Ordinary Undetached Parts

Justin Mooney
University of Alberta
Jmooney90@gmail.com

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1. Undetached Parts

Here's a puzzle that continues to tease metaphysicians.[1] Dion is a human being and Theon is his left-foot-complement, i.e., that proper part of Dion which is composed of the atoms that compose Dion except for those which overlap his left foot. We know that Dion is distinct from Theon, since they have different properties. For example, Dion has two feet but Theon has one. But suppose Dion's left foot is cut off and destroyed. Dion seems to survive this ordeal, since a person can survive losing a minor part such as a foot. Theon seems to survive too, since it would be strange for Theon to

[1] The puzzle can be traced back as far as Philo of Alexandria and Chryssipus (Sedley 1982; Long & Sedley 1987: 171-172). A version of it also appears in William of Sherwood (1968: 60-61). Another instance of the problem was introduced to the literature by Wiggins (1968), who - perhaps mistakenly - took it to be a version of the puzzle due to Geach (1980: §110) which is now known as the problem of the many.

be destroyed by a mere extrinsic change, viz., ceasing to be attached to a foot. But with Dion's left foot gone, Dion and Theon are now in exactly the same place at exactly the same time, and they seem to be composed of all the same atoms. In short, they seem to be *coincident*. When numerically distinct objects are coincident, I will say that they are *co-located*. Since Dion and Theon are distinct, it follows that, if they are coincident, then they are also co-located. Unfortunately, the idea that material objects can be co-located does not sit well with common intuitions.

This problem has spawned a wide array of creative and interesting solutions.[2] Simons (1987) observes that it "brings together a number of crucial ontological issues, and has elicited the most varied responses. It is almost a touchstone for finding out important facts about a philosopher's ontology" (118). One solution, which I will call the *conservative solution*, distinguishes between ordinary and extraordinary undetached parts. Ordinary undetached parts are parts which are recognized in folk metaphysics, and extraordinary undetached parts are parts which are not recognized in folk metaphysics. (I will have something to say about the vagueness of this distinction in Section 2.) The conservative solution claims that only ordinary undetached parts exist.[3] Theon's existence is then denied on the grounds that Theon is an extraordinary undetached part, not an ordinary one, and this dissolves the puzzle. After all, there is no reason to worry that Dion is coincident with Theon if Theon doesn't exist. An important objection to the conservative solution is that it doesn't generalize

[2] Various solutions are defended by Wiggins (1968); van Inwagen (1981; 1990: 172ff); Hirsch (1982: 28-31, 57-61); Simons (1987, 118-127); Heller (1990: 19-20); Burke (1994, 2004); Olson (1995, 1997a, 2007: 59-60, 157-164); Sider (2001: 142-143, 152-153); Merricks (2001: 47-53, 135-136); Lowe (2002: 74-76); Brown (2005: 157-160); Baker (2007: 194-6); Jaworski (2016: 129-136); Carmichael (2020); Guillon (2021); and Sutton (2021: 90-93).

[3] The name is a nod to Korman's (2015:1) term, "conservatism." I am also following Korman in using the "ordinary"/"extraordinary" terminology, though I don't know whether he would endorse the distinction between ordinary and extraordinary undetached parts.

to all coincidence puzzles about undetached parts, for there are cases in which an object seems to become coincident with an *ordinary* undetached part. Call this the problem of ordinary undetached parts.

My aim is to sketch a novel solution to the problem of ordinary undetached parts. My solution will make use of two phenomena that, like ordinary undetached parts themselves, are present in our pre-philosophical view of the world: destruction by part loss, and phase sortal changes. However, I will not argue that my solution should ultimately be preferred to the alternatives in the literature. My aim is only to add it to the repository of available solutions worth seriously considering. I begin in Section 2 by outlining the conservative solution to the puzzle of Dion and Theon in a bit more detail. Then, in Section 3, I will introduce the problem of ordinary undetached parts. In Section 4 I sketch my novel solution to the problem of ordinary undetached parts. Finally, in Section 5, I will respond to some remaining objections to my proposal.

2. Extraordinary Undetached Parts

Here is a general schema for constructing coincidence puzzles like the Dion/Theon puzzle. Where φ and ψ are place-holders for sortal terms, there are a φ and a ψ at a time, t_1, such that the ψ is a proper undetached part of the φ, and the ψ is intrinsically suited to be (or at least to be coincident with) a φ. In the interval between t_1 and a later time, t_2, the φ loses all of its parts which do not overlap the ψ. This leaves, at t_2, a φ which is coincident with a ψ. In cases with this structure, each of the following seem true:

(S1) The φ at t_1 is not the ψ at t_1.

(S2) The φ at t_1 is the φ at t_2.

(S3) The ψ at t_1 is the ψ at t_2.

(S4) The φ at t_2 is the ψ at t_2.[4]

For any way of filling out this schema, the result will be an inconsistent tetrad of four propositions, and so at least one of them is false. For example, if we substitute 'person' for φ and 'foot-complement' for ψ, we get the Dion/Theon version of the puzzle. If we substitute 'cat' for φ and 'tail-complement' for ψ, we get Wiggins's (1968) version of the puzzle. And so on.

