

# Notes on The Grandfather Paradox\*

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1. Some time travel stories are blatantly inconsistent. There is no consistent way to say which events happen when. The first few scenes in *Back to the Future* depict Marty McFly's dad as extremely uncool throughout a particular stretch of time in 1985. The last few scenes in the movie depict Marty's dad as extremely cool throughout the very same stretch of time. If there is just one time line in this story (if it is not a story of time travel in branching time) — and that is how the story presents itself<sup>1</sup> — then this story is blatantly inconsistent.

But a time travel story may be inconsistent without being blatantly inconsistent. Even if we do not run into inconsistency when we list what events occur in the world of the story, we may run into a more subtle inconsistency somewhere else.

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<sup>1</sup>I think it is obvious that *Back to the Future* is not a story in branching time. Despite this (or maybe because of it) countless undergraduates have tried to convince me that it is. Here, just for fun, is one of my reasons for doubting this. On the branching time interpretation when Marty “returns” to 1985 he does not in fact arrive at the same spatiotemporal location that he left early in the movie. Instead there are two 1985s. At the beginning of the movie Marty is in 1985<sub>1</sub>; he gets in the DeLorean and travels to the past; then he travels forward to 1985<sub>2</sub>. Now Marty's parents (or the people who closely resemble his parents) in 1985<sub>2</sub> are not surprised to see him when he encounters them. They evidently believe they have a son called Marty who looks a lot like Michael J. Fox, even though this is the first day Marty has spend in the second time line. So there must be a near-duplicate of Marty (who was born in the second time line) wandering around. Where is he? If we are supposed to interpret the story as a story in branching time, shouldn't Marty run into his counterpart, since he is sleeping in his counterpart's bed and living in his counterpart's parents' house? A time travel story in branching time (one that is competently-told anyway) would be sensitive to these questions.

That is what is going on in the grandfather paradox.

In outline, the paradox is this. If time travel is possible then a time traveler could both have and lack a given ability on a given occasion. Since it is impossible to both have and lack a given ability on a given occasion time travel is impossible. This is not an inconsistency is what happens; it is an inconsistency in what modal properties the time traveler has.

We know how the stories go. Tim hates his (material) grandfather, Arthur, for things Arthur did long before he got married and had children. Tim builds a time machine and visits the past — 1921 to be precise — aiming to prevent Arthur from doing those things. Tim finds Arthur asleep, and stands over him preparing to strangle him.

Tim does not, in fact, strangle Arthur. Arthur lives long enough to have children, including Tim's mother. The question is: when Tim refrains from killing Arthur, is he *able* to, does he have it *in his power* to, kill Arthur instead?

It seems obvious that Tim is not able to kill Arthur. For if Tim were to kill Arthur on that night then Arthur would not have children and Tim would never be born and so would never exist. So if Tim were able to kill Arthur he would be able to make it so that he (Tim) never existed. But then by killing Arthur he would make it so that he both exists (he must exist to kill Arthur) and never existed. And no one is able to make a contradiction true.

But it also seems obvious that Tim *is* able to kill Arthur. Imagine someone else, Tom, not a time traveler, in a room much like the room Tim and Arthur are in, standing over someone, Robert, much like Arthur. Tom is able to strangle Robert. But Tom and Tim are so similar that they must have all the same abilities. We can imagine them being as similar as we like. Maybe they are even molecule for molecule duplicates. (So Tom believes (falsely) that his name is "Tim," that he is a time traveler, that the person before him is Arthur...)

Let's make this argument against the possibility of time travel completely explicit. It has three premises:

POSSIBILITY. If time travel is possible then it is possible for someone (let's just call him "Tim") to go back in time, locate the person X who is his grandfather, and get X within arm's reach.

ABILITY. If Tim were to go back in time, locate X, and get X within arm's reach, then on that occasion he would have the ability to kill X.

¬ABILITY. If Tim were to go back in time, locate X, and get X within arm's reach, then on that occasion he would lack the ability to kill X.

C. Therefore, time travel is impossible.

(I use the variable X because "Possibly, Tim kills his grandfather" has a *de dicto* and *de re* reading. I am only interested in the *de re* reading. Whether a sentence like this could be true on the *de re* reading but not on the *de dicto* reading is something I will return to.)

I said some things to motivate the premises ABILITY and ¬ABILITY. But I said nothing about POSSIBILITY. Could we defend the possibility of time travel by rejecting POSSIBILITY while still accepting ABILITY and ¬ABILITY? As a matter of logic this is possible: ABILITY and ¬ABILITY could both be true if POSSIBILITY is false. But I do not think that rejecting POSSIBILITY is interestingly different from rejecting ABILITY.

Rejecting POSSIBILITY means saying that (some) time travelers' freedom is limited. Maybe Tim is not able to get into the time machine in the first place. Or maybe he can but once he arrives in the past he is not able to get Arthur into arm's reach.

But if one is going to accept limitations on time travelers' freedom then it is hard to see why rejecting POSSIBILITY is better than rejecting ABILITY. Rejecting ABILITY also means saying that time travelers' freedom is limited. And I do not see how the limitations implied by rejecting POSSIBILITY are more plausible than those implied by rejecting ABILITY.

Since the question whether Tim is able to get in to the time machine in the first place raises just the same issues as the question whether Tim is able to kill Arthur, let's set POSSIBILITY aside and focus on ABILITY and ¬ABILITY. Which one should a believer in the possibility of time travel reject?

2. It is worth keeping in mind that there are many versions of the grandfather

paradox.<sup>2</sup> Each alleges that a time traveler both has and lacks a certain ability; but the abilities differ in the different versions. A solution to “the” grandfather paradox should show what is wrong with each of these arguments.

