

# Parts and Counterparts

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**Abstract.** Ordinary objects – people, planets, tables and rivers – exist at various worlds, times and places. But what does that mean? One account says that things exist at other worlds, times and places by having *parts* at these worlds, times and places. Another says that they have *counterparts* there. I argue that these two accounts are one and the same.

## 1 Extensions

The Yangtze extends all the way from the Geladandong region in Tibet to the East China Sea at Shanghai. In this sense, the Yangtze exists at many different places. The Yangtze also exists at many different times, in the past and in the future. And it exists at other possible worlds, at worlds for example where the Three Gorges Dam has been prevented.

The spatial, temporal and modal extension of objects is not settled by linguistic conventions insofar as we cannot make the Yangtze disappear tomorrow simply by changing our language. But it is a matter of convention that “the Yangtze” denote an object with this particular extension. In local Chinese, the name is used for only the lower reaches of the Yangtze. We could even have used it for the mereological fusion of the lower reaches of the Yangtze with the upper reaches of the Amazon.

Whereas the extension of objects like rivers and nations is to some degree explicitly regulated, there rarely exist official documents on the demarcation of other objects like tables and people. When a child is baptised, nobody cares to explain that what gets baptised is neither the child’s head nor the child plus the upper reaches of the Amazon. Such an explanation is unnecessary because all parties know that *a person* is being named, and these other candidates, though suitably placed at the ceremony, are not persons. The kind *person* (unlike the kind *object*) largely determines the extensions of its instances: only objects with specific spatial, temporal and modal boundaries are rightly called “person”. These restrictions make it possible for us to meaningfully ask whether the person in front of us is the same as a person we met at another place and time.

A common and fruitful way to understand this question assumes that there is something *x* wholly located in front of us now and something *y* wholly located at the other

place and time. The question is then whether  $x$  and  $y$  are suitably related. What “suitably related” means depends on the relevant kind. For persons, psychological continuity between earlier and later stages is important (cf. [Parfit 1971]), but not for rivers and tables.

There may not always be an informative description or analysis of the ‘suitable relation’ associated with a given kind – let’s call it (following Parfit) the *R-relation* for that kind. Some hold that whether a person at another world is the same as the person in front of us is not determined by the distribution of qualitative properties in the two worlds, but rather by non-qualitative *haecceities*. If so, sharing of haecceities is what constitutes the *R-relation* for persons, or at least its modal dimension.

It is likely that spatial, temporal and modal extension are often determined by very different criteria. Psychological continuity matters for the temporal, but hardly for the spatial extension of persons: my liver is not psychologically continuous with my left foot. So perhaps one should speak of *three R-relations* associated with a given kind. When I point at the Yangtze in Geladandong, the *river* I point at also exists near Shanghai in 1879 at another world  $w$  because the object wholly located where I point at stands in the relevant *spatial R-relation* to other objects which together stand in the relevant *temporal R-relation* to further objects which together stand in the relevant *modal R-relation* to yet further objects one of which is wholly located near Shanghai in 1879 at  $w$ .

I do not assume that there is always a precise, determinate *R-relation* for every kind. Perhaps there is no fact of the matter where precisely the Yangtze ends and the East China Sea begins, or where Theseus’ ship is at the end of the story, or whether some person brought by a stork at another possible world is Saul Kripke.

I also do not assume that *R-relation* is transitive or symmetric (though I assume that it is reflexive). Perhaps when I point at the Yangtze in Geladandong, “this river extends all the way to the East China Sea” is determinately true, whereas, pointing at the river near Shanghai, “this river extends all the way to Geladandong”, is not determinately true. After all, the Yangtze has other sources outside Geladandong which could just as well be selected as the river’s official origin.

## 2 Parts

I haven’t said yet what it *means* for an object to exist at a certain place, time or world. What do I mean when I say that the Yangtze exists in Geladandong? Do I mean that the entire, 6300 km long Yangtze is wholly located inside that region? Probably not. Only a *part* of the Yangtze is located there.