However, not all instances of the problem-schema are created equal. Some possible substitutions for ψ are sortals that correspond to what I will call *ordinary undetached parts*. An ordinary undetached part is an undetached part that is also an ordinary object, where an ordinary object is an object of a sort that features in folk metaphysics.[5] Other possible substitutions for ψ are sortals that correspond to what I will call *extraordinary undetached parts*, i.e., undetached parts which are not ordinary objects. Theon, Dion's left-foot-complement, is an example of an extraordinary undetached part.

Actually, this is probably too simple. It is likely that conceivable objects fall on a spectrum ranging from very ordinary to very extraordinary. They are ordinary to the extent that the folk are disposed to believe that they exist, or would be surprised if they did not exist, and exotic to the extent that this isn't true. But I will assume that things like feet are far enough toward the ordinary end of the spectrum to exist according to the conservative solution, and that foot-complements are not. Moreover, it doesn't matter whether borderline cases are classified as ordinary or extraordinary. For any such undetached part, if it is classified as extraordinary, then it will fall within the scope of the solution to the

[4] Expressions like "the φ at t_1" should be read as short for more complex descriptions that single out specific objects, such as "the φ that exactly occupies place p_1 at time t_1."

[5] I owe this characterization of ordinary objects to Patrick Grafton-Cardwell.

problem of extraordinary undetached parts that I will describe momentarily; and if it is classified as ordinary, then it will fall within the scope of the solution to the problem of ordinary undetached parts that I develop in Section 4.

Consider the following view, recently defended by Carmichael (2020): "Dion has a foot but no foot-complement. Theon does not and never did exist, but Dion's ordinary parts - his head, his feet, and so on - do exist" (207).[6] More generally, the view is that objects which fall at least as far along the ordinary end of the ordinary-extraordinary spectrum as heads, hands, and feet exist, while objects that fall at least as far along the extraordinary end of the spectrum as foot-complements do not exist. Since this view entails that there are no foot-complements, it also entails that Dion is not coincident with a foot complement, thereby dissolving the puzzle about Dion and Theon. This is the conservative solution to the puzzle. It follows from conservatism about objects in general, so it will appeal to those who are attracted to that more general view (e.g., Korman 2015).

The conservative solution is probably the least counterintuitive solution to the problem of extraordinary undetached parts. Compare it, for example, to one of its most popular rivals: the co-location solution. According to the co-location solution, Dion and Theon both exist, and when Dion loses his foot, he becomes co-located with Theon. More generally, objects which seem to become coincident with an extraordinary undetached part become co-located with an extraordinary undetached part, so corresponding instances of (S4) in the schema above are false. The co-location solution is counterintuitive in at least two ways. First, the claim that material objects are sometimes located in exactly the same place at exactly the same time is counterintuitive, and second, the further claim that material objects are sometimes made of exactly the same matter is also counterintuitive. Speaking for myself, each of these claims taken individually - and the combination of them especially - is much harder to swallow than the plausible thesis that there are no foot-complements.

[6] Similar views are defended by Brown (2005: 157-160) and Jaworski (2016: 129-136).

The conservative solution is plausible on its face, but that doesn't mean it faces no challenges. One of the main objections to the conservative solution claims that it is arbitrary to believe in ordinary undetached parts but not extraordinary ones.[7] I prefer to distinguish two versions of this objection: an epistemic version, which claims that there is no good reason to believe that ordinary objects exist but extraordinary objects do not, and a metaphysical version, which claims that there is no good explanation why ordinary objects exist and extraordinary objects do not. Let me explain briefly why I am not persuaded by either version of this objection.

Consider the epistemic version first. It seems to me there is a good reason to believe that ordinary objects exist and extraordinary ones do not, namely: there are stronger intuitions in support of ordinary objects than extraordinary ones. By my lights, it is very counterintuitive - even startling - to say that there are no heads, hands, or feet; it is not nearly so counterintuitive to say that there are no foot-complements. Of course, one can raise skeptical, debunking, and disagreement worries about these intuitions, but that would not revive the worry of arbitrariness. It is not *arbitrary* to believe something that is highly intuitive while also disbelieving something that is not nearly so intuitive, or maybe even counter-intuitive.

Now consider the metaphysical version of the arbitrariness objection. What relevant metaphysical difference explains why there are ordinary undetached parts but not extraordinary ones? Some proponents of the conservative solution might respond by denying that there is a metaphysical difference which plays this explanatory role. Perhaps facts about which composite material objects exist are brute (Markosian 1998),[8] or perhaps they are relative to a conceptual scheme (Putnam 1981), in which case a psychological rather than metaphysical explanation is in order.

[7] For discussion of this objection, see Olson (1995), Jaworski (2016), Carmichael (2020), and Yang (2022). Cf. Korman's (2010, 2015: ch. 8) treatment of the arbitrariness objection to conservatism about objects in general.

[8] Carmichael (2020: 7-8) makes this point, citing Markosian.

However, I also think it is entirely reasonable for the defender of the conservative solution to plead ignorance here. Intuitions about which objects exist provide a reason to think that there is a relevant metaphysical difference of some sort, even if it is as-yet unidentified. Carmichael (2020: 7-8) considers the plausible suggestion that an answer to the Special Composition Question which entails that there are, e.g., feet but not foot-complements would play the requisite explanatory role. I think he is exactly right when he says that "the fact that we have not produced a completely adequate commonsense answer to the special composition question… is an extremely weak reason to reject the existence of feet. This would be like claiming that we should not believe in chairs or knowledge because we have not succeeded in defining chairhood or knowledge. If this is what the arbitrariness argument amounts to, then the argument should convince no one" (7-8). I agree.