It is easy to see what is wrong in some versions. Joe travels to the past, not to kill his grandfather, but to kill his grandfather’s brother (his great uncle) John. In fact Joe does not kill John — he loses his nerve at the last minute. But was he able to? The reasons to think he is parallel the reasons to think that Tim is able to kill Arthur. But are there reasons to think he is not? We worry about whether Tim is able to kill Arthur because it at least seems like Tim would never had existed had he done it. But nothing like this even *seems* true for Joe. I see no reason to think that Joe would never had existed had he killed John.<sup>3</sup>

One might of course say that Joe is not able to kill John because he does not *in fact* kill John. But as others have pointed out that would be a mistake: people are very often able to do things they do not in fact do.<sup>4</sup> What makes Tim more of a threat to the possibility of time travel than Joe is that the argument that Tim is not able to kill his grandfather is better than this.

So some versions of the grandfather paradox are easier than the “official” version. Others are harder, or at least as hard. Versions that focus on time travelers interested in auto-infanticide are an example. Hollis, full of self-loathing, gets into

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<sup>2</sup>There are also “grandfatherish” paradoxes that resemble, but are distinct from, the paradox I aim to discuss. First among them is Paul Horwich’s argument [1987: 119-21]: if time travel will be discovered, many time travelers will repeatedly try to kill their grandfathers (or their younger selves); those attempts will result in lots of “coincidental” failures (failures caused by strange coincidences); since we have empirical evidence that repeated coincidences like this do not happen, we have empirical evidence that time travel will not be discovered. I will not say anything about this argument, which I think raises a different set of issues than the ones I discuss in this paper. Smith [1997] and Sider [2002] (among others) discuss Horwich’s argument.

<sup>3</sup>One might worry that the universe is chaotic: that even small changes in the past can “ripple outward” to make for large changes in the future. If that is right then it may be a reason to believe that Joe would never have been born if John had died young. But it is not a reason to believe that Joe would never have been born if John had died young *at Joe’s hand*.

<sup>4</sup>Lewis [1986] and Horwich [1975] make this point.

a time machine and visits his one year old self, intent on killing. But once he gets there he changes his mind and merely pats his younger self on the head. Is Hollis able to kill his younger self? Again contradiction threatens. If he were to exercise this ability, it seems, then he would never have existed.

What I aim to do in this paper is to defend the possibility of time travel by saying something general about what abilities time travelers definitely do have. What I say will not by itself entail, for each act type, whether a time traveler in some given time travel scenario is able to perform an act of that type. So it will not give a verdict, for each version of the grandfather paradox, about which of the analogue of ABILITY and the analogue of  $\neg$ ABILITY is true. But what I say will undermine the motivation for ABILITY in the standard versions of the paradox. This is important because some philosophers, in the grip of that motivation, appeal to controversial metaphysical theses to defend ABILITY. I aim to show that a coherent response to the grandfather paradox does not require these controversial metaphysical commitments.

**3.** Maybe the best-known response to the grandfather paradox is David Lewis's.<sup>5</sup> David Lewis proposed a contextualist solution to the grandfather paradox. He said that we (defenders of the possibility of time travel) do not have to choose, once and for all, which premise to reject. He argued that there is a context in which ABILITY is true and the argument I gave for it is sound. And that there is also a context in which  $\neg$ ABILITY is true the argument I gave for it is sound. They are just not the *same* context. There is no single context in which it is true to say "Tim is able to kill" and "Tim is unable to kill." Here is the central passage in which Lewis defends this claim:

To say that something can happen means that its happening is compossible with certain facts. *Which* facts? That is determined...by context. An ape can't speak a human language — say, Finnish — but I can. Facts about the anatomy and operation of the ape's larynx and nervous

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<sup>5</sup>Lewis's response is widely accepted; two philosophers who endorse it in print are Sider [1997], [2002] and Carroll [2010].

system are not compossible with his speaking Finnish. The corresponding facts about my larynx and nervous system are compossible with my speaking Finnish. But don't take me along to Helsinki as your interpreter: I can't speak Finnish. My speaking Finnish is compossible with the facts considered so far, but not with further facts about my lack of training. What I can do, relative to one set of facts, I cannot do, relative to another, more inclusive, set. [1986: 77]

Of course, the word "can" does not appear in the arguments I gave above; but "S can A" may be used as a synonym for "S is able to A," and Lewis thinks that what he has said about "can" applies just as well to "able to."

Let me re-state Lewis's view. His view is that "S is able to A" expresses different relations in different contexts.<sup>6</sup> Each context C determines a kind of fact F(C) (or perhaps several kinds) that is relevant to ascriptions of ability in that context. So in C "S is able to A" expresses the relation *S's Aing is compossible with all facts of kind F(C)*. When I gave the argument that Tim is able to kill Arthur the relevant facts did not include, for example, the fact that Arthur is Tim's grandfather, or the fact that Arthur exists in 1945. Since Tim's killing Arthur is compossible with those facts, "Tim is able to kill Arthur" expressed a truth in that context. When I gave the other argument a different set of facts was relevant, one that does include facts like the fact that Arthur is Tim's grandfather and the fact that Arthur exists in 1945. So in that context "Tim is able to kill Arthur" was false. But because there has been a shift in which relation "able to" expresses we do not have a single proposition that is both true and false and the argument is not sound.

**4.** I am convinced that the contextualist solution to the grandfather paradox does not work. But I will not try to present a comprehensive refutation of it here. I am

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<sup>6</sup>John MacFarlane [2009] argues that contextualism about some predicate should not be defined as the view that that predicate expresses different relations in different contexts. Instead, he says, we should recognize "non-indexical" forms of contextualism, which say merely that the predicate has different extensions in different contexts. But nothing in this paper turns on the distinction between indexical and non-indexical forms of contextualism. So for convenience I will speak in the language of the indexical contextualist.

just going to say a few things about Lewis's defense of it.

