuated as described above rather than words) then Stalnaker's view would be compatible with the view expressed here.

backup means of identifying it then the concept is lost.[23] Jones can share Smith's concept provided Jones intends to reproduce Smith's concept; this is analogous to a Kaplanian sharing of words. Jones need not know what a concept is in order do this; just intending to preserve Smith's reference and acknowledging Smith's authority about what the reference is will suffice. Concepts thus construed may seem like suspiciously abstract entities, but they are no more abstract than Kaplan's words and certainly no more abstract than symphonies, poems or philosophical works (which arguably can also be thought of as being created or ceasing to exist at particular times).

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[23] This view also has similarities with Evans's (1985, pp. 310-1) account of perceptual demonstrative

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