

Stages, Worms, Slices and Lumps¹

1 Introduction

The account of individuals David Lewis provides in *On the Plurality of Worlds* draws on both mereology and counterpart theory. The account of how individuals can have different properties at different times is mereological: x is F at t iff x has a part at t which is F . Individuals survive throughout a region of time to another by having parts at each of the times. The account of how individuals can have different properties at different worlds is counterpart-theoretic: x is F at w iff x has a counterpart at w which is F . Individuals do not exist at different possible worlds, though we can truly make assertions which appear to assign them properties at alternative worlds via the tools of counterpart theory.

Because it requires the resources both of mereological theories of individuals and of counterpart-theoretic accounts, Lewis's theory has the disadvantages of each. It would be better, *ceteris paribus*, to have a theory which only incurred one set of costs rather than two. One such theory is Theodore Sider's stage theory: individuals are what we think of as temporal parts, and survival is explained using counterpart theory. Another such theory holds that individuals are trans-world fusions. We then explain not only how an individual could have different properties at different times by appeal to parts, but also how it could have different properties at different worlds.

Although the dispute between Lewis, Sider, and the proponent of trans-world fusions may seem like a metaphysical dispute on the surface, it is at heart a dispute about reference. (Of course, many disputes in metaphysics turn on questions in philosophy of language; the point is that here the connection is more direct.) This opens up the possibility of an ambiguity theory: in ordinary contexts,

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it is indeterminate whether a singular term refers to a stage, as Sider thinks, a trans-time fusion, as Lewis thinks, or a trans-world fusion. The evidence at this time points to such a theory, though not one quite so liberal. The reference of ordinary singular terms is, I shall argue, ambiguous between stages and trans-world fusions.

2 Assumptions & Definitions

2.1 Assumptions

All parties to the dispute here share a number of metaphysical assumptions which are not held by all philosophers. In particular there are four premises which I am just going to take for granted. This is not to claim that these are not serious issues, nor even that the premises are all true. All I claim is that it is interesting to flesh out the consequences of these assumptions. I am putting these assumptions up front not to turn off potential readers, but because the debate becomes much clearer when framed in these terms.²

The first premise is that there exist other worlds, or at least representations of them. Roughly, this assumption is what Stalnaker (1987) calls modal realism. Either there are concrete possible worlds, as in Lewis (1986a), or there are ersatz worlds of some kind or another. I don't mean by this to rule out fictionalist accounts of modality, provided those accounts say there is such a thing as the fiction according to which there are possible worlds. I do rule out accounts of modality which do not use possible worlds of any form. What I take for granted is that, when doing semantics, we can talk properly as if some variety of modal realism is true, and in our semantic theory, *Possibly p* implies there is a possible world in which *p*.

The second premise is that there exist other times, or at least representations of them. This premise is obviously compatible with eternalism, the 'block universe' theory according to which past,

² See Sider (1996, 1997) for ways to frame the debate in more neutral language.

present and future times exist. It is also compatible with some varieties of presentism, the view that only what is present exists. In particular, I do not rule out a presentist theory which holds there are ersatz other times, and these ersatz times play the semantic role that eternalists think the times themselves play.

Thirdly, I assume that objects which exist at more than one time (world) do so by having different parts at the different times (worlds). That is, I assume there exist temporal parts and modal parts. This is the most controversial of the assumptions, and I will say the least about it. See Sider (1997) for clarification of the issues involved here and a defence of the assumption.

Finally, I assume a principle of unrestricted composition. Whenever there are some objects, there is an object which is the aggregate of these objects. I also assume that this principle holds not just in the real world, but in the domain we discuss when doing semantic theorising. There is a possible position which says that one of the differences between the true theory of the world and the fiction of possible worlds is that in the world unrestricted composition holds, but it does not hold in the fiction. Again, this assumption is not universally shared, but is quite widely held, particularly among people who accept the third premise.

As mentioned above, I don't expect every reader to accept each of these assumptions. But you can be interested in what the lie of the land is in these parts without wanting to live here. Indeed, some readers may hope that what follows constitutes a modus tollens against the assumption they most detest.

2.2 *Definitions*

Some philosophers believe that the objects of ordinary reference are temporal parts, or **stages**. The most prominent defence of this is Sider (1996), though there are suggestions of it in Smart (1959) and Jackson (1998). In Sider's version, this view extends the counterpart-theoretic semantics Lewis (1968) provides for sentences about other possible worlds to sentences about other times. So *Jimmy Carter*

was President is true because the current Carter has a counterpart at some time in the past, and at that time that counterpart of our Carter was President.³

Lewis (1986a) defends the view that we refer to trans-time, but not trans-world, fusions. We will call such fusions **worms**. Carter is the fusion of each of the stages which are, on Sider's view, his temporal counterparts. The truthmakers for *Carter was President* are the past temporal parts of Carter which have the property of *being President*. When we refer to modal properties, matters are different. *Carter might have won a second term* is true not because Carter himself has parts in other worlds which won a second term. Rather, it is because Carter has counterparts in other possible worlds which won a second term. Individuals, or at least the individuals of ordinary reference, are world-bound.

One could have the opposite theory to Lewis's. That theory says that the objects of ordinary reference are trans-world, but not trans-time, fusions of stages. Call such fusions **slices**. On the slice view, individuals of ordinary reference are time-bound but not world-bound. To my knowledge no one has held such a view, but it is included here for completeness.

Finally, one may hold that we refer to fusions of stages across times and worlds. I call these fusions **lumps**. If we think that we refer to lumps, then we have no need for counterparts in our semantic theory, and that will be the main attraction of the lump theory. If you believe in such things as worms and counterpart worms, the lump theory can be simply stated. Let *O* be the object to which Lewis thinks we refer by some term *t*. On the lump theory *t* refers to the object which is the fusion of all of *O*'s counterpart worms⁴. We can just as easily state lump theory in the terms accepted by slice

³ It might be better to say that stage of Carter *is* President; on some views, the stage does not have tensed properties, but it is the thing in virtue of which the worm has tensed properties.

⁴ I assume here, with at least some temporal parts of Lewis, that *O* is one of its own counterparts. This had better be the case if we want to make sense of sentences like *T might have been in a world exactly like this one* without appeal to duplicate worlds. The earliest reference to lumps appears to be Kaplan (1979), a paper first presented in 1967.

theory: t refers to the slice O which slice theory says it refers to, and all of its counterpart slices. More generally, lumps exist at many worlds and many times. Their parts at each world are worms, and their parts at each time are slices.

By the assumptions, stages, worms, slices and lumps all exist. They are even all individuals, under any reasonable definition of ‘individual’. The question is: Which individuals do we ordinarily refer to and quantify over? Is the referent of *Clinton* in *Clinton is President*, a stage, a worm, a slice or a lump? Into which of these categories do the people in *Some people are asleep* fall?⁵ What I have been calling the φ -theory is the theory that these ordinary individuals are φ 's, for $\varphi \in \{\text{stage, worm, slice, lump}\}$. For $\varphi_1, \dots, \varphi_n$ in this set, the $\varphi_1/\dots/\varphi_n$ -theory is the theory that ordinary reference to individuals is indeterminate between φ_1 's, \dots , and φ_n 's.

In the interests of completeness, note that there are more possible views than these four and the ambiguity theories constructable from them. In particular we should at least classify views which make explicit account for the asymmetry of time. So we have first-half-worms, and first-half-lumps, corresponding respectively to the fusions of all an individual's actual world stages to the moment of utterance, and the fusion of all of its counterpart first-half-worms. Such a view may account for the intuition that we acquire new properties as we get older, but never lose responsibility for our previous acts. As we'll see below, this view validates an interesting subset of our intuitions about duplication. Alternatively, we may believe in second-half-worms and second-half-lumps, which are defined in a similar way as fusions of non-past stages. On this theory, we explain why we are not scared about things which happen yesterday on the grounds we know they do not happen to us⁶. I

⁵ I assume these questions receive the same answer, though there is a possible position which holds that we ordinarily quantify over a wider range of types of things than we ordinarily name.

⁶ This is a rather minor variant on Prior's famous “Thank goodness that's over” argument (Prior 1959).

leave it to the reader to verify that these views generally have all the costs of the other theories I discuss and few of the redeeming virtues.

It might be wondered why I have chosen these folksy names rather than something more descriptive like 3D, 4D and 5D theories for the stage, worm and lump theories respectively. Four reasons; none of them conclusive. First, this would leave no convenient name for slices, and I think it is useful to keep them in mind. Secondly, the issue is whether we refer to trans-world or trans-time fusions, not how many dimensions such fusions have. In a Flatland world, lumps would have four dimensions, but would still be lumps.⁷ Thirdly, some scientists are suggesting that the manifold of our universe has many more than the four dimensions with which we are familiar. But I don't take this too seriously. As Meyer (1987) points out, the usual empirical standard in philosophical argumentation is conformity with the science of the last century, and I don't have any desire to outpace my peers. Fourthly, as noted above it is plausible to read J. J. C. Smart as holding something like the stage view in "Sensations and Brain Processes". But it is completely implausible to associate Smart with any view named '3D'. When it comes to disputes over naming, I don't know any better argument than argument from authority, and Smart is a good enough authority for me to rest content with that.

3 Methodological Issues

3.1 What a Theory Must Do

Everyone who knows a little about American politics knows that (1), (2), (3) and (4) are all true.

- (1) Bill Clinton was Governor of Arkansas.
- (2) Bill Clinton is President.
- (3) Bill Clinton will be an ex-President.

⁷ This kind of consideration is advocated in van Inwagen (1990).

(4) Bill Clinton might have been removed from office.

Any theory of reference must, if it is to be acceptable, interact with the other parts of semantic theory to provide a meaning to these sentences according to which they are true. Now it might be thought that the stage theory cannot do this. On the stage theory, *Bill Clinton* picks out a particular temporal part, and that temporal part is now President. That stage is neither Governor of Arkansas, nor an ex-President. Hence the stage theory fails this simple test.

Sider (1996) points out that stage theory has enough resources to dodge this bullet. The truth condition for (1) is that Bill Clinton, the stage, has a temporal counterpart who exists at some past time and who was Governor. Similarly, the truth condition for (3) is that Clinton has some temporal counterpart which exists at a future time and which is an ex-President. (The counterpart stage is an ex-President iff it has an earlier temporal counterpart which is President.) And the truth condition for (4), as we learned from David Lewis, is that Clinton has a counterpart who was removed from office.

So the stage theory can explain the truth of (1), (3) and (4) by appeal to counterpart theory. The lump theory never has to appeal to counterparts, but does have some oddities of its own. It might be thought that the Clinton lump is not itself President, though it undoubtedly has a part which is President. Hence on the lump theory (2) is true. The lump theorist simply has to insist that for some properties, such as being President, a lump is President iff it has a current, actual part which is President. We set aside, for now, whether this can be the lump theory's general theory of property possession.

The stage theory uses counterparts to explain both temporal and modal predication. The lump theory uses parts to explain all predication. Other theories will use a mixture of these methods. For example, the worm theory says that (1), (2) and (3) are true in virtue of the properties of Clinton's parts, and (4) in virtue of the properties of his counterparts. The first-half-worm theory, which says that *Clinton* refers to a fusion of past and present temporal parts, says that (1) and (2) are true in virtue of the properties of Clinton's parts, (3) in virtue of his temporal counterparts, and (4) in virtue of his modal counterparts.