I have presented the grandfather paradox as a paradox about what abilities time travelers have. (Lewis does the same.) But the idea behind the paradox is that the possibility of time travel is inconsistent with some claims about time travelers' free will. Now the connection between freedom and ability is usually stated like this:

- (1) S acted freely when he Xed if and only if he was able (on that occasion) to perform some alternative to X.

But once one entertains the thesis that "S is able to A" is context-sensitive one needs to be careful about the status of (1). For if "S is able to A" is context-sensitive then so is (1). And then it is possible that in some contexts (1) is false.

Of course the falsity of (1) does not *follow* from the thesis that "S is able to A" is context-sensitive. For all that has been said so far it could be that "S acted freely when he Xed" is also context-sensitive, and the context-sensitivity of these two expressions is linked so that (1) remains true when a shift in context induces a shift in what relation "is able to" expresses.<sup>7</sup>

But in fact I think this is false. Right now I am typing at my computer. And there is dry land all around — no largish bodies of water for quite some ways. Now let us be in a context C in which "BAS is able to swim" is true. (Of course I can swim — I learned as a child and practice every Sunday.) I submit that it does not follow from this that "BAS acted freely when he typed" is also true in C. (Of course I think this sentence *is* true C; what I deny is that its truth in C follows from the truth in C of "BAS is able to swim.") But if (1) were true in all contexts this would follow; so (1) is not true in all contexts.

What is true when there is no water nearby is that I have the "general ability" to swim. But I lack the "ability and opportunity" to swim.<sup>8</sup> And freedom goes with

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<sup>7</sup>Carroll [2010: 89] explicitly endorses this claim.

<sup>8</sup> Peter Van Inwagen [1983: 8-13] tries to isolate the sense of "is able to" that is relevant to questions about free will and distinguish it from other senses. "General ability" is one of the senses he distinguishes it from. I should mention here that Van Inwagen's discussion leaves me unsure whether to classify "can" and "is able to" as

ability *and opportunity* to do otherwise. (Or, since we are discussing contextualism: in any context “freedom” goes with “ability and opportunity.”)

Since the grandfather paradox is a paradox about time travel and free will the contexts that matter for evaluating premises ABILITY and  $\neg$ ABILITY are contexts in which (1) is true. What the contextualist needs to show is

(2) *Even limiting our attention to contexts in which (1) is true* ABILITY is true in some contexts in false in others.

**5.** The example Lewis uses to motivate contextualism about ability does not support (2). He imagined someone who has never been exposed to the Finnish language saying something like

An ape can't speak Finnish, because he just does not have the right “equipment,” but I can. But do not bring me to Finland as your interpreter; I can't speak Finnish.

Lewis says that the context shifts after the first sentence. But it is obvious that the context the first sentence is in is one in which (1) is false. In that context “can” expresses a relation such that having a normal and functioning human larynx is sufficient for bearing that relation to the act-type of speaking Finnish. This is relevantly like the context above in which having taken a bunch of swimming lessons is sufficient for bearing the relation expressed by “can” in that context to the act-type of swimming.

**6.** So even if Lewis succeeds in in this passage in establishing that “can” is context-sensitive, he says nothing in it that supports (2). Are there things Lewis says elsewhere in the article that support (2)?

Here is one defense of it that some of his later remarks suggest. We might initially have thought that the (unique) relation that is expressed by “S is able to A” in contexts in which (1) is true (let these be the “relevant” contexts) is *S's Aing was* context-sensitive or as ambiguous. But which classification better fits the semantic facts makes no difference to the philosophical thesis I am interested in defending.



*compossible with the facts about the past.* In time travel scenarios, though, there is no such thing as “the past.” There are *two* pasts: the “objective” past and the time traveler’s “personal” past. Tim stands over his grandfather in 1921. So the objective past of Tim’s act includes all and only times earlier than 1921. But the personal past includes events that occur objectively after 1921 — like, for example, Tim’s getting in the time machine in (say) 1985.

The line of thought I am pursuing now continues: once we recognize the distinction between the objective and the personal past we should admit that in some relevant contexts “S is able to A” expresses *S’s doing A was compossible with facts about the objective past*; and in other relevant contexts it expresses *S’s doing A was compossible with facts about S’s personal past*. The suggestion might be made then that (i) we have here two different kinds of relevant contexts, and (ii) ABILITY is true in one and  $\neg$ ABILITY in the other.

I think this defense of (2) goes wrong at the very beginning when it says that “S is able to A” expresses the same relation as “S’s Aing is compatible with facts about the past” in any context in which (1) is true. That is just wrong. Focus on a non-time-travel scenario — say the scenario I am currently in as I type — so we can ignore the difference between the objective past and my personal past. It is compatible with facts about the past that I flap my arms and fly right now. There is no metaphysical impossibility in the past’s being just as it is while the present contains a flying me rather than a sitting me. But this fact does not bear one way or another on whether I am acting freely right now as I sit here and type. That my acting in a certain way is compatible with facts about the past does not entail that I am able to perform that act in the (or a) sense of “able” that is relevant to questions about free will.

Of course we could strengthen the claim about what “S is able to A” means: we could say that in contexts in which (1) is true “S is able to A” expresses the same relation as “S’s Aing is compatible with facts about the past and the laws of nature.” It is *physically* impossible for me to fly by flapping my arms (given the actual structure of my body).

