Sideways music

Ned Markosian

There is a popular theory in the metaphysics of time according to which time is one of four similar dimensions that make up a single manifold, which is appropriately called *spacetime*. Some of the ways in which time is supposed to be similar to the dimensions of space, according to this theory, include the following: (i) there is no intrinsic direction to time; (ii) physical objects are extended in time in virtue of having different *temporal parts* in different regions of time; (iii) the so-called 'A-properties' (such as *being present*, *being past* and *being future*) are not to be included in accurate descriptions of fundamental reality;[1] (iv) there is no such thing as the passage of time; (v) there are no ontological distinctions between past, present and future.

I will refer to this popular theory as the Spacetime Thesis. Here is a formulation of the view.[2]

> (The Spacetime Thesis) The universe is spread out in four symmetrical and similar dimensions (each one orthogonal to each other one), which together make up an isotropic, four-dimensional manifold, appropriately called spacetime. Humans tend to perceive one dimension – the one we call 'time' – as different from the others in various ways, but in reality, no one of the dimensions is intrinsically different from any of the others.

It is worth emphasizing that the different components I am building into the Spacetime Thesis need not all be combined in this way – there are a number of 'mix and match' variations that have been endorsed in print. One notable version of the Spacetime Thesis will allow that time may be slightly different from the dimensions of space in certain respects. For some philosophers with Spacetime sympathies may want to take the asymmetry in what is allowed along time-like dimensions by special relativity (or some other physical theory) to be an intrinsic feature of time itself, rather than merely a contingent fact about the spread of physical phenomena in the actual universe. And such people will accordingly want to say that time is different in at least some respects from the other dimensions of the manifold. I will return to this point below.

1 The terms 'A-property' and 'B-relation' were introduced in Markosian 1993, but they derive from McTaggart's talk of an A-series and a B-series in McTaggart 1908.

2 The canonical formulation of the Spacetime Thesis can be found in Williams 1951. But the main elements of the view can also be found in Smart 1966, Lewis 1976, Price 1977, Hawley 2001, Sider 2002 and Moss 2012 (among other places).

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The main rival of the Spacetime Thesis is sometimes called 'the Dynamic Theory of Time'. According to the Dynamic Theory, time is very different from the dimensions of space. (It is also sometimes said by philosophers in this camp that time is more like modality than like the dimensions of space.) Here is a formulation of this view.[3]

> (The Dynamic Theory of Time) Time is completely different from the dimensions of space, in several important ways: (i) time has an intrinsic direction; (ii) physical objects do not have temporal parts; (iii) A-properties are genuine and unanalysable features of reality; (iv) the passage of time – that is, the process by which times and events continually change with respect to their A-properties – is an objective and mind-independent phenomenon; (v) there are important ontological distinctions between the present, on the one hand, and the past and future, on the other hand.

I want to offer a new argument for the Dynamic Theory and against the Spacetime Thesis. My argument has an important presupposition, namely, realism about aesthetic value. I assume that there is such a thing as *aesthetic value* (both positive and negative), that it is an intrinsic feature of whatever possesses it and that it contributes to the overall intrinsic value of the world.[4] I have in mind such examples as the beauty of a specific oak tree and the ugliness of a pile of trash. I take it that the facts about aesthetic value are objective and mind-independent facts.[5] Thus, on the version of aesthetic realism that I am presupposing, the value of a beautiful object is an intrinsic property of the object itself and does not depend on the object's being appreciated by some sentient being. Nor does it depend on the object's disposition to produce a particular kind of aesthetic experience in a sentient being.[6] Finally, I also assume that we are at least sometimes correct (and justified) in our judgements about aesthetic values.

3 Some or all of the following components of the Dynamic Theory can be found in Prior 1967, Thomson 1983, Markosian 1993, 2004 and Sullivan 2012 (among other places). The last component of the Dynamic Theory, about there being important ontological distinctions between the present and the past and future, is considered by many to be an optional component of the theory.

4 This view has a long and distinguished history. See, for example, Plato's *Republic* (especially Book V) and Saito 2007.

5 The claim that facts about aesthetic value are objective and mind-independent is consistent with the further claim that these facts supervene on other value-neutral facts, such as the totality of physical facts about the world. It is also consistent with the claim that the facts about aesthetic value are non-fundamental.