So one test for a theory of reference is that, in combination with an appropriate theory of meaning, it generates the appropriate kind of truth conditions for sentences. And by *appropriate* here, I just mean that intuitively true sentences should be assigned truth conditions which are, intuitively, true. On its own, this test is too easy. Just as any scientific theory can accommodate any data, provided the right extra assumptions are made, any semantic theory can accommodate any data. The theory which says all singular terms refer to my coffee cup under different modes of presentation could, when combined with a suitable theory of meaning, assign the right truth conditions to (1) through (4). To get a feel for the theory of meaning needed, imagine (2) says that my coffee cup, under the mode of presentation Bill Clinton, is President. And this is true iff some concrete object which duplicates the mode of presentation (in this case Clinton) is President. If we accept this theory of meaning we have to give up the folk theory that reference is transparent in simple sentences like (2), but that's the price one must pay. So the requirement that theories of reference can, in combination with other parts of the meaning, deliver the appropriate truth conditions is too weak. We also need a requirement that the theory of meaning needed to get the appropriate truth conditions is plausible. When I talk about whether a theory of reference can explain a particular usage of singular terms, I mean that it can, in combination with a plausible theory of meaning, deliver the intuitively appropriate truth conditions for sentences including such singular terms.

3.2 *Varieties of Semantic Indeterminacy*

The stage/lump theory says that ordinary reference is indeterminate between stages and lumps. There are many types of semantic indeterminacy in language, and a corresponding variety of ways to argue for semantic indeterminacy. So it is worth clearing up the kind of ambiguity involved in the stage/lump theory.

The most obvious kind of semantic indeterminacy is ambiguity. *Pike* is ambiguous between a kind of fish and a kind of weapon. For a less clear case, *class* is ambiguous between, *inter alia*, a particular kind of mathematical entity, and a particular kind of sociological entity and a particular kind

of pedagogical entity. Although these entities generally have something in common (for example, they can all loosely be described as having members) it is to some extent an accident of language that we use the same word for all three. It would, in contrast, be very surprising if we used different words for Clinton's stage and lump. So the kind of semantic indeterminacy in the stage/lump theory should be different from mere ambiguity.

Semantic indeterminacy can also arise from quantifier domain variation. There are well known examples of this kind. Does *Everyone's glass is empty* mean that all the glass of the wine drinkers are empty, or the glasses of everyone at the table, or of everyone in the restaurant, or of everyone in western Canada? In practice, it will often be clear enough, though in the null context it is hard to say. In this case it seems open to the speaker to resolve the indeterminacy in any of a wide variety of ways. The same phenomenon occurs with predicates which are, implicitly or explicitly, relative to a comparison class. For example, *Michael Jordan is tall* will be true if the comparison class is humans, but not if it is professional basketball players. (Jordan was shorter than most of his colleagues in professional basketball, but still taller than most humans.) More generally, it occurs with predicates which have variable standards of application⁸. *France is hexagonal* is false in a context where geometric pedantry is in vogue, but can be true in other contexts. Still, these theories seem quite different from the kind of indeterminacy which is being posited here. The indeterminacy is between a wide variety of different possible referents, while we are positing an ambiguity between just two possibilities.

The kind of indeterminacy we are positing is that which arises when there are no perfect deservers for a term, but there are competing imperfect deservers. As Hartry Field (1973) points out, there are two properties definable in relativity theory which fill almost all the functional role

⁸ This is more general because, plausibly, the function of the comparison class is to introduce a standard of application. It is interesting to note the extent of the overlap between the predicates with variable standards of application and the vague predicates. This seems to be a fact theories about vagueness should take into account, but only a select few seem to do so.

constitutive of being *mass* in Newtonian mechanics. Neither property fills the functional role exactly; after all, there is no such thing as Newtonian mass. And the two properties are distinct, in ways which become important at high velocities. But there seems no reason to identify *mass* with either property. Rather, we should say that the referent of *mass* in Newtonian mechanics is indeterminate between these two, though it may be determined by either (i) an explicit determining phrase, (ii) a recognisable intention by the speaker to use the term in a particular way, or (iii) charity considerations. The last clause is put in to ensure that when we say things which are only true on one determination of *mass*, we may manage to say something true. Of course, I do not assume that charity runs wild. Sometimes when we say things which are only true on one determination, we fail to say something true. But in some cases charity is appropriate, so we should make allowance for it.

Field's case is historically important, but we need not go via upper-level physics to see examples of such indeterminacy⁹. Jack Sprat has just built a carport attached to his comfortable old home. When we now use the phrase *Jack Sprat's house*, do we refer just to the old house, or to the fusion of the old house and the carport? Answer: sometimes to the one, sometimes to the other, and often it is indeterminate. It is plausible here that the term is indeterminate between these two referents, even though there are no objects 'in between' the two candidates which are plausible referents. Again, in this case we can pick out one or other referent in practice by a number of techniques. If we say *Jack Sprat's house has a carport attached to it*, we refer to the old house; if we say *Jack Sprat's house includes a carport* we refer to the fusion; and if we say *Jack Sprat's house is on Maple St.*, the reference is indeterminate.

There are two interesting differences between Field's example and the example of Jack Sprat's house. First, Field posits an indeterminacy in the reference of a predicate, *mass*, rather than a denoting expression, *Jack Sprat's house*. Secondly, the two possible determinations of *mass* in Newtonian physics are mereologically independent, whereas one of the possible determinations of

⁹ The following example is borrowed from Lewis (1993a).

Jack Sprat's house (the old home) is a proper part of the other possible determination (the fusion of the old home with the carport.) The kind of indeterminacy I am positing in ordinary names is like the indeterminacy in *Jack Sprat's house*, and unlike the indeterminacy in *mass*, in each respect. For this reason, disanalogies between the way ordinary names function and the way indeterminate expressions like *Jack Sprat's house* function will be strong marks against my theory.

4 Some Symmetries

In this section I go over some of the hard cases which face each of the deterministic theories. It is remarkable just how similar are the difficulties which face each kind of theory. This symmetry is quite strong evidence in favour of a symmetric theory of reference, like the stage/lump theory.

4.1 *Parts and Counterparts*

...if we say 'Humphrey might have won the election (if only he had done such-and-such),' we are not talking about something that might have happened to *Humphrey*, but to someone else, a 'counterpart'. Probably, however, Humphrey could not care less whether someone *else*, no matter how much resembling him, would have been victorious in another possible world. (Kripke 1980: 44-5).

Note how well the lump theory does at handling this problem! According to the lump theory, it really is Humphrey himself who wins in those worlds where he uses the appropriate amount of push polling. Maybe this isn't good enough for Humphrey. (Being a Wednesday-morning quarterback wasn't meant to be easy.)

[P]resumably the losing part cares what might have happened to *it*; it could not care less what happens to some *other* slice off the same great salami (Lewis 1986a: 197).

The lump theorist shouldn't feel too upset by this challenge. She should, at least as an opening gambit, deny (i) that we can sensibly have intuitions about what such an odd thing as 'the losing part'

can care, and (ii) that the italicised pronominal reference is to the worm. Rather than work out what Lewis should say in response, or whether the quoted sentence was intended as argument or parody, we will look at a stronger argument against the lump theorist due to Mark Hinchliff.

Although Humphrey might have won the election, he in fact lost. Not just some part of Humphrey lost. (Was it his fur hat, or maybe his left hand?) No, Humphrey *himself* lost. The reader should imagine tables being banged and feet being stomped at this point. Kripke's point is that the worm theory has the truth conditions for *Humphrey might have won* invoke Humphrey's counterparts rather than Humphrey himself, and this is intuitively wrong. This difficulty carries across trivially to the stage theory. Hinchliff's point is that the lump theory for *Humphrey lost* invoke Humphrey's parts rather than Humphrey himself, and this is intuitively wrong. To the extent that there are semantic intuitions in the area, they suggest we should appeal neither to parts nor to counterparts when providing truth conditions here.

Hinchliff's point does not only tell against the lump theory; indeed, Hinchliff designed it as an argument against the worm theory. Nixon *HIMSELF* won the '68 election, not just one of his parts, the same way that Nixon *HIMSELF*, not just one of his parts, lost to Kennedy. Say this all loudly enough, and it seems to be a problem for both the worm theory and the lump theory. After all, according to them, the truthmakers for Humphrey's '68 loss and Nixon's '60 loss include not the whole of Humphrey and Nixon, but only their relevant parts. Hinchliff (1996) has argued that these considerations show that the worm theory cannot explain how it is possible that objects change, or more generally how objects can have temporary intrinsic properties, so we now turn to that issue.

4.2 *Intrinsic Properties*

Nixon had a particular shape when he lost in '60, call this S_1 . He had a different, incompatible, shape when he won in '68, call this S_2 . Nixon also satisfied various predicates describing a change in shape over time. For instance, he mostly got taller, but not fatter, as he got older. English does not have the words to describe the complete dynamics of Nixon's shape, so let's invent a new predicate S_0 , which

holds of people with just that pattern of shapes throughout time.¹⁰ It is plausible that S_1 , S_2 , and S_0 are all intrinsic properties. Certainly, in no case do we need to refer to anyone, or it seems anything, other than Nixon to judge whether they apply in any context. The fact, if it is a fact, that temporary shapes, like S_1 and S_2 , are intrinsic properties of Nixon poses a *prima facie* problem for worm and lump theories. The fact, if it is a fact, that 'long-term' shapes, like S_0 , are intrinsic poses a *prima facie* problem for slice and stage theories. The problem of temporary intrinsics has been much discussed in the recent literature, and I assume some familiarity with this literature in what follows.

There are two problems for the worm or lump theorist in saying that shapes are intrinsic. The first is the problem that Hinchliff raised: when we discuss change of intrinsic properties, it seems we should look for properties of wholes, not properties of parts. But the worm and lump theorists seem to say that it is only parts of Nixon which have the shape properties, not Nixon himself. Nixon himself has some properties, such as being shape S_1 in 1960, but only his temporal part in 1960 has the simple property of being shape S_1 . Since it is plausible that our ordinary shape terms pick out these simple properties, and that our ordinary singular terms pick out objects which may have these ordinary shape properties, this is a problem for the worm or lump theory. It is really very hard to deny that in *Nixon is round*, the predicate *round* picks out a simple shape property and the sentence is true iff the referent of *Nixon* has that property, yet it seems the worm and lump theorists must deny this.

The second problem for the worm or lump theorist is raised by a plausible principle of duplication. In the possible world Twin Twin Earth (TTE), there is a planet, p_1 , which is an exact match of our own, presumably including their own Nixon, call him n_1 . There is another planet, p_2 , on the opposite side of the sun which at all times is an exact match of the way p_1 was eight years prior. On this planet there is yet another Nixon; call him n_2 . If *Nixon* picks out a worm (or a lump), then

¹⁰ The change of shape properties which I will discuss are closely related to the distributional properties discussed in Parsons (2000).

the only difference between (the worms) n_1 and n_2 is their position in space-time¹¹. The worm n_1 is eight years prior, and a few million miles across, from the worm n_2 . The plausible principle of duplication is that objects which differ only in their spatio-temporal position are duplicates. So n_1 and n_2 are duplicates. But in 1968, n_1 has shape S_2 , and n_2 has a different shape S_1 , so, since duplicates share all intrinsic properties, according to the worm theory shapes are not intrinsic.

In the literature on temporary intrinsics it is frequent to see one or other party complain that what the other side calls an intrinsic property is really an extrinsic property. For instance, Lewis says that an endurantist will “draw a distinction that he will call the distinction between matters of one’s own intrinsic character and matters of one’s relationships: having a shape will go on one side, being an uncle on the other.” (1988: 188) Lewis then goes on to complain that because of the way this distinction is formulated, some of the properties which are called intrinsic are really relational. Not surprisingly, few of Lewis’s opponents are convinced by this argument; they insist that what they call the intrinsic/extrinsic distinction is the intrinsic/extrinsic distinction. Even some of Lewis’s allies in the debates with endurantists jump ship at this point; Jackson (1994: xx) agrees that if endurantism is correct then they are right as to what the intrinsic/extrinsic distinction amounts to. Putting the point in terms of the twin Nixon’s makes vivid what is going on: two things which are duplicates by the endurantist’s lights have different shapes, so shape is not intrinsic according to the endurantist. (If they want to use the word *intrinsic* for a property of properties which can differ between duplicates, then they really have changed the meaning of the word, as Lewis alleges.) The problem for Lewis is that not only the endurantist, but the worm and lump theorists should agree that the two Nixons are duplicates.