The problem with this proposal is that it makes the thesis that free will is incompatible with determinism true in all relevant contexts. Now maybe free will

is incompatible with determinism. But Lewis did not think so. So he would reject this attempt to make his contextualist solution to the grandfather paradox work. And I take it his contextualist solution would be far less appealing if endorsing it required one to be an incompatibilist.

7. Lewis is certainly right that “is able to” is context-dependent (or, at least, ambiguous; see footnote 8). But we have not seen a good argument that, *in contexts in which (1) is true*, “is able to” does not always express the same relation.

Just after Lewis explains his contextualist solution he says a few things about fatalism, the thesis that necessarily no one ever acts freely. It might be thought that what Lewis says about fatalism lends some support to his contextualist solution to the grandfather paradox. But this is not so.

Here is what Lewis says about fatalism:

Fatalists...are philosophers who take facts we count as irrelevant in saying what someone can do, disguise them somehow as facts of a different sort that we count as relevant, and thereby argue that we can do less than we think...I am not going to vote Republican next fall. The fatalist argues that...I not only won't but can't; for my voting Republican is not compossible with the fact that it was true already in the year 1548 that I was not going to vote Republican 428 years later. My rejoinder is that this is a fact, sure enough; however, it is an irrelevant fact about the future masquerading as a relevant fact about the past, and so should be left out of account in saying what, in any ordinary sense, I can do.

[1986: 78]

This is an excellent reply to one standard argument for fatalism. But it does nothing to support Lewis's proposed contextualist solution to the grandfather paradox. In fact this passage marks a slide in Lewis's paper toward a *non*-contextualist approach to the paradox. Let me explain.

The contextualist response to fatalism says that fatalists, when they give their arguments, get us into a context in which facts about the future are relevant to what abilities we have. In that context “No one is able on any occasion to perform an

act other than the one he does in fact perform” is true. But in normal contexts facts about the future are irrelevant and this sentence is false. But this is *not* Lewis’s response to fatalism. He does not accuse the fatalist of changing the context.<sup>9</sup> He seems to assume that both before and after a fatalist begins to argue for his view “S can A” expresses (something like) *S’s Aing is compossible with facts about the past*. What Lewis does instead is accuse the fatalist of trying to trick him into thinking that a certain fact that is irrelevant (according to these fixed standards) is relevant. That is a very different accusation.

When Lewis returns to the topic of time travel later in the paragraph he suggests that opponents of the possibility of time travel are doing the same kind of thing fatalists do: they are trying to trick us into thinking that Tim lacks the ability to kill by disguising an irrelevant fact so that we mistake it for a relevant one. Lewis says that when we are discussing time travel “we’re on less familiar ground, so it may take less of a disguise to fool us. Also, new methods of disguise are available, thanks to the device of personal time” (78). If (as Lewis says here) we are “fooled,” then we *falsely* believe that the argument we are hearing is sound. That is, if we are fooled then the argument is *unsound*. But this is not the contextualist response. Contextualists say that when the opponent of time travel delivers the argument that Tim cannot kill (to a cooperative audience) he changes the context to one in which his argument *really is sound*.<sup>10</sup>

Maybe this is a good way to defend time travel. Maybe we could say that the opponent of time travel, in his argument for  $\neg$ ABILITY, has disguised some fact that is irrelevant to Tim’s abilities to make it look like a fact that is relevant. My point here is that this is *not* the contextualist response that Lewis articulates

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<sup>9</sup>Well, on most views the context typically changes whenever anyone makes an assertion. What I mean is that Lewis does not accuse the fatalist of changing the context in a way that changes what relation “can” expresses.

<sup>10</sup>My claim is not that what Lewis says is *incompatible* with contextualism about “can.” A contextualist could say that Lewis is being uncooperative and refusing to let the context change to one in which  $\neg$ ABILITY is true. But Lewis’s response to fatalism and the analogy he draws between fatalism and the grandfather paradox does not *require* contextualism. It works just as well if contextualism is false. And if one is a contextualist then this response is unnecessary.

on the previous page of his paper. The discussion of fatalism does not support the contextualist response; it inspires a distinct response.

**8.** I have been discussing the weaknesses in Lewis's motivation for a contextualist solution to the grandfather paradox. But maybe Lewis was just a "B+" defender of the contextualist solution. That his arguments for it are bad does not show it is false.

In fact there is another formulation of contextualism due to John Hawthorne that might look better [Hawthorne 2001]. His version bypasses worries about the connection between "ability"-talk and freedom. It is directly a contextualist theory of "freedom." It says, more or less:

"X acted freely when he Aed" is true in a context C iff there is no set of events causally sufficient for X's Aing — of the kinds that are not properly ignored in C.

This version of contextualism is designed to make sense of our inclination to affirm that we often act freely up until we start thinking hard about the fact that the present is determined by the exact past state of the universe, or that our behavior now is determined by the neurological state of our brain and immediate environment a few seconds ago. The idea is that in "ordinary" contexts it is okay to ignore causes of our behavior like the entire state of the universe at some past time, or the neurological state of our brain. And if we ignore those kinds of causes of our behavior our behavior is not determined by prior causes.

Could this form of contextualism help with the grandfather paradox? To answer this we need to know what determines which kinds of causes are properly ignored in a given context. Different contextualists might answer this in different ways. But the most natural answer leaves us with a theory that does not solve the grandfather paradox. That natural answer says that if a kind of cause is salient to the parties of a conversation then the context in which that conversation takes place is one in which that kind of cause is not properly ignored. When talking to the man on the street about happenings on the square I am entitled to ignore the neurological determiners of my behavior, and so "BAS is acting freely" is true in that context.

But if someone starts describing in detail the neurological determinates of people's behavior the context changes to one in which the sentence is false.

