

## **Music on the Train:**

### **A Puzzle about Temporal Experience**

Consider the following.

TRAIN RIDE            It's 7 am and you are about to start your 50-minute train ride to work. Today, you've prepared yourself well: being a fan of XYZ band, you brought a copy of its nearly 50-minute song "ABC". You take a minute to find a good seat, lay back, and hit the "play" button. As any decent fan of XYZ would, you spend the rest of the journey absorbed in appreciating the music. As you arrive at your destination, you feel like less than 20 minutes have passed since the train took off. You declare the beginning of your day a success.

This familiar situation presents us with the following phenomenological puzzle.

According to TRAIN RIDE, when absorbed in listening to ABC, you are bad at experiencing time: you experience a 50-minute train ride as having lasted less than 20 minutes.

Also, it seems hard to deny that to experience music you must experience duration. As Phillips (2014) puts it "in audition we can simply make no sense of experience without temporally extended contents: sounds (and, I would add, silences) essentially have duration, and all auditory experience is experience of sound (or silence)".<sup>1</sup> In a similar vein, Lee (2014) writes: "[w]e can't even begin to describe an

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<sup>1</sup> Phillips, 2014, p. 152.

auditory experience such as an experience of music without supposing that it presents the durations and temporal orders of sounds”.<sup>2</sup> Let us express this thought as follows:

MUSIC EXPERIENCE            Experiencing music requires experiencing temporal features such as duration and temporal order.

From TRAIN RIDE and MUSIC EXPERIENCE, however, it seems to follow that when absorbed in an experience of a phenomenon that requires you to experience time—in this case, listening to music—you become bad precisely at experiencing time! This claim is quite perplexing: it entails that to appreciate a piece of music you would be better off *diverting* your attention away from it, for absorption would ruin your experience of time, which is needed to experience the music. The claim is also contrary to everyday experience: in ordinary cases like TRAIN RIDE, absorption does not ruin your experience of music—if anything, it seems to enhance it!

Another way of getting a grip on this puzzle is by considering the following, more extreme case.

EXTREME TRAIN RIDE            The situation is just like TRAIN RIDE, except that you are so absorbed in listening to ABC that, as you arrive at your destination, you feel like *no* time has passed since the train took off.

EXTREME TRAIN RIDE may be implausible, but it does not seem to be impossible. Even if we do not have experiences as extreme as this—let’s assume that, for whatever reason, we always experience at least some time as having passed—it is easy to imagine a creature, psychologically similar to us in every other respect, that has it. However, given MUSIC EXPERIENCE, this creature would be impossible. For according to EXTREME TRAIN

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<sup>2</sup> Lee, 2014, p. 2.

RIDE, in experiencing the piece of music, the creature would feel like no time has passed. Yet, according to MUSIC EXPERIENCE, experiencing duration—and hence feeling like some time has passed—is a condition on experiencing music in the first place! The experience described in EXTREME TRAIN RIDE would thus be self-undermining. Put differently, you cannot have a musical experience while feeling like no time has passed.

The puzzle is thus this. TRAIN RIDE is an intuitively appealing description of a familiar experience. MUSIC EXPERIENCE is also hard to deny. From these, it seems to follow that absorption ruins musical experience and that EXTREME TRAIN RIDE involves a self-undermining experience. Yet, these latter claims are hard to accept. The challenge consists in finding a way of resisting this inference.

My aim in this paper is to provide a phenomenological characterization of the type of experiences described in TRAIN RIDE and EXTREME TRAIN RIDE that meets this challenge.<sup>3</sup> In section 2, I introduce the notions of spatial attachment/detachment by considering several spatial experiences. In section 3, I use the temporal analogues of these notions to model the type of experiences that give rise to the puzzle. In section 4, I explain how this account solves the puzzle. Section 5 offers a discussion of the kind of work that absorption does for the model. In this section, I also briefly consider another interesting phenomenon in time consciousness: *thinking* about time makes one *feel* like more time has passed. I end by suggesting how we can make sense of this phenomenon in terms of the proposed model. In the rest of this section, I lay out various features of the puzzle that are relevant throughout the paper.

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<sup>3</sup> More broadly, I hope to illustrate that approaching the study of time perception from its phenomenology can be illuminating. This, by no means, is meant to imply that a neurological approach is not also fruitful. My view is that by complementing one another, each of these approaches can serve to uncover different aspects of time perception.

*The puzzle concerns experiences*

The puzzle arises at the phenomenological level: it concerns the what-it-is-like to experience a certain amount of time as having passed. From TRAIN RIDE and MUSIC EXPERIENCE it seems to follow that when absorbed in listening to ABC—something that requires you to *experience* how much time has passed—you are bad at *experiencing* how much time has passed.<sup>4</sup>

The following observation supports the idea that the puzzle concerns experiences, as opposed to mere immediate judgments (i.e. judgments made on the basis of experience alone) about how much time has passed. Even after you come to acknowledge—perhaps on the basis of looking at your properly functioning watch—that the train ride took 50 minutes, you still feel like no more than 20 minutes have passed during your train ride. In other words, your feeling that no more than 20 minutes have passed during the train ride persists *even after forming the explicit belief that the train ride took about 50 minutes*. That you maintain two mental states with blatantly inconsistent contents after explicitly acknowledging their inconsistency is an indication that one of these mental states is not a belief.<sup>5</sup>

Despite this, the puzzle does not go away by denying that we have experiences of time and holding instead that musical experiences solely involve immediate judgments

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<sup>4</sup> Likewise, from EXTREME TRAIN RIDE and MUSIC EXPERIENCE it seems to follow that absorbed musical *experiences*, precisely because they require *experiencing* that some time has passed, are self-undermining.

<sup>5</sup> Within the psychological literature on visual perception, it has even been suggested that the existence of a conflict between the content of an experience and the content of a belief (or desire) is the defining marker of an illusion. Firestone and Scholl, for instance, write: “Consider that every case in which a visual illusion persists despite conflicting beliefs or desires is inherently a failure of higher-level factors to penetrate visual processing (*such persistence may even be a defining feature of visual illusions*).” (Firestone and Scholl, 2014, p. 38, my emphasis). Of course, this conflict can only be a marker of a visual *illusion* if the perceptual content is non-veridical.

about time. For the same kind of puzzle would arise at the level of such judgments.<sup>6</sup> From the analogues of TRAIN RIDE and MUSIC EXPERIENCE stated in terms of temporal judgments, it would likewise seem to follow that when absorbed in an experience that requires forming *immediate judgments* about how much time has passed (i.e. listening to music), you are bad precisely at forming *immediately judgments* about how much time has passed.<sup>7</sup>

Throughout this paper, I assume that we have temporal experiences. Someone who rejects this assumption could modify the proposed account so as to apply solely to immediate judgments about time.

*The puzzle concerns experiences as of how much time has passed*

According to TRAIN RIDE, as the train arrives at your destination you feel like 20 minutes have passed since the train took off. We should distinguish these experiences—experiences *as of how much time has passed since some event took place*—from experiences *as of the passage of time*; that is, experiences as of the now moving forward in time. The former experiences solely concern the so-called “B-properties” of time—properties<sup>8</sup> such as being *simultaneous to*, *earlier than*, or *later than*. The latter experiences concern also the so-called “A-properties” of time—properties such as

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<sup>6</sup> In other words, though I am here assuming that musical experiences involve genuine experiences of duration and temporal order, this discussion is not directed against a (Humean) view according to which musical experiences involve only a succession of sensory experiences accompanied by memories and/or judgments (with or without phenomenology) about duration and order. For even if the relevant experiences ultimately consisted of memories and judgments, the same kind of puzzle would arise at the level of these memories and judgments.

<sup>7</sup> It would also seem to follow that a maximally absorbed musical experience is self-undermining. For according to a version of EXTREME TRAIN RIDE stated in terms of immediate judgments, when absorbed in experiencing music, you would immediately judge that no time has passed. Yet, according to the analogue of MUSIC EXPERIENCE stated in terms of immediate judgments, having such an experience would require judging that some time has passed.

<sup>8</sup> I am thinking of properties loosely, so as to include relations.

*nowness* and *passage*. Our problem should be understood as concerning only the former type of experiences.<sup>9</sup>

*The puzzle concerns experiences of long durations*

According to MUSIC EXPERIENCE, you cannot hear sounds—however short-lived they may be—without experiencing temporal features such as durations and temporal orders. There is no such thing as an experience of a sound as lasting no time.

Moreover, experiencing a longer-lived piece of music such as ABC requires more than hearing various short-lived sounds one after the other. To illustrate this, consider experiencing a piece of music with the sole aim of getting the pitch of each sound correctly (you may be tuning your instrument or testing your ears). In focusing on each short-lived sound, you might very well miss out on the whole song. Experiencing a song *qua* song requires more than this; it requires experiencing at least some of the temporal relations that stitch together the various shorter-lived sounds into the longer-lived piece of music. That is, experiencing a song *as a song*—as opposed to merely as a string of temporally isolated short-lived sounds—involves more than experiencing the temporal features of the sounds produced when this or that piano key is pressed, when this or that drum is hit. It further involves experiencing, for instance, a 5-minute bass solo *as lasting twice as long as an earlier guitar solo*; a 30-second chorus *as having happened a few times before*; a ten-minute movement *as being much shorter than the whole piece*; the closing section of the song *as a longer variation of the opening theme*. If you do not experience at least some of the temporal features of the longer-lived stretches of the song, we wouldn't say that you are experiencing the song *qua* song.