There are things which the worm or lump theorist can say here. For example, one might adopt a tensed theory of duplication according to which n_1 and n_2 being duplicates *simpliciter* does not

¹¹ This isn’t quite as obvious on the lump theory as it is on the worm theory, but the assumptions needed to make the argument go through are quite plausible.

imply that they are duplicates in 1968. On this theory, that they have different intrinsic properties only shows that they are not duplicates in 1968. It will be tricky to reconcile this with the general account of predication, on which wholes have simple properties in virtue of the nature of their parts, but at least there is a line of argument available. Alternatively, they can agree that Nixon's shape is not intrinsic to Nixon, but it is intrinsic to something else: Nixon's stage. And that, they may argue, is enough to satisfy our intuition that shapes are intrinsic. Lewis (1988) has made this defence, and we will return to it below.

Dynamic shape properties raise an entirely symmetric problem for the stage or slice theorist. Change the example a little so that on p_1 in 1968 there is a swamp-Nixon, call it n_3 , which is a sub-atomic particle for sub-atomic particle duplicate of Nixon as he then was. Swamp-Nixon is created by a random aggregation of sub-atomic particles, so he does not get taller as he gets older. The stages (or slices) of n_1 and n_3 differ only in their spatio-temporal position, so they are duplicates. But they differ with respect to S_0 , the property which applies to people with just Nixon's pattern of shapes over time. Hence on the stage theory, this property is not intrinsic. This is not too surprising; on the stage theory Nixon has the property of getting fatter as he gets older iff he stands in a certain relationship to his other temporal counterparts. Hence there are properties which are at least *prima facie* intrinsic, which are not intrinsic to stages or slices. Call these inter-time intrinsics.

It might be thought that inter-time intrinsics are not really intrinsic property, because whether they are instantiated depends not only on the instantiator, but on the structure of time.¹² There is a sense in which a duplicate of our Nixon, in a world with a different structure of time, might have not become taller as he got older. Or, more probably, in such a world Nixon would not have had quite the same change-of-shape-over-time property S_0 . Of course, in a world where the structure of space is different, a duplicate of Nixon's stage in 1960 might not have shape S_1 . In general, when we start allowing duplicates to be instantiated in worlds with a different underlying

¹² I am indebted in this paragraph to conversations with Alyssa Ney and John Hawthorne.

structure, many of our intuitions about shapes seem to go awry. For a very simple example, if you think it is part of the definition of a straight line that it traces the shortest distance between two points, then you should think that *being straight* is an extrinsic property of lines. (I am using *line* here in Euclid's sense to pick out what modern mathematicians would more likely call a curve.) If you think that this is not a definition of straightness, but merely a theorem about straight lines, then maybe you can still think that *being straight* is an intrinsic property of lines. In any case, it is not clear (a) what the duplicate of a Euclidean line in a non-Euclidean space should be and (b) whether this duplicate is straight or curved in the new space. I think it is safest to keep to a concept of intrinsicity which disregards complications brought on by alternative spacetimes, while noting that there is a different concept of intrinsicity which is sensitive to these complications and which is worthy of investigation in its own right.

If you are prepared to accept inter-time intrinsics, you may also be interested in inter-world intrinsics. During his resignation speeches, Nixon stood as straight and tall as he possibly could. That is, at that moment he had a certain modal property, *standing as straight and tall as he possibly could*. Plausibly, this is an intrinsic property, since it seems to only be about Nixon. But on the worm theory, it is true in virtue of Nixon's relations to other counterparts. Hence it will, wrongly, turn out to be an extrinsic property. I call all properties which are either inter-time intrinsics or inter-world intrinsics, *long-range* intrinsics.

4.3 Scorecard

We have four puzzles in front of us: Kripke's Humphrey puzzle; Hinchliff's candle puzzle; temporary intrinsics; and, long-term intrinsics. Kripke's puzzle, in its simplest form, is to explain modal and temporal predication without appeal to counterparts, which always seem exogenous to the issue at hand. (Humphrey himself, not his counterparts, was Governor and might have been President.) Hinchliff's puzzle, in its simplest form, is to explain simple predication without appeal to parts. (The candle itself, not one of its parts, is bent.) Roughly, the stage theory solves two, the lump theory

solves two, the worm theory, in its crudest form, solves none, and a more sophisticated worm theory can solve two. Let's look at these in order.

The stage theory, clearly enough, has no problem with the candle puzzle. The candle itself, really is straight. Nor is it hard to see how an object might have temporary intrinsic properties. A stage can be round even though it has temporal counterparts which are not round. Similarly, it is fairly clear that the stage theory cannot solve Kripke's puzzle, or the problem of long-term intrinsics. The stage theory just accepts that we need to appeal to counterparts to explain all temporal predication, contra Kripke's dictates. Further, any property which an object has in virtue of different temporal parts will be extrinsic to each part, and hence to the object.

The lump theory has the opposite scorecard. The lump theory shuns counterparts, so Kripke's puzzle is solved. On the lump theory there are possible worlds in which Humphrey himself, our Humphrey, wins the election. Sadly, this is not such a world. And it is clear how we will get long-term intrinsics, because these are intrinsic to the lump. Temporary intrinsics will be harder, because we have to say something mildly counterintuitive to handle cases like the two Nixons on opposite sides of the sun. And the lump theory just concedes that we cannot satisfy Hinchliff's intuition that simple properties apply in virtue of the nature of wholes, not parts..

Note, at this point, just how attractive the stage/lump theory looks. If the stage/lump theory can plausibly maintain that each of the puzzle cases creates the right kind of context where reference is determined in just the right way, all the puzzles will be solved. We need to show the following three things:

- When talking about long-term properties, like change of shape over time, singular reference is determinately not to stages.
- When talking about how objects have properties which are, in the first instance, properties of stages, reference can determinately be to stages.
- When talking about which objects have which properties in other possible worlds, reference can determinately be to lumps.

A few points of clarification are needed. None of these points should be taken as a claim that in sentences like *Clinton has become fatter as he has become older*, or *Clinton is fat*, the term *Clinton* has a determinate reference. Rather, the claim is that when we talk about how Clinton comes to have those properties, and about whether they are had intrinsically or extrinsically, the reference becomes determinate. To give a particular instance of this, I think that when we talk about which properties Clinton has in another possible world, the term *Clinton* refers determinately to Clinton's lump. However, when we assign modal properties to Clinton, the term *Clinton* will normally be indeterminate.

This last point may be useful in resolving the impasse between Kripke and Lewis over the Humphrey case. Kripke claims that counterpart theory is mistaken because it says that *Humphrey might have won* can be true in virtue of the victory of Humphrey's counterpart in another world. Kripke alleges that it should be Humphrey himself, not his counterpart, who wins in the other world. Lewis replies that it is Humphrey himself who has the property that he might have won. I think Lewis is right that counterpart theory can support our intuition that Humphrey himself might have won. In *Humphrey might have won*, the reference of *Humphrey* is indeterminate between a stage, which has a winning counterpart, and a lump, which has a winning part in another world. Either way, the sentence turns out true. However, in the sentence, *In another world (where he does such-and-such), Humphrey wins the election*, the reference of *Humphrey* is determinately to Humphrey's lump, not his stage. This explains the force of Kripke's argument, while acknowledging that the worm theorist has an explanation of how *Humphrey himself might have won* can be true.

Given these clarifications, none of the three premises seem implausible. And given the three premises, the stage/lump theory can solve all four puzzles. This is a dramatic improvement over either the stage theory or the lump theory. As we will see, it is also an improvement over what the worm theory can do.

The crudest form of worm theory fails on all four puzzles. Since Kripke and Hinchliff formulated their puzzles as objections to the worm theory, this is not too surprising. We saw in the

case of the two Nixons that worm theory, combined with a plausible principle of duplication, led to a denial that (three-dimensional) shapes are intrinsic. And although worm theory handles inter-time intrinsics, it does not do so well on inter-world intrinsics. The truth conditions for *Nixon stood as straight and tall as he possibly could* invoke Nixon's counterparts, so the property assigned here must be extrinsic to Nixon. Can a less crude worm theory do significantly better? Our answer will be a qualified *no*.

Let's just grant that although the worm theory cannot handle Kripke's and Hinchliff's objections, this is no serious objection. That is, let us assume that there is little intuitive force to the complaint that the worm theory provides the wrong kind of analysis twice over. As Hazen (1979) points out, it is hard to be clear on the force of this objection. The point of the Kripke and Hinchliff objections is that the worm theory analyses various kinds of predications in the wrong way, not that they make false predictions about the truth conditions of various sentences. The objection is not that there is some sentence *S* such that the worm theory says that *S* is true iff *p*, but really *S* is true iff *q*. Rather, the objection is that the way the worm theory generates the (correct) truth conditions for every sentence conflicts with the folk theory of predication. Although the folk theory of predication is more negotiable than other parts of folk theory, this has the form of a sound objection. But its apparent force derives from a confusion between this true claim of divergence with folk semantics and the false claim that counterpart theory makes incorrect assignments of truth conditions. Hazen shows quite clearly how Kripke's language can lure an unsuspecting reader from the true claim to the false claim, and thus create the impression there is a devastating criticism here.¹³ So these objections

¹³ Hazen, of course, only makes this point about Kripke's argument, not Hinchliff's, since his paper was written 17 years before Hinchliff's. But the same kind of reasoning seems to carry over well. Our folk theory of predication does strongly suggest that *Nixon is round* predicates a property of Nixon, not of his parts, but this does not show that the worm theory generates the wrong truth conditions

are not devastating. Further, let us grant that inter-world intrinsic properties are obscure enough to not constitute a serious objection. The worm theorist then handles temporary intrinsics the following way.

My shapes belong in the first instance to my stages, and in a derivative, relational way to the whole of me. [Worm] x is bent at time t iff some stage of x is at t and is bent (Lewis 1988: 189).

So you might have thought that *being bent* was an intrinsic property of any bent thing. In fact it is an intrinsic property of stages, but an extrinsic property of worms. Lewis insists that the core intuition about shapes is that they are intrinsic properties of some things, not of anything of which our common shape terms can be truly predicated. Grant this too. So we concede that the Nixons on opposite sides of the sun are duplicates, because the shape properties which differ between them are not intrinsic to the worms.

After all this concession, there is still a problem. We seem to have talked our way out of a solution for inter-time intrinsics. We were supposed to have our intuition that shape is intrinsic satisfied by the fact that shapes are intrinsic to stages. But if that is the method for judging intrinsicality, then we should think inter-time properties are all extrinsic, since they are extrinsic to stages.

There is a more general problem here concerning predication. The rule Lewis gives above for how shapes apply to worms cannot apply generally without leading to absurdity. I, hopefully, now have the property that I will see the Red Sox win a World Series. That is, I have the property at October 20, 2000. But my stage at October 20, 2000 does not have the property that it will see the Red Sox win a World Series, for it has already gone out of existence. In a different vein, Lewis says, "No man, unless it be at the moment of his execution, believes he has no future." (Lewis 1986a: 204).

for that sentence. All it shows is that the worm theory generates the correct truth conditions in an unexpected, and perhaps untenable, way.

But why not think that I have the property of having no future at t ? After all, there is an excellent sense in which my stage at t has no future. If we say that worms have properties by courtesy of their current stages having properties, then we will assign all sorts of crazy properties to worms.