6 There are of course other weaker versions of aesthetic realism, according to which the aesthetic value of a beautiful object does depend in some way on the actual or possible appreciation of that object by some sentient being. But my argument requires the stronger version of the thesis described above.

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With these assumptions in mind, consider an object that has some positive aesthetic value – a lovely oak tree, say, or Van Gogh's painting *The Starry Night*. Here is a notable fact about aesthetic value: if we rotate the painting 90 degrees so that it is hanging sideways on the wall, its aesthetic value will be unaffected. It might be harder for us to appreciate the value of the painting after it has been rotated in this way, but this problem could be easily overcome by changing our own orientation in space. Similarly, when the orientation of the tree in space changes, as a result of the rotation of our entire planet, this does not change the aesthetic value of the tree. These facts follow from the more general fact that, when an object is located in an *n*-dimensional space consisting of perfectly similar dimensions (like our three-dimensional physical space), changing the orientation of the object in that space does not change the object's intrinsic features.

Now consider an especially good performance of a particularly beautiful piece of music. For specificity, and to keep things relatively simple, let it be a short, seven-note passage from a piano solo by Nina Simone. And for reasons that will become clear shortly, let it be a passage that happens to include the playing of seven different notes, corresponding to seven different keys on the piano's keyboard (so that no one note is repeated). In keeping with our assumption of realism about aesthetic value, I am assuming that this series of events – the occurring of these seven notes in the concert hall – contributes some positive intrinsic value to the world. (Recall that we are considering an especially good performance of a particularly beautiful piece of music.)

Notice that if we now rotate this series of events around the up–down spatial dimension, by rotating the piano 90 degrees on the stage floor, this change in the spatial orientation of the series of events will not affect its contribution to the intrinsic value of the world. Likewise, if Ms Simone simply waits around for six hours and then repeats her performance, after the Earth has rotated 90 degrees on its axis, the second performance of the seven-note passage will be no less beautiful than the first one, despite being oriented differently in space. All of this is in keeping with the point made above about how rotating an object (in this case a series of events) in a manifold of similar dimensions does not affect its intrinsic features (including its aesthetic value).

So far so good. But now imagine rotating this seven-note passage of music in the four-dimensional manifold that is spacetime in such a way that the result is a series of events that consists of the same seven notes all occurring at the same time. This is what I am calling *sideways music*. It is the result of rearranging a series of events in the manifold (the hammer-striking events inside the piano) so that instead of being spread out slightly in time, and also along one of the spatial dimensions, that series of events is still spread out slightly along the relevant spatial dimension, but is no longer spread out in time.

Perhaps some illustrations will make this example clearer. Figure 1(a) represents a painting's normal orientation in space, and Figure 1(b) represents the result of rotating the painting so that it is hanging sideways on the wall.

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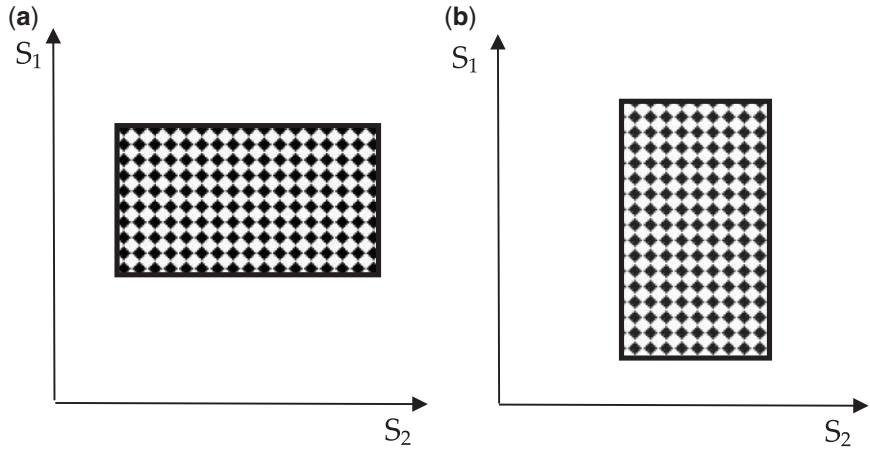

Figure 1. (a) Normal art. (b) Sideways art.

Meanwhile, Figure 2(a) below represents the original performance of the seven-note passage by Nina Simone, with the series of events made up of the resulting sounds spread out slightly in time and also along one of the spatial dimensions, whereas Figure 2(b) represents the same series of events, but rotated in the manifold in such a way that the sounds all occur at the same time.