But when people discuss the grandfather paradox *everyone knows* that there are future causes of Tim's behavior. Given the common knowledge of, and salience of, these causes, this version of contextualism must say that ABILITY is false.

Of course a sophisticated contextualist can get around this problem. He might say that rehearsing the argument for ABILITY manages to make the future causes less salient. Or he might cite some other factor that determines what kinds of causes are properly ignored, and say it comes into play in this case. Whether some other version of contextualism gets the right verdict is going to depend on the details. And it *does* depend on the details. There is no reason to be confident ahead of time that the correct theory of how "can," "ability," and "free" are sensitive to context will provide a context in which ABILITY is true and a context in which it is false. Lewis's few remarks certainly do not give us reason to be confident.<sup>11</sup>

**9.** So let us set contextualism aside, and assume that "able to" expresses the same relation in all relevant contexts. The question I started with, back at the beginning of this paper, was: is ABILITY true or false?

In a well-known paper Vihvelin [1996] argues against ABILITY (and so for  $\neg$ ABILITY) this way. She invokes the principle

(3) If S is able to A, then had S tried to A, S might have succeeded.

Since (she argues) Tim would have failed to kill Arthur if he had tried, he is not able to kill Arthur.

This argument is not very good. As Vranas [2010] notes, (3) is false. Some people can (and frequently do) perform acts of a given type as long as they do it "automatically," without thinking. But *trying* to perform an act of that type would leave them flustered and they would fumble the job.<sup>12</sup> (I have heard that when, say,

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<sup>11</sup>A complementary discussion of Hawthorne's version of contextualism is [Feldman 2004]. He argues that Hawthorne's contextualism is not much help in solving the puzzle about freedom and determinism.

<sup>12</sup>This counterexample to (3) is a kind of backwards version of the examples that

baseball pitchers start focusing on their technique, start *trying* to throw the ball a certain way, they fall apart and lose the ability to pitch well.)

In more general terms the problem with (3) is this. If S is able to A then, obviously, there is some possible world in which S As. Roughly speaking, (3) says that one of these worlds is among the closest world in which S tries to A. But this need not be so. Sider [2002] develops this point by focusing on the fact that counterfactuals are context-sensitive and (he claims) owe their context-sensitivity to contextual variation in the standards for closeness of possible worlds. Suppose Ben never gets married; he is a permanent bachelor. But there was nothing stopping him from marrying. He was open to the idea, dated plenty of women, and just never met the right person. Ben was able to get married. Still, in a given conversational context the fact that Ben never gets married might be so salient that the closest possible worlds in which Ben tries to get married are ones in which he is still a permanent bachelor. So even though he was able to marry, “if he had tried he would have failed” is true in that context.<sup>13</sup>

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refute the conditional analysis of ability. A simple version of that analysis says that S was able to A if and only if, had S chosen to A, S would have Aed. But consider Smith, who is contemplating a bowl of red candies. Smith is deathly afraid of the sight of blood. But the candies are the same color as blood. Due to his phobia Smith is unable to choose to eat one of the candies. We may assume in this case that choosing is the only “path” to eating, so Smith’s inability to choose entails an inability to eat one of the candies. Still, if Smith *had* chosen to eat one of the candies he would have (he’s coordinated enough not to fumble the candy once he chooses to eat one, and no hidden demons are waiting to interfere with the normal connection between choosing and eating). Smith was unable to eat, even though he would have eaten had he chosen; the people in Vranas’s example are able to X, even though it is false that they would have if they tried. There are also connections between Vranas’s example and the use of finkish dispositions as counterexamples to conditional analyses of dispositions (see [Lewis 1997] and [Manley and Wasserman 2008]). (I get the example of Smith from Peter Van Inwagen’s long discussion of conditional analyses of ability [1983: 115-16]; he attributes it to Keith Lehrer.)

<sup>13</sup>Carroll [2010: 89] says that Sider here makes a “minor mistake.” That is because Carroll thinks that the context-sensitivity of “is able to” is correlated with that of “if” so that (3) is true in every context. But Vranas’s counterexample to (3) shows that this is wrong.

So much for a bad reason to reject ABILITY. Is there a better reason? Well, ABILITY and  $\neg$ ABILITY are contraries. So the “standard” argument for  $\neg$ ABILITY (which I gave above) is also an argument against ABILITY. That argument starts from a claim about what would have been the case if Tim had killed Arthur:

- (4) If Tim were to kill Arthur on that night then Arthur would not live to have children and so Tim would never be born and so would never exist.

So, the argument goes, if Tim were able to kill Arthur he would be able to make it so that he never existed. But then by killing Arthur he would make it so that he both exists (he must exist to kill Arthur) and never existed. And no one is able to make a contradiction true.<sup>14</sup>

Some have challenged (4). Lewis, for one, suggests that if Tim had killed Arthur then Arthur might have been resurrected [1986: 80]. Is that right? Is resurrection even possible? Even if it is, is it compatible with what we know about the world Tim and Arthur live in?

I don’t know. But we can bypass the issue by setting aside the question whether Tim was able to kill Arthur and focusing instead on a different ability. Was Tim able to *permanently* kill Arthur, kill him so that he remains dead?<sup>15</sup> Maybe (4) is at least a correct description of what would have happened if Tim had permanently killed Arthur.

Friends of ABILITY do not think so. One popular suggestion is: if Tim had permanently killed Arthur then Tim would not have had Arthur as his maternal grandfather. (This suggestion is also due to Lewis. Note that this suggestion is aimed at defending the truth of “Tim is able to kill his grandfather” read *de re*. It seems to concede that this sentence is false on the *de dicto* reading.)