This is obviously not a refutation of the worm theory. The worm theorist must say that there are some properties which worms have in virtue of their stages, and some properties which they have in virtue of their whole being. The real dialectical problem is that the only problem facing the stage/lump theory was that it made a possibly arbitrary appeal to how contexts shift. Now the worm theorist needs to make a possibly arbitrary appeal to how properties get applied to worms: sometimes via stages, sometimes directly. This problem for the worm theorist seems to balance the matching problem for the stage/lump theorist. And the worm theorist had extra problems: Kripke's problem, Humphrey's problem, and the fact that shapes are not intrinsic properties of individuals, but only of their parts. These are minor issues, but when there is a tie on other considerations, they seem sufficient to settle the score in favour of the stage/lump view.

5 Counting Issues

Arguments about counting are vitally important to the stage theorist, and to a lesser extent the worm theorist. See, for example, the stress on these kind of arguments in Sider (1996). I aim to show here that these kind of considerations lead not to victory for one determinate view, but just to stalemate. Almost all of our intuitions can be accounted for on either the stage theory, the worm theory, or the lump theory, when combined with an independently justified principle about counting. The stage theory and the lump theory each have a very minor flaw, the worm theory has each of these flaws. So this is a win for the stage/lump theory.

Much of this section will be spent arguing that our views about counting cases are, on the whole, consistent with the lump theory. Given the centrality of counting cases to our principles of individuation, if this is not true it poses a real threat to a theory which says it is indeterminate

whether ordinary reference is to lumps. But the lump theory can, contrary to first impressions, handle all the data.

5.1 *The Problem*

This statement of the problem relies heavily on the statement in Sider (1996). I don't believe I beg any questions by doing so. Al Gore has a secret plan to win the next election. He will undergo fission into two objects, Gorer and Gored. Gorer will win the Republican nomination, Gored will win the Democratic nomination, and Gore will then run against himself in the general election, presumably with a victory for Gorer. Before this happens, Gore is sitting in a Buddhist temple alone, pondering the political and metaphysical implications of his plan. How many people are in that temple?

It seems there is an argument that there should be two. First premise: Gorer and Gored are both persons, but they are not identical. After all, one of them is a Republican and the other a Democrat. Second premise: Gorer and Gored are both in the temple. Some people think that fission is death, so this premise is not true. But that seems to conflict with common usage. Imagine Gorer is being tried for perjury because he said he has never been in that temple. The evidence shows that Gorer has not entered the temple since the fission, but Gore was a frequent visitor. If the jury should convict, which they surely should, then it is true that Gorer was in the temple. Similar reasoning shows Gored was in the temple. Hence the premise is true. Now we appeal to a principle: For any people x and y , if x is in the temple and y is in the temple, and x is not identical to y , then there are at least two people in the temple. As Lewis puts it, counting is by identity. So there are, at least, two people in the temple.

Sider notes that there are a number of frivolous objections to this conclusion, and two serious objections. The frivolous objections are of the form: since Gore weighs 180 pounds, why don't Gorer and Gored together weigh 360 pounds. Of course Gorer and Gored overlap and weight is not additive for overlapping objects. I have a glass with 100 grams of water in it. The glass contains

90 grams of oxygen, and the oxygen is not identical to the water. So is there 190 grams (or more) of stuff in the glass. Of course not, since the oxygen and the water overlap.

Sider is aware of all this, and doesn't rely on the frivolous objections. Rather, he just brings them up because they point to a serious principle: two things can't be in the same place at the same time.¹⁴ So that's one objection to worms or lumps. Gorer and Gored, distinct individuals we say, are in the same place at the same time. The second objection is that intuitively there is only one individual in the temple, but the worm and lump theorists say there are two.

The lump theorist may appear to have a more serious worry. I was only kidding before; Gore will not use fission to win the next election. But he might have. Gorer and Gored are different in the world in which he does. So they are distinct lumps. Imagine the real Gore (who avoids fission) sitting alone in his office. On the lump theory, quantification is over lumps. So the claim *There are at least two distinct individuals in Gore's office* is true, since Gorer and Gored are both there, and they are distinct. As Lewis says, modality is pathological; rare problems for the worm theorist which only arise in possible fission cases seem to be everyday problems for the lump theorist.

This last argument of Lewis's seems a bit excessive. For one thing, it seems odd in philosophy to complain that one's account faces no actual counterexamples. (Imagine defending the justified true belief account of knowledge by challenging one's opponent to find an actual Gettier example.) Secondly, as Sider points out, the worm view does just as badly as the lump view when it comes to counterfactuals. Go back to Gore alone in his office. On the worm theory, the following conditional seems to be true: *If Gore were to undergo fission in five years, there would be two people in his office now*. This seems (a) false and (b) a rather bizarre case of backward causation. At least the lump theorist doesn't make mistake (b).

¹⁴ The strategy here is, to say the least, rather puzzling. Surely it is not best to remind the reader that the principle on which you rely is based on fallacious intuitions. There may be a serious response here; how close that serious response is to the one I actually make is left as an exercise for the reader.

5.2 *Why it is a big problem*

Of course counting arguments are no help to the stage view unless the stage view can account for all the troubling data. And the stage view does account for the fission cases we have considered so far.

However, it does not account for all the possible counting problems¹⁵. I own a lounge suite consisting of an armchair and a sofa. I have just moved, and the suite is the only thing in the new apartment. That is, the armchair and the sofa are the only things in the new apartment. How many things are in the apartment? One? Maybe. Two? Plausibly. Three? Forget about it.

Any theorist must have something to say about the lounge suite problem, just like they must have something to say about the fission cases. The problem is that anyone who accepts mereology seems to be committed to the implausible solution that there are three objects in the apartment. (Recall that we are assuming, for this paper, that mereology is innocent.) At this stage we can start asking just the same rhetorical questions which are fired at the lump theorist when she says that there are two people, Gorer and Gored, in Gore's office. If my sofa weighs 120 pounds, my armchair weighs 60 pounds and my lounge suite 180 pounds, does this mean I should be charged for shipping 360 pounds of goods? Where is the suite hiding if it is in the room as well as the sofa and the chair? In fission cases, lump theorists have to face just such questions. What the lounge suite case shows is that it is not in virtue of their being lump theorists that they must answer such questions eventually, it is just in virtue of their finding mereology innocent.

Everyone, including the stage theorist, has to put some restrictions on counting principles in order to resolve this puzzle. The real dialectical problem for the stage theorist here is not that she must adopt such a restriction, but that once she does so she has no reason to object to worm or lump theorists resolving fission cases by adopting the very same restriction. When we work out the details, it turns out the stage theorist does best at accommodating pre-theoretical intuitions about

¹⁵ This case is modelled on, though not identical with, some cases discussed in Kratzer (1989).

metaphysical principles, the lump theorist does best at accommodating pre-theoretical intuitions about particular cases, and the worm theorist has the worst of both worlds.

One tempting and obvious apparent solution to the lounge suite problem does not work. Many people hold that quantification is, in the first instance, only over objects satisfying ordinary sortals. We do not normally count two objects and their fusion as three objects because the fusion does not satisfy a sortal. But 'being a lounge suite' seems just as good a sortal as 'being an armchair' or 'being a sofa'. It is important for the lump theorist that this solution to the lounge suite problem does not work, because it could not be applied in the fission cases. Gorer and Gored presumably satisfy just the same sortals.

5.3 *Domain Restriction Principles*

Here's a theory about quantifier domains which seems to solve all the problems. In ordinary contexts quantifier domains are partitions of some space, they do not include overlapping objects. This principle is relatively weak; it is always overridden by the principle that objects made salient are in the quantifier domain. We will call contexts in which domains include overlapping objects 'deviant'.

In some contexts it will be indeterminate precisely what the domain is. This indeterminacy may arise in part from indeterminacy about the type of objects being quantified over, but it also has more traditional sources. If I look at a crowd of people and say *Everyone seems happy*, the domain of the quantifier is the crowd, and the boundaries of the crowd are indeterminate. When domains are indeterminate, contexts are deviant if any of the possible determinations includes overlapping objects.

Sometimes it can be indeterminate which of two objects is in a domain, though it is determinate that they are not both in the domain. For example, it will rarely be the case that a lump shares a domain with one of its parts. So it might be indeterminate whether Gore's lump or stage is in the domain, but determinately the case that they are not both in the domain. We would not say that there are two people in Gore's office just because his lump and his stage are both there. The

right thing to say about such a case is that it is indeterminate whether the quantifier domain includes his lump or his stage. Since it is determinate that it includes exactly one of them, it is determinately true that there is one person in Gore's office. (I assume here a supervaluational theory of determinate truth; if the domain of a particular quantifier is indeterminate between some sets, then a sentence containing that quantifier is determinately true iff it is true no matter which of these sets is taken to be the quantifier domain.)

I aim to convince you of three theses about deviant contexts. First, the stage theory, the worm theory and the lump theory ascribe the intuitively correct truth conditions to sentences involving counting under the assumption that the context is not deviant. Secondly, everyday contexts are not deviant. Thirdly, everyone says things which are counter-intuitive in deviant contexts, though as we'll see in the next subsection, which counter-intuitive things are said differs. From these three theses, it follows that counting arguments provide no refutation of the lump theory.

The first thesis seems fairly trivial. What we have to show is that, on the assumption that the context is not deviant, the sentence *There is exactly one person in the temple* is true in the story we told about Gore contemplating fission. (And we have to show that this example is general enough that the morals drawn from it can be expected to generalise, but hopefully this will be clear.) Any domain which includes both Gorer and Gored is deviant, since they overlap here and now. This is true whether we consider Gorer and Gored to differ in (later parts of) this world, or only in other worlds. But unless Gorer and Gored are both in the domain, we can't say *There are distinct x, y such that each is in the temple*. There may well be such people, but not in our quantifier domains. So it is true that *There is exactly one person in the temple*. Similarly, any domain including the sofa and the suite includes overlapping objects and hence is deviant. And this means that in all contexts which are not deviant, there are at most two objects in my apartment. Whether there is one or two depends on whether the domain includes the suite or the sofa and chair. In general, the assumption that the context is not deviant seems to lead us back to the assumption that the counting sentences we normally take to be true really are true.

The argument that everyday contexts are, on the whole, not deviant is more indirect. Assuming that these contexts are not deviant solves a whole host of philosophical problems. And this, I take it, is evidence that it is true. I will just sketch here the reasons for believing this. In particular, I will make no serious effort to defend the claim that appeals to deviancy provide the best solution to these puzzles. I hope that the sketch is, however, worthwhile.

Some of these problems are counting problems. That is, if you are inclined to believe mereology for independent reasons, then you are faced with these counting problems, and the no deviancy principle resolves that problem. Even if you only believe in a restricted mereology, so that you don't believe in arbitrary fusions, but only fusions which create 'natural' objects, you are still faced with counting problems in lounge suite cases, and should welcome a principle which resolves these problems.

Similar problems arise, for obvious reasons, when working out the semantics for 'only'. If we adopt the no deviancy principle, we can keep the simple and attractive theory that *Only a is F* is analysed as $\forall x: (x \neq a \supset \neg Fx)$ and explain away the apparent exceptions in lounge suite cases by contextual deviancy. This pragmatic explanation of the problem cases, which appeals to a principle supported on independent grounds, is much simpler than the semantic explanations offered in Kratzer (1989) and von Stechow (1998).

Accepting the Russellian account of the truth conditions of sentences containing definite descriptions requires that we adopt the hypothesis that normal contexts are not deviant. The premise of this little argument, that the Russellian account is true, is somewhat controversial, but the argument still has merit. McCawley (1993) notes that on a Russellian account, the following three sentences are inconsistent.