Let’s call this view, which is not very controversial, *Spatial Fusion Theory*. According to Spatial Fusion Theory, the Yangtze is a mereological fusion of things located at different places. The view can just as well be applied to temporal and modal extensions, yielding the more controversial *General Fusion Theory*. According to General Fusion Theory, the Yangtze exists at other times and worlds also by having parts located wholly and only at these times and worlds. Hence if you’ve traveled all the way from Geladandong to the East China Sea, you have only seen a tiny part of the Yangtze; you

have not seen its past and future parts, nor its many other-worldly parts.

If the  $R$ -relation is an equivalence relation, we can say that things are maximal fusions of parts that stand to one another in the  $R$ -relation for the relevant kind. If the  $R$ -relation is not an equivalence relation, we should probably instead say that things are maximal  $R$ -interrelated fusions:  $x$  is a *maximal  $R$ -interrelated fusion* if a) any atomic parts of  $x$  are either  $R$ -related or inversely  $R$ -related to one another, and b)  $x$  is not a proper part of any object satisfying (a).

Three temporal examples: 1. Fred fissions into Fred<sub>1</sub> and Fred<sub>2</sub>. The (atomic) parts of both Fred<sub>1</sub> and Fred<sub>2</sub> are  $R$ -related to the earlier parts of Fred, but not to one another. So there are two maximal  $R$ -interrelated fusions containing Fred, one of which also contains Fred<sub>1</sub> and the other Fred<sub>2</sub>. Presumably it is indeterminate which of the two we speak of when we ask, before the fission, what will happen to Fred tomorrow. There is no maximal  $R$ -interrelated fusion containing both Fred<sub>1</sub> and Fred<sub>2</sub>. So after the fusion, when we meet Fred<sub>1</sub>, the person we meet is not simultaneously located at Fred<sub>2</sub>'s place.

Example 2. Fred is a time traveler meeting his younger self. This time, the two co-present Fred stages are  $R$ -related to one another. There is no ambiguity in who we mean by "Fred": we determinately mean a fusion that has both stages as parts. Fred *is* simultaneously located at two different places.<sup>1</sup>

Example 3. Fred lives so long and changes so much during his long life that we don't want to say that the person who eventually dies is the person in front of us now (cf. [Lewis 1976: 65ff.]). The dying stage is not part of the fusion we refer to by "this person" because it is neither  $R$ - nor inversely  $R$ -related to the present stage. In this case, the stage in front of us belongs to many different maximal  $R$ -interrelated fusions, and it is probably indeterminate which of them we mean by "Fred".

So on General Fusion Theory, "existing at" means "having a part at". What about "being such-and-such at"? The Yangtze, for example, is clean in Geladandong and heavily polluted near Shanghai. General Fusion Theory provides a simple analysis: that the Yangtze is clean in Geladandong means that it has a *part* in Geladandong which is clean. Similarly, that I am now bent means that my current temporal part is bent; that Socrates is actually a philosopher means that his actual part – the (maximal) part of Socrates located in our world – is a philosopher.

This is the basic idea. But there are some complications.

First, *intensionality*. Consider "at time  $t$ , Fred is 35 years old". This is true despite the fact that Fred's temporal part, or stage, at  $t$  is not 35 years. In the other direction: even though Fred's stage at  $t$  is less than a minute old, "at  $t$ , Fred is less than a minute old" is false.

One might suggest that Fred's  $t$ -stage is 35 years old in the derivative sense of being the last part of a fusion extending over 35 years. But not only is this a very odd sense

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<sup>1</sup> Unlike the other two examples, it is not obvious how this kind of situation looks like in the spatial and modal dimension. In space, imagine a long road that leads through a little village, turns round far outside the village and leads back through another part of the village (cf. [Sider 1996: §III]). In modality, similar cases arise if it is possible for one object to be another object *in its own world* (cf. [Lewis 1986: 231ff.]).

of being 35 years old, it also applies to far too many things. Almost anything is at the end of some gerrymandered fusion extending over 35 years. More importantly, we want “Fred’s  $t$ -stage is 35 years old” to be *false*, not true. So with predicates like “is 35 years old” it can happen that “at  $t$ ,  $x$  is  $F$ ” is true and “at  $t$ ,  $y$  is  $F$ ” is false even though  $x$ ’s stage at  $t$  is the same as  $y$ ’s stage at  $t$ . I will therefore call such predicates *intensional*.