I trust that the reason for the odd feature of the example – requiring it to consist of a series of seven notes, with no one note repeated – is now evident. This was to make it easier for Ms Simone to play all the notes at once in the sideways version of the example. But it is also important that this is an inessential feature of the example. Ms Simone could have been playing a non-standard piano with several keys corresponding to a single note. Or we could have produced the same series of sounds by playing a recording of our passage of music through speakers on the stage of the concert hall, with one speaker for each of the seven notes, lined up in such a way that the spatial relations among the speakers are isomorphic to the temporal relations among the notes in the passage of music. In fact, for the topologically minded among us, this last version of the example will offer the clearest illustration of how sideways music can be the result of literally rotating some object (in this case a series of events) in the manifold in a way that is perfectly analogous to the rotation of the painting that produced sideways art. In order to see this, imagine a short piece of string extended diagonally in a three-dimensional space in such a way that it is at a 45-degree angle with respect to each of the three axes. Then imagine pulling the string down flat, so that it is at a 90-degree angle with respect to the up–down axis while remaining at a 45-degree angle with respect to each of the other two axes. Finally, replace the string

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with the series of sound-events on our concert stage, and let the top–down axis represent time. This is what I am calling sideways music.[7]

Returning to my argument, it is a consequence of the Spacetime Thesis that the series of events that results from rotating our short musical performance in the four-dimensional manifold – the sideways music – should have the same aesthetic value as the original series of events. But it doesn't. Whereas the original series of events had some considerable positive aesthetic value (for it was a passage from an especially good performance of a beautiful piece of music), the resulting series of events has either no aesthetic value or, more likely, negative aesthetic value (since it is a cacophony of sound consisting of seven notes all occurring at once). Hence we have a powerful modus tollens argument against The Spacetime Thesis.

I note, as an aside, that there are moral analogues of sideways music. For consider a series of mental events that constitutes some kind of positive moral development on the part of a subject. This series of events adds to the intrinsic value of the world. Now turn it sideways. What you have is a collection of simultaneous mental events spread out in space.[8] It's hard to see how such a

7 There is a possible worry here, having to do with the fact that a sound is a fairly long-lived event, typically involving an expanding wave that is spread out in both space and time. It might be wondered whether the kind of rotation in the manifold that I am talking about would be possible, given this fact.

Here is my response. A sound event, like the ones in my example, begins in a small region of space over a short span of time, and then it expands outwards in space over some span of time. A good way to represent this in my diagrams would be to envision a cone that extends upwards (since the vertical axis in my diagrams represents time) from the dot in the diagram that represents a single hammer-striking event. These cones don't extend upwards forever, because of facts about acoustics. So for each dot in my Figure 2(a) (normal music), picture a small cone that extends upwards from that dot. In this way we can capture both the hammer-striking events (the dots) and the sounds that emanate from them (the cones). And it is this complex series of events that has (according to my assumption) positive aesthetic value.

In Figure 2(b) (sideways music), we have pulled the series of hammer-striking events down flat, so that the seven dots all have the same coordinate along the vertical axis that represents time. But the cones should still extend upward from the dots, since if we rotate the hammer-striking events, the sounds that emanate from them will still propagate outwards in spacetime in the same way, as cones that widen over time.

If this is how we should think about sideways music, then I think the argument I am about to give will be unaffected. For if we have seven simultaneous hammer-striking events, and seven sound-cones emanating from them also simultaneously, then that will still be a cacophony of sounds all occurring at once, and will have negative aesthetic value. (It's true that the sound-cones in the sideways case will stand in slightly different relations to one another than they did in the normal case, but it is hard to see how that difference could make the difference between positive aesthetic value and negative aesthetic value. And in any case this final worry could be easily assuaged by simply reversing the temporal order of the sound events, that is, rotating the original series of events 90 degrees downwards so that the result is a mirror image of Figure 2(a). For some series of notes that are beautiful when played in the normal way are not beautiful when played backwards.)