- (5) The place Woody Allen lives is Manhattan.
- (6) The place Woody Allen lives is New York.
- (7) Manhattan is not New York.

Since, McCawley claims, all three are true, this refutes the Russellian account. Intuitively, McCawley is clearly right that (5), (6) and (7) are all true, though you could possibly get an argument about (7) from travel guide writers and die-hard Brooklyn separatists. And in any domain which includes both Manhattan and New York, (5) and (6) will be false on a Russellian account. But if we take both the no deviancy principle and the 'salient objects are in the domain' principle, then we find that the right domains for (5) and (6) make each of them true.

Finally, the no deviancy principle provides an attractive solution to the Problem of the Many. If we accept mereology, then it seems we have to say there are millions of things in my new apartment, not merely one, two or even three. As well, there are all the atoms in my lounge suite. Actually, that doesn't sound too objectionable. Everyone, except the scientific anti-realists, will accept that there are these atoms. The real problem is that there are several fusions of atoms which look quite a lot like my lounge suite. Indeed, each of these fusions has a good claim to being a lounge suite: the right shape, the right texture, the right weight, the right appearance, and so on. So maybe there are millions of lounge suites in my apartment. Don't tell my moving company! My bill is large enough already. This problem is well known; the most prominent discussions of this problem are Geach (1980), Unger (1980) and Lewis (1993a).

The existence of the problem of the many closes off another line of defence for the stage theorist. She might respond to the lounge suite case by agreeing that she gets counter-intuitive results when she tries to count 'things'. But she might, following Geach, argue that we can't make good sense of this kind of counting. The only intuitions we are obliged to respect are those about the number of people, or sofas, or lounge suites, in the room. In the Gore cases, the lump theorist not only makes a mistake about how many *things* there are in the rooms, but about how many *people* are in the room. It isn't obvious that this solves the lounge suite problem. I think that we can make sense of asking how many items of furniture are in the room, and that the stage theory with unrestricted counting says, implausibly, three. Nor is it obvious that this kind of defence is justified. Why should we care if a theory answers some questions correctly when it answers others incorrectly? More

rigorously, doesn't this just mean we will have to adopt restrictions on counting principles to make sense of these questions about how many things there are, and that these principles will still save the lump theorist? In any case, the problem of the many shows that we have some work to do before we get plausible answers even to the restricted questions.

A suggestion of Lewis's might do the relevant work here. While some of these fusions may look, feel and smell like lounge suites, this is not sufficient to be a lounge suite. Indeed, even the fact that they have duplicates which undeniably are lounge suites is, apparently, not enough for them to be lounge suites¹⁶. Being a lounge suite is an extrinsic property. Something which would otherwise be a lounge suite fails to be one because it is a little less than something which really is a lounge suite. So this looks like a serious argument for the stage theorist. We concede the questions about the number of things, then appeal to the fact that most ordinary properties are extrinsic to solve the problem of the many, and hence claim that we can solve all the questions about counting under a sortal.

There are two difficulties with this move. First, it makes a mystery of why there seemed to be a problem in the first place. I will deal with this further in the next subsection. Secondly, it says nothing about any problem of the many *F*s where *F* is intrinsic. Assume that the property of being a ball is an intrinsic property, and I have a bag with (what we would normally say) is a single ball in it. On this solution to the problem, it turns out that there are billions of balls in the bag, because each of the ball-shaped fusions of particles is a ball. Maybe the assumption that being a ball is intrinsic is false, but it seems heroic of this kind of stage theorist to assume that the problem of the many only arises for extrinsic properties.

On the other hand, the no deviancy theory explains the problem easily. In normal contexts we don't count overlapping objects, because we don't quantify over them. Hence in normal contexts we can properly say there is only one lounge suite. To be sure, when the different fusions are made

¹⁶ I am indebted to Neil McKinnon for this point.

salient, we have to say that there are millions of lounge suites. But this is a *good* feature of the theory; it explains why there is the appearance of a problem.

The hypothesis that normal contexts are not deviant thus resolves several philosophical puzzles in a simple and attractive way. This is a very surprising result. The Problem of the Many, the problems surrounding composition and identity, and the puzzles about fission are all hard cases. That the lump theory, combined with the no deviancy principle solves them, seems good grounds for accepting both theses.

5.4 *Scorecard*

The third thesis I suggested earlier was that both stage and non-stage theories say counterintuitive things in deviant contexts. They both say that there are, for example, millions of lounge suites. This is mildly counterintuitive, but it can be put down to the deviancy of the context, not to any flaw in the theories we are discussing. The final scorecard is that there is a negative mark against each of stage and lump theories over what they say in deviant contexts, and two negative marks against the worm theory.

Even in deviant contexts, stage theorists can deny that two things can occupy exactly the same space at the same time. Worm and lump theorists have to concede that in deviant contexts this can happen, as long as we count by identity. So the worm and lump theorists either have to accept that two things can occupy exactly the same space at the same time, or that we do not count by identity in natural language. Since there is a theoretical intuition that such co-occupancy is impossible, and that counting is by identity, this counts against the worm and lump theories. To gauge precisely how big a negative mark this is, note that the stage theory accepts that there can be a point in spacetime occupied by distinct objects. That is, it accepts objects can coincide. It even accepts that there can be an object which is entirely overlapped by a distinct object, as the sofa is overlapped by the lounge suite. So we may wonder how strong the intuition which the stage theory upholds, that

overlap of any level up to, but not including, coincidence, is possible. Still, the stage theory rejects the extreme case, and the worm and lump theories accept it, which is to the good of the stage theory.

The bad news for the stage theory is that in deviant contexts it denies that there are deviant truths. There is a strong intuition that in these philosophers' cases, there really are more objects around than appear to be the case at a first glance. The worm theory also does badly on some of these cases. To illustrate this, let's look at a famous example of a deviant context, Gibbard's clay and statue (Gibbard 1975). As a gift from God, a bronze statue of Clinton has materialised outside the Capitol. A terrorist group opposed to divine intervention plans to seize and melt down the statue, and replace the heap of bronze outside the Capitol. God, however, plans to destroy the bronze when the statue is melted, foiling the plan. Currently, the statue is alone in a side room at terrorist HQ, awaiting melting. Intuitively, all of (8) through (12) are true.

- (8) The statue could not survive being melted down.
- (9) The heap of bronze could survive being melted down.
- (10) 'Could survive being melted down' is a property.
- (11) If there is a property which the heap of bronze has and the statue lacks, then the heap of bronze is not identical to the statue.
- (12) If the statue and the heap of bronze are not identical, and each of them is in a room, then that room contains at least two things.

Unless there is some equivocation, it follows from these premises that there are at least two things in the side room, contra the dictates of either stage theory or worm theory. (God's intervention at either ends of the statue's life ensures that the heap and the statue are the same worm.) This isn't the end of the argument. The stage theory can give us a way to deny one of these premises. Given that the stage theory is consistent, this is not that surprising. Lewis, for example, claims that (8) and (9) are not both true on a univocal reading of 'could survive'. Someone who favoured a less pragmatic restriction on counting principles could deny that (12) is true, though there is a risk that the lump theorist could use this to deny that they admit coincident objects into their ordinary ontology. And

one could deny that Leibniz's Law applies to modal properties, and use that to resist either (10) or (11).

I don't wish to go into the merits of these various proposals. The only point I wish to stress is that the intuition that each of (8) through (12) is true is at least as strong as the intuition that there cannot be coincident objects. Which intuition is stronger? Don't answer that! Rather than get into a contest over who can thump tables hardest, I propose that we call this part of the debate a draw between the stage and lump theories. That this debate is a draw seems like good news for the stage/lump theory.

The advantage the stage/lump theory has over the lump theory is that it can explain our intuition that no two objects coincide. One advantage it has over the stage theory is that it can explain our intuitions in philosophers' cases. Another advantage is that it handles timeless counting particularly well¹⁷. When we ask, "How many people have ever been President of the U.S.A?", we do not want the answer, "Continuum many," though there have been continuum many stages which have been President. The worm theory seems to give the right answers here, though the lump theory combined with the no deviancy principle also gives the correct answers. So as long as we think the timeless perspective determines that reference is to lumps rather than stages, timeless counting cases are again good news for the stage/lump theory.

There may seem to be a difficulty for the stage/lump theory in cases where we mix the timeless and the timed perspective. Gore currently lives in a room on K Street, which was especially built for his campaign. Call this Room K. Next month, he will undergo fission in Gorer and Gored, with Gored staying in K, and Gorer going on the road. The month after that, Gorer will move into K, and Gored will go on the road. Then Room K will be demolished. A quick pop quiz now about Room K.

¹⁷ The original source of these examples is Lewis (1976: 72). The discussion here draws heavily on Sider (1996).

Q1: How many people are now in Room K?

A: One.

Q2: How many people will ever be in Room K?

A: Two.

Q3: Of the people who will ever be in Room K, how many of them are now in Room K?

A: Two?!

We have a reasonably strong intuition that it cannot be that more Fs than are Gs than there are Gs *simpliciter*.

The case is a complete mess, which is surprisingly good news for the stage/lump theory. There are two ways the stage/lump theory can account for Q1, and each of them lead to the natural answers to the following questions. First, it can say that the ‘timed’ perspective leads to determinate reference to stages, but in the following questions reference is to lumps, leading to the paradoxical answers. Secondly, it can say that the domain of quantification in Q1 does not include the overlapping objects Gorer and Gored, but these are forced into the domain when answering Q3, by the implicit reference to them in the opening clause. Again, it isn’t paradoxical to say there is one G in one domain, and two things which are F and G in another domain, so the air of paradox here is avoided.

Two final points. First, the stage theory and the lump theory both do better on counting cases than the worm theory. The worm theory manages to get the worst of both worlds. Like the lump theory, it is forced to admit that there can be coincident objects. And like the stage theory it must deny one of (8) to (12). Hence counting cases provide motivation for believing the stage/lump theory over the stage/worm/lump theory.

Secondly, the kind of argument used here against the stage theory, call it the argument from philosophical usage, can be used against Lewis’s resolution of the problem of the many. The ‘no deviant contexts’ theory provides a simple explanation for why we might think there are millions of suites: raising the problem makes those millions salient, and hence makes the context deviant. What

could be the explanation on Lewis's theory? What has to be explained is how it is that in some contexts, the sentence *There are millions of cats on the mat* can seem to be true when Tibbles is alone on the mat. Lewis says that it is part of the meaning of *cat* that it picks out an extrinsic property, a property which cannot be satisfied by distinct objects with a substantial amount of overlap. On Lewis's theory, we mean to use *cat* to pick out a property which has this feature and applies to cat-like things, and singular terms like *Tibbles* to pick out cats. Since there are many such properties, it is indeterminate which property we pick out, and hence indeterminate which lump of matter is Tibbles. This is all good, but it does not explain how or why the meaning of *cat* changes in philosophical contexts so it no longer picks out a property with this feature. Perhaps it is that we forget, *en masse*, that being a suite, or a cat, or whatever, is extrinsic. This doesn't sound overly plausible. As long as philosophical usage is not the product of a specifically learned convention, but can be induced with little difficulty in ordinary language users, it is reasonable to request that semantic theories explain this usage.

6 Semantic Issues

It seems reasonable to demand of the stage/lump theorist that the stage and lump theories are at least tenable theories of reference. If one of them is beset by internal difficulties, then it is barely plausible to say that it is indeterminate which is correct. It turns out there are, *prima facie*, such internal difficulties for each theory. I conclude that the difficulties facing stage theory are not difficulties for the stage/lump theory, and that the difficulties facing lump theory can be handled by the appropriate meta-theory of reference.