Is this plausible? Kripke [1980] famously defended the view that something’s origins are essential to it. If Kripke’s view is correct then it is metaphysically impossible for Tim to have anyone other than Arthur as his material grandfather, and this suggestion is false. (Vihvelin [1996] also makes this point.)

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<sup>14</sup>Horwich [1975: 443] says some things that suggest that he endorses this argument. Perszyk and Smith [2001] definitely endorse it.

<sup>15</sup>Sider [2002] also focuses on this particular ability.

But maybe the doctrine of essentialism about origins is false. Still, rejecting essentialism about origins is not enough to defend the analogues of ABILITY in all versions of the paradox. It certainly does not help with versions that focus on auto-infanticide. Think back to Hollis poised to (permanently) kill his younger self. If he had permanently killed his younger self then he would have both died (permanently ceased to exist) at age 1 and also survived past age 1. That contradiction does not disappear by saying that if he had killed his younger self then he would have had different parents.

There is more metaphysical tap-dancing that has been done to try to make sense of the possibility that someone kills his younger self. I don't think that tap-dancing is necessary to have a good solution to the grandfather paradox. To see why let us leave this example aside, step back, and take a wider view of what is going on.

**10.** What we want is some systematic way to think about all versions of the grandfather paradox. Each version will focus on some act some hypothetical time traveler performs; the question is whether the time traveler's freedom was limited on that occasion, whether he was able to perform some specified alternative. Should we say the same thing in all cases — that he is always able? If not, we should have some simply-statable principle that lets us sort the cases into those in which the time traveler has the ability in question and those in which he is not.

Some who defend ABILITY have a principle like this in mind. (It is a principle that the argument for ABILITY, the one that invokes Tom the non-time-traveler, implicitly invokes.) The principle is this:

- (5) Time travelers have all the same abilities (or, at least, can have all the same abilities) as similarly situated non-time-travelers.

Sider, for example, says that he is trying to show “that a time traveler would not be subject to constraints that a normal person in similar circumstances would not be subject to” [2002: 131].

(5) certainly looks plausible. But there are abilities and there are abilities and not all kinds of abilities are created equal. (5) is only plausible when it is restricted



to abilities of a certain kind — *narrow* abilities. A person’s narrow abilities on a certain occasion are the bodily movements he is able to perform on that occasion. The ability to wave my hand is a narrow ability; the ability to bid on that painting (which I can do by waving my hand) is a wide ability. To have the wide ability (on a given occasion) it is not enough to have the narrow ability; external circumstances must cooperate. I must be seated at an auction, the auctioneer must be looking, and so on.<sup>16</sup>

I have distinguished narrow from wide abilities. But really there is not an absolute division of abilities into narrow and wide. Instead there is a relative division into narrower and wider. The wider the ability, the more distant the external circumstances that need to cooperate for the agent to have it.

To see why (5) should be restricted to relatively narrow abilities look at a generalization of (5):

(6) If two people are similarly situated then they have the same abilities.<sup>17</sup>

Suppose that (6) is not restricted to narrow abilities and consider Babe and Bub, molecule-for-molecule duplicates, each standing at-bat at home plate (in distinct but very similar baseball fields, of course) with the pitch heading toward him. Neither of them swings. Now it certainly seems that Babe and Bub are similarly situated, so (6) entails that they had the same abilities. Let us suppose that Babe was able to hit a home run. Then if (6) is true Bub was also able to hit a home run.

But that conclusion is false. For a giant flock of low-flying geese came out of nowhere and buzzed through Bub’s baseball field just after the pitch crossed home plate. Even if Bub had swung and connected with the ball and the ball had left the bat on a good trajectory it would have hit one of the geese and not flown over the fence. He was not able to hit a home run in those circumstances.

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<sup>16</sup>After writing these notes I learned that Vihvelin makes a similar distinction using the same terminology — wide vs. narrow abilities — in some blog posts and her forthcoming book.

<sup>17</sup>A principle like this is called “the autonomy principle” in [Sider 1997]; he is discussing a principle proposed (under the same name) in [Deutsch and Lockwood 1994].

None of this, though, suggests that Bub was unable to swing the bat (or unable to move his hands and arms in a bat-swinging motion). Bub does have the same narrow abilities that Babe has. This case is not a counterexample to (6) if that principle is restricted to narrow abilities.

Of course, instead of restricting (6) to narrow abilities we could be more explicit about what “similarly situated” means. Perhaps the presence of the geese just outside the stadium during the pitch means that Babe and Bub are not similarly situated. The upshot is the same. If “similarly situated” means “the same as far as *local* matters are concerned” then the principle is only plausible if it is restricted to abilities locally construed. But an ability locally construed is an ability that does not require the participation of distant circumstances to be exercised; it is a (relatively) narrow ability. If on the other hand “similarly situated” means “the same as far as local and distant matters are concerned” then the principle is plausible even if we include relatively wide abilities, like the ability to hit a home run. We just need to keep clear which way we are understanding the principle.

But we do not have as much freedom to interpret (5) as we do to interpret (6). “Similarly situated” as it occurs in (5) *must* mean “similarly situated as far as local matters are concerned” if the principle is not to be vacuous. For “the time traveler and the normal person are similarly situated” cannot be true unless “similarly situated” means sameness in (relatively) local matters. That is because the time traveler and normal person are *not* the same as far as (temporally) distant matters are concerned: matters like whether they exist many years in the future, whether the person in front of them is their grandfather, and so on. (The fact that Arthur is Tim’s grandfather is not a fact “local” to the situation in which Tim stands over Arthur because it concerns things that happen much later.)