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<sup>9</sup> For accounts of experiences as of *nowness* and *passage* see, for instance, Paul (2010) and Phillips (2013).

Furthermore, your experience of a song does not merely involve experiencing the *relative* durations of its various sounds with respect to one another. For if this were so, you would notice no difference between listening to ABC and listening to a slowed down or a sped up version of it—versions in which the durations of its sounds have been, say, doubled up or compressed by half while their relative durations are held constant.<sup>10</sup> Yet, your experiences of a 30-minute piece of music and of a 5-minute compressed version of it feel different: the former feels like lasting longer than the latter. Your experience of a song *qua* song, then, involves experiencing its duration.<sup>11 12</sup>

It is also important to note that the model I will propose is not intended as an account of *every* temporal experience at the level of long-lived events. Rather, the model is compatible with there being other factors, not here discussed, that also play a relevant role in accounting for our temporal experience and, more specifically, in generating different temporal illusions.<sup>13</sup> The targets of this model are cases relevantly similar to TRAIN RIDE and EXTREME TRAIN RIDE. In other words, the proposed model should be

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<sup>10</sup> It may still be true that if the whole world—yourself included—is slowed down or sped up, you may not notice the difference between the correspondingly slowed down or sped up version of ABC.

<sup>11</sup> Or at least, experiencing ABC involves more than experiencing the relative durations of its various sounds with respect to one another. Perhaps experiencing a piece of music involves experiencing the durations of its various sounds relative to something that remains fixed during your experiences of the compressed and the doubled up versions of the song. For some recent defenses of proposals along these lines see (Phillips, 2013), and (Lockwood, 2005).

<sup>12</sup> Cases like TRAIN RIDE also give rise to a different puzzle, one that involves an incongruity between the way in which you experience the duration of a *long-lived event* and the way in which you experience the durations of the *short-lived events* that compose it. One way of phrasing this puzzle is this: how could it be that while having a good time, the whole party feels like flying by while none of its short-lived moments seem to be going by really quick? During the party, you do not, for instance, see your friend's glass falling to the floor at a super-high speed: you see the glass's fall as taking its usual duration. Yet, somehow, the whole party seems to be going by really quick. It will be important throughout this paper to distinguish this puzzle from the one stated earlier, which is the focus of this paper. The crucial difference between the two puzzles is this. While the puzzle just stated arises due to an incongruity in your experience of the duration of a long-lived event (i.e. the party, which feels like going by really fast) and your experiences of the durations of its component short-lived events (i.e. the falling of a glass of water, which doesn't feel like going by really fast), the puzzle we are concerned with here arises due to an apparent incongruity in your experience of *the same long-lived period of time* (in the example, the 50-minute period of time stretching between 7 and 7,50 am).

<sup>13</sup> Emotions, for instance, may also play an important role in certain duration illusions.

taken as part of a larger, multi-factored, non-monolithic account of temporal experience.<sup>14</sup>

### *Veridicality*

None of the above involves claiming that your experiences of duration need to be veridical, nor that there can be no systematic illusions of felt duration. The claim is rather that if, for instance, you are engaged in listening to a 30-minute song *qua* song, then your experience should allow you to see that the duration of the song is significantly longer than, say, the duration of a 5-minute song you have also attentively listened to. In particular, if you attentively listen to a 5-minute compressed version of the 30-minute song you have just heard, your experiences should allow you to see that the 5-minute version is much shorter than the 30-minute version. None of this should be controversial. This could all be so even if it turns out that we are wired up so as to experience time as going much slower or much faster than it does,<sup>15</sup> or even if in experiencing a piece of music you undergo other temporal illusions at the level of short- and long-lived events here and there.

### *The puzzle concerns experiences of temporal features, not recollections thereof*

We should also distinguish the temporal experiences (and corresponding judgments) had *while* experiencing an event from the memories (and/or corresponding

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<sup>14</sup> There is widespread agreement, amongst psychologists working on time perception, that there is no one, simple model of temporal experience that accounts for all cases. See, for instance (Zakay and Block, 1997), though note that they are focusing on temporal experiences over relatively shorter durations and (Sanders, 2015).

<sup>15</sup> Though see (Chalmers, 2014) for a defense of temporal functionalism, a view according to which we could not have systematic temporal illusions such that, say, a minute, a second, or an hour, would feel like taking, for example, twice or half as long as they actually feel.



judgments) one may *later* form of the event's duration (even if such memories and judgments are accompanied by phenomenology). Three hours of a fun party, for instance, may feel like lasting less than an hour. Upon going over the events of the party 'in your mind' the next day, however, you might find yourself thinking that the party took a really long time. William James famously noted this mismatch between experiences of time in passing vs. in retrospect. As he put it: "[i]n general, a time interval filled with varied and interesting experiences seems short *in passing*, but long *as we look back*".<sup>16</sup> It will be important to keep in mind that our puzzle solely concerns the former experiences and not the latter memories and/or judgments. Using James's terminology: our puzzle concerns experiences of time "in passing" and not "as we look back".<sup>17</sup>

Accordingly, the following clarification is relevant. Even while I take it that throughout the *train ride* you find yourself with experiences as of how much time the trip has taken, in posing the puzzle, I focused on those temporal experiences you have towards the end of your trip ("as the train arrives at your destination"). The reason for choosing these later experiences is that by focusing on them it is easier to see that your felt duration of the trip is much shorter than what it would have been had you not been engaged in the music. One could, however, generate the same kind of puzzle by focusing

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<sup>16</sup> James, 1952, p. 408, my emphasis. For the related, but different way in which prospective and retrospective experimental paradigms are used in the psychological literature, see, for example, Zakay and Block (1997) and Grondin (2010).

<sup>17</sup> It is worth noting that there is yet a further sense of "retrospective" according to which temporal experiences, memories, and judgments about duration are all retrospective: they are about how much time *has passed* since a certain event started. The retrospective character of our temporal experiences in this sense is perhaps more evident when we focus on experiences of longer durations. The duration of a song, for instance, is too long to be presented to you in the more immediate way in which a cup, a chair, or perhaps even a much shorter interval of time (1-2 seconds long) may be presented to you. For a discussion on the sense in which we experience the durations of long-lived events, see the discussion on page 15. For a way of carving up the distinction between short and long-lived events, see [reference removed for blind review].

on your temporal experiences at earlier moments during the train ride.<sup>18</sup> The important thing to note is that in focusing on the last moments of the trip, I do not intend to suggest that you are no longer experiencing the trip's duration but rather merely recollecting it ("looking back at it") in an effort to determine its duration.

### *Seconds, minutes, hours*

For ease of exposition, I talk as if our experiences of time were given in seconds, minutes, and hours. This is unrealistic. I rather take it that we experience durations either in terms of some subjective unit of time<sup>19</sup> or in some other way that does not require a unit,<sup>20</sup> and that we have learned to express the content of such experiences in seconds, minutes, and hours.<sup>21</sup> Thus, what I mean when I say that you feel like your train ride has taken 20 minutes is that your feeling of how long the train ride has taken is the one you have learned to express by saying that you have an experience as of 20 minutes having passed.

### *Inconsistent Experiences*

Perhaps what is going on in cases like TRAIN RIDE is that you are having an inconsistent experience, such as this:

INCONSISTENT EXPERIENCE    As the train arrives at your destination, you feel like less than 20 minutes have passed *and* you also feel like 50 minutes have passed since the train took off.

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<sup>18</sup> Below, I will consider these experiences.

<sup>19</sup> For some proposals, see (Lockwood, 2005) and (Phillips, 2013).

<sup>20</sup> See (Peacocke, 1984).

<sup>21</sup> For an interesting paper on how children learn time words, see (Tillman and Barner, 2015).

INCONSISTENT EXPERIENCE can provide us with the following solution to the puzzle. Your experience as of 20 minutes having passed serves to vindicate TRAIN RIDE: when absorbed in listening to the music, you are bad at experiencing time. Your experience as of 50 minutes having passed serves to vindicate MUSIC EXPERIENCE while rejecting that absorption ruins your musical experience: it is what allows you to experience ABC *qua* a 50-minute song, and not as you would hear a heavily compressed or distorted version of it.<sup>22</sup>

This proposal, however, faces the following problem. Contrast your temporal experience upon the train's arrival with a typical instance of an inconsistent experience, such as the waterfall illusion. After seeing a waterfall for a little while and then gazing over a stationary object, the object appears to be moving. Yet, the object *also* appears to remain still. Crucially, these two inconsistent appearances are readily available to the subject undergoing the illusion. (Check it out for yourself if you haven't done so: <http://www.michaelbach.de/ot/mot-adapt/index.html>). This is not what happens in TRAIN RIDE: if, as the train arrives at your destination, I ask you how much time you feel has passed since the train took off, you do not reply that, oddly, you feel like no more than 20 minutes have passed *and that you also feel like about 50 minutes have passed*. Instead, you only report feeling like less than 20 minutes have passed. That this is so is further revealed by your bafflement upon looking at your watch and learning that it's been 50 minutes since the train took off. You are baffled because what you learn about the trip's duration is contrary to how long you feel it has taken. Thus, the incompatibility expressed

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<sup>22</sup> A similar solution could be offered in the case of EXTREME TRAIN RIDE. Because in this case you would feel like no time has passed and also like 50 minutes have passed since the train took off, your music experience would not be self-undermining: feeling like 50 minutes have passed would allow you have musical experiences.

in INCONSISTENT EXPERIENCE, if indeed present, is not readily apparent to you. Put differently, the fact that you do not report the inconsistency in your temporal experience and the fact that you are surprised upon learning that the train ride took 50 minutes are, at the very least, marks against INCONSISTENT EXPERIENCE. For this reason, an account that avoids positing an inconsistent experience should be, all else equal, preferred to this.