6.1 *Are Counterparts Coherent?*

Assume, with some artistic licence, that Bill Clinton is the greatest living President (GLP).¹⁸ And assume, as is normal, that Twin Earth is a world just like this one on the macro level, but quite different on the micro level. From those premises, it seems to follow that (13).

(13) In Twin Earth, Clinton is the GLP.

Given (13), the argument to (14), (15) and (16) seems fairly quick.

(14) Necessarily, if Clinton is the GLP, then Clinton exists.

(15) In Twin Earth, if Clinton is the GLP, then Clinton exists.

(16) In Twin Earth, Clinton exists.

(14) seems like it is obvious enough to use as a premise. (15) follows on the assumptions that Twin Earth is a possible world, and that all necessary truths are true in all possible worlds. (This is the first assumption we made in §2.1, that a possible worlds account of modality is broadly correct.) And (16) follows from (13) and (15) on the assumption that 'In Twin Earth' is a normal modal operator. This holds on every account of possible worlds in the literature.

The problem for counterpart theorists is that they seem to want to endorse (13) and deny (16). Of course, they only endorse (13) on a counterpart theoretic reading of it, but we only appealed to the truth of (13) in the argument for (16), not on whether it had a reductive analysis. And (16) seems like as much like a straight out denial of the claim that ordinary individuals are world bound as we could hope to find. (I don't take seriously the riposte that Clinton is no ordinary individual.)

¹⁸ It has been pointed out to me that this is rather implausible if(f) we are allowed to include future Presidents in the comparison class. It is an interesting question if Clinton should count as the GLP if he is better than all those now alive who have been President, but is worse than someone now alive who will become President. But we have enough questions to address already.

The problem, in a nutshell, is that if we give a counterpart theoretic interpretation of the hypotheses counterpart theorists like to *deny*, those theories turn out *true*. In particular, the counterpart-theoretic interpretation of *Some individuals exist in many worlds* is true. This raises very serious worries about whether counterpart theory is coherent. And since the stage theory, like the slice and worm theories, appeals to counterpart theories, these worries carry across to the stage theory. There seem to be two strategies open: deny (13), or re-interpret (16) so that it is compatible with counterpart theory.

One way to deny (13) would be to apply counterpart theory to sentences in the language of boxes and diamonds, but not to sentences with operators like 'in w '. So, *Possibly Clinton is the GLP* is true if Clinton has a counterpart who is GLP, but (13) is false because Clinton, being world-bound, is not in Twin Earth to be their President. The problem with this view is that it abandons the possible worlds account of modality we are assuming is true. One part of that account is that *Possibly p* iff for some w , *In w , p* . The denier of (13) would admit *Possibly Quayle is the GLP*, but not *In some world, Quayle is the GLP*.

The plan to re-interpret (16) looks more promising. After all, we know what the re-interpretation will be. (16) just says that Clinton has a counterpart in Twin Earth. The analogy here should be with nominalism in mathematics. Nominalists typically endorse all of (17) and (18) but deny (19), though they know that (17) and (18) entail (19).

(17) There is an even prime number. (Mathematical truth)

(18) If there is an even prime number, then there is a number. (Logical truth)

(19) There is a number.

The strategy here is fairly familiar. We provide a reductive analysis of sentences like (17), showing how they can be true even if there are no such things as numbers. To be sure, if we applied the same reductive analysis to (18) it would show that it was true, but that just shows how inappropriate it would be to let the debate about nominalism turn on whether the reductive analysis of (18) is true.

It might be thought the same could be said in defence of the counterpart theorist. However, there are two important distinctions between the counterpart theorist and the nominalist which make this kind of defence untenable. First, unlike the nominalist, the counterpart theorist agrees that the type of trans-world individual to which we appear to be referring in (15) really exists. This should reduce somewhat our enthusiasm for their reductive analysis, as it cannot be defended on the grounds it permits an ontological saving. Secondly, the debate here was over what kinds of things we refer to *in ordinary language*, not in some reductive counterpart of it. If one's aim is to account for what kinds of things exist, then it is permissible to explain away apparent reference to kinds of things you don't think exist. If instead the debate is about which of the existing things we refer to in ordinary language, we should be more respectful of the data. Ordinary language may be a poor guide to ontology, but it is an excellent guide to ordinary language.

It is not a refutation of counterpart theories that they have to be applied with some care, though it is definitely a cost. Simpler theories are preferable to more complex theories, and theories which can be uniformly applied are simpler than theories which cannot be so applied. But note that this cost does not carry across to the stage/lump theory. For that theory has already held that sometimes reference is to stages, and sometimes to lumps. That is, the theory already holds that sometimes claims about other worlds should be interpreted according to counterpart theory, and sometimes according to a more mereological account. On the stage/lump theory we can take seriously the appearance of trans-world individuals; we can say that in contexts like (13) through (16), reference is determined to be to lumps. Indeed, we might just take this to be more evidence that in sentences of the form *In w, x is F*, *x* determinately refers to a lump. The stage theorist, or the worm theorist, has to deny that a counterpart-theoretic reading of (4) is correct, so their theory looks more complex than the elegant stage/lump theory.

6.2 *Are Lumps Eligible Referents?*

Many people have suggested to me that the following objection is fatal for the lump theory, and hence for the stage/lump theory. If other possible worlds are ersatz, then on the lump theory, the *Clinton* in *Clinton is President* picks out a rather odd object. One part of it is concrete, for it exists in this world, the other parts are all abstract, for they exist in ersatz worlds. But we learned, in response to the various puzzles posed by Goodman, Quine, Putnam and Kripke, that reference is always to 'natural' objects, rather than oddities¹⁹. So we do not refer to lumps.

If one accepts without question a causal theory of reference, the objection can be put even more forcefully. Both Clinton's worm and Clinton's lump can be plausibly claimed to be causally related in the right way to our use of *Clinton*. This does not show that reference is indeterminate. The fusion of Clinton's worm with some Martian rocks is also causally related in the right way to our use of *Clinton*, but we assuredly do not refer to that fusion with *Clinton*. The right theory of reference is that we refer to the most natural object which stands in the right causal relationship to our use of the term. Clearly, the worm and not the lump wins this contest.

Three responses. First, we can just deny that lumps are that odd. We don't have a natural-o-meter to run over objects, so claims about naturalness are not verifiable. Secondly, the objection only goes through if we believe other worlds are ersatz rather than genuine. So the evidence for lumps might be evidence for genuine alternative possible worlds. Again, I don't want to rest too heavily on this response.

The objection only makes sense if we think that referring terms directly pick out, *inter alia*, concrete objects. But this is not a compulsory way to develop a theory of reference. The third response is that if we are a bit more liberal about the nature of reference, the object of reference will not be particularly odd. The objection assumes other worlds are ersatz, so let's adopt that

¹⁹ The puzzles are in Goodman (1955), Quine (1960), Kripke (1980) and Putnam (1977, 1980, 1981). The solution is in Lewis (1983a, 1984, 1992).

assumption. Then there is some object, be it a universal, or a state description, or whatever, which corresponds to each of the possible worlds. That includes an ersatz world corresponding to this world. That ersatz world, alone among the worlds, has the property of being actualised.

The fusion of all the Clintons in each of the ersatz worlds, including the ersatz world which happens to be actualised, is not an odd object. In particular, it is not part concrete, part ersatz, in the way that it seemed the Clinton lump would be. So if we say the reference is, in the first instance, to this object, the objection from linguistic oddity will be abolished. Reference can still be, in the second instance, to the concrete person in the White House. I adopt a *correspondence* theory of reference; some term t refers to a concrete object o just in case o corresponds to the abstract object a to which t directly refers. The abstract object a is a fusion of ersatz individuals from different possible worlds.

Out of the frying pan and into the fire! The correspondence theory of reference is nothing but descriptivism in a shabby disguise, and that was thoroughly refuted years ago. This would be a telling objection if both premises were true, but each can be plausibly rejected.

The correspondence theory differs from descriptivism in a few ways. It does, in a way, associate an object with a function from worlds to individuals, and this could be plausibly regarded as a description. But this way of putting things glosses over many points. It does not require that the 'description' associated with a name, say *Clinton*, be storable in a public language, or indeed any natural language. It does not require that the description is constructed from concepts which are possessed by anyone who is competent with using the name. It does not even require, as it stands, that anyone who grasps the name be implicitly aware of the description, though it may be wise to impose that restriction for other reasons. And it certainly does not preclude the description from including concepts defined using causal predicates and/or rigidifying operators. In short, to the extent it is a variety of descriptivism at all, it is the nuanced descriptivism endorsed by Frank Jackson (1998). Obviously, there is a large issue here which could take up a few papers on its own. But I think that there is enough here to indicate the kind of points which are at issue, and to suggest that the correspondence theorist may end up on the winning side of the debate.

There may appear to be a nice advantage of the correspondence theory over the description theory, but this appearance is probably illusory. Descriptions, as noted above, can be thought of as functions from worlds to world-bound individuals. On a description theory, *t* refers to *o* iff the description associated with *t* takes this world to *o*. On the correspondence theory, referring terms pick out in the first instance, not these functions, but fusions. Since fusions are individuals, functions are set-theoretic entities, and it is plausible that referring terms pick out individuals rather than set-theoretic entities, this may seem to be an advantage of the correspondence theory. The problem with this argument is that if the ersatz individuals which fuse to create our objects of reference are themselves set-theoretic entities, then even on the correspondence theory referring terms pick out set-theoretic entities, rather than individuals. So there is an advantage to the correspondence theory here to the extent that it is plausible that ersatz individuals are not set-theoretic constructions.

There are two possible lump theories. The *direct* lump theory says that we refer, in the first instance, to the fusion of concrete objects and ersatz 'counterparts'. The *correspondence* lump theory says that we refer to the fusion of some ersatz objects, one of which corresponds precisely to an object in the actual world.²⁰ We refer to that object in virtue of its correspondence with the object to which we directly refer. The objects of reference are only odd on the direct lump theory, so I presume that the correspondence lump theory is closer to the truth. So when I say it is indeterminate whether *t* refers to a lump or to something else, I mean that it is indeterminate whether *t* refers, in the first instance, to the ersatz lump, or to something else.

²⁰ Ted Sider has pointed out to me that several of the core claims of direct theories of reference are compatible with the correspondence theory. So the names here might be a little misleading. If he is right, that is *good* news for the correspondence theory, since it suggests that theory might be the safe middle ground between traditional directly referential and correspondence theories.

6.3 *Crossed Reference*

Zwicky and Sadock (1975) point out that many of our intuitive tests for ambiguity of predicates fail. One simple test is that there are two types of thing which instantiate the predicate. So, we might say, *pike* is ambiguous because it is instantiated by a type of fish and a type of weapon. But, *sister* is instantiated by two types of things, older sisters and younger sisters, and *sister* is not ambiguous. A second simple test is that we might find, or expect to find, other languages having different words for these two types of satisfiers. So we would expect that other languages would not share English's oddity of using the same word for this fish and this weapon. But other languages do use different words (or at least different suffixes) for older and younger sisters, and this is still insufficient for *sister* to be ambiguous.

The test they settle on for being most decisive is that a word is ambiguous if a single token of it could not be used to pick out an object from each of the two types of things to which it applies. Imagine that Jack owns a pike-fish and has an older sister, and that Jill owns a pike-weapon and has a younger sister. This is sufficient for the acceptability of (20), but not of (21).

(20) Jack and Jill each have a sister.

(21) *Jack and Jill each own a pike.

This *zeugma* is not obviously sufficient for ambiguity. Part of the problem is that (21) is not clearly defective in the way that sentences with, say, grammatical errors are defective. (22), from Dickens, illustrates how the same effect can be used for literary effect, and without indicating an obvious ambiguity.

(22) Mr. Pickwick took his hat, and leave.