Whether an intensional predicate applies to an object at a given place, time and world depends not only on the properties of the object’s stage at that place, time and world, but also on parts the object has elsewhere. “is 35 years old” applies to Fred at  $t$  if Fred has 35 years of parts before  $t$ ; “is essentially two-legged” applies to Fred at our world if his (maximal) parts at other worlds are all two-legged.

Second, *multiplicity*. I have already mentioned that when Fred fissions into Fred<sub>1</sub> and Fred<sub>2</sub>, it is indeterminate which of the two maximal  $R$ -interrelated fusions we call “Fred”. “Fred is such-and-such” should then probably be regarded as true iff *both* fusions satisfy the predicate. But what if Fred is a time traveler meeting his younger self? We want to say that at that time, he still has only two arms and weighs less than 100 kg, even though the fusion of his parts at that time (and world) has four arms and weighs over 100 kg.

So here we have to look at the weight of certain *proper parts* of Fred’s timeslice. But surely not any old part counts, otherwise it would also be true that Fred weighs only 10 grams. The eligible parts can probably be characterized by looking at the different components of the  $R$ -relation: the two co-present Fred stages are related to one another by psychological continuity, not in the way my liver is related to my left foot; that is, they stand in the *temporal*  $R$ -relation for persons.

At any rate, the Fusion Theoretical analysis now looks something like this: “at  $t$  [ $w$ ,  $p$ ],  $x$  is  $F$ ” is true iff the fusion denoted by  $x$  has some maximal eligible part located at  $t$  ( $w$ ,  $p$ ) which (perhaps with a little help from other parts) satisfies  $F$ . One could instead require *all* relevant eligible parts to satisfy  $F$ , but it seems to me that if time-traveling Fred kicks his younger self, then Fred both kicks and gets kicked.<sup>2</sup>

Next, *counting*. Return to the fission case. Isn’t it intuitively false that if Fred will fission tomorrow, there already are already two persons in Fred’s room now? Isn’t it false that Fred’s mother gave birth to two children the day she gave birth to Fred?

Lewis [1976: 63f., 1986: 218f.] suggests that in such cases we do not count persons ‘by identity’, but rather by their present stages. As long as both Freds share their current stage, we count them as one. This delivers the correct result, but it seems implausible that we really count in such a peculiar way.<sup>3</sup>

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<sup>2</sup> Time travel being rare, our language probably leaves many questions about its correct description open. For example, could both Fred stages truly say “I am kicking myself”?

<sup>3</sup> Lewis agrees, but points out that “peculiar cases have to get described in peculiar ways” [1986: 219]. He takes this to be an argument against *General Fusion Theory*: if people were trans-world fusions, we would almost always peculiarly count several people as one, for almost all people doubly exist at some world. (Even if Fred does not actually undergo fission, he *could have*.) However, it is not clear why the frequency of actual cases should be relevant here (cf. [Sider 1996: §IV], [Weatherson 2000: §7]). Moreover, as Lewis [2004] admits, on some interpretations of quantum mechanics, fission is in fact very common and widespread. In the other direction, Cresswell [2004] argues that there is no good reason to believe that things are ever multiply located at other worlds.

However, if one carefully applies the Fusion Theoretic semantics, I think the situation does not look that odd any more: on Fusion Theory, “at  $t$ ,  $x$  bears relation  $F$  to  $y$ ” is (in easy cases) true iff the  $t$ -stage of  $x$  is  $F$ -related to the  $t$ -stage of  $y$ . So “at  $t$ , Fred<sub>1</sub> = Fred<sub>2</sub>” is *true*, and we need not introduce any special and implausible rule for counting: in the scope of “at  $t$ ”, counting ‘by identity’ *is* counting stages.