If that is how (5) is to be understood in the argument for ABILITY then the argument is not good. Tim, when he is standing above Arthur, *does* have the ability to move his body in just the way that Tom does when he is standing above Robert. They have the same narrow abilities. But that is all that follows from (5). It is compatible with (5) (read narrowly) that Tim lacks the ability to kill the person in front of him, even though Tom has that ability. The ability to kill, and (especially) the ability to permanently kill, are (relatively) wide abilities.

**11.** Does the distinction between narrow and wide abilities really help? One might worry that in some situations one cannot deny a time traveler a certain wide ability without also denying him a certain narrow ability. Suppose that Tom is able to kill his target and that Tom and Tim are alike not just so far as local matters are concerned, but also so far as *spatially* distant matters are concerned. Suppose in fact that the *entire instantaneous state of the universe* is the same in Tim’s world and in Tom’s world when they hover over their intended victims. By (5) Tim and Tom have the same narrow abilities. Now generally speaking one has a certain wide ability if one has a “corresponding” narrow ability and external circumstances cooperate. External circumstances cooperate for Tom: he is able to kill, no elephant stampede (or whatever) is poised to break the usual connection between certain hand motions and his target’s death. But Tim is in the same external circumstances; so Tim is able to kill as well. So even if we read (5) narrowly we are forced to attribute to Tim the ability to kill.

This is a mistake. Look back at the supposition that this argument starts with. It has two parts: (i) the instantaneous state of the entire universe is the same for Tim and Tom; and (ii) Tom is able to kill. The first part is much stronger than the supposition that appeared in the original argument for ABILITY: that Tim and Tom are in duplicate “local” situations. Are (i) and (ii) really consistent? Maybe time travelers cannot end up in a global instantaneous state like Tom’s. (Even if this is impossible it need not mean that there is any limit to time travelers’ (narrow) abilities, since no one has the narrow ability to put the universe into an arbitrary global instantaneous state.) Whether this is possible — whether time travel imposes constraints on what instantaneous states of the world can be realized — is an interesting question, one I will say something about presently. My point here is just that the claim that the conjunction of (i) and (ii) is possibly true requires an argument, and none has been given.

There is a (relatively) easy way to argue for the truth of (i): just focus on Tim (whose adventures we are assuming at least for the purposes of the argument are possible) and *stipulate* that Tom’s world is in the same instantaneous state as Tim’s. Then (i) is definitely true. But now, since we do not know anything about the external circumstances in Tim’s world, there is no reason to believe (ii). Maybe

all that follows from (5) and these assumptions is that Tom is also unable to kill.

**12.** The question whether Tim’s killing Arthur would produce a contradictory state of affairs still hangs over us. Let it continue to hang there for now. Either way it is safe to say this much: if Tim were to kill Arthur a contradiction would *threaten*. The problem was that there was pressure — from principle (5) — to say that Arthur *does* have this ability. I have suggested a way to relieve this pressure. Once we distinguish narrow from wide abilities the pressure to say that Tim has a wide ability like the ability to kill goes away.

But the pressure to say that he has all the same narrow abilities as Tom, his non-time-traveling counterpart, remains. Can the same problem reappear for narrow abilities? Can we imagine a time travel scenario in which Tim’s having a narrow ability — say, the ability to wiggle his thumb — would threaten to lead to contradiction? If so then we have not really made any progress.

Some encouragement comes from work on time travel in physics and the philosophy of physics, which I will now explain. Suppose that there is a “wormhole” in spacetime connecting two pockets of a billiards table. When a ball goes into pocket A it emerges from pocket B *half a second before it entered A*. Traversing the wormhole is a way of traveling into the past. This setup suggests a grandfatherish paradox, one that does not involve the concept of free will or of an agent’s abilities. Let a pair  $(p, v)$  of a point  $p$  on the table and an initial velocity  $v$  on (tangent to) the table be a *physically impossible initial state* iff the following is true: there is no way to evolve the state in which a ball is at  $p$  and initially moving at  $v$  into the future without violating the laws of nature. If you start drawing the “potential trajectory” of a billiard ball that starts at  $p$  at  $v$ , and the line you draw goes into pocket A, emerges from pocket B, and then crosses itself, that is reason to think that  $(p, v)$  is a physically impossible initial state: it suggests that a ball that started in that state would enter A then bump into its earlier self and prevent itself from ever entering A. It certainly seems like there will be some physically impossible initial states. But that looks paradoxical. For on billiard ball tables without wormholes there are no physically impossible initial states. Why should some of them become physically impossible when the wormholes are added?

Now one might well wonder how deeply paradoxical all this really is. But the interesting fact that has been discovered is that, in some easy cases at least, the paradox does not even arise: the existence of the wormholes does not in fact make some initial states physically impossible.<sup>18</sup>

What does all this have to do with the actual grandfather paradox, the one about what abilities a time traveler has? I have said that time travelers may lack many wide abilities that their non-time-traveling counterparts have, but that the argument for ABILITY is at best an argument that time travelers have the same narrow abilities as their counterparts. But a narrow ability is an ability to determine where the parts of one's body are in the very near future. If Tim's exercising a particular narrow ability would make a contradiction true then (it is plausible to suppose that) the state his body would be in as he exercised that narrow ability would be a physically impossible initial state. The arguments that physically impossible initial states are very hard to come by also establish that narrow abilities that threaten to lead to contradiction are very hard to come by.

**13.** I have been arguing that to respect the idea that time travelers are as free as similarly situated non-time travelers it is enough for time travelers to have the same narrow abilities as non-time travelers. So as far as respecting that idea goes there is no problem accepting  $\neg$ ABILITY, no problem saying that Tim was not able to kill Arthur, that Hollis was not able to kill his younger self, and so on.