This is all relevant because a similar effect arises for indeterminate terms.²¹ Recall our original example of indeterminacy: *Jack Sprat's house*. Assume that the old home and the carport each are 400 ft² large. Despite that, (23) is clearly defective.

(23) *Jack Sprat's 400 ft² house is 800 ft² large.

Just as in the case of ambiguity, we cannot here conjoin two acceptable claims into one acceptable claim. We can say *Jack owns a pike* and we can say *Jill owns a pike*, but not *Jack and Jill each own a pike*. Similarly, we can say *Jack Sprat's house is 800 ft² large*, and *Jack Sprat's house is 400 ft² large*, but we cannot conjoin these claims into (23).

So far, this is a mildly interesting point about the behaviour of indeterminate expressions in compound sentences. The problem here is that names, and denoting expressions generally, do not exhibit similar behaviour. If a denoting expression is indeterminate in reference between a stage and a lump, then we should find a similar effect. In the most obvious cases, however, we do not find this. So (24), for example, is perfectly acceptable.

(24) The tall man in the corner could have been the champion of the world.

If we take the lesson of the problem of temporary intrinsics to be that *the tall man* denotes a stage, and the lesson of Kripke's Humphrey argument to be that in sentences assigning modal properties, like (24), the subject is a lump, then (24) should be defective, like (21) or (23), or at least mildly odd, like (22). But we have none of these effects. This seems to be an important objection to the stage/lump theory.

The best response is to insist that the lessons of those problem cases is more subtle than that. First, it is not in cases assigning modal predicates, like (24), that reference is determinately to lumps. Rather, it is in sentences like *In twin earth, Humphrey wins the election*, where we directly talk about what happens in a particular world (or class of worlds) that reference is determinately to lumps.

²¹ These examples, and the underlying argument, are due to Tamar Gendler.

Secondly, it is not just in cases where we assign a temporary intrinsic property to an individual that reference is determinately to stages. In *Clinton is round*, it is indeterminate whether *Clinton* picks out a stage or a lump. It is only in the more rarefied setting of the metaphysical seminar, when we are discussing whether roundness is intrinsic to Clinton, and whether all of Clinton's duplicates are round, that such a determination is made. In particular, it is only when we have a conversational partner who insists that roundness is intrinsic, and in particular is intrinsic to Clinton, that we go along with the insistence that the reference be determinately to the stage. (Compare Lewis 1994 on the effect of having Putnam as a conversational partner on the meaning of *water*.)

There is some evidence that this is the right thing to say about cases like (24). Note that (25) almost has to be read elliptically.

(25) ?Humphrey won the election, in twin earth, and lost the election.

It is almost mandatory to read the last clause as short for *lost the election in the real world*. There is a good reason for that. In the first clause, *Humphrey* refers to a lump. Lumps do not win and lose elections *simpliciter*; even FDR loses elections in some possible world. But they, via their parts, do win and lose elections in various worlds. Some of them win elections in this world, and some of them, like Humphrey, lose elections in this world. So in (25), just like in (23), once the referent of a token is determined by one part of the sentence, it must keep that referent for the rest of the sentence. The argument from (24) was that we did not see this effect, so the hypothesis that reference was indeterminate was refuted. But since we do see it in other cases, cases more in keeping with the hypotheses about when reference is determined, the hypothesis still stands.

These cases do serve two vitally important functions within the dialectical picture. First, they provide a theoretical reason for not letting indeterminacy run out of hand. There should be evidence for indeterminacy; evidence like (23). Secondly, they put limits on when we can say reference is determined. The fact that (24) is not at all odd is a knock-down refutation of the simple theories about when reference is determined that I mentioned above. There are other theories about when

reference is determined which seem immune to such attacks, so the general hypothesis of indeterminacy still stands.

6.4 *Burden of Proof: Indeterminacy or Determinacy?*

Lewis says somewhere that the pastime of “debating which side bears the burden of proof” is “as useless as it is undignified.” (Lewis 1993b: 128) Nevertheless, this section will be about debating which side bears the burden of proof. So I should say a little by way of self-defence. In general, informal methods of reasoning, such as burden of proof arguments, are justified to the extent they are probabilistically sound²². That is, they are justified just in case they uncover appropriate grounds for raising the posterior probability of the desired conclusion. Most methods of reasoning which we use are, to a good approximation, methods for doing just this. Burden of proof debates are, I think, best understood as debates about the aptness of various prior probabilities. Many people will still think that this is as useless as it is undignified, because subjective probabilities are not subject to normative constraints beyond coherence. Our time is too short to outline how big a mistake that is, so I will just assume that we can properly discuss the aptness of various priors. If the prior probability of an ambiguity or indeterminacy is low, then the burden of proof is on the defender of the ambiguity or the indeterminacy to raise its probability. The denier of such an ambiguity can, if she merely refutes all the proposed arguments properly claim victory. At least, she can if the other side bears the burden.

When someone is trying to claim an ambiguity, it seems they bear the burden. One of Kripke’s objections to Donnellan’s distinction between referential and attributive uses of definite descriptions is that it posits a needless ambiguity (Kripke 1977). If the Russellian can explain the data without appeal to the ambiguity, she wins. This argument is not knock-down; we should compare the

²² The clearest exception is in the case of debates about logic, where it is far from clear what the underlying probability theory should be.

cost of the ambiguity with the cost of the resources which the Russellian uses, but it seems to be a legitimate move.

When someone is trying to claim an indeterminacy, not only do they face no burden, but there is an assumption they are correct. (That is, the prior probability that they are right is high.) When Quine (1960) argued for radical indeterminacy in natural languages, the main argument was that various incompatible theories were consistent with the data. Quine pointed out that all of the natives' uses of *gavagai* could be explained on the hypotheses that *gavagai* meant rabbit and that it meant undetached rabbit part. Indeed, each hypothesis explained the data without appeal to implausible semantic machinery. The most important critiques of Quine stressed that the rival theories were not, in certain cases, all compatible. Evans (1975), for example, argued that we would expect certain kinds of predication to vary on the two hypotheses, so some data would distinguish the two possibilities. However, no one argued as follows: "We agree, Quine, that your hokey theories are compatible with the data. The claim that *gavagai* means undetached rabbit part is not refuted by the data. But neither is the theory that *gavagai* means rabbit. Since you have provided no positive evidence in favour of an indeterminacy, as opposed to evidence that we cannot tell what the determinate content of *gavagai* is, we should still believe that it has some determinate content." If Quine was trying to argue that *gavagai* was ambiguous, he would have had to provide evidence in favour of an ambiguity. Since he was trying to argue that it is indeterminate, he merely has to show that various theories are compatible with the data.

So says received wisdom. I doubt received wisdom can be correct in both cases. The line between ambiguity and indeterminacy is too blurry to allow for such a radical methodological distinction. Recall my original example of ambiguity: *class*. Now that you have the concept of indeterminacy in front of you, are you sure it is ambiguous rather than indeterminate? Would Kripke's arguments lose all their force if Donnellan had instead claimed it was indeterminate whether ordinary definite descriptions had a referential or an attributive content? For all that, I think there is no burden of proof on the proponent of indeterminacy. Weak evidence in favour of indeterminacy,

such as evidence that various semantic theories are compatible with the data, is evidence enough. Evidence that an indeterminist theory does a better job of explaining the data than any determinist theory, which we saw in sections 4 and 5, should be easily sufficient.

6.5 *Easy Cases and Hard Cases*

Every theory we have discussed so far can explain most of our uses of singular terms. A completely absurd theory like the slice/second-half-worm theory could explain why it is true that *The Red Sox might win the pennant next year*. Philosophical discussion focuses on cases which are difficult for various theories, but we should never ignore the existence of all these easy cases. Indeed, it seems that most uses of singular terms in ordinary life are 'easy cases'; they are all compatible with all the rival theories.

The existence of the easy cases poses an intriguing question: how does the evidence we get from hard cases bear on the reference of terms in the easy cases? I defend a moderate answer to this question. In this subsection I argue that the hard cases are unlikely to show us that reference is fully determinate in the easy cases. In the next subsection I argue that they do show that reference is not radically indeterminate.

Sider (1996) takes the position that, although in some hard cases singular terms refer to worms, in easy cases they always refer to stages. The evidence for this is that in the bulk of hard cases, singular terms refer to stages. That is, in many hard cases, only the stage theory can provide a plausible theory of meaning which generates the right truth conditions for the target sentences. The clearest example of this is the fission cases we discussed in section 5. Sider concedes that in a few hard cases, the worm theory looks better than the stage theory, but that the cases in which the stage theory looks better are more numerous and more important. Let's assume he is right about that, for now, and that the stage theory does better on many more hard cases, but that lump or worm theories do better on a few.

His position still posits an odd kind of referential kinematics. Although *Clinton* picks out a stage in most appearances, when it has to do so, it changes its reference so it picks out a worm. How could this be? We are familiar with cases where the reference of indeterminate expressions is determined by explicit determination, or by charity considerations, but this referential leap is mysterious.

Many people say things like *Clinton should have been removed from office*. To someone opposed to Clinton's impeachment, this utterance would make more sense on the assumption that *Clinton* has something other than its usual reference, but we feel no inclination to assume that its reference does so helpfully shift. We don't, for example, interpret *Clinton* here as referring to Nixon even though doing so would be a more charitable interpretation of the words involved. Sider's position is that reference is normally to stages, but we explain the (rare) hard cases by saying that in those cases reference is to worms.

Granting Sider the evidence, there is a simpler explanation to hand. In ordinary contexts, *Clinton* is referentially indeterminate between a stage and a worm. This reference can be determined in various ways. We are more interested, perhaps much more, in the cases where it is determined to be a stage. But when necessary it can be determined to be a worm. We shun bizarre referential kinematics, and give a sociological explanation for the nature in terms of our interests of the data, rather than a semantic explanation.

If we take this worry about referential kinematics quite seriously, then we should think that the reference of singular terms will be shown to be indeterminate by *any* pair of cases where it is shown to be determined in different ways. This puts a rather large burden on the defender of determinacy. It may be a fair burden. If we are committed to normal referential kinematics, according to which reference can be determined but never altered to fit the needs of the situation, then we have a very low prior probability of semantic determinacy.

6.6 *Radical Indeterminacy?*

In most everyday cases, we could make sense of reference to, or quantification over, persons, by identifying people with livers.²³ When we ask *How many people are in the room?*, an answer given by counting livers will be appropriate. Of course there are some cases, call them hard cases, where this identification will not work. When we ask *Where is Jack Sprat?* after he has a liver transplant, we will not be amused to be directed to a waste storage facility. But, the defender of the liver theory might say, this just shows that, in some cases, reference to Sprat is determined to pick out something other than a liver. It is still possible that in easy cases, the reference is indeterminate between a liver and something else. Nothing that philosophers can show us by bringing up *recherché* cases can tell us what to say about normal, everyday cases.

The liver theory of reference is preposterous; we had better have a way of ruling it out. It is true that it is consistent with some cases that *Jack Sprat* picks out a liver. But there are no cases where we need to say that it refers this way in order to explain the data. We lose no explanatory power if we drop Sprat's liver from the set of things over which the reference of *Jack Sprat* is indeterminate. This suggests a methodological rule. The $\varphi_1/\dots/\varphi_n$ -theory is preferable to the $\varphi_1/\dots/\varphi_{n-1}$ -theory iff it can explain more data. That is, we are justified in adding φ_n 's to the set of things over which reference is indeterminate iff there are cases which can only be explained by this addition. And by *explained* here we mean, as usual, that a theory of reference can explain some sentences iff it can, in combination with a plausible theory of meaning, generate intuitive truth conditions for those sentences. This keeps the large burden on the defender of complete determinacy, but it rules out the radical indeterminacy threatened by the liver theory of reference. And given our methodological preconceptions, that balance seems about right.