### *Failure to attend to time*

Another initially attractive way to try to account for our puzzle would be to appeal to a view—widely endorsed within the psychological literature in the case of short-lived events—that holds on to the following two claims. First, a subject’s total attention is divided between processing temporal and non-temporal stimuli. Second, the more attention is devoted to processing temporal information, the more time is experienced as having passed.<sup>23</sup> According to this, the reason why you feel like only 20 minutes have passed in TRAIN RIDE is that while you are listening to the music, your attention is coopted to process musical information and, as a result, not much attention is left to process the passing of time.

This proposal, however, is inconsistent with TRAIN RIDE and MUSIC EXPERIENCE. For in TRAIN RIDE your attention is focused on the music which, given MUSIC EXPERIENCE, requires it to be focused on processing temporal information. According to

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<sup>23</sup> As Block and Zakay put it:

“[m]ost theorists think that *experienced duration increases when a person allocates more attentional resources to processing temporal information*. According to attentional models (e.g., Thomas & Weaver, 1975; Zakay & Block, 1996), a person divides attentional resources between nontemporal (stimulus) and temporal information. Thus, experienced duration should increase if the number of stimuli requiring processing is small, if a processing task is easy, if participants do not need to actively respond to presented information, or if they do not need to divert attention between two sources of stimuli.”

(Block and Zakay, 1997, p. 185, my emphasis).  
Zakay and Tsal express the idea as follows:

Proponents of the attentional approach (e.g., Fankenshauser, 1959; Hicks, Miller, Gaes, & Beirman, 1977; Priestly, 1968) view time estimation as a direct function of the amount of attention allocated for processing the passage of time. The more attention is allocated to a cognitive processor of time, the longer duration estimates will be.

(Zakay and Tsal, 1989, p.209).

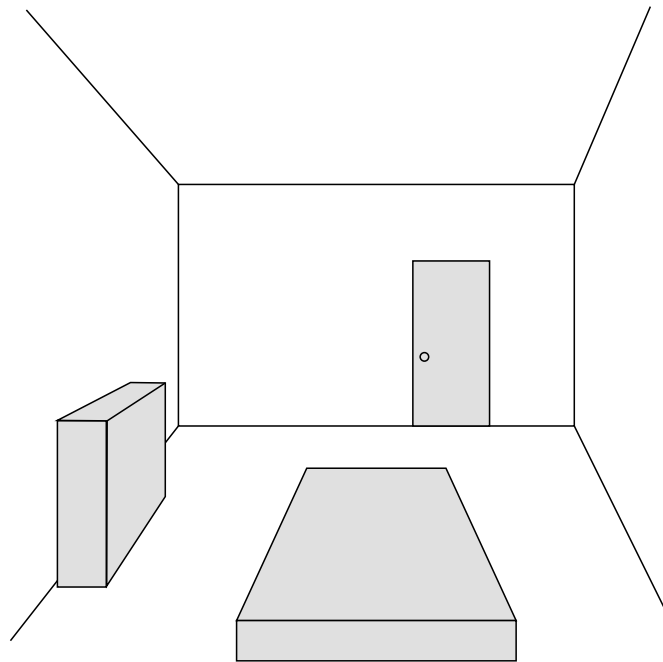
the above proposal, however, devoting more attention to processing temporal information results in feeling like *more* time has passed. Yet, according to TRAIN RIDE, you felt like the train ride took only 20 minutes! Thus, unless TRAIN RIDE or MUSIC EXPERIENCE are rejected (which, given the strong initial plausibility of each of these claims, would require an argument), this proposal should be resisted.

Let me now turn to develop a solution to the puzzle that avoids both of these problems.

## 2. A Spatial Analogy

Consider the following spatial experience.

HOTEL ROOM 1      You have been traveling for about a month. After a good night sleep, you wake up to find yourself in a windowless hotel room. You look around but cannot tell where you are. Figure 1 below offers a depiction of what you see upon waking up.



*Figure 1. Your view of the hotel room*

Your visual experience allows you to spatially locate the objects around you with respect to one another—you see, for instance, the bed as to the side of the table and the door as a few steps away from the bed. Yet, your experience is spatially disconcerting in the following sense: it does not present the scene before your eyes as being spatially related to any other location outside of the room. You could be in any street, any city, any country.

Contrast this case with the following.

HOTEL ROOM 2      A few moments later, you recall that you flew in to Boston to give a talk, checked in at the downtown conference hotel, and got a room on the 17<sup>th</sup> floor. Once again, you look around and see the same objects as standing in the same spatial relations between each other. Figure 1 also offers a depiction of what you see upon recalling where you are.

Even if what you see is exactly the same in both cases, being able to locate the scene before your eyes with respect to places that you are not currently perceiving but are aware of has an effect on your overall experience. In the second case but not in the first one, you experience the scene as situated within a space in which other places are also located: you see the scene as taking place in a hotel room, in downtown Boston, several feet above the street level. This is so even if you are not at that time perceiving some of these places but are merely aware of them. To make this difference more vivid, consider how your experience of the scene would further change upon recalling that you are no

longer in Boston—that’s where you were a few nights ago. Today, you are at the next conference in Abu Dhabi, where you were given a hotel room on the 160<sup>th</sup> floor!<sup>24</sup>

The sense in which you experience the room *as being in Boston*, or *as being several stories above the street level* is the same sense in which you see, say, your room’s door *as having a back*, or the desk *as having an occluded left side*. Even if you do not see the back of your room’s door or the occluded side of the desk, you still see the door *as having a back* and the desk *as having a left side*. Likewise, even if while looking at your room in HOTEL ROOM 2 you do not see Boston or the street below, you still experience the room *as being in Boston* and *as being several stories above the street level*.

Figure 2 below illustrates this difference. The dotted, orange lines represent spatial relations that affect your overall experience. These relations may hold either solely amongst perceived objects—as in HOTEL ROOM 1—or amongst perceived objects (e.g. the bed or the door) and objects that you are merely aware of (e.g. the street or downtown Boston)—as in HOTEL ROOM 2.<sup>25</sup>

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<sup>24</sup> This is not too unrealistic. According to Wikipedia ([http://en.wikipedia.org/wiki/List\\_of\\_buildings\\_with\\_100\\_floors\\_or\\_more](http://en.wikipedia.org/wiki/List_of_buildings_with_100_floors_or_more), accessed on September 7<sup>th</sup>, 2015), the tallest building is Burj Khalifa in Dubai with 163 floors.

<sup>25</sup> For another example, suppose you got lost in your way home. We can contrast an experience of the crossroad in front of you when you have no idea where the crossroad is, with an experience of the same crossroad when you finally figure out that it is located a few blocks away from home. Or suppose you’re driving on an empty road to work and, as it turns out, a crossroad five miles away from your office looks exactly like a crossroad two miles away from it. Even if what you see looks exactly the same as you drive through each of these crossroads, your experiences may still differ in this: you may experience the first crossroad as being located much further away from your office.