But these claims might be compatible with the idea that time travelers are as free as non-time travelers yet still be objectionable. It might still be objectionable to systematically deny time travelers certain wide abilities.

To have a concrete case in mind, suppose we say that Tim, when he stands above Arthur, is able to move his hands however he wants but he is not able to kill Arthur. Suppose, in fact, that the following is true:

- (7) Necessarily, if Tim (in those circumstances) moves his hands in a way that would "normally" kill the person in front of him, something or other interferes to break the connection between those hand movements and death.

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<sup>18</sup>See [Earman 1995] and [Arntzenius and Maudlin 2009] for detailed discussion of just how far these results extend.

Is that a bad thing to have to say?

Something Sider says suggests an argument (I do not think it is quite the argument he had in mind). When Sider defends the claim that Tim is able to kill Arthur he says he wants to “avoid the conclusion that the possibility of time travel could only be secured by postulating a kind of ‘force’ or ‘guardian of logic’ that shackles time travelers by ensuring that they perform certain tasks” [2002: 132]. Does accepting (7) require us to accept a conclusion like this — that there is a guardian of logic out there depriving Tim of certain wide abilities by preventing some of Tim’s movements from having their normal causal consequences? That *would* be bad.

I do not think that accepting (7) means believing in a “guardian of logic” or some other “metaphysical add-on” (this term is also Sider’s). Suppose (7) is true. If there is a guardian of logic that shackles Tim (by depriving him of certain wide abilities) then it is the activities of the guardian that explain Tim’s failures (within and across possible worlds). Of course the guardian may use different means to frustrate Tim on different occasions. Still, in the end the guardian’s interests provide a common explanation of all of Tim’s failures.

But (7) could be true without all of Tim’s failures having this kind of common explanation. In each possible world in which Tim does something that would normally lead to Arthur’s death something or other breaks the normal chain of events. Why can’t it be a different something in each world? I can see no reason. There need not be a single factor that explains every one of Tim’s failures.

Of course, maybe each of Tim’s failures is explained by the fact that a contradiction would have been true if he had succeeded. But this does not require there to be some demon whose job it is to “enforce” the laws of logic.

We certainly do not think that for any “ordinary” necessary truth T (like, say, the law of excluded middle) there must be some magical force running around preventing events from occurring that would falsify T if they were to occur. The failure of such events to occur is well enough explained by the fact that they cannot. Why should it be different with (7)?

**14.** Let’s go back to Hollis and wrap things up. Is he able to (permanently) kill his

younger self? Well how could he be? If he did it would be both true and false that he lives into adulthood.

Maybe he is able if the doctrine of temporal parts is true. Let  $\alpha$  be Hollis's 1 year old stage and  $\omega$  be the older, time traveling stage that pats him on the head. Now consider the question: is  $\omega$  able to make it so that  $\alpha$  is succeeded in a short time first by wounded and then by dead stages? Sider suggests that the answer is yes. As things are there is a continuous series of stages (with later stages — later in personal time — depending causally on earlier ones) connecting  $\alpha$  to  $\omega$ . And Hollis is the mereological sum of these stages.<sup>19</sup> If  $\omega$  had caused  $\alpha$  to be succeeded by dead stages this would not have been so. There would be no continuous sequence of stages connecting  $\alpha$  to  $\omega$ .

What bearing does all this have on the question whether Hollis is able kill his younger self? There are a couple of answers one might give.

One might say: since  $\omega$  is able to cause  $\alpha$  to be succeeded by dead stages it follows that Hollis is able to kill his younger self. (At least, it follows that “Hollis is able to kill his younger self” is true when read *de re*. It is still false *de dicto*.) Notice that this claim presupposes more than just the doctrine of temporal parts. It also presupposes some *de re* modal claims that might be controversial, for example that Hollis,  $\alpha$ , and all of the stages that actually precede  $\alpha$  could all exist without  $\alpha$  being one of Hollis's temporal parts.

If one does not accept these modal claims then one should say that Hollis is not able to kill his younger self, even though  $\omega$  is able to cause  $\alpha$  to be succeeded by dead stages. (A world in which  $\omega$  does that is one in which Hollis dies young at the hands of a non-time traveler, or in which Hollis does not exist at all.) While Sider accepts that Hollis could have killed his younger self he says that it is enough for his purposes if this weaker claim is true: for its truth secures “as much freedom as we should want” [2002: 131]. Why is that? My answer is: because the narrow abilities had in the scenario are the same as those had in an otherwise similar non-time-travel

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<sup>19</sup>I am working with the version of the doctrine of temporal parts that identifies people with four dimensional spacetime worms. An alternative view, the stage view, identifies people with instantaneous three dimensional stages. It will be clear how to translate this story into the story the stage view tells.

scenario. For to look at what  $\omega$  is able to do to  $\alpha$  and ignore what bearing it has on Hollis's abilities just is to bracket some (temporally) wide facts (facts about what larger continuants  $\alpha$  and  $\omega$  may be parts of).

So where have we ended up? There is a cluster of metaphysical views which are such that, if one accepts them, one can consistently believe that Hollis is able to kill his younger self.<sup>20</sup> And we have already seen that there is a cluster of metaphysical views which are such that, if one accepts them, one can consistently believe that Tim is able to kill Arthur. If you find those clusters of views independently appealing then the grandfather paradox will not worry you. But there is a solution to the grandfather paradox that does not require so many metaphysical commitments. The ability to kill one's younger self, and to kill one's grandfather before one's parents are born, are wide abilities, and (I have argued) one can respect the reasons there are not to limit time travelers' freedom without saying that time travelers have wide abilities like these.

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<sup>20</sup>There are others besides the one I have described; Sider presents another cluster of views that works that does not include the doctrine of temporal parts.



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