I conclude that the conservative solution is promising as a solution to the initial puzzle of Dion and Theon, and more generally to any instance of the puzzle schema where the substitute for ψ is an extraordinary undetached part. The real problem for the conservative solution is what to say about instances of the puzzle schema where the substitute for ψ is an ordinary undetached part.

3. Ordinary Undetached Parts

There are cases where an object seems to become coincident with an ordinary undetached part. For example, there is a well-known variant of the Dion/Theon case in which Dion survives (at least momentarily) after being beheaded, and so he seems to become coincident with his head, an ordinary undetached part (Burke 1994a: 132). The conservative solution doesn't work for this version of the problem. That is because, rather than entailing that the relevant undetached part, Dion's head, does not exist, the conservative solution entails that it does exist. So the proponent of the conservative solution needs a different approach here.

Carmichael (2020) recently offered a clever solution to the problem posed by Dion's beheading. He suggests that certain things inside Dion's head, such as blood cells and an electrical current, are merely contained in Dion's head but not parts of Dion's head (just like the fish in a fishbowl are contained in that fishbowl without being parts of it). But they *are* parts of Dion himself. That is because Dion is an event-based object, like a wave or a tornado. A wave's existence depends on the activity of certain water molecules, and each of those molecules is a part of the wave. Similarly, Dion's existence depends on the biological activity in his living body, including, e.g., the movement of blood cells through his head. So those blood cells are parts of Dion. If this hypothesis is correct, then, even after Dion is beheaded, he is not coincident with his head. He is not made of exactly the same atoms as his head, since the atoms composing the blood cells in his head are parts of Dion but not parts of his head. Nor is Dion located in exactly the same region as his head, since the regions occupied by the blood cells in his head are subregions of the region Dion occupies, but not subregions of the region his head occupies.

Carmichael's solution is ingenious, and might very well be correct. But while his solution seems to handle Dion's beheading, and (as he indicates) it can also be extended to similar cases involving other organisms, there are many instances of the problem of ordinary undetached parts that it doesn't seem to solve. Consider the following cases, each of which is at least a plausible candidate for an instance of the puzzle schema involving an ordinary undetached part:

1. *Tree*. imagine that a fallen tree (or log, if you prefer), which consists of only a trunk and a single, very small branch, loses that branch. Since a tree can survive losing a branch, the tree seems to survive this change and become coincident with its trunk. And tree trunks, like trees, are

ordinary objects. So we seem to end up with one ordinary object co-located with another (Hirsch 1982: 28-31: 57-61).[9]

2. *Jar*. Suppose I have an ordinary jar that consists of a glass body and a metal lid. And suppose I remove the lid and destroy it, leaving only a lidless glass jar. This doesn't seem to destroy the jar, since jars don't have to have lids, and it doesn't seem to destroy the glass body of the jar, since the glass body only changes extrinsically. But once the lid is gone, the jar and the glass body of the jar are coincident.[10]
3. *Cutting board*. Consider a cutting board composed of a piece of wood and a leather loop on one end by which the cutting board can be hung from a hook. If the loop is removed, then the cutting board seems to become coincident with its wooden part.
4. *Mug*. A typical mug has a cylindrical body and a handle. If the handle breaks off, the mug seems to become coincident with its cylindrical body. Although I think the mug's body is perhaps not a clear case of an ordinary undetached part, I think it is a plausible candidate.
5. *Door*. Imagine a door composed of a large, rectangular piece of wood and a brass doorknob. One day, the doorknob is removed. At that point, the door seems to become coincident with the rectangular piece of wood.
6. *Cloak*. Suppose there is a cloak that is composed of a single piece of cloth and a single button. If it loses its button, it seems to become coincident with the piece of cloth (Robinson 1982: 319).[11]

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[9] Noonan (2019: 205) attributes a version of this example to Saul Kripke. Noonan instructs readers to disregard the tree's roots. I have instead imagined a fallen tree that no longer has roots.

[10] I have imagined a case in which the lid is destroyed and not simply removed because I want to remain neutral about whether the lid continues to be part of the jar when it is merely removed.

[11] Stylistically, this list is inspired by a list of cases of another sort in Juvshik (2021).

7. *Tile*. Sutton (2014) describes a tile surrounded by a border of tiny tiles. Together, the central tile and its border of tiny tiles compose a tile that is only slightly larger than the central tile. Suppose the border of tiles breaks off of the central tile. Then the larger tile seems to become coincident with the slightly smaller central tile.[12]

In each of these cases, we can generate a puzzle by plugging the relevant sortals in for φ and ψ in the puzzle schema from Section 2. The first of these cases involves the remains of a now-dead organism, and the rest involve artifacts. In each of them, it is hard to find any atomic parts that don't seem to be shared by the apparently coinciding objects. A referee wonders if Carmichael's solution can be applied to the tree case by suggesting that the sap flowing through the trunk is not part of the trunk, just as the blood flowing through a human head is not part of the head. But this won't work for a fallen tree that is dead and completely dried out, lacking sap altogether. So, whether or not it is correct as far as it goes, Carmichael's approach to Dion's head doesn't seem to have any application here.