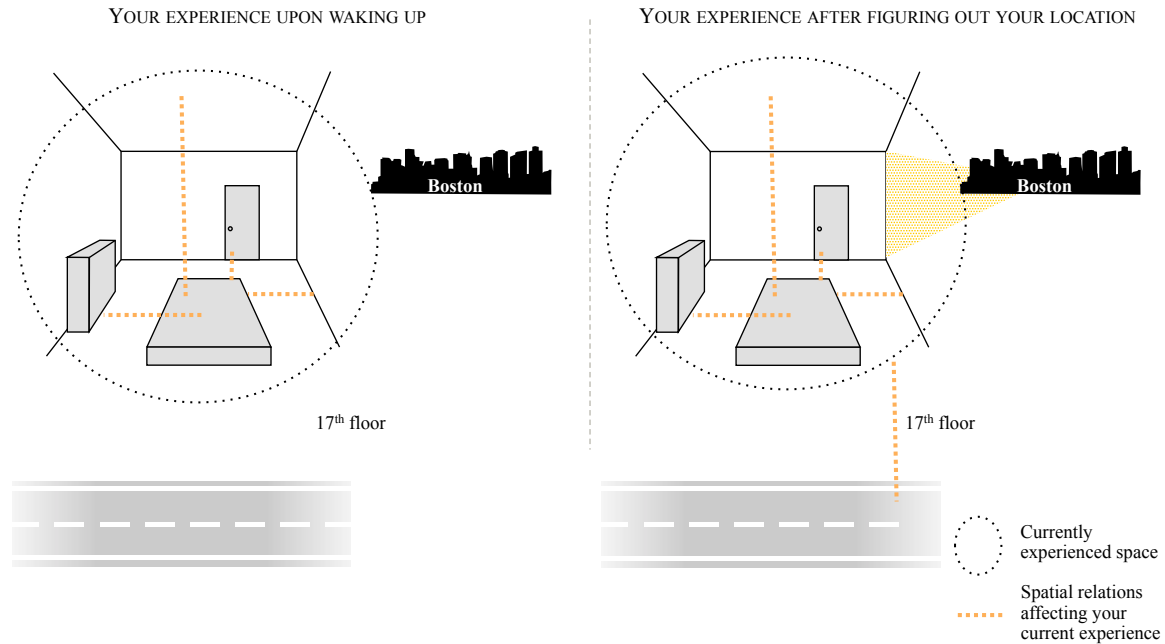


Figure 2. Your experience in HOTEL ROOM 1 vs. your experience in HOTEL ROOM 2

*Spatially attached vs. spatially detached experiences*

Let me express the difference between your experience in HOTEL ROOM 1 and HOTEL ROOM 2 as follows. I will say that a scene is experienced as being *spatially attached with respect to location  $l$*  whenever the scene is experienced as being affected by the spatial relations that you take to obtain between the scene's location and some other location  $l$  that you are aware of but which is out of your perceptual field. Alternatively, I will say that a scene is experienced as being *spatially detached with respect to location  $l$*  whenever your experience is not so affected. Using this terminology, we would thus say that cases like HOTEL ROOM 1 involve experiencing the scene you see as being spatially detached with respect to locations outside of the room (the locations of the street, of downtown Boston, etc.), whereas cases like HOTEL ROOM 2 involve experiencing the

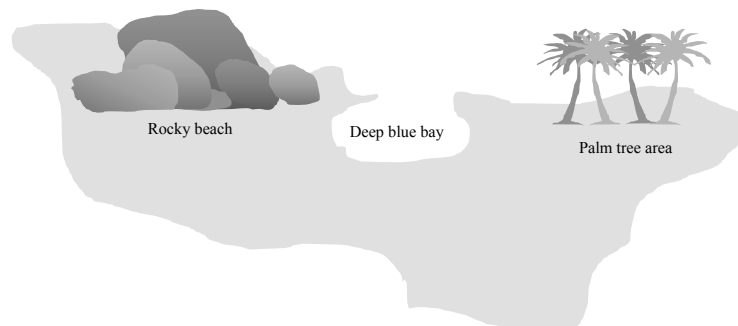


scene you see as being spatially attached with respect to locations outside of the room. Note that these notions are relative to locations outside of the subject's perceptual field.

To further illustrate, let us consider a case in which the relevant place is, unlike the hotel room in the previous example, too large to be seen in one glance from your current location. Consider the following slightly more unusual experience.

#### ISLAND

You wake up and find yourself lying on a rocky beach. You have no idea of where you are and how you got there. You decide to walk along to explore the area. First, you walk through the rocky beach. You then find a deep blue bay and, after that, a palm tree area. Not being able to walk any further without running into the sea, you turn around and walk back through the palm tree area, the deep blue bay, and into the rocky beach. From there again, you cannot walk any further without stepping into the sea: you are in a small, slim island! Figure 3 below offers a depiction of the island's spatial configuration, as gathered from your explorations.



*Figure 3. Island's spatial configuration*

In ISLAND, you experience the objects you see right in front of you as being spatially related to each other. You see, for example, the palm tree to your right as being a few feet away from the palm tree to your left. You also experience the whole scene you are currently looking at as being spatially attached to other places within the island that you do not see at that moment. You see, for instance, the scene before your eyes as being spatially contiguous to the bay area you crossed a few minutes ago and as further away from the rocky beach, even if at that time you are seeing none of these other areas. Using our previous terminology, we would say that during your explorations in ISLAND, the scenes are experienced as being spatially attached with respect to other locations within the island that are currently out of sight.

Still, the scenes you see in ISLAND are not experienced as being spatially related to locations outside of the island.<sup>26</sup> In walking away from the bay and into the palm tree area, for instance, you do not feel like you are approaching or moving away from any location outside of the island. Even if you are aware of Cancún as being south of Miami and east from Los Cabos, you do not experience any place in the island as being north or south, east or west, of any of these places. The various scenes you see are experienced as being spatially detached with respect to any location outside of the island.

We can contrast this case with one in which, as you walk across the island from the rocky beach to the palm tree area, you feel like you are getting closer to Cancún. Figure 4 below illustrates this experiential difference, where the orange, dotted lines once again represent spatial relations that have effects on your experience.

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<sup>26</sup> Ignore here the fact that you may be experiencing the various scenes of the island as being below the sky or as holding spatial relations to various celestial bodies.

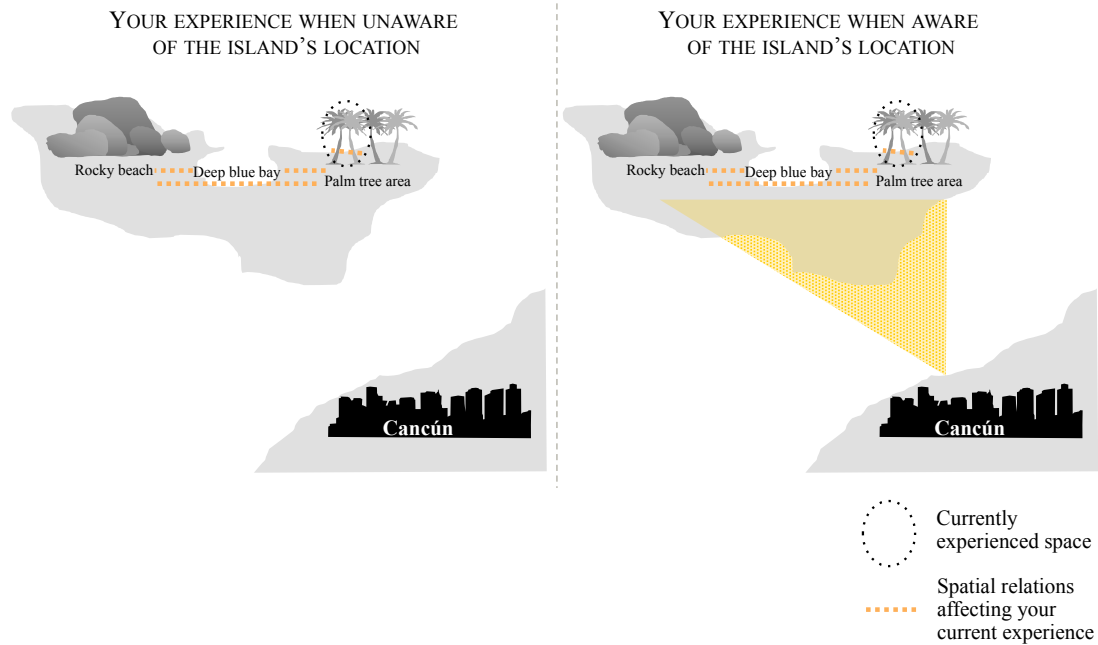


Figure 4. Your experiences in walking through the island while aware vs. while unaware of its location

Keeping this in mind, let me turn to offer a phenomenological characterization of your experiences in TRAIN RIDE and EXTREME TRAIN RIDE, beginning with the latter.

### 3. TRAIN RIDE and EXTREME TRAIN RIDE: a phenomenological characterization

In the previous section, we characterized your experiences in ISLAND as being *spatially attached* with respect to locations within the island and *spatially detached* with respect to locations outside of it. Let us now think of your experiences in EXTREME TRAIN RIDE as the temporal analogues of your experiences in ISLAND. That is, let us think that during your extreme train ride, you experience the sounds of ABC as being:

- (i) *temporally attached* with respect to the temporal locations of other sounds of ABC that are not then heard—that is, the sounds of ABC are presented as holding temporal relations to other sounds of ABC not currently being heard; and
- (ii) *temporally detached* with respect to the temporal locations of events that are not part of ABC—that is, the sounds of ABC are presented as holding no temporal relations to any event that is not part of ABC.

Consider (i). In ISLAND, the scenes you encounter are experienced as being spatially related to other areas of the island already explored. As you walk away from the palm tree area, you feel like the various scenes you see are closer to the rocky beach and, correspondingly, further away from the trees. When you finally reach the beach, you may feel like what you see is about a mile away from the palm tree area. It is as if you formed a mental map of the area and each new scene was experienced as occupying a spatial location within this map.

Similarly, in EXTREME TRAIN RIDE you experience the sounds of ABC heard at any given time as being temporally related to other sounds of ABC not heard at that time. As you listen to ABC, it is as if you formed a mental timeline of its sounds and each new sound were experienced as occupying a temporal location further along this (constantly growing) timeline. Figure 5 below illustrates how your experience of ABC changes as you keep listening to the music.