²³ I owe this example to Ted Sider.

7 Lewis's Five Objections

Lewis (1986a) lists five objections to the lump theory. Most of these seem to carry across equally well to the stage/lump theory, so they need to be discussed. Two of the objections concern the way lumps are held together, one is about counting, one is about self-interest and the last about the counter-intuitive nature of lump theory.

7.1 *Trans-World Glue*

The general worry here is determining which stages are part of a particular worm and/or lump. That is, the worry is about how the worm or lump is held together. There are two ways in which this seems more problematic for lumps than for worms. First, the various parts of a worm are held together by a causal dependence of some parts on others. But since worlds are causally isolated, this cannot be the way that worms are held together. Secondly, to the extent that we need a similarity relation on top of the causal relation for worms, it is the similarity of one part to the nearby parts. Because there is no one-dimensional ordering of modal space matching the ordering of temporal space, the relevant similarities will have to be "a matter of direct similarity between the stages." (Lewis 1986a: 218). Presumably, a worm in another world can be part of my lump in virtue of its similarity on the whole to my worm in this world, so perhaps this should read, "direct similarity between the stages or worms."

It is hard to see what the objection here is meant to be. Assume we think there is a (salient) counterpart relation such that x is F in w iff x 's counterpart in w is F . Then the lump is just the fusion of all worms y such that y is a counterpart of x in some world. The counterpart relation will have to be determined by direct similarity, rather than similarity between adjacent parts or causal connections, but the lump can be determined to just the extent that the counterpart relation can be determined. There is some indeterminacy in the counterpart relation, but that just corresponds to some harmless indeterminacy regarding which lump is being referred to. The counterpart relation varies with our interests, but the lump to which we refer also varies with our interest. Indeed, just a few pages earlier,

Lewis notes that for formal purposes, lump theory can be treated as a harmless rewording of counterpart theory.²⁴ This supports the conclusion that the odd similarity relation between the parts is no barrier to there being reference to lumps.

Lewis's objections also presumes there is some particular importance attached to having parts connected by a causal relation. While it is true that some of the time we are interested in such individuals, this is not always the case. We will often talk about regular events, such as newspapers, comic strips, or sporting finals, as individuals. When we say, *The Los Angeles Times became less conservative in the 1960's*, we appear to be referring to one thing, a newspaper, which has distinct temporal parts, several of them appearing each day, but whose parts are not connected by the right kind of causal relation. Of course, there is some kind of causal connection between the various editions of the *Los Angeles Times*; for example, they have a common causal origin. But this does not seem to be the kind of connection posited by causal theories of identity over time. In general, it seems that when it is possible that the parts be causally connected, then we use the causal connection to individuate, but when this isn't possible, we don't. So it isn't surprising that when talking about lumps, we don't use causal connections to individuate.

7.2 Counting

Lewis acknowledges that the worm theory has to say odd things in cases of actual fiction. This is a cost, but only a small cost, for these examples are so obscure and bizarre, that we might expect the unexpected. The lump theory cannot use this excuse because "modality is different: pathology is

²⁴ Lewis says there are some extra assumptions needed to make the formal equivalence go through, but some of these can be dropped. The lumps Lewis is interested in are such that all parts are counterparts of all the other parts. The lumps used here are such that all parts are counterparts of one particular part, the actual part.

everywhere.” (Lewis 1986a: 220) When talking about anyone who might undergo fission, that is anyone at all, we have to acknowledge the presence of multiple lumps wherever they are.

One might be tempted by a contextualist response here, but it runs into some formidable formal difficulties. As Lewis notes in several places, most prominently “Elusive Knowledge”, modal quantification is usually restricted to ‘normal’ worlds. So we can truly say *Clinton can't serve a third term as President*, despite the existence of a world where the U.S. Constitution is changed to permit this, because such a world is outside the domain of quantification. Perhaps the lump picked out by *Clinton* is the fusion of Clinton's counterparts in normal worlds. This removes the problem that pathology is everywhere, but opens up other counterintuitive results.

Imagine a world, call it *w*, just like this one in respect of what happens in our solar system, but completely surreal outside of it. In other parts of the galaxy, people are undergoing fission, fusion, brain transplants and every other kind of philosophical torture imaginable. So *w* is clearly pathological for most people. While discussing *w* over drinks, we hear a CNN anchor say *Clinton is in India*, and wonder, Is what the CNN anchor just said true in *w*? It seems the answer must be *yes*, because Earth is the same in *w* as it is here, and CNN is veridical on facts about this world. So the anchor's term *Clinton* must refer to something in *w*, since what she said is true in *w*. This is despite the fact that she is not thinking about *w*, and it is well outside any domain of quantification about which she cares. So if any kind of contextualism about reference is true, it must be that reference is dependent on the worlds relevant to the audience, not the speaker. While this is not impossible, it seems a bizarre enough theory to ignore it here.

We can get by without contextualism. As noted in §5.1, there are several reasons to discount Lewis's suggestion that these cases pose a bigger problem for the lump theory than the worm theory. First, it isn't clear why the frequency of trouble cases in the actual world should be a problem. Secondly, every hard case for the lump theory can be converted to a hard case for the worm theory by considering the matching counterfactual. Thirdly, the puzzles here seem to parallel puzzles which everyone faces in lounge suite cases. In lounge suite cases, we have to either give up mereology, or

put some restrictions on counting. As I suggested in §5, there is a justifiable restriction which solves all these puzzles, so the lump theory is not threatened by counting cases.

7.3 *Self Interest*

“stages want to fulfil the remembered desires of earlier stages... That is what it means not to be a quitter... stages want to fulfil the foreseen desires of later stages: that is prudence ... Even if it is in the first instance the momentary stages that do the desiring, still a person through time is capable of collective self-interest. Not so across worlds. My this-worldly self has *no* tendency to make the purposes of its other-worldly counterparts its own.” (Lewis 1986a: 219).

As Lewis notes, this is no direct objection to the view that things not capable of self-interest, like newspapers or baseball parks, have parts in various worlds. But if it shows humans are world-bound, and we are inclined to metaphysical unity, it indirectly shows these things are world-bound.

In some respects, the disanalogy between other times and other worlds is not as strong as Lewis suggests. Speaking personally, I do not perform actions just because my prior temporal stages desired that I do so. Sometimes, when I still endorse the desires, I perform the acts, and sometimes, when I do not, I do not. Maybe it is the profile of the quitter to not reflexively endorse prior desires. Maybe it is the profile of the stubborn to reflexively endorse those desires²⁵. The situation is similar for future desires. There is a sense in which I perform actions because it will make my later self better off. I do the grading now so I can go to dinner tonight, rather than sentence my later stage to a dreary evening at home. But this is because I now desire dinner this evening, rather than because I am interested in the desires of that later stage. To see this, note that when I do not endorse my later desires, not only do I fail to act on them now, I act so as to prevent their satisfaction. Thus Ulysses ties himself to the mast, and I delete *Solitaire* from the computer. There is, at best, an indirect

²⁵ Or perhaps it is the profile of the believer in the fallacy of sunk costs!

connection between the desires of my other temporal parts in this world and my current actions. On the other hand, there is a fairly direct connection between the desires of some of my other worldly parts and my actions. Because I value ϕ 'ing, that is, because my perfectly rational (counter)part desires that I ϕ , I ϕ . (See Smith 1994 for a discussion and defence of this definition of value.) So to the extent that we view humans as aggregates which try to satisfy the desires of their other parts, it is the slice theory, not the worm theory, which draws the advantage. (The slice theory, recall, says that singular reference is to a fusion of temporal parts across worlds, but not across times.)

These considerations do not show that there is no argument from welfare against the lump theory, just that this argument fails when we adopt a preference satisfaction theory of welfare. Add this to the list of problems with that theory of welfare. (See Hausman 1995 for more serious problems.) I perform actions designed to make my later stages better off in objective ways. I now do things I would rather avoid so my later stages will have food, shelter and video games. I do not make such sacrifices for my other-worldly parts, even the perfectly rational parts. To the extent that I view myself as an integrated self, this shows that I am a worm not a lump.

It is not the worm theory, but the second-half-worm theory, which does best from these considerations. When I act now, the objective welfare of my *earlier* selves is absent from my prudential calculations. Why could this be? Perhaps the requirement of integration is that I act so as to maximise the welfare of those parts over which I have some causal influence. Hence the worm theory can explain why prudence permits me to discount my earlier stages, and the lump theory can explain why prudence permits me to discount my other-worldly parts. So one response to the argument from welfare is that other-worldly parts are, with good reason, treated in the same way in the prudential calculations as earlier stages. The good reason is that what happens to them is causally independent of what I do now.

There is a well-known problem about how to combine utilitarianism and modal realism. The utilitarian says we should maximise the welfare of all things. The modal realist says that all things include talking donkeys, gods desiring virgin sacrifices, and supporters of rival football teams. Must

we maximise their welfare too? No, says one proponent of the combined view (Lewis 1986a: ???). Despite our intuitions to the contrary, our moral judgements need not be universalisable. All that morality requires is that we maximise the welfare of things around here, modally speaking. If morality can be so restricted, then so can prudence. It is compatible with integration that we only care about the welfare of our parts around here, modally speaking. The second response to the argument from welfare is that it is no harder for the lump theorist to give an account of integration than it is for the modal realist to give an account of proper moral concern which ignores all those other-worldly things.

The second response might have little bite on those philosophers not convinced of modal realism. So my third response is directed at those who think Lewisian modal realism is false. There is much discussion, particularly in the environmental ethics and animal rights literature, about moral standing. Some things deserve consideration in our moral evaluations, and others can be properly ignored. Similarly, some parts deserve consideration in our prudential considerations, and others can be properly ignored. My spatial parts which are dysfunctional, or even malignant, are not considered when I work out what is in my best interests. (Removing my appendix is probably not in the best interest of my appendix, but this does not enter into my prudential considerations when deciding to do it, despite the fact that my appendix is undeniably one of my parts.) One criteria for being a part with prudential standing is *being concrete*. My ersatz parts are ignored, and properly so. Hence my lack of care for them is consistent with integration.

7.4 *Common People*

“[Lump theory] disagrees gratuitously with common opinion. After all, not all of us are modal realists; and those who are not (even the ersatzers) couldn't possibly think of ordinary things as having parts in many worlds.” (Lewis 1986a: 220).

This is a rather odd objection. Certainly it is important that we agree with common opinion about the nature of the objects of ordinary reference. Whatever its faults, speakers' intention surely plays some

role in determining reference. But why think that these intentions are to pick out world-bound objects? The whole point of Kripke's Humphrey example is that we do think the objects of our ordinary reference inhabit other possible worlds, at least as long as they are ersatz worlds. If the arguments so far, all based on ordinary intuitions, have supported the lump theory, that is evidence that lump theory is entailed by common opinion, from which it is hard to argue it disagrees gratuitously with common opinion.

8 Conclusion

In many parts of our survey, the lump theory has done the best of all the theories of reference with which we started. In some parts, particularly when discussing variable intrinsic properties and pre-theoretical metaphysical commitments, the stage theory came out on top. But in no part did the worm theory do best. In many cases it suffered from the faults of the stage theory and the worm theory. In some cases, such as the argument from welfare, it looked like it could have an edge but the argument turned out to be weak on close inspection. Hence if we think that singular reference is, in general, indeterminate between stages and lumps, there is no reason to think it is also indeterminate between those things and worms. In most fields of life the moderate theory accrues enough of the benefits of the extremes without their costs that it should be endorsed. Here the theory in the middle of the road really does get hit by cars going each way. The stage/lump theory, straddling the sidewalk on either side of the road, seems the safest refuge for now.

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