How then should the proponent of the conservative solution handle the problem of ordinary undetached parts? They could draw on the resources of an existing rival to handle cases like (1)-(7), such as the co-location solution. Perhaps cases of coincidence with an ordinary undetached part are genuine cases of co-location, even if there are no extraordinary undetached parts. Some will protest that, if we appeal to co-location to solve the problem of ordinary undetached parts, we could have done the same to solve the problem of extraordinary undetached parts, and so the conservative solution is redundant. But I think that conservatism is plausible independently of its utility for solving problems about undetached parts. My main worries about drawing on rival strategies like the co-location solution concern specific problems facing those rivals. For

[12] Sutton (2014) uses this case in a different way than I do. An anonymous reader suggested it as an example of the problem of ordinary undetached parts.

example, it turns out that the co-location solution has trouble handling at least some ordinary undetached parts. This is worth exploring briefly.

Consider (7), the tile case. In this case, a tile seems to become coincident with another tile. But same-kind co-location is not permitted by at least some versions of the co-location theory, e.g., that of Wiggins (1968).[13] And even if the co-location theorist permits cases of same-kind co-location, there are other issues. For each of cases (1) - (7), we can imagine a "reversed" version of the case which involves part gain instead of part loss. According to the co-location solution, when the larger tile loses its border, it becomes co-located with the central tile. But suppose I make an ordinary tile, and then add a border of tiny tiles around it. Now instead of two tiles appearing to converge on the same region, two tiles appear to diverge from the same region. What should the co-location theorist say about this case? One thing they could say about this case is that there was already a second tile co-located with the original before the border was added, and when the border was added, the tiles ceased to be co-located. This is a natural suggestion because it treats the corresponding cases of part loss and part gain symmetrically.

But it raises awkward questions too. Do all tiles have other tiles co-located with them that would cease to be co-located with them if someone were to add a border to them at some point? If so, then there are about twice as many tiles in the world as anyone supposed, and it turns out to be impossible to make just one tile. Anyone who makes an ordinary tile inevitably makes at least two co-located tiles. One way to avoid these counterintuitive consequences is to say that a newly-made, ordinary tile is only co-located with another tile if the maker intends to add a border to it. But suppose the maker doesn't intend to add a border, and someone else comes along later and adds one. Now we have two tiles that seem to have emerged from the same place at the same time, and yet, *ex hypothesi*, there was only one tile in that place at that time, rather than two co-located tiles. Another response the co-location theorist might try is to say that only tiles

[13] A point discussed by, e.g., Spaolore (2012).

which will later have borders added to them are co-located with other tiles. But in that case, wherever there is a borderless tile that will one day have a border added to it, there is also a second tile whose existence depends on something that hasn't happened yet. That strikes me as even more counterintuitive than the position that a material object's existence might depend on extrinsic changes. Better to deny instances of S3 in the puzzle schema than to go this route.[14]

There's a further problem. The tile case presses the co-location theorist to say that, in at least some cases, there are tiles which differ only in respect of which parts they can gain and lose. But there is nothing special about tiles. If there are tiles that differ only in those ways, then one might expect the same from other sorts of objects. E.g., one might expect there to be chairs that differ only in respect of which parts they can gain and lose, or tables, or hippos, or people that differ only in respect of which parts they can gain and lose. And yet most of us do not believe that there are any such things.

So the co-location solution struggles with at least some cases involving ordinary undetached parts. And yet it is cases like these which are among the most prima facie plausible candidates for genuine cases of co-location. Unlike the case of Dion and Theon, both objects involved are ordinary objects, and so both have the support of common sense. And unlike the case of Dion and his severed head, there are no plausible candidates for atomic parts that the two objects don't share after part loss occurs. If co-location happens anywhere, it happens here. The fact that the co-location solution struggles to handle cases like these is a reason to be skeptical that co-location ever occurs at all. So in the next section, I will propose a solution to the problem of ordinary undetached parts which takes it for granted that co-location is impossible.

[14] I am indebted here to Roach (2010) and Adams (1979), both of whom run arguments which exploit the idea that existence or identity facts do not plausibly depend on future events. Roach's argument is especially similar in that it concerns coincident entities.

4. A Phasalist Approach to Undetached Parts

Let's start with a different kind of coincidence puzzle. Suppose a piece of clay is molded into a statue. On the one hand, it seems that the piece of clay existed before the statue did, which would entail that the statue and the piece of clay are distinct. On the other hand, the statue and the piece of clay are located in the same place at the same time, which suggests that they are not distinct. So which is it? Some philosophers solve this puzzle by suggesting that being a statue is like being a child. A human can be a child temporarily and then grow into an adult. Likewise, a piece of clay can be a statue temporarily. When the piece of clay is molded statue-wise, it begins to be a statue, and if the piece of clay is squashed, it ceases to be a statue. So the statue is not distinct from the piece of clay it coincides with.[15] This view has been dubbed "phasalism," (Korman 2015: 203), because it claims that *being a statue* is what Wiggins (1967: 7, & 2001: 30) called a phased-sortal, and what is now called a phase sortal.

The phasalist solution to the statue puzzle doesn't carry over in a straightforward way to coincidence puzzles about undetached parts (Robinson 1982: 319; Burke 1994b: 592). If these cases were merely sortal changes, the phasalist could give them the same treatment that they give the statue. But they are not merely sortal changes; they are more like cases of fusion, where two objects which are manifestly distinct at one time apparently begin to coincide at a later time. The phasalist can say, e.g., that the tree begins to be a trunk when it loses its branch, but they cannot say that the tree begins to be the particular trunk that was formerly a distinct proper part of it.