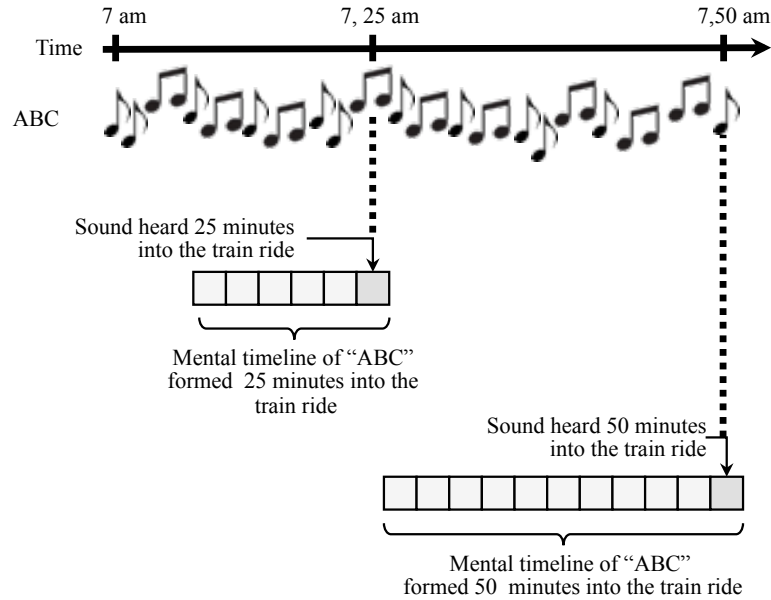


Figure 5. Mental timeline formed while listening to ABC

The timeline serves to capture the temporal relations needed in experiencing ABC *qua* song. For instance, how long ABC is experienced as lasting for at any given time is determined by the size of the timeline formed at that time. Because the timeline you have formed halfway through the train ride has a certain size and because you experience, say, the guitar solo then played as occupying the last bit of this timeline, you experience this solo as closing a 25-minute long segment. If by the end of your trip this timeline is about twice as long as it was when you heard the guitar solo, you would experience the sounds then played as ending a 50-minute long song.<sup>27</sup>

Consider (ii). In ISLAND, as you walk along you do not feel like you are getting closer to, or further away from, any location outside of the island: at the end of your walk, you do not feel like the rocky beach is a mile closer to or a mile further away from

<sup>27</sup> This view remains neutral on what the metric of this timeline is. All that matters for the purposes of our discussion is that the timeline serves to model the temporal features that are relevant for having an experience of ABC *qua* song, such as duration and temporal order.

Cancún or Los Cabos.<sup>28</sup> It is as if you formed a mental map of the island that showed no spatial relations between the island's locations and the locations of the rest of the places you are aware of; it is as if this map were spatially isolated from the map in which you locate the rest of the places. From a phenomenological point of view, the island's locations free-float from locations outside of it.<sup>29</sup>

Similarly, before plugging in your headphones during your extreme train ride, you may experience the train's departure as taking place while your friend's dental procedure is about to start, after your hearty breakfast, and about an hour and a half before your upcoming meeting. As you become absorbed in the music, however, your experiences become less affected by the temporal relations you take to hold between the sounds of ABC and other events you are not currently experiencing. When completely engaged in the music, the sound of a forceful trumpet, for example, is no longer heard as happening as your friend's tooth is being drilled or before your work meeting—you may not even be aware of which day of the week it is!

To further appreciate this, contrast your experiences during EXTREME TRAIN RIDE with the ones you would have during a trip in which you are not at all engaged in the music. In this latter case, your attention would drift away from the music and towards other events you are merely aware of. As a result, the sounds of ABC would be experienced as being temporally related to those other events: they would be heard as, say, taking place after your hearty breakfast (you may regret not having brought the leftovers as snack), as happening while your friend's teeth are being drilled (you might even hear some sounds as those produced by a dentist's tools), or as about half an hour

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<sup>28</sup> As with the case of duration, you do not experience the distance you travelled in miles, even if you express it that way.

<sup>29</sup> This is too strong: you may feel like the island and other places outside of it lie in the same planet.

before your upcoming meeting (you may find yourself wondering whether you will have to rush to be there on time). Figure 6 below illustrates the differences between your experiences during EXTREME TRAIN RIDE and your experiences during a train ride in which you are completely disengaged from the music. The orange, dotted lines represent temporal relations that have effects on your experience.<sup>30</sup>

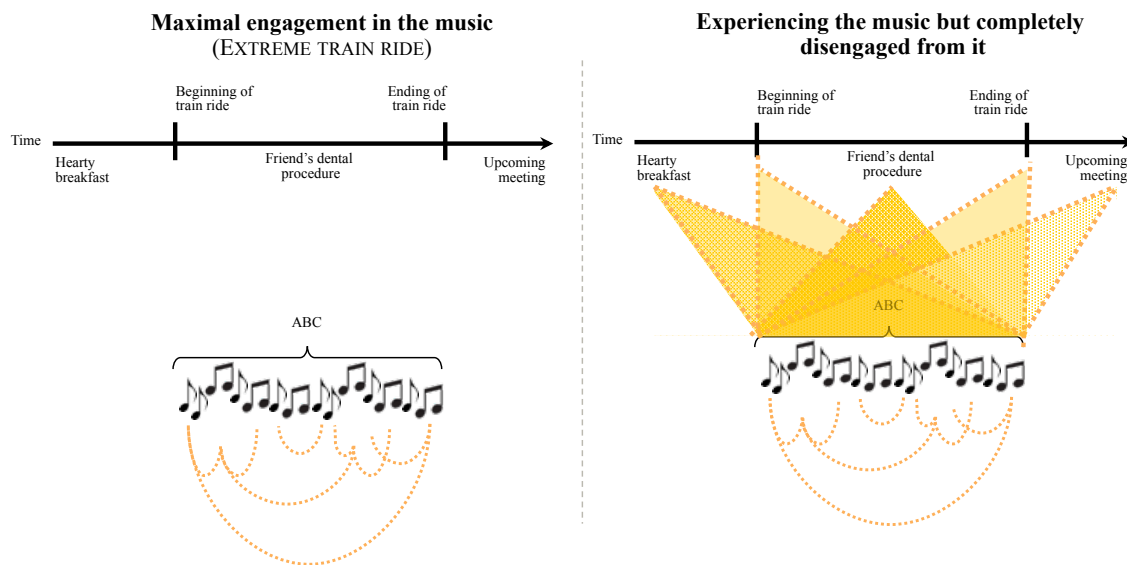


Figure 6. Your experiences while completely engaged in the music (EXTREME TRAIN RIDE) vs. while completely disengaged from it

<sup>30</sup> There is a sense in which ISLAND, on the one hand, and TRAIN RIDE and EXTREME TRAIN RIDE, on the other, are not analogous. The reason why you do not experience the scenes in ISLAND as being temporally related to places outside the island is that *you don't know where you are*. This is not so in TRAIN RIDE or EXTREME TRAIN RIDE (at the end of the paper, however, I consider a case that is more closely analogous to ISLAND in this respect). In these latter cases, as your ride is about to begin you know when you are with respect to events you are not then experiencing. You know, for instance, that it's 7 am, that your 50-minute train ride to work is about to begin, that you just had breakfast, that your friend's dental operation starts in a few minutes, that you have a meeting shortly after arrival, etc. The reason why you fail to experience the music as being temporally related to these other events is that, as your journey proceeds, *you become absorbed in the music*.

Summing up, you experience the sounds of ABC as having various durations and as standing in various temporal relations with respect to each other. Yet, while each new sound is heard as being further and further away from the beginning of the song and correspondingly closer and closer to its end, the sounds are not heard as being any further away from, or any closer to, events that are not part of the music. It is as if the mental timeline you form of ABC while listening to the music were temporally isolated from the mental timeline in which you locate the rest of the events you are not then perceiving but are aware of. From a phenomenological point of view, the duration experienced between any two sounds of ABC free-floats from the temporal location of any other event that is not part of the song.

*Back to TRAIN RIDE*

We can now think of TRAIN RIDE as lying between EXTREME TRAIN RIDE and a case in which you are not at all engaged in the music. Like in EXTREME TRAIN RIDE, most sounds of ABC are experienced as being temporally detached with respect to the timeline in which you locate the rest of the events you are aware of. As in a train ride in which you are not at all engaged in the music, some other sounds are experienced as being temporally attached with respect to this timeline. In this way, the timeline of ABC you form during TRAIN RIDE is only *partially* detached from the timeline in which you locate the train ride and the rest of your daily events.

Before I turn to put these thoughts together to offer a way out of the initial puzzle, let me note the following. I have been talking of your experiences in TRAIN RIDE and EXTREME TRAIN RIDE as if all you perceived were the music. But this need not be so: an experience that is temporally detached from every event other than ABC could be one in



which what you see around, the flavors you taste, the smells you perceive, etc. while listening to the music are integrated with the sounds you hear. You might, for example, see that in jumping from his seat, the boy in front of you lands on the floor precisely when the bass solo begins. Or you might experience the burst of the strawberry flavor coming out from the center of the candy you have been chewing as occurring right when you hear that loud drumbeat. Your experience will be temporally detached from every long-lived event other than ABC so long as you experience your surroundings (the boy's fall, the burst of strawberry flavor, etc.) as being temporally related *solely* to ABC. In this case, you will not, for example, experience the boy's fall or the burst of strawberry flavor as happening *after* your earlier breakfast or *before* your work meeting, or as being part of another long-lived event (such as the train ride) that you take to occur *after* your earlier breakfast and *before* your work meeting.<sup>31</sup> Whatever you perceive should be experienced as being temporally anchored solely to ABC. To simplify the exposition, however, I will continue to assume that all you perceive during TRAIN RIDE and EXTREME TRAIN RIDE are the sounds of the music.

