THERE IS NO LOOP IN *LOOPER*

Many viewers of time travel movies and readers of time travel fiction see loops where there are none. The loops they think are there are persistent cognitive illusions. In what follows I explain why they are illusions and how the illusion arises.

Of course, there often are loops in time travel movies and fiction. In *Back to the Future I*, Marty knows how to play the song "Johnny B. Goode" at the high school dance in 1955 because he had heard Chuck Berry recordings of it in the 1980s. Chuck Berry knows how to play it (according to the movie) because his cousin Marvin held up a phone to Marty's playing of it in 1955—"Chuck, here's the new sound you're looking for." This is an information loop. In *Somewhere in Time,* the Christopher Reeve character is given a watch by an old woman. Later he travels back in time to meet a young woman whose photograph has captivated him and gives her the watch. She ages into the old woman who eventually gives the watch to him. This is an object loop. In Robert Heinlein's "By His Bootstraps," Bob1 falls into the tunnel to the future only because he is punched in by his older time-traveling self, Bob3, and Bob3 punches Bob1 in only because Bob1 falls into the tunnel and makes the round trip. This is a causal loop. For a useful classification of various loops in time travel stories, see Hanley's "No End in Sight." (In Hanley's scheme, object loops and information loops are causal loops, but not all causal loops are object loops or information loops.) Loops sometimes happen in time travel stories, but there is no reason why loops of any sort must occur in backwards time travel. The perceived loops I am about to describe are not loops at all.

In *Twelve Monkeys*, a deadly virus decimates the earth's population in 1996 and forces the survivors to move underground. James Cole, played by Bruce Willis, is sent back to 1996 by the scientists of the underground civilization in 2035 to capture specimens of the virus. Though not charged with trying to prevent the virus outbreak—the undergrounders believe you cannot change the past—Cole happens to be at the Philadelphia airport as the terrorist who spread the virus around the world heads for the boarding gate with his deadly vials. In a moment of panic, Cole runs after the man and tries to shoot him down. As he aims his gun, he is himself shot down and killed by the Philadelphia police. The entire scene is witnessed through the haunting eyes of his eight-year old self, who had been brought by his parents that day to the airport. Young Cole grows older, survives the plague that soon envelops the earth, goes underground with the other survivors, and is eventually sent back on the mission that ends in his death.

Is there a loop in Cole's life, as many viewers of the film believe? The appearance of one is created by the following sequence: Cole dies; then he lives on as a boy; then he goes underground; then he is sent back and pursues the Twelve Monkeys; then he dies; then he lives on as a boy, and so on. It appears that every time Cole dies, he lives on, only to die again. He suffers an endless series of deaths. At any rate, a death of Cole is followed by a death of Cole, even if it is the same death.

We need to distinguish two possible loop scenarios. As I initially describe things in this paragraph, there is a repeating cycle in which Cole dies many times. As I characterize things in the final sentence, there is a static loop in which Cole's death is followed by other events which are themselves followed by Cole's death—the very same death, not another one. The "closed time-like curves" permitted by Einstein's general theory of relativity are loops of the second sort —they are loops in which (owing to the transitivity of 'followed by') an event is literally followed by itself. Hanley notes that it is a fallacy to think that in loops you always go "round and round," for in static loops, each event happens only once. I am maintaining here that there are no loops of either sort (static or repeating) in the lives of the movie protagonists I discuss.

Before I explain what is wrong with thinking there is a loop in Cole's life, let's look at how radical its consequences would be (in a way not generally noticed). If Cole is shot many times, the cops shoot him many times, even though they are not themselves time travelers. If the cops shoot him many times, they go home and tell their wives about it many times. If while waiting for their husbands to return, the wives are watching a live broadcast of a soccer game in Spain, that game happens many times. And so it goes: if Cole is in a loop, the whole world is in a loop. (If it is a static loop, Cole's death is followed by Cole's death, the soccer game is followed by that very game, and so on.)