8 It is admittedly difficult to imagine this scenario in the physical world that we are familiar with. Yet this is exactly the kind of scenario envisioned by Williams (1951: 468): 'It is

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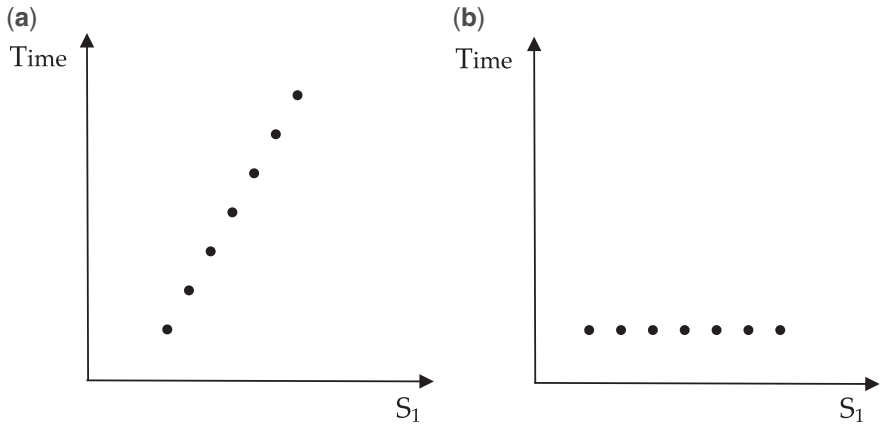

Figure 2. (a) Normal music. (b) Sideways music.

collection could add to the intrinsic value of the world in the same way. Or take some series of events that constitutes a wonderful narrative arc. But turn it sideways so that all the events are happening at once. Again, the result does not seem as wonderful. Or think of a series of events that builds from an unjust situation to a just resolution. And now turn it sideways (or worse: backwards). The result seems to be a situation with considerably less overall intrinsic value. I think that these cases can also be the basis for an interesting argument against The Spacetime Thesis ('The Argument from Sideways Morality'), but I will not pursue that argument here.

One way the proponent of The Spacetime Thesis could resist The Argument from Sideways Music is by denying the assumption that there is such a thing as intrinsic aesthetic value in the world. To me this response is wildly implausible – it seems obvious to me that the world contains both tremendous beauty and terrible ugliness. But I understand that some people feel differently about this issue, and I do not wish to dogmatize about aesthetic realism here. Still, I do want emphasize that if I have shown that proponents of The Spacetime Thesis must (or even should) deny aesthetic realism, then that is a big deal. Metaphysicians working on the nature of time have not previously thought of aesthetic anti-realism as a consequence of one of the main views in the debate over the nature of time.

conceivable, indeed, that a single whole human life should lie thwartwise of the manifold, with its belly plump in time, its birth at the east and its death in the west, and its conscious stream perhaps running alongside somebody's garden path.' (Williams adds in a footnote: 'I should expect the impact of the environment on such a being to be so wildly queer and out of step with the way he is put together, that his mental life must be a dragged-out monstrous delirium.')

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Another option for the Spacetime theorist is to accept that normal music has intrinsic aesthetic value, and to maintain that sideways music does too. The proponent of The Spacetime Thesis who takes this approach will explain our reaction to hearing sideways music (which is to perceive it as a very short-lived cacophony of sound rather than as beautiful music) by claiming that, as a result of how human consciousness works, we are just not very good at perceiving the aesthetic value of sideways music.[9] I for one do not find this response at all plausible, but this may well be simply an area where intuitions differ. In any case, I want to register that if this is the best response to my argument that is available to the Spacetime Theorist, then we have again uncovered a surprising and substantive commitment (concerning both the nature of aesthetic value and the limits of human perception) of those who endorse The Spacetime Thesis.[10]

A third option for the proponent of The Spacetime Thesis is to respond to The Argument from Sideways Music by modifying their view in an attempt to avoid the relevant consequence (namely, that it makes no aesthetic difference whether a musical performance is spread out in the manifold in the normal way or sideways). A Spacetime Theorist who takes this line will admit that time is at least a little bit different from the dimensions of space (so that it has an intrinsic direction, say), and that the slight difference in question accounts for the difference in aesthetic value between normal music and sideways music.

I see two main problems with this response, and they are connected. The first problem is that there is a danger of a slippery slope. If we say that time is a little bit different from space, then why not say that it is substantially different? For what is most appealing about The Spacetime Thesis is the elegant idea that time is exactly like the dimensions of space, and what is most intuitive about The Dynamic Theory of Time is the idea that time is strikingly different from the dimensions of space. Hence there is pressure to move towards one of the two extreme positions on the question of time's similarity to space, rather than to occupy a middle position.