[15] The phasalist solution to the statue puzzle is endorsed or at least suggested by Ayers (1974: 128); Jubien (2001: 6-7); Schwartz (2009: 613-615); Markosian (2010: 144); and Mooney (2021). Brown (2005: 99; see also 160-162) attributes a version of the phasalist solution to Aquinas.

Nevertheless, I think that a variant of the phasalist solution can be developed for cases like (1)-(7). I propose that, when a φ loses parts in such a way that it seems to become coincident with one of its ordinary undetached parts, a ψ, two things happen:

1. The original φ ceases to exist. For example, the tree ceases to exist when it loses its branch, the jar ceases to exist when it loses its lid, and so on. Contrary to appearances, these cases of part loss are destructive cases of part loss, for a reason that I will suggest below.
2. The ψ begins to be a φ. It does not merely begin to be *coincident* with a φ; it begins to *be* a φ. This is a phase sortal change. For example, the trunk begins to be a tree, the glass jar-body begins to be a jar, and so on. This is the distinctively phasalist component of the view.

On this view, the φ prior to part loss is distinct from the φ following part loss, and therefore instances of S2 in the schema from Section 2 are false. That's my proposal in skeletal form, but both components require elaboration and defense. I will take them in order.

According to my preferred view of ordinary material objects, constraints on the persistence of those objects include continuity constraints, such as spatiotemporal or qualitative continuity requirements. They might also include connectedness constraints, change-minimizing constraints, and constraints on composition. It is only constraints like these, and not independent requirements that objects retain certain sortal properties, that determine which mereological changes and which sortal changes objects do or do not survive. Consider mereological changes first.

Prima facie, ordinary objects survive some mereological changes and not others, and we can appeal to the above constraints on identity over time to explain why. For example, if there are continuity conditions on identity over time, then some cases of part loss may be destructive because they create discontinuities that objects cannot survive, while others are not destructive at least in part because they do not create such discontinuities. If seventy percent of a boulder were vaporized all at once, this would create a large discontinuity with respect to size, shape, and so forth that the

boulder plausibly does not survive; whereas if a very small chunk of the boulder were to break off, this would create only a small discontinuity with respect to size, shape, and so forth that the boulder plausibly does survive.

I propose that, alongside continuity constraints and their ilk, the impossibility of co-location is one of the constraints that governs which cases of mereological change objects do and do not survive. If surviving the loss of a part, in certain circumstances, would require an object to become co-located with one of its ordinary undetached parts, then the object does not survive losing that part. So the tree is destroyed when it loses its branch because it could only survive by becoming co-located with its trunk; the jar is destroyed when it loses its lid because it could only survive by becoming co-located with its glass body; and so on.[16] And it seems plausible to me that an anti-co-location constraint does not merely entail that cases where an object seems to become coincident with an undetached part are cases of destructive part loss, but rather it explains why they are destructive.

One might protest that the anti-co-location constraint does not require that, say, the tree is destroyed when it loses its branch. If co-location is impossible, then it can't be the case that both the tree and the trunk survive the loss of the branch, for then they would be co-located. But for all I have said so far, the tree could survive instead of the trunk. So what determines which of the two objects that are competing for the same space wins the competition?[17] One way to answer this question is to appeal to the thought that motivates instances of S2 in the puzzle schema: it seems that material objects cannot be destroyed by merely extrinsic changes. While the loss of the branch seems insignificant, it is at least an intrinsic change in the tree. The trunk, on the other hand, does not change in any intrinsic way when the branch is lost. So, given that objects cannot be destroyed by extrinsic changes, the anti-co-location constraint entails that the tree does not survive losing its branch.

[16] Thanks to a referee for this suggestion about why the original object is destroyed.

[17] I owe this objection to a referee.

What about reversed cases in which a part is gained and it seems that two objects emerge from exactly the same region? Consider the lidded jar and its glass body, the latter of which we can call B. When the jar's lid is destroyed at a time t_1, it ceases to exist, while B continues to exist but begins to be a jar. But what happens if a new lid is created for B at a later time, t_2? Now we again have both a lidded jar, and a glass jar-body. There are two stories we can tell about what happens to B at this point. According to one story, B is identical to the jar-body at t_2, and so undergoes another phase sortal change. It ceases to be a jar and returns to being a mere jar-body. This story is plausible insofar as B is perfectly continuous with the jar-body at t_2. If they are not identical, it is hard to see why not. According to the other story, B is identical to the jar at t_2, and so B continues to be a jar, but it gains a new part: a lid. This story is plausible because, just as jars seem to survive losing their lids, they also seem to survive gaining lids. So which of these stories is the correct one, and why?

I prefer the first story, which treats the addition of the new lid symmetrically with the loss of the old lid. Just as the loss of the old lid destroys the original jar, the addition of the new lid creates a new jar. And just as B begins to be a jar when the old lid is lost, it ceases to be a jar when the new lid arrives. The rationales for these changes are symmetric as well. Once the new lid is attached to B, there are now two jar-like objects again: a lidded jar and its glass body. At most only one of these objects is identical to B. And since there is no other jar or jar-body co-located with B (co-location being impossible), the other is an object which begins to exist when the lid is attached. But which is which? Just as it's plausible that material objects cannot be destroyed by merely extrinsic changes, it's also plausible that they cannot be created by merely extrinsic changes. An object that begins to have a lid as a part undergoes an intrinsic change, but an object that merely begins to be attached to a lid that is not part of it undergoes a merely extrinsic change. So it is the jar which is created when the new lid arrives, and it is the jar-body that is identical to B.