But Cole dies only once, and his death is not followed by his death. To see why, we must take note of a distinction that is required if we are to make sense of time travel in the first place: David Lewis's distinction between external time and personal time. External time is ordinary time, in which events are ordered by relations of earlier and later. We can represent it by a line on the blackboard with points further to the right indicating events later in external time. In personal time, the same events may be ordered (and their durations measured) in a different way, going perhaps by the movements of a person's own watch, the growth of his hair, or the accumulation of his memories. A time traveler is someone whose personal time is out of sync with external time. If he travels to the future, he may traverse centuries of external time while his watch advances only a few hours and his beard grows only half a millimeter. If he travels to the past, his personal time will run in a direction opposite to that of external time. Stages of him earlier than his departure stage in external time will be later than his departure stage in personal time. His departure stage in 2035 may contain a just-eaten bagel in his stomach and the mission instructions still sounding in his ears; the stage of him that arrives in 1996 will contain a semi-digested bagel and memories of the instructions he heard. We need a distinction like this to resolve what would otherwise be contradictions: "five minutes from now, …, the traveler will be 100 years from now" (cf. Williams 1951, 463)—five minutes of personal time, 100 years of external time.

Back to *Twelve Monkeys*. Cole's life forms a loop in the way viewers suppose only if a death of Cole comes after a death of Cole. If a death of Cole happens after a death of Cole, it must do so either in external time or personal time, but in fact it does so in neither. Not in external time, for if you draw a diagram of Cole's life with externally later events further to the right, you will find no death of Cole to the right of a death of Cole. Not in personal time, for no stages of Cole are personally later than his death stage. No stages of Cole contain memories of his dying. His

boyhood and subsequent stages contain memories of seeing someone get shot in the airport, but these are not memories of getting shot.

To see what is really going on and how it gives rise to the illusion of a loop, consider in what sense the various occurrences of the word *then* must be understood in the sequence described five paragraphs back. "Cole dies; then he lives on as a boy." That is true in external time, but not in personal time. His boyhood stages contain memories of seeing someone get shot, but none of getting shot, as just noted. His boyhood and growing up stages are in no way a causal continuation of his terminal stages as a 47-year old man, and in no way does consciousness flow from his older to his younger self. "He lives on as a boy; then he goes underground." That is true in both external time and personal time. "He is sent back; then he pursues the Twelve Monkeys and dies." That is true in personal time, but not in external time. In external time, his death in Philadelphia in 1996 occurs before his being sent back in 2035, not after, as the dates themselves indicate. It is only in his personal time that his final actions in Philadelphia come after the launch —while these things are happening, he remembers his life in the underground cell and the instructions he received at the launch.

In short, we can make a loop out of the events in Cole's life (whether of the static or the repeating variety) only by equivocating with the word *then*: by taking it to express external time order in some places and personal time order in others. If we stick to one meaning of our temporal terms, there is no loop.

I do not say there are no loops of any kind in *Twelve Monkeys*. There is arguably an information loop in which Kathryn's recorded message causes Cole to go on the trail of the Monkeys and his going on the trail eventually causes her to leave the message. There may also be causal loops in which events in the life of young Cole are both causes and effects of events in the life of middle-aged Cole. I do maintain that Cole's life does not form a loop in which he lives after he dies and dies after he lives.

Crude though this loop fallacy may seem once pointed out, it is extraordinarily seductive. It causes the writers of the movie *Looper* to title their movie as they do even though in reality it contains no loop. In this movie, gangsters of the year 2074 dispose of their victims by sending them back thirty years to be shot on arrival by assassins they have recruited from that era. That way, there are no bodies in 2074 to implicate them in the crime. The assassins are paid handsomely for their work, but must agree to be sent back themselves and get executed when they reach age 60 (ironically, at the hands of their own younger selves). Thus the life of a typical assassin looks like Figure 1.

Figure 1: 60-year-old assassin executed upon arrival.

The writers (as well as the characters and the majority of viewers) believe that such a diagram portrays a loop; hence the assassins are known as "loopers," and their killing of their older selves is called "closing the loop."