Finally, *other modes*. According to General Fusion Theory, “Fred is such-and-such” is true iff the whole trans-world fusion denoted by “Fred” is such-and-such, but “at  $t$  [ $w,p$ ] Fred is such-and-such” is true iff some eligible Fred-part located at  $t$  ( $w,p$ ) is such-and-such. It follows that “Fred is such-and-such” is not equivalent to “at present, Fred is such-and-such”. In other words, the Fusion Theorist’s copula is not tensed, it is not restricted to the present, nor to the here and the actual: “Fred is such-and-such” is not equivalent to “at the actual world, Fred is such-and-such” or to “at this place, Fred is such-and-such”. But we often use these interchangeably. (For the spatial case, imagine that Fred is a long wall painted white in our village and red elsewhere. Then in our village, we can truly say that Fred is white.)

So a Fusion Theorist should accept additional, more egocentric readings (or modes) of these sentences. For example, she could say that often our sentences are interpreted as if prefixed by “at the present time” or “at the actual world”.

### 3 Counterparts

Counterpart Theory is an alternative to Fusion Theory. Its best known version is David Lewis’ [1968, 1986: ch.4] *Modal* Counterpart Theory, on which ordinary objects have *counterparts*, rather than *parts*, at other possible worlds. Ted Sider [1996] defends a *temporal* version on which things have counterparts at other times. *General* Counterpart Theory, which to my knowledge no-one has ever defended (nor even described), carries the idea further to spatial extensions. According to General Counterpart Theory, ordinary objects are unextended mereological atoms existing at other places, times and worlds only in virtue of having (equally unextended) counterparts there.<sup>4</sup>

What are the counterparts of a given atom? That largely depend on the kind under which it is considered (cf. [Lewis 2003]). When I point at some Yangtze atom in Geladandong and say “that river”, all atoms that stand to the atom I point at in the  $R$ -relation for rivers are its counterparts. The counterpart relation for rivers is simply the  $R$ -relation for rivers.

A note on terminology: I do not assume that a counterpart relation is a relation of qualitative similarity. My liver is not particularly similar to my left foot, nor is my present stage to my very early stages. And even in modality, I still don’t rule out that who I am at another possible world is determined by non-qualitative haecceities.

So “existing at” means “having a counterpart at”. Likewise, “being such-and-such

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<sup>4</sup>In fact, it is not essential for General Counterpart Theory that ordinary objects are mereological atoms (things without proper parts), nor that they are absolutely unextended. With at most a few minor variations the theory can also be applied to things that consist of atomless gunk or small but extended atoms.

at” can be understood as “having such-and-such a counterpart at”. Thus on Lewis’s account, “Humphrey wins the election at world  $w$ ” is true iff Humphrey’s counterpart at  $w$  wins the election; and on Sider’s account, “I was bent 24 hours ago” is true iff my counterpart at that time is bent.

As before, complications arise.

*Intensionality.* The current analysis only works for extensional predicates. If Fred is a timeslice, how can he be 35 years old? If he is an unextended atom, how can he be 1,80 m large? These properties primarily belong not to Fred (the atom) but to certain fusions of his counterparts: the fusion of his (actual) past counterparts spans 35 years, and the fusion of his (actual) present counterparts spans 1,80 m. In Counterpart Theoretic semantics, intensional predicates do not simply map atoms (or stages) to truth values, but atoms-*qua*-kind, or atoms together with their counterparts.

*Multiplicity.* If due to fission or time travel Fred has two stages at  $t$  which together weigh more than 100 kg, we nevertheless want to say that Fred weighs less than 100 kg at  $t$ . So weight predicates do not always express properties of maximal fusions of co-present counterparts. Rather, they express properties of maximal fusions of *R-interrelated* counterparts. This solves the fission cases, but not the time travel cases. For those, we can borrow our previous solution: weight predicates express properties of *eligible R-interrelated* counterpart fusions.