#### **4. Solving the Puzzle**

Consider first the version of the puzzle that EXTREME TRAIN RIDE gives rise to. The puzzle was this. According to EXTREME TRAIN RIDE, you feel like no time has passed during your train ride. According to MUSIC EXPERIENCE, to experience ABC you must experience some time as having passed. But then, if absorption makes you feel like no

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<sup>31</sup> There could be other experiences in which the attachment goes the other way around. You may experience the music as being temporally related to some other event, for example, as being the background to some other activity you are performing. In this case, whether or not a puzzle similar to the one we are discussing here arises will depend, according to this proposal, on whether or not your experience of that other event is temporally attached or detached from the rest of your daily events.

time has passed then it also prevents you from experiencing ABC. It thus looks like the kind of experience involved in EXTREME TRAIN RIDE is self-undermining.

If we assume that every event is experienced as partaking in a unique, all-encompassing timeline, then the above inference is valid: unless you are undergoing a blatantly inconsistent experience—an option that, for the reason offered in the introduction, was set aside—then you cannot experience no time as having passed (EXTREME TRAIN RIDE) while experiencing duration (MUSIC EXPERIENCE). However, if as suggested in the previous section, your experience becomes fragmented into multiple, temporally isolated timelines as you become absorbed in the music, then this assumption is unwarranted and the inference is no longer valid. For you may consistently experience some time as having passed relative to one timeline while experiencing no time as having passed relative to a different timeline. More specifically, you may experience no time as having passed relative to the timeline in which you locate the train ride while experiencing, relative to ABC's timeline, the durations needed to experience a 50-minute piece of music.

Figure 6 below offers a depiction of this solution. Timeline T models the temporal relations that you take to obtain between the various events of your day, while timeline T\* models the temporal relations amongst the sounds of ABC you experience. (Only events that are about an hour long are depicted in the main timeline; the second timeline depicts the temporal relations between the various parts of ABC that you experience).

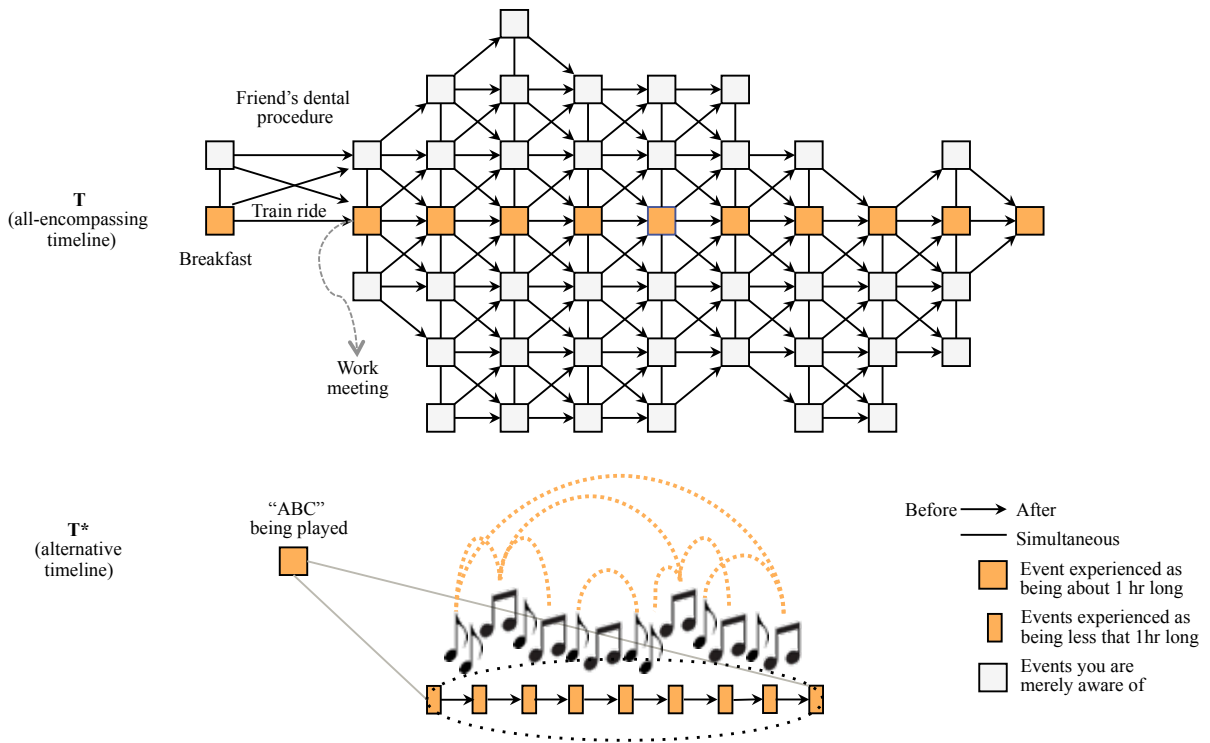


Figure 6. Your experience in EXTREME TRAIN RIDE

Consider timeline T. None of the sounds of ABC are experienced as being part of T—they are not experienced as being simultaneous to, earlier than, or later than any event in T. For this reason, none of the temporal relations that you experience while listening to ABC gets reflected on T. Since in EXTREME TRAIN RIDE the only events you experience as being part of your train ride are the train's departure and its arrival (the rest of the journey you experience the sounds of ABC as in temporal isolation from your train ride and from any other event on timeline T) T exhibits no temporal distance between the train's departure and its arrival. Given that T determines the felt duration of the train ride, you must have felt like it took no time.

Consider now timeline T\*. This timeline reflects the temporal relations you experience between the various sounds of ABC. In particular, the size of this timeline determines that, as you hear the last sounds of ABC, you experience ABC as having

lasted about 50 minutes.<sup>32</sup> Since T\* is detached from T, in experiencing ABC as lasting for 50 minutes you do not also experience the train ride as having taken 50 minutes.

*Back to TRAIN RIDE*

Consider now the version of the puzzle that TRAIN RIDE gives rise to. From TRAIN RIDE and MUSIC EXPERIENCE it was concluded that, contrary to what seems to be the case, absorption ruins music experience. This is perplexing because it entails that by being absorbed in an experience that requires you to experience time (e.g. listening to music) you become bad precisely at experiencing time. Ordinary experience also stands against this claim.

However, if you experience ABC as if it took place in a timeline that is (partially) isolated from the timeline in which you take the train ride and the rest of your daily events to take place, then being bad at experiencing time *relative to this latter timeline* need not imply that your experience of ABC is ruined. For you may be appropriately capturing, relative to ABC's timeline, the temporal relations needed to appreciate ABC *qua* the song it is. But then, the inference from TRAIN RIDE and MUSIC EXPERIENCE to the conclusion that absorption ruins musical experience also depends on assuming that you experience the train ride and the music as taking place in the same timeline. Figure 7 below offers a depiction of the solution to this version of the puzzle.

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<sup>32</sup> One can model the way in which the size of these timelines determines the felt duration of a long-lived in different ways.