The second problem with the current approach is that when you consider the ways in which orientation in the manifold seems to be relevant to the

9 The claim that humans are generally not good at appreciating the aesthetic value of sideways music, despite its being real, is reminiscent of the claim made by the character Tortoise in Hofstadter and Dennett 1981: 432. Tortoise claims that he can appreciate the beauty of a piece of music just by looking at the grooves on a phonograph recording of the piece.

10 For what it is worth, my own view, as a proponent of The Dynamic Theory of Time, is that this is the response to The Argument from Sideways Music that Spacetime Theorists ought to make. Also, although he of course does not discuss sideways music explicitly, it seems to me that Williams (1951) says things about what we might call 'sideways consciousness' that suggest that he might respond in this way to The Argument from Sideways Music.

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aesthetic value of a musical performance, it is the most dynamic aspects of The Dynamic Theory that seem crucial. I have in mind the idea that pastness, presentness and futurity are genuine properties; the claim that only present objects and events are real; the idea that there is some kind of dynamic flow or passage that characterizes time but none of the other dimensions; and the claim that there is something inexorable about this flow or passage. It certainly does not help merely to say that there happens to be an asymmetry to certain time-like dimensions within the manifold, for example, that is a result of some contingent facts about how causation works in the actual world. For this reason the point raised above (about how some people with Spacetime Thesis sympathies will want to say that time is at least a little bit different from the dimensions of space, owing to relativistic considerations) will be of little help to the Spacetime Theorist in dealing with The Argument from Sideways Music. For whatever small differences are posited between time-like dimensions in the manifold and merely space-like dimensions will presumably not be enough to account for the great difference in aesthetic value between normal music and sideways music.

One thing that The Argument from Sideways Music brings out is the crucial importance of certain 'tensed facts' (i.e. facts involving A-properties), such as the fact that only *this note* is present. (Perhaps it is equally important that *that note* is in the recent past, and also that the next note is in the near future.) Another thing that the argument brings out is the importance of the fact that there is an essential, dynamic aspect to time. For it is literally the passage through the sequence of the sounds (the 'jerk and whoosh' as Williams (1951: 466) memorably puts it[11]) that gives music the compelling quality it has. The dynamic aspect of music is essential to its aesthetic value, and is directly tied to the dynamic aspect of time.[12]

11 This is the paragraph containing Williams's wonderful description of the (mistaken, in his view) sense we have of the inexorable passage of time: 'It is simply that we *find* passage, that we are immediately and poignantly involved in the jerk and whoosh of process, the felt flow of one moment into the next. Here is the focus of being. Here is the shore whence the youngster watches the golden mornings swing toward him like serried bright breakers from the ocean of the future. Here is the flood on which the oldster wakes in the night to shudder at its swollen black torrent cascading him into the abyss.' And here, he might have added, is the powerful force that pulls us along from one note in a passage of music to the next.

12 I am grateful to Mark Balaguer, Rebecca Chan, Maya Eddon, Andy Egan, Adam Elga, Nina Emery, Tim Juvshik, Rebecca Mason, Peter McInerney, Michaela McSweeney, Molly O'Rourke-Friel, Christina Pawlowitsch, Katherine Ritchie, Katherine Thomson-Jones and Martin Thomson-Jones for helpful conversations about the ideas in this paper; to Maya Eddon, Tim Juvshik, Rebecca Mason, Katherine Ritchie, Ted Sider and two anonymous referees for *Analysis* for helpful comments on earlier versions of the paper; and to participants in Nina Emery's Philosophy of Time seminar at Mount Holyoke College and audiences at Oberlin College and Amherst College for helpful feedback on this material.

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Abstract

There is a popular theory in the metaphysics of time according to which time is one of four similar dimensions that make up a single manifold that is appropriately called spacetime. One consequence of this thesis is that changing an object's orientation in the manifold does not change its intrinsic features. In this paper I offer a new argument against this popular theory. I claim that an especially good performance of a particularly beautiful piece of music, when oriented within the manifold in the normal way, adds to the intrinsic value of the world, but that if the same performance is turned sideways within the manifold, so that it involves a number of different notes spread out in space and all occurring at the same time, then it does not add the same intrinsic value to the world.

Keywords: time, dynamic theory of time, spacetime thesis, aesthetic value, music

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