*Counting.* Notice that Counterpart Theory does not have Fusion Theory’s (apparent) problems with counting: if persons are timeslices, there is only one person in Fred’s room now, no matter that he fissions tomorrow.<sup>5</sup> On the other hand, if persons are atoms rather than timeslices, far more than just two people are in that room now. Similarly, if persons are timeslices, infinitely many persons have been in Fred’s room during the last hour; and if they are world-bound, the worlds in which Fred is the only person together contain not one, but infinitely many persons. (Notice that in these cases, it is the Fusion Theory which immediately delivers the correct result.)

But again, the problems look less severe if one consequently applies the Counterpart Theoretic semantics: if Fred has a counterpart at  $t$ , then “Fred exists at  $t$ ” is true, as is “at  $t$ , there exists a person identical with Fred”. So the following is also true: “at any time  $t$  of the present day, whenever there is a person in Fred’s room at  $t$ , that person is identical with Fred”. And that is arguably enough for “there is only one person in Fred’s room today” to be true.<sup>6</sup>

*Other modes.* According to Counterpart Theory, ordinary objects, though existing

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<sup>5</sup> This is one of Sider’s [1996] main arguments for Temporal Counterpart Theory. He also mentions spatial cases which show that (in some contexts), roads should be regarded as small road segments (though not quite point-sized segments). Sider does not explicitly endorse General or spatial Counterpart Theory, but I think he should. Otherwise he has to say that (in these contexts), “no two cities are connected by a road” is true.

<sup>6</sup> Sider suggests that “Fred” sometimes denotes a large fusion and sometimes a small spatial segment of a time-slices. This radical change of meaning seems odd to me, and also too costly to account for the data. Moreover, what should vary is not only the reference, but the entire semantics. For suppose the semantics is always the fusion semantics. Then if in some contexts, only time-slices count as “person”, “some persons already existed yesterday” will be false, as no part of a timeslice existed yesterday.

at many places, times and worlds, are strictly speaking only located at a single point. At which point of the many where they exist? Consider Modal Counterpart Theory: Which world-bound individual does Lewis assume “Humphrey” denotes? the *actual* Humphrey, of course. Similarly, on Sider’s theory, “I” denotes my *present* stage. So in *General* Counterpart Theory, we should say that our terms denote atoms located at the place, time and world of the term’s utterance.<sup>7</sup> Hence “the Yangtze exists” is true only if uttered somewhere inside the Yangtze, where “the Yangtze” denotes some Yangtze atom located at the place, time and world of the utterance. In effect, “the Yangtze is such-and-such” is equivalent to “the Yangtze is actually now here such-and-such” (with a very strict interpretation of “here”).

But we sometimes want to talk about things located elsewhere. A Counterpart Theorist should therefore accept other, less egocentric, readings (or modes), on which “the Yangtze is such-and-such” can be true even if uttered outside of the Yangtze. In such a mode, “the Yangtze” is presumably indeterminate between all relevant Yangtze atoms, for instance between all actual and present Yangtze atoms (cf. [Sider 1996: §VII]).

## 4 Further Possibilities

Before I continue my discussion of General Fusion and Counterpart Theory, I should mention that these are not the only possible answers to the question what it means for something to exist or to be such-and-such at a certain place, time or world.

For one, the two strategies can be mixed. Thus Lewis holds that ordinary objects exist at other places and times in virtue of their parts, but at other worlds in virtue of their counterparts. So on Lewis’s account, “at time  $t$ , I am bent” is true if I have a bent part at  $t$ ; but “at world  $w$ , I am a bent” is true if I have a bent counterpart at  $w$ .

But completely different answers are also possible. For example, one can hold that other places, times and worlds are not *real* places, times and worlds – hosting real people and rivers –, but rather some kind of abstract representations. To ‘exist at’ such a representation means being abstractly represented as existing. Or one can say that ordinary objects are somehow located in their entirety at all the places, times and worlds where they exist, in the way Aristotelean universals are supposed to be wholly present in each of their instances. Or one can simply deny that things exist at other places, times and worlds. If it is not true that at some world I am rich, no account has to be offered about what makes that true.