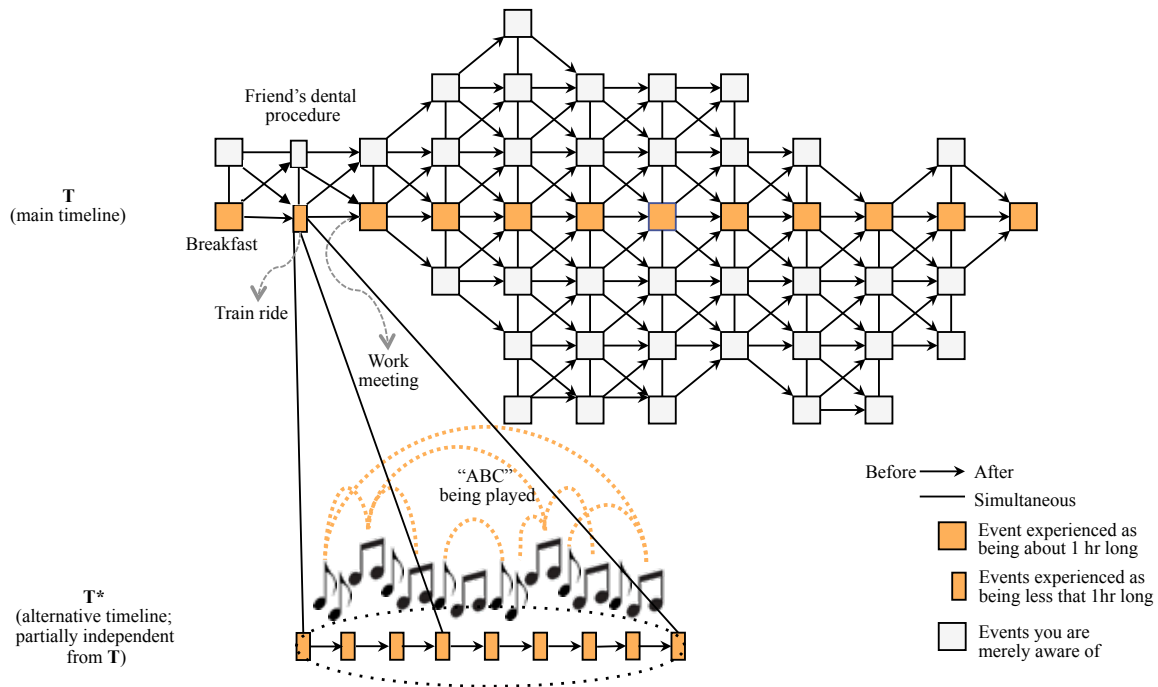


Figure 7. Your experience in TRAIN RIDE

As before, timeline  $T^*$  reflects the temporal relations you experience between the various sounds of ABC: the size of this timeline determines that, as you hear the last sounds of ABC, you experience ABC as having lasted about 50 minutes. Unlike in EXTREME TRAIN RIDE, however, in this case some of the sounds of ABC are experienced as being temporally attached with respect to events that you locate in timeline  $T$ . Because the sounds of ABC that are experienced as being temporally attached with respect to  $T$  add up to determine a separation of 20 minutes between the train's departure and its arrival in timeline  $T$ , you feel like the train ride lasted about 20 minutes. In other words, the bits of timeline  $T^*$  experienced as being temporally attached to  $T$  determine that the trip is experienced as being 20 minutes long. Given that timeline  $T$  reflects your sense of how long the train ride took, you must have felt like 20 minutes passed during your train ride.

Figure 7 also allows us to see why the following line of thought, while tempting, should be resisted. One might have thought that accepting TRAIN RIDE forces us to reject that you experience ABC as lasting 50 minutes. For according to TRAIN RIDE you experience the train ride as lasting 20 minutes and you also take yourself to have heard all of ABC while riding the train (as illustrated in Figure 7, you may even experience the beginning of the song *as happening while the train begins to move* and the song's last sounds *as happening as the train reaches its destination*). But then, unless there is a patent inconsistency in your experience (something that has been ruled out), you could not have experienced ABC as lasting 50 minutes.

The problem with the above reasoning is this. While you may be certain that you heard the whole song during your train ride, that is, you may place full credence in the *belief* that you heard the whole piece of music while riding the train, this is not how you *experience* the piece of music. As illustrated in Figure 7, most sounds of ABC are not experienced as happening while you are riding the train. Rather, they are experienced as being temporally isolated from every event that is not part of the music; they are experienced as being temporally detached from timeline T (this was illustrated in Figure 7 by the absence of lines connecting most bits of the song to bits of T). Because your belief that all of the music was heard during the train ride is true, what is rather revealed by the clash between the content of this belief and the content of your experience is that your experience is illusory. While your experience presents most bits of the song as being temporally isolated from every event that is not part of the music, this is not how things are: every sound of the song is either simultaneous to, earlier than, or later than every bit of the train ride.

The account offered delivers a consistent experience. That is, things *could* be as your experience presents them to be: it could be that ABC lasts 50 minutes and the train ride lasts only 20 minutes. As shown in figure 7, this can happen if most bits of ABC are indeed temporally isolated from everything else, including the train ride. This could be so even if ABC starts when the train departs and ends when the train arrives to your destination, for the middle part of the song would be, for the most part, what is in temporal isolation from the train ride.<sup>33</sup> If things were so, we would inhabit a world with two timelines—T and T\*—that connect at the extremes and at a few intermediate points but that are otherwise in temporal isolation from one another.<sup>34</sup> In this case, Figure 7 would depict not only the content of your experience but also the way the world is.

In this way, the puzzle can be solved. We can accept EXTREME TRAIN RIDE and MUSIC EXPERIENCE while rejecting that ABC is self-undermining. We can also accept TRAIN RIDE and MUSIC EXPERIENCE while rejecting that being absorbed in listening to a piece of music ruins your experience of it.

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<sup>33</sup> Compare this case with an instance of the Müller-Lyer illusion in which you yourself drew the lines. In this case, you may be certain that both lines are equidistance. Yet, one of them looks longer than the other. As in TRAIN RIDE, this case involves a clash between the content of your belief (that the lines are equidistance) and the content of your experience (that they are not equidistance). Yet, your visual experience is not inconsistent (at least as it has been described, perhaps more things are going on in this case): there is no inconsistency in taking two separate lines as having distinct lengths—this is a way in which the world could be. Your experience would be inconsistent if it presented you the same line as simultaneously having two incompatible lengths (this would be closer to the waterfall illusion). Similarly, while your experience in TRAIN RIDE is illusory, it is not inconsistent: your experience presents the music as in (partial) temporal isolation from the train ride, and this is a way in which the world could be. There are, however, important disanalogies between the two cases. For one thing, whereas in the Müller-Lyer case you do not misperceive the number of lines you are looking at, according to this model, in TRAIN RIDE you do misperceive the number of timelines involved in the situation. Furthermore, in the Müller-Lyer case, the full length of the lines fall within the spatial area covered by your visual field. Assuming that something like the specious present is the temporal analogue to your spatial field, this is not so in TRAIN RIDE: the full duration of ABC falls well outside of what most people take the specious present to last (i.e. no more than a couple of seconds). For this and other reasons, I don't think the cases should be treated in the same way.

<sup>34</sup> This, of course, requires assuming that “being temporally related to” is an intransitive relation, so that A could be temporally related to B, B could be temporally related to C, while A and C could be temporally unrelated.

## 5. Absorption

The previous solution assumes that when absorbed in the music, the sounds of ABC are experienced as being temporally detached from events that are not part of ABC, fragmenting thus your experience into multiple timelines.<sup>35</sup> Could becoming absorbed in the music affect your experience in this way? What kind of mechanism could underlie such effect? Let me turn to briefly consider a phenomenon known as feature-based attention in order to suggest an answer to these questions.

### *Feature-based attention*

Research on attention—mostly carried out in vision—has revealed that we are capable of focusing our attention not only on objects and on localized spatial regions, but also on specific *features* of the scene we are looking at such as color, direction of motion, and orientation. As with spatial- and object-directed attention, the effect of feature-based attention is to enhance the strength of the feature attended to throughout the visual field. This usually comes at the expense of weakening the strength of other less relevant features. This type of attention becomes relevant in searching tasks.<sup>36</sup>

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<sup>35</sup> As discussed earlier, according to some attentional models discussed within the psychological literature, your experience of duration increases as you process more temporal information (see footnote 23). As explained in the introduction, these models could not explain why, while listening to the music, and thus, while processing more temporal information (MUSIC EXPERIENCE), you feel like *little* time has passed (TRAIN RIDE). In the model here proposed, attention also plays an important role. In this model, however, attention can be divided between different *temporal* stimuli, such as the song and other daily events (i.e. the train ride, an earlier breakfast, an upcoming meeting, etc.). Moreover, according to this model, focusing your attention on the music nullifies the effect on your experience of the temporal relations that you take to hold between the music and all other events, detaching thus your experience of the music from the timeline in which you locate the rest of the events. As explained in section 4, in this way, in attending to the music you can appreciate the temporal relations of its various parts (from the detached timeline that ABC forms) while feeling like *little* time has passed relative to the timeline in which you locate the rest of the events.

<sup>36</sup> See, for instance (Treue S. and Martínez-Trujillo, J.C., 2007), (Maunsell J. H. R. and Treue S., 2006), (Treue, S. and Katzner, S, 2007) and (Freiwald, W. A., 2007).



Suppose you are looking for your blue t-shirt in your messy room. By attending to blueness, those visual components within your visual field that are blue will be enhanced, while the strength of the signals of other features—perhaps other colors, shapes or orientations—will be weakened. Put differently, you can use a concept such as blueness to attend and doing so has as effect magnifying the corresponding feature across your visual field—in this case, whatever is blue—while weakening other features that are irrelevant for the task at hand.

Suppose now that by becoming absorbed in the music you attend to the temporal relations that hold between the different sounds of ABC. That is, you use the concept *temporal-relations-amongst-the-sounds-of-ABC* to attend. The effect of this would be the enhancement of these temporal relations at the expense of weakening other features that are irrelevant for this—perhaps the temporal relations that the sounds of ABC hold to other unrelated events, such as your friend’s dental operation or you earlier breakfast. If this were so, feature-based attention could be one of the mechanisms that give rise to the fragmentation of your temporal experience described in the previous section and, in this way, to the phenomenon that gave rise to our puzzle.<sup>37</sup>

Let me end by suggesting how a similar explanation could account for one more interesting phenomenon: if you *think* about time, you *feel* like time runs slower.