There is a further possibility that should be acknowledged. One could say that, when the new lid is attached to B, the lidded jar that comes into

existence is identical to the original lidded jar. This is possible provided that objects can exist intermittently.[18] But I will remain neutral on the possibility of intermittent existence and on the further question about whether, if intermittent existence is possible, cases like the jar are cases of intermittent existence.

It's important to notice that, because ordinary undetached parts are relatively sparse, cases where an object seems to become coincident with one of its ordinary undetached parts are also relatively sparse, and so objects will normally survive the loss of apparently insignificant parts. The anti-co-location constraint is only relevant when the loss of an insignificant part threatens to generate a case of co-location, and that only happens in cases like (1) - (7). So although a tree that has been reduced to just a trunk and one branch does not survive losing that branch, trees normally survive losing individual branches. And although a cloak made of a single piece of cloth and a single button doesn't survive losing its button, a cloak with other buttons will survive losing a single button. As for the jar, no simple glass jar with a metal lid survives the destruction of its lid, but many objects do survive the loss of similar parts, like a paperback book surviving the loss of its top cover. The upshot is that destruction by seemingly insignificant part loss is the exception, not the rule. And the same goes for creation by the addition of a new part. If I sew a button onto a coat that consists of a single piece of cloth, I create a new coat, but if I sew a button onto a coat that already has other buttons, then that coat merely gains a new part, and no new coat comes into existence. And the same goes for each additional button I might add. So creation by the addition of seemingly insignificant parts is likewise the exception, not the rule.

Indeed, the fact that creation and destruction by seemingly insignificant mereological changes is the exception rather than the rule helps to explain why these changes do not seem to create or destroy the objects that undergo them. If a tree normally survives losing a single branch - even a very large

[18] See Burke (1980) for a defense of intermittent existence. I owe the point in this paragraph to a referee.

branch - then the case of the one-branched tree resembles genuine cases of survival through part loss. And if the jar's lid is similar in relative size and importance to parts that objects survive losing, like the cover of a paperback book, or the top shelf of a shelving unit, then the case of the jar resembles genuine cases of survival through part loss. The intuition that the original object survives in cases like (1)-(7) may be tracking similarities like these. Since the conservative solution to the problem of extraordinary undetached parts entails that undetached parts are sparse (only the ordinary ones exist), persistence intuitions that track these similarities will be pretty reliable. But they will be wrong every now and then, when surviving the loss of a seemingly insignificant part requires becoming co-located with an ordinary undetached part.

Now turn to the second and explicitly phasalist component of my proposal. When the original tree is destroyed, the trunk begins to be a tree; when the original jar is destroyed, the glass jar-body begins to be a jar; when the original door is destroyed, the piece of wood begins to be a door; and so on. Obviously, this proposal is going to require that a lot of sortal properties are phase sortal properties, including *being a tree*, *being a jar*, *being a door*, etc. So how far does this go?

My view is roughly that all sortal properties of ordinary objects are phase sortal properties, and so no ordinary object can be created or destroyed merely by changing in sort.[19] Recall that, according to my view of material objects, constraints on the identity over time of ordinary objects might include various continuity, connectedness, change-minimizing, and compositional constraints. Prima facie, constraints like this can limit which changes objects survive without entailing that any sortal properties are substance sortals rather than phase sortals. Suppose a window pane shatters. The window pane could survive this only as the fusion of the shards or as one of the shards taken individually. But it can't survive as the fusion of the shards, because, on my conservative view of composition, there is no such fusion. The shards don't compose anything. And it can't

[19] Versions of this view are defended by, e.g., Price (1977) and Mooney (2021, 2022).

survive as one of the individual shards, because each individual shard is too discontinuous with the window pane (there is a big discontinuity in size, shape, mass, etc.). But none of this entails that the window pane couldn't, e.g., cease to be a window pane and begin to be the top of a glass table instead.

This phasalist metaphysics fits well with the conservative solution to the problem of extraordinary undetached parts. At first, they might not seem like a good match, because the conservative solution aims to respect our commonsense intuitions about what objects there are, while my phasalist metaphysics does not respect our commonsense intuitions about what changes those objects can persist through.[20] However, while the proponent of the conservative solution will presumably want to respect as many of our commonsense intuitions about ordinary objects as they can, it's well-known that they won't be able to respect all of them, since there are inconsistencies in what commonsense tells us about those objects. So the mere fact that phasalism is revisionary in some ways does not by itself make it a poor fit with the conservative solution. In fact, there are a number of reasons why phasalism should be quite attractive to the proponent of the conservative solution.

First of all, resisting our commonsense intuitions about the persistence conditions of ordinary objects seems significantly less revisionary to me than denying that those same objects exist. If there are no statues or trees (for example), then all of our commonsense beliefs about such things are false, rather than just some of our beliefs about their persistence conditions. That makes it easier to see, in principle, how those who assign a lot of weight to our commonsense intuitions about objects might find themselves believing in ordinary objects, including ordinary undetached parts, while also adopting the phasalist view of their persistence conditions.