Arbitrary combinations of these positions are also possible. Ted Sider for example combines (a special kind of) abstractism about worlds with Counterpart Theory about times and Fusion Theory about places; most ‘three-dimensionalists’ mix abstractism about worlds with a multi-location theory about times and Fusion Theory about places; presentists usually endorse abstractism with respect to worlds and times and Fusion

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<sup>7</sup>I assume for simplicity that utterances take place at a single point in space and time. In reality, the denotation of our terms will be a little indeterminate. (Perhaps a more complicated rule is needed for situations in which several counterparts are time-travel style co-located at the point of utterance. Imagine an unextended angel who travels back in time to the same place where he had been before, and now says, “I was here before”.)

Theory with respect to places; [Prior 1968] sketches some kind of abstractism about everything; and so on. There are 620 further possible combinations, most of which still await defence.<sup>8</sup>

Now back to Fusion and Counterpart Theory.

## 5 Two Theories or One?

Alvin Plantinga [1974: 115f.] and Saul Kripke [1980: 44f.] once objected that by denying that ordinary things exist at other possible worlds, Lewis's Counterpart Theory has intuitively absurd consequences. But, as Hazen [1979: 320-324] and others have observed, these objections rest on a misunderstanding. Counterpart Theory does not deny that ordinary things exist at other worlds. It rather is an analysis of what existing at another world means: Humphrey (*he himself*) exists (*identically*) at another world  $w$  iff he has a counterpart at  $w$ .

Granted, this analysis is not immediately obvious. But this is also true for all prominent alternatives. For instance, on Plantinga's abstractism, Humphrey exists at  $w$  iff the abstract representation  $w$  is such that if it had the inexplicable property of obtaining, then Humphrey would exist. But, one might echo Kripke, probably Humphrey could not care less what would happen if some abstract entity had some inexplicable property.

Philosophers have also complained about the Fusion Theory's analysis. As Mellor [1998: 86] puts it: "No one else would say that only parts of Sir Edmund Hillary and Tenzing Norgay climbed only a part of Everest in 1953" (see also Haslanger [1989: 119f.], Hinchliff [1996]). It would indeed be objectionable if Fusion Theory denied that (the whole) Edmund Hillary climbed the (whole) Everest. But it does not deny that: the whole Edmund Hillary is such that his 1953-part climbed the Everest.

Now something funny has happened. Initially, I said that according to General Fusion Theory, objects like the Everest and the Yangtze are large trans-world fusions only partly located at our world and only partly 6300 km long. Since then it has however turned out that in ordinary contexts, "the Yangtze is 6300 km long", and perhaps even "the Yangtze is wholly located at our world", is *true* according to Fusion Theory. Similarly, General Counterpart Theory, which I introduced as claiming that ordinary things are unextended atoms, now turns out to accept "the Yangtze is 6300 km long" as true. It seems that these theories, like Berkley's idealism, undermine their own formulation.

A Counterpart Theorist could of course maintain that in some *strict and philosophical sense*, ordinary objects do not extend across worlds and time and space. This could be supported by other theoretical considerations. For example, if our Counterpart Theorist is also a mereological nihilist, she might want to say anyway that there are strictly speaking no extended objects. But if Counterpart Theory is not coupled with some

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<sup>8</sup> In fact, there are even more possibilities. For example, one can combine abstractism about the future with a Fusion Theory about the past. And of course the above proposals may not be exhaustive.

I should note that my use of "Counterpart Theory" is rather restrictive. There is a less restrictive sense in which some of the accounts I classify as abstractism (like [Stalnaker 1987], [Sider 2002]) are Counterpart Theories. They do not qualify on my restrictive usage because abstract representations (and fusions thereof) do not have properties like weight and size and chemical constitution.

such further agenda, should a Counterpart Theorist really insist that the Yangtze is unextended, given that this a) is absurd and b) contradicts his own theory (on which “the Yangtze is extended” is true)?

If Counterpart and Fusion Theory are understood as *metaphysical* theories about the nature of ordinary objects, the claim cannot be given up without giving up Counterpart Theory itself. But I believe Counterpart and Fusion Theory are better understood as primarily *semantic* theories about the analysis of sentences involving operators like “at world  $w$ ” and “at time  $t$ ”. The disagreement between the two does not really concern the metaphysical question whether the Yangtze is extended. Rather, what the two theories disagree about are (mainly) semantic questions concerning reference, satisfaction and the effect of certain sentential operators (cf. [Lewis 1986: 217]).