But there is no loop. To see this, imagine another time travel scenario in which a traveler goes back, visits an earlier stage of himself (perhaps shaking the hand of his 18-year old self on his graduation day), then returns to the time from which he has come and goes on with life normally. This scenario may be depicted as follows:

Figure 2: A traveler goes to his past and then heads back to the future.
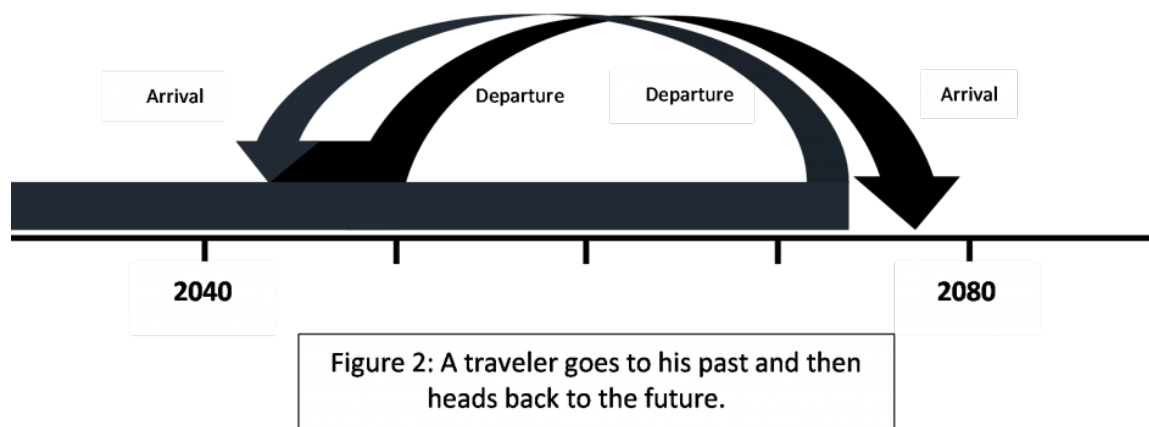
No loop there. The traveler simply makes a trip to his own past, returns, and then lives on in sync with external time.

Now let's make one more change. Just as he is set to return to the future from his visit to the past, the traveler abruptly dies—not necessarily because anyone kills him; his existence simply comes to an end. The diagram looks like this:

Figure 3: A traveler travels to his past, dying upon arrival.
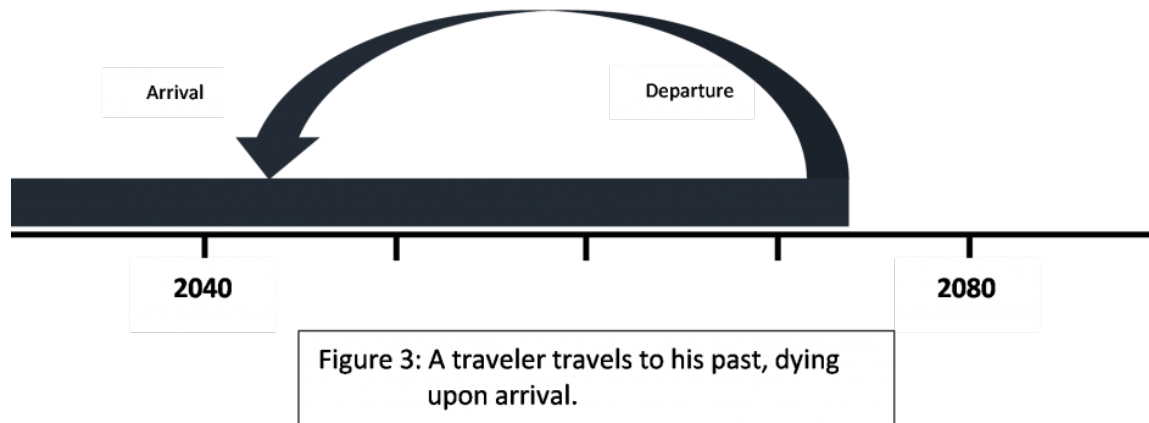
Note two things: Figure 3 has the same structure as Figure 1, and we arrived at it just by erasing some parts of Figure 2. That gives me everything I need for my argument. There is no loop in Figure 2; we can get from Figure 2 to Figure 3 or Figure 1 simply by erasure; and you cannot transform a nonloop into a loop merely by erasure. It follows that Figure 1 does not depict a loop.[i] There is no loop in *Looper*..

References

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Williams, Donald. "The Myth of Passage." *Journal of Philosophy* 48 (1951): 457-72.

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[i] In some time travel stories and in some time travel theory, it is posited that every arrival of a time traveler in the past starts a new branch of history, rather than continuing with the old. Some viewers of *Looper* take it to involve such branchings, but I do not assume them here. If an old assassin's arrival started a new branch, there would not even be anything that *looked* like a loop.