Second, although phasalism violates some of our intuitions about the persistence conditions of ordinary objects, it also respects some of those intuitions. Maybe a statue can survive ceasing to be a statue, and a jar-body

[20] Thanks to a referee for encouraging me to address this worry.

can become a jar, but a window can't survive being shattered. Moreover, I think the intuitions that phasalism respects are stronger than the ones it violates. My intuition that a window ceases to exist when it shatters is stronger than my intuition that a statue ceases to exist, rather than merely ceasing to be a statue, when it is squashed into a lump.

Third, phasalism provides a solution to the statue coincidence puzzle and other puzzles like it that should be attractive to defenders of the conservative solution to the problem of extraordinary undetached parts. Phasalism is one of the least revisionary solutions to those puzzles because it solves them by appealing to an idea that we already believe in prior to doing philosophy. Though non-philosophers would never use the technical term "phase sortal change",[21] they do believe that there are such changes, like when a child grows into an adult. Rival solutions tend to appeal to more exotic notions like coincidence or temporal parts.

Finally, and relatedly, recall that the conservative solution to the problem of extraordinary undetached parts is an alternative to existing solutions that appeal to ideas like coincidence, temporal parts, and so on. So proponents of that solution are likely to have qualms about these alternatives. In that case, they need a solution to the problem of ordinary undetached parts, and to the statue puzzle and its ilk, that does not draw on any of these notions. Phasalism fits the bill.

I conclude that the conservative solution to the problem of extraordinary undetached parts and the phasalist solution to the problem of ordinary undetached parts make for a nice pair.

5. Objections and Replies

In this final section, I will consider objections to my phasalist solution to the problem of ordinary undetached parts. First, return to the case in which Dion is beheaded and seems to become coincident with his head. My solution to the problem of ordinary undetached parts seems to entail that,

[21] Thanks to Sam Cowling for this point.

in this case, Dion ceases to exist when he is beheaded. For he could only survive being beheaded by becoming co-located with another object, his head, and, *ex hypothesi*, it is impossible for distinct objects to be co-located. However, the popular psychological criterion of personal identity entails that Dion does survive his beheading, since his severed head is psychologically continuous with him (at least for a short time). So, on the strength of the psychological criterion of personal identity, my solution to the problem of ordinary undetached parts should be rejected.

One way to respond to this objection is to reject the psychological criterion of personal identity. I am inclined to accept animalism, the view that a human person is identical to a human organism or animal.[22] Animalists have independent reasons to reject the psychological criterion of personal identity, since there are a variety of possible cases where psychological continuity and connectedness seem to come apart from the persistence of an organism.[23] But maybe animalism only replaces the problem about psychological continuity with a similar problem. Some animalists say that Dion would survive as a brain if his whole brain were removed from his head (van Inwagen 1990: 172-181; cf. Olson 1997b: 44-46), or that he would survive as a cerebrum if his cerebrum were removed from his head (e.g., Madden 2016). In that case, surely he survives as his head when he is beheaded.[24]

However, it is certainly not obvious that Dion survives in these cases. Olson (1997) writes that "Removing your entire brain either kills the animal or reduces it to a mere detached brain… [T]he vital functions going on in the rest of your body immediately cease - just as they would if your entire head was removed" (47). The first alternative, that it kills the animal, is at least somewhat plausible. After all, survival for Olson is a matter of biological continuity (ibid. 16ff), and the biological continuity between Dion

[22] Animalism has a growing number of defenders. Prominent among them are Olson (1997b) and Snowdon (2014).

[23] Many such cases are discussed in Snowdon (2014).

[24] Thanks to a referee for (a version of) this objection.

and his severed head is minimal, given that most of Dion's organs, including most of his vital organs, stop functioning when he is beheaded. At best, Dion's beheading is a borderline case of animal survival.

Moreover, even if Dion's severed head is adequately biologically continuous with Dion prior to his beheading, I could qualify the biological criterion of animal identity. Above I suggested that, e.g., trees normally survive losing branches, but not when they can survive only by becoming co-located with another object. Similarly, I could say here that animals normally persist through biologically continuous change, but not when they can do so only by becoming co-located with another object.

Finally, for those who endorse the psychological criterion of identity, it can be retained by adopting Carmichael's (2020) solution to the problem of Dion's beheading, which I described in Section 3. If Carmichael is right that certain things in Dion's head, like blood cells, are parts of Dion but not parts of his head, then Dion's beheading is unlike cases (1)-(7). While the one-branched tree really could not survive losing its branch without becoming co-located with its trunk, and the lidded jar really could not survive losing its lid without becoming co-located with its glass body, Dion can survive beheading without becoming co-located with his head. This difference makes space for me to endorse Carmichael's solution to the puzzle about Dion's beheading, for the very fact which explains why the tree and the jar are destroyed - the fact that they could survive only by becoming coincident with another object - is not present in the beheading case.

Here's another objection. The story I have told about ordinary undetached parts could also be used to solve the problem of extraordinary undetached parts. Nothing about it depends on the idea that the undetached parts in question are ordinary rather than extraordinary. So why have I developed it as a supplement to the conservative solution rather than an alternative to that solution?