Let us have a closer look at this semantic disagreement. Consider a simple first-order language  $L$  with three additional (classes of) sentential operators, “at place  $p$ ”, “at time  $t$ ” and “at world  $w$ ”. I will first set up the neutral part of  $L$ ’s semantics on which Fusion and Counterpart semantics can agree.

Every name  $n$  of  $L$  gets assigned a class  $|n|$  of mereological atoms, for example, the class of all atoms that are part of the Yangtze at any place, time and world. The semantic value of a predicate maps such classes together with a triple of a place, a time and a world to a truth value. Sometimes (if the predicate is extensional), the truth value only depends on those atoms in the class located at the designated place, time and world. Mostly however, it also depends on other members of the class.

Now an  $L$ -sentence  $\Phi$  is *true relative to* a place  $p$ , a time  $t$  and a world  $w$  iff

- $\Phi$  has the form “ $\Psi_1$  and  $\Psi_2$ ” and both  $\Psi_1$  and  $\Psi_2$  are true relative to  $p$ ,  $t$  and  $w$ ; likewise (*mutatis mutandis*) for the other propositional operators;
- $\Phi$  has the form “ $\forall x\Psi(x)$ ” and  $\Psi(n)$  is true relative to  $p$ ,  $t$  and  $w$  in all extensions of  $L$  by some new name  $n$ ; likewise for “ $\exists x$ ”;
- $\Phi$  has the form “at place  $p'$ ,  $\Psi$ ” and  $\Psi$  is true relative to  $p'$ ,  $t$  and  $w$ ; likewise for “at time  $t'$ ” and “at world  $w'$ ”;
- $\Phi$  has the form “ $n$  is  $F$ ” and the semantic value of  $F$  maps  $|n|$  and  $\langle p, t, w \rangle$  to the truth-value *true*; likewise for multi-place predicates.<sup>9</sup>

Finally, an utterance of an  $L$ -sentence is true iff it is true relative to the place, time and world of the utterance.

So far, I’ve ignored multiplicity and other modes. The latter are easily taken care of. Thus we can say that an utterance of  $\Phi$  is true in tensed mode iff it is true relative to *some* place at the time and world of the utterance. Multiplicity however requires a few revisions.

Suppose due to fission, Fred doubly exists at  $t$ . On the current semantics, (the  $L$ -translation of) “at  $t$ , Fred weighs less than 100 kg” is true (in tensed mode) iff for some

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<sup>9</sup>I have not explicitly stated that some member of  $|n|$  must be located at  $p$ ,  $t$ , and  $w$  as there might be some intensional predicates like “is famous” which can apply to objects at times and places where they do not exist.

$p$ , “Fred weighs less than 100 kg” is true relative to  $p$ ,  $t$  and the actual world. But presumably the semantics of “weighs less than 100 kg” maps a class of atoms and a place, time and world to *true* iff the fusion of all atoms in the class located at the given time and world weighs less than 100 kg. So in the fission case, the sentence wrongly comes out false.

By assigning classes of atoms to names, the current  $L$ -semantics in effect pretends that the  $R$ -relation is an equivalence relation. We should instead assign to each name *several* classes of atoms, corresponding to all maximal  $R$ -interrelated subclasses of its current semantic value. Then we can stipulate that “ $n$  is  $F$ ” is true relative to  $p$ ,  $t$  and  $w$  iff the value of  $F$  maps, say, *all* the classes  $|n|$  assigned to  $n$  together with  $\langle p, t, w \rangle$  to *true*.