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<sup>37</sup> One may think that even if this model can account for cases like TRAIN RIDE, there are other cases that are not so easily explained. One might think, for instance, that when absorbed in experiencing pain, time seems to take longer. There are two things I would like to say about these cases. First, it is not at all clear that time seems to take longer during a painful experience. Experiments such as (Thorn and Lee Hansell, 1993) and (Isler, Solomon, Spielman, and Wittleib-Veerpport, 1987) suggest that, while in pain, subjects judge the duration of a time interval to be shorter than subjects in the same condition but undergoing no pain. Second, it is likely that in such cases factors other than attention (emotions, for instance) are also playing a relevant role in accounting for the subject’s temporal experience. As already noted, I have not attempted here to capture the effects of all such factors. Most likely, the model that accounts for every temporal experience is a non-monolithic one. It seems best to attempt to discern its many pieces one by one.

### *Thinking about time*

It is well known that thinking about time makes you feel as if more of it passes. If, for instance, while awaiting for a bus you keep looking at your watch—or if you have no watch you simply keep wondering what time it is—you will feel like the bus is taking longer to arrive than what you would have felt if, instead, you had spent those five minutes reading over the newspaper. How could merely *thinking* about time have such effects on your experience?

To see this, consider again HOTEL ROOM 1 & 2. Before you figure out where you are, the hotel room is presented as being spatially detached from any other locations. Once you've figured out where you are, the room is presented as being spatially related to other locations you are aware of (see figure 2 above). We can now think of the difference between these two experiences as an effect of feature-based attention. While looking at the hotel room before *wondering* where you are, the spatial relations that you take to hold between the room and places outside of it (e.g. downtown Boston or the street below) have either a very weak or a null effect on your experience. *As you start thinking of the spatial relations held between your room and places outside of it* the experiential import of these relations is enhanced. The room would be experienced differently before and after you wonder where it is because using the concept spatial-location-with-respect-to-my-surroundings to attend would enhance the effect on your experience of the spatial relations that hold between the scene you see and other locations that are out of sight (i.e. the street below, downtown Boston, etc.). In this way, feature-based attention could also serve to account for why, after you start wondering where you are, your experience of the

room goes from being spatially detached with respect to locations outside of the room to being spatially attached with respect to these locations.

On this view, then, whether a scene is experienced as being spatially attached or detached would be an interest-relative matter that can be driven by thought. When I am interested in finding my blue t-shirt, blueness becomes relevant and, through the mechanism underlying feature-based attention, it is enhanced at the expense of other features. Similarly, when I am interested on the spatial location of the scene I see with respect to locations in my surroundings that are out of my perceptual reach, thinking about where I am relative to those locations could activate the mechanism underlying feature-based attention. This would enhance the effect that the spatial relations holding between the scene I see and locations I am merely aware of have on my experience.

The same can be said of the difference between your experiences when waiting for the bus while reading over the newspaper and waiting for the bus while you keep wondering how much longer the bus will take. While absorbed in reading the newspaper, the temporal relations that you experience between, say, the words you read and other unrelated events you do not then perceive (e.g. your later lunch or your earlier workout) are either too weak to have an important effect on your experience or completely absent. As you wonder about the time—as you wonder how the event you are currently experiencing is temporally related to events you are not then perceiving—these temporal relations would become salient and their import on your experience would be enhanced. Enhancing these temporal relations is, according to this model, tantamount to attaching your experiences to the timeline where you locate the rest of the events. Since each attached experience adds temporal length to this timeline, the more you think about time,

the longer this timeline will become. In this way, the model can explain why when you think about time, more of it seems to have passed: thinking about time would have as effect unifying the timeline of the event you currently experience with the timeline of other events you are merely aware of. In other words, thinking about time would have the reverse effect of becoming absorbed in the music.

### ***Coda***

Imagine the following creature. Like us, she is able to experience the temporal features of ordinary events such as dinners, movie screenings, and talks as she lives through them. She can, for example, experience her dinner as lasting for about two hours; she can experience the car explosion in the movie she's watching as happening after the romantic scene; if I were reading this paper out loud to her, the sounds of my voice as I read this bit would feel like coming after those produced when I read the line before this. In this sense, the creature can experience time: she can experience the temporal features of the event she lives through. Let me express this by saying that the creature is capable of experiencing *the internal time* of the event she is experiencing, keeping in mind that the type of events we are considering are long-lived events such as dinners, movie screenings, and talks.

There is another sense, however, in which this creature is not able to experience time. She cannot experience the temporal relations that hold between *different* long-lived events: the event she is currently experiencing and other events she is merely aware of. For instance, she is unable to experience her breakfast *as happening after her morning workout*; her morning workout *as happening before her commute to work*; her commute

to work as happening *while her friend is having an operation*.<sup>38</sup> That is, despite being able to experience the temporal features of each of these individual long-lived events as she lives them through, for this creature, every such event is experienced as if the entire world consisted *just* of that single event.<sup>39</sup>

As we are imagining it, the creature's experience is quite extreme. We should not, for instance, imagine her experiencing of, say, a meeting as taking place within a world that is very much like ours except that, apart from the meeting, it is quiet and uneventful. For this would still be to imagine her experience of the meeting as being temporally related to other quiet and uneventful times in the world. Rather, the meeting is presented to her as if it were all there ever is to the world. According to her experience, the meeting defines every temporal horizon of the world: there is no sense to be made of anything else as being earlier, later, or simultaneous to her meeting.<sup>40</sup>

It is not even enough to say that, for this creature, there is *nowhen* else, outside of this meeting, for another event to occur. For this suggests that the time of the meeting is all the time there is. But this is still compatible with feeling like other events are happening *at the very time at which the meeting takes place*. That is, this would still be compatible with experiencing her meeting as being simultaneous to some other event she is not then experiencing. It is better to say that for this creature *only* parts of the event she

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<sup>38</sup> You might worry that the boundaries of events are not sharp or that what counts as an event is interest-relative. None of this matter for the purposes of imagining this creature: we can think of this creature as deploying psychological principles to determine what counts as the boundaries of a long-lived event.

<sup>39</sup> The creature might experience one more event besides, say, her meeting: she might also be experiencing her very experiencing of the meeting. Though this type of self-awareness may not be irrelevant to our experience of time, for the purposes of our discussion, I am setting it aside.

<sup>40</sup> If the events the creature lives through are like meetings, her experiences would be disconcerting. If, for instance, a work meeting is experienced as the only event there is, the creature may be left wondering: where did the people come from? And, why would they be planning all these other events, given that the meeting is the only event there is to the world? Her experience would be less disconcerting if the event experienced is, say, a breath-taking natural scene or an astonishing art performance. It might make more sense to experience these as being all there is to the world. Or perhaps the lesson is that this creature experiences her meetings in the way in which you and I experience a natural scene or an art performance.

experiences—the beginning of the meeting, a funny joke in the middle, the wrapping up—can be experienced as being *earlier than*, *later than*, and *simultaneous to* other parts of the meeting. No other event can be experienced as standing in these relations to her meeting.<sup>41</sup> When the creature thinks of any other event, she does not think of it as being part of the world she is experiencing, but as forming its own, isolated temporal reality. The way in which this creature thinks of another event is thus akin to the way in which a (committed) modal realist thinks of an event that takes place in a merely possible world: as alien to the temporal order and metric of the event she is currently experiencing. When the event she is experiencing ends and she begins to experience a new event, her sense of time restarts: she now takes the whole world to be exhausted by the new event she is living through.<sup>42</sup>

There is thus a clear sense in which the creature's temporal experience is limited. Let me express this sense by saying that the creature is incapable of experiencing *external time*, that is, this creature is unable to experience the event she is living through as being temporally related to other events she is merely aware of. (It might help to think of this creature as a poorly designed conscious robot. The engineers were good enough to provide her with some consciousness of time. Yet, there was still some work left to be done).

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<sup>41</sup> One might even wonder if this experience should count as an experience of time.

<sup>42</sup> We can also think of her experiences of time as akin our experiences pains. Just as I do not experience my headache (or any other mental state I may experience) as being subjectively connected to the mental states of other subjects (leave aside here the case of conjoined twins who might experience some of their conscious states as being shared by their twins) and, in this sense, I do not experience my headache as part of a larger, all-encompassing mind of which we all partake, this creature doesn't experience the time of her meeting as being temporally connected to the time of any other event. She does not experience her meeting as part of a larger, all-encompassing timeline. Whereas I experience my headache as being shared by no other subject, she experiences the time of her meeting as being shared by no other event.

Unlike this creature, we experience the events we live through as participating in an overarching temporal order, one in which events we are not currently experiencing also partake. It is common, for instance, to experience the events you go through as happening while other events are going on: you might experience your time in the office as happening while your child is at school; or your cooking as taking place while your friend walks to your place; if your flight is delayed, you might experience your trip as happening while the first talk of the conference you are attending to has already started. We also ordinarily experience events as happening before or after other events. A breakfast may be experienced as happening before your commute to work; the commute to work may be experienced as happening after your early workout; your meeting might be experienced as taking place right after your commute. There is thus more to our temporal experience than just the internal time of the individual events we live through. That much the creature and we share. Unlike the creature, we also experience the events we live through as partaking in external time.

But things need not always be so. It may be that under certain circumstances—as in cases of absorption—this creature’s experiences serve as a better model of our own temporal phenomenology. That might be the main lesson to take away from this paper. \*\*

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\* [Here and throughout the text, acknowledgments and self-identifying references have been removed for blind review.]

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