I suspect most philosophers who believe in extraordinary undetached parts will endorse the Doctrine of Arbitrary Undetached Parts, or something like it. According to the Doctrine of Arbitrary Undetached Parts, every subregion of the region that is exactly occupied by an object is itself

exactly occupied by a part of that object (van Inwagen 1981). This doctrine implies that instances of the puzzle schema from Section 2 are ubiquitous. Every time an object, O, loses an inessential part, P, O seems to become coincident with the arbitrary undetached part which is composed of all of O's parts except those that overlap P. And every time O gains an inessential part, P*, O seems to have been coincident with the arbitrary undetached part that is composed of all of O's parts except those which overlap P*.

Suppose we applied the phasalist solution to all of these cases of mereological change. This would entail that objects cease to exist every time they lose any part, and a symmetric story about gaining parts would entail that a new object is created every time a new part is added. In short, the phasalist solution collapses into a version of mereological essentialism, an existing solution to the problem.[25] Mereological essentialism is much more counter-intuitive than my hypothesis that objects are occasionally destroyed by changes they seem to survive. By contrast, if there are no extraordinary undetached parts, then undetached parts are sparse, as are the puzzle cases they generate. Nothing as radical as mereological essentialism follows from applying my phasalist proposal in these cases. So my proposal is more plausible when it is used to supplement the conservative solution to the problem of ordinary undetached parts.

But this leads to another objection. If my solution is not meant to be applied across the board to cases involving ordinary and extraordinary undetached parts, doesn't that put it at a disadvantage relative to solutions which can handle every instance of the puzzle in the same way? Consider, for example, the co-location solution, which claims that it is possible for distinct material objects to be co-located. In each instance of the puzzle, the object which loses one or more parts begins to be co-located with one of its undetached parts, whether ordinary or extraordinary. So when Dion loses his foot, he begins to be co-located with his foot-complement; when he is

[25] Chisholm (1976) defends mereological essentialism and applies it to a related problem (ibid: 157-158). Carmichael (2020) notes that Chisholm's view can solve the puzzle of Dion and Theon in particular.

beheaded, he begins to be co-located with his head; when the one-branched tree loses its branch, it begins to be co-located with its trunk; and so on.[26] Now I argued in Section 3 that the co-location solution struggles with at least some cases involving ordinary undetached parts, but even so, its approach to those puzzles is the same as its approach to cases involving extraordinary undetached parts.

It's important to keep in mind that my solution is meant to accompany the conservative solution to the problem of extraordinary undetached parts. Between the two of them, all instances of the puzzle are covered. So if views that solve all of the puzzles in the same way, such as the co-location solution, have some advantage over my own, the advantage lies in the uniformity of their approach. The thought is something simpler or otherwise attractive about giving each puzzle the same treatment.

I have two main points to make in response to this objection. First, it seems to me that the problem of extraordinary undetached parts and the problem of ordinary undetached parts are different in an important way which suggests that they ought to be solved differently. The difference has to do with the standing of extraordinary versus ordinary undetached parts in folk metaphysics. As I said in Section 2, going by our pre-theoretical intuitions, it is much less clear that there are extraordinary undetached parts than that there are ordinary ones. To that extent, it is natural to deny the existence of the former and not the latter, and consequently solve the two versions of the problem in different ways.

Second, while the co-location solution says that what is going on in the case of ordinary undetached parts is the same thing that is going on in the case of extraordinary undetached parts, my own view says that what is going on in the case of ordinary undetached parts is the same thing that is going on in cases of destruction by part loss. Likewise, I have suggested that a proponent of the conservative solution adopt the phasalist solution to the puzzle of the clay statue, which entails that what is going on in that kind of coincidence puzzle is the same thing that is going on in phase sortal changes

[26] A referee pressed me on this point.

like a child growing into an adult. More generally, my strategy is to solve coincidence puzzles by assimilating them to more ordinary phenomena. I think this approach exhibits an attractive balance of conservatism and parsimony that may appeal to those drawn to the conservative solution to the problem of extraordinary undetached parts. So while alternatives like the co-location solution have their attractions, my approach has important virtues of its own.

6. Conclusion

I have distinguished two different kinds of coincidence puzzles about undetached parts: those that involve extraordinary undetached parts, and those that involve ordinary undetached parts. One of the most plausible solutions to the problem of extraordinary undetached parts is the conservative solution, which claims that extraordinary undetached parts do not exist, but ordinary ones do. However, this solution does nothing to address the problem of ordinary undetached parts. For that reason, it needs to be supplemented with a solution to the latter problem. I have sketched and defended a novel solution to the problem of ordinary undetached parts. The solution is broadly phasalist insofar as it relies on the idea that the sortal properties of ordinary material objects tend to be phase sortal properties, and it is designed to accompany the phasalist approach to the coincidence puzzle about the statue and the piece of clay.

The phasalist solution to the problem of ordinary undetached parts has a number of virtues. It pairs well with the conservative solution to the problem of extraordinary undetached parts, which is arguably the least counterintuitive solution to that problem. And as a solution to the problem of ordinary undetached parts, it has what seems to me a very attractive feature: it assimilates cases of coincidence with an ordinary undetached part to an ordinary phenomenon, destruction by part loss, rather than something more exotic like co-location. Moreover, although it is counterintuitive, it does not strike me as more counterintuitive than its rivals, particularly not the popular co-location solution, given the extra

difficulties that emerge for the co-location solution when it is applied to certain cases involving ordinary undetached parts.[27]

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