This will still not handle time travel cases correctly, for which we need to package further information about what I called “eligibility” into our semantic values, say, by pairing each  $|n|$  with the class of its eligible subclasses. Then we can say that “ $n$  is  $F$ ” is true relative to  $p$ ,  $t$  and  $w$  iff the value of  $F$  maps *at least one* eligible subclass of each class  $|n|$  assigned to  $n$  together with  $\langle p, t, w \rangle$  to *true*.<sup>10</sup>

This completes the neutral part of my semantics for  $L$ .<sup>11</sup> What Fusion Theory and Counterpart Theory add are basically certain claims about reference: Fusion Theory says that each name  $n$  indeterminately refers to one of the fusions of the associated classes  $|n|$ . Counterpart Theory says that  $n$  instead denotes a single member common to all  $|n|$ s, though it is usually indeterminate exactly which member that is.

What should we make of these additions? Doesn’t the neutral semantics by itself suffice to settle all truth-conditions? What does it matter which entities in the semantic machinery then get labeled “reference”?

Of course, one may ask which labeling fits best to our offhand intuitions about “reference”. In this respect, both do rather badly. For intuitively, “the Yangtze” refers to the Yangtze. So if one accepts, as General Counterpart Theory does, that the Yangtze has many parts, one better not claim that “the Yangtze” refers to an atom. For the same reason, a proponent of General Fusion Theory should not say that “the Yangtze” refers to something that is not wholly located at our world. Some kind of mixed approach is probably best here.

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<sup>10</sup> This is perhaps not the most perspicuous way of setting up the semantics. Perhaps it would be better to simply add the relevant spatial, temporal and modal  $R$ -relation itself to a term’s semantic value.

<sup>11</sup> Of course,  $L$  is not as rich a language as English. For example, it lacks common generalizations of the “at”-operators, like “at some place”, “at some time” and “possibly”. (Note that if “possibly  $\Psi$ ” is defined as true relative to  $p$ ,  $t$  and  $w$  iff for some  $w'$ ,  $\Psi$  is true relative to  $p$ ,  $t$  and  $w'$ , and “necessarily  $\Psi$ ” is defined as “not possibly not  $\Psi$ ”, then “necessarily  $\Psi$ ” is *not* true iff for all  $w'$ ,  $\Psi$  is true relative to  $p$ ,  $t$  and  $w'$  (cf. [Lewis 1968: 31]). Note also that “at world  $w_\otimes$ , not  $\Psi$ ” is not in general equivalent in  $L$  to “not: at world  $w_\otimes$ ,  $\Psi$ ” (cf. [Fara and Williamson 2005]), and that “necessarily ( $\Psi_1$  and  $\Psi_2$ )” does not entail “necessarily  $\Psi_1$ ” in  $L$  (cf. [Woollaston 1994: 258]). It seems to me that if one looks at the relevant counterexamples, these features of  $L$  either clearly apply also to English or at least do not clearly *not* apply.) More importantly, the semantic values in real languages can systematically vary with the context of utterance, which should be accounted for in the semantics (for example, by replacing the current semantic values with something like functions from contexts to the respective values). But complications like these are irrelevant to the opposition of Fusion and Counterpart Theory.

But notice that these issues, whether for example “the Yangtze” refers to something that is wholly located at the present time – *that it, whether the Yangtze is wholly located at the present time* –, have little to do with the semantic issues Counterpart and Fusion Theory are about. Why should questions about the Yangtze’s mereological properties be answered by *semantics*? Nobody would look at semantics for chemical information about the Yangtze.

In the semantics of Counterpart and Fusion Theoretic, in the analysis of “existing at” and “being such-and-such at”, there is no need to mention reference at all. As we’ve seen, the semantics can be stated in completely neutral terms. So if Counterpart and Fusion Theory are understood as semantic, rather than metaphysical theories, they are not two theories, but one. Either is just a harmless rewording of the other (given some background assumptions about mereology).<sup>12</sup>

I hasten to add that this is *not* true for the other alternatives I have mentioned. There is serious *semantic and metaphysical* disagreement between, say, Fusion/Counterpart Theory and (most kinds of) abstractism or multi-location theories. It makes a big difference whether there are other concrete worlds besides the actual world, or whether there are lots of multiply located mereological atoms.

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<sup>12</sup> Many older semantics for modal logic in which singular terms are assigned individual concepts can also be extended so that they become equivalent to (modal) Counterpart/Fusion